

Radio Communication

March 1988



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E & O E

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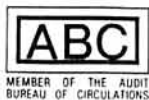
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FRONT COVER

An RSGB stand at Radiolympia in the 'thirties



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Technical articles on subjects of amateur interest are always welcome and should be sent to: The Editor, *Radio Communication*, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

All articles received are reviewed for technical merit by the RSGB Technical & Publications Committee, or an acknowledged expert on the subject, before acceptance. Payment at high competitive rates will be made for all articles published.

A contribution will only be considered for publication on the understanding that the person submitting it is the original author and owner of the whole copyright, and that on acceptance for publication such copyright will become the property of the RSGB in consideration of the above-mentioned payment by the RSGB to the contributor.

The editor will be pleased to send intending authors a manuscript preparation guide and to give any other advice and assistance requested.

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GREAT BRITAIN 1988

The R-5000 from Kenwood



The R5000 is a new general coverage receiver. It offers the dedicated short wave listener and radio amateur a receiver that will match the performance of the best transceivers available today.

The R5000's frequency range is continuous from 100 kHz to 30 MHz and its modes of operation are USB, LSB, CW, AM, FM and FSK. An optional VHF converter (VC20) extends the frequency range to include 108 to 174 MHz.

The R5000 uses 2SK 125 junction-type FETs in the high sensitivity direct balanced first mixer resulting in outstanding two signal characteristics and a substantially improved noise floor level.

Operating from either 12 V DC or 240 V AC the receiver can be used both in the home or whilst out in car, caravan or boat.

The receiver has two rates of tuning for each mode selected by a front panel switch. The frequency increments for SSB/CW/FSK are 10 Hz and 100 Hz, for AM 100 Hz and 1 kHz and for FM 2.5 kHz and 5 kHz.

Both low (50 ohms) and high (500 ohms) aerial connections are provided on the rear panel of the R5000. The required aerial can be selected by means of a front panel switch. Information on which aerial to be used with a stored frequency can also be held in memory.

The R5000 has 100 memory channels which store frequency, mode and which of the two aerial connections has been selected. Information is easily transferred from one VFO to the

other, from memory to VFO and in order to quickly access your favourite station, from VFO to any of the memories. Both memory scan and frequency scan (between frequencies in memories 8 and 9) are included in the receiver. Halt on an occupied channel whilst scanning can either be timed or until the signal drops. The entire one hundred memories can also be quickly scrolled to check the data held and to find the location of an empty channel.

To enhance reception, IF shift and a tunable notch filter are part of the R5000 receiver. Filter selection according to mode is automatic when the front panel selectivity switch is set to AUTO. This selection can, of course, be overridden. Additionally, the introduction of optional SSB and CW filters (YK88SN for SSB and either YK88C or YK88CN for CW) will improve the already excellent signal to noise ratio and selectivity. The optional YK88A-1 AM filter will improve the shape factor and enhance reception even further.

The R5000 general coverage receiver also has keyboard frequency entry, dual mode noise blanker, two 24 hour clocks with timer, option VS1 voice synthesizer and CW tone mode indication for the blind operator, a large 100 mm diameter top mounted speaker, switchable AGC (fast or slow), RF attenuation (10, 20 or 30 dB steps) and a F.LOCK switch which protects against frequency shift if the VFO knob is accidentally moved.

R5000 General Coverage Receiver £895.00 (carr. £7.00)

All prices subject to confirmation

LOWE ELECTRONICS LTD.

Chesterfield Road, Matlock, Derbyshire DE4 5LE
Telephone 0629 580800 (4 lines)



send £1 for complete mail order catalogue.

station accessories

TL-922 HF amateur band linear amplifier

The TL-922 is a class AB2 grounded grid linear amplifier using two high performance EIMAC 3-500Z tubes. It covers 160 to 10 metres for SSB, CW and RTTY modes of operation. Engineering perfection, those who have seen a TL-922 will know what I mean. It is one of the few items of amateur radio equipment which is truly hand built by a specialist engineer.



TL-922 inc tubes... £1495.00 inc VAT, carriage £8.00

SM-220 station monitor

Based on a wide frequency range oscilloscope, the SM-220 station monitor features in combination with a built-in two-tone generator, a wide variety of waveform observing capabilities. The SM-220 aids efficient station operation as it monitors transmitted waveforms and it also serves as a sensitive wide frequency range oscilloscope for various adjustments and experiments. When fitted with the optional BS-8 panoramic display and connected to one of the following transceivers (TS-940, TS-830, TS-180, TS-820 series) signal conditions in the vicinity of the receive frequency can be seen over a 40 or 200kHz range.



SM-220...£343.36 inc VAT, carriage £8.00
BS-8...£77.00 inc VAT, carriage £1.50



TR-751E

Amazing - we haven't mentioned Kenwood's most popular transceiver for about a year. Maybe it's because it sells so well on its reputation, but that's no reason for keeping it off the pages of RadCom.

What is Kenwood's most popular transceiver? It's the TR-751E (fanfare of muted trumpets). The TR-751E is THE definitive 2 metre multimode, and carries on the tradition started by the TR-9000 many years ago and maintained by the TR-9130.

If you want a rig that does it all, the TR-751E is it. Full 2 metre coverage, 25 watts, super receiver, use as a mobile or base station, it's all there. I'll make my usual comment that in order to appreciate all it can do, you should see a fully descriptive brochure, and that's available for the cost of a first class stamp. Better still, if you send us £1, we will return the full Kenwood colour catalogue together with all sorts of other useful reading.

Finally, for those who actually read the advertising, we have a new pair of micro handheld transceivers from Kenwood. Just ask.

TR-751E...£599.00 inc VAT, carriage £8.00

send for the
KENWOOD
detailed leaflet

amateur band plus general coverage transceivers

TS-940S HF transceiver with general coverage receiver

Top of the range, the TS-940S has every operating feature that the discerning HF operator needs. Amateur bands from 160 to 10 metres plus a general coverage receiver tuning from 150 kHz to 30 MHz. Modes of operation are USB, LSB, CS, AM, FSK, and FM. Forty memory channels, each effectively separate VFO and easy keyboard frequency entry make operation and ownership of the TS-940S a pleasure.



TS-940S...£1995.00 inc VAT, carriage £8.00

TS-930S HF transceiver with general coverage receiver

Much has been said and written about the TS-930S and it now has a place high in the affection of radio amateurs. Modes of operation are USB, LSB, CW, AM and FSK. Providing full coverage of the amateur bands from 160 to 10 metres and including a general coverage receiver tuning from 150 kHz to 30 MHz, the KENWOOD TS-930S is the ideal rig for today's crowded bands.



TS-930S...£1695.00 inc VAT, carriage £8.00

TS-440S HF transceiver with general coverage receiver

A step forward in compact HF equipment, the TS-440S covers the amateur bands from 160 to 10 metres and is also a general coverage receiver tuning from 100 kHz to 30 MHz. It has keyboard frequency entry, full and semi break-in on CW, one hundred memories and provision for fitting an internal ATU. Modes of operation are USB, LSB, AM, FM and AFSK.



TS-440S...£1138.81 inc VAT, carriage £8.00

TS-140S HF amateur bands transceiver

Kenwood common sense. The TS-140S shows the way to go in balancing performance, operating features, and ease of use; all at an attractive price. All mode amateur band transmit with an excellent general coverage receiver. Full break in CW is provided for the real operators, but so is FM for idle chatting on ten metres (although why one would use FM in preference to SSB or CW, I cannot imagine). Every TS-140S we can obtain is instantly sold. Ask around and you will find out why.

TS-140S...£862.00 (carr £8)



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Telephone 0629 580800 (4 lines)



HF 125

Why did we design and produce the HF 125 receiver? Simply to provide the keen short wave listener with a receiver which offered not only all the facilities he or she needed in an HF receiver, but to give at the same time a level of performance which would cope easily with HF conditions likely to be encountered in Europe.

You all know the problems, high power broadcast stations pounding in at night, blotting out the weak signals you wanted to hear – and many of the unwanted signals were generated in your receiver itself. That we succeeded in designing a receiver which could solve the listening difficulties is obvious from comments from reviewers, but we also did it at an attractive price.

The HF 125 performance ranks equal to or better than imported receivers at twice its price, and its success stretches around the world.

So what did the reviewers say. I'll give you a few comments, but for the full story why not send a stamped addressed envelope marked "HF 125" and we will return a fully descriptive brochure with all the review comments included.

"I tuned straight to the 40 metre amateur band to see how it stood up to the battering from high powered propaganda broadcasters when attempting to resolve relatively weak amateurs striving to get contacts. The simple answer was, no problem." Chris Lorek.

"After an hour, drift was less than 50Hz in each instance. This is comparable with receivers in much higher price classes." World Radio and TV Handbook.

"I have no doubt that the Lowe HF 125 represents extremely good value for money, and the performance far exceeds so much of its competition, including some receivers costing rather more." Angus McKenzie.

"It's refreshing to find a receiver that does exactly what it claims." World Radio and TV Handbook.

The HF125 costs £375 including VAT. Need I say more?

packet radio from KANTRONICS

When I first heard of packet radio, I said "What?", and that is the reaction of many radio amateurs. However, I never expected it to be so much fun, and judging by the demand and the queue to get at our demonstration station here at Matlock, a lot of other people are also finding it truly fascinating.

There are several companies offering ready made packet systems, and the descriptions are usually full of terms you don't understand (including some of our own ads in the past). What for example is "enhanced generic command structure"? Sounds very much like something taught at Sandhurst or West Point. From the equipment available, we chose to represent Kantronics, because their units are sheer delight to see, to use, and to enjoy. For full information on this most interesting aspect of our hobby, just send a couple of first class stamps and ask for "Kantronics".

Prices range from £159 to £298, and I know I haven't told you what packet radio will do – the experts among you already know; if you are like me, a novice, why not send for the info...



DAIWA meters.

CN410M... 3.5 to 150 MHz, forward 15/150 W, reflected 5/50 W, SO239 connectors... £61.72 inc vat, carriage £1.50.

CN460M... 140 to 450 MHz, forward 15/150 W, reflected 5/50 W, SO239 connectors... £65.40 inc vat, carriage £1.50.

NS448 with remote head... 900 to 1300 MHz, forward 5/60 W, reflected 1.6/6.6 W, N type connections... £86.60 inc vat, carriage £2.50.

NS660P with switchable meter reading (average, normal PEP and hold PEP) and provision for optional remote head (U66V), 1.8 to 150 MHz, forward 15/150/1500 W, SO239 connectors... £115.00 inc vat, carriage £2.50.

U66V remote head, 140/525 MHz, max 300 W, N type connectors... £55.27 inc vat, carriage £1.50.

SC20 extension cable for U66V, approx 20 metres long... £29.21 inc VAT, carriage £1.50.

CN410M

NS660P

NS448

CN460M

LOWE SHOPS

Our Head Office is at Matlock, but we have conveniently placed branches around the country. Each branch is run by a manager who is an active radio amateur and also keen to help you. He normally stocks everything in our extensive range and can demonstrate all major items of radio equipment to you. Note though that all mail orders must be sent to Head Office at Matlock.

In Glasgow, at 4/5 Queen Margaret Rd., (off Queen Margaret Drive). Tel. 041 945 2626.

In Darlington, at 56 North Road. Tel. 0325 496121.

In Cambridge, at 162 High St., Chesterton. Tel. 0223 311230.

In Cardiff, at South Wales Carpets, Clifton St. Tel. 0222 464154.

In London, at 223 Field End Rd., Eastcote, Middx. Tel. 01 429 3256.

In Bournemouth, at 27 Gillam Rd., Northbourne. Tel. 0202 577760.

Branches are normally open from Tuesday to Saturday inclusive, with lunch breaks to suit local conditions. If in doubt, just telephone your nearest branch.

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30MRK	HF2V 30M add-on Kit	33.49
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T2	Tripod Tower 2ft Roof Mounting	14.79
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2MCV-5	2M Colinear 15.75ft 5db gain	63.99

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CUSHCRAFT ANTENNAS

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10-4CD	4el 10M	131.48
15-3CD	3el 15M	139.70
15-4CD	4el 15M	147.92
20-3CD	3el 20M	238.31
20-4CD	4el 20M	328.71
40-2CD	2el 40M	349.95

Verticals

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AV5	5 Band 25ft high	123.26

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ARX2B	134-164MHz Vertical	42.95
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215WB	15EL 2M Boomer	85.26

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LAC2	PL259 to PL259	6.58
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MFJ ENTERPRISES

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MFJ949C	300W Deluxe Versatuner built-in dummy load, cross needle SWR/PWR meter, 6-way switch and balun	157.75
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MFJ941D	300W Built-in SWR/PWR Meter, 6 way switch and balun	105.13
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MFJ901B	200W Versatuner	63.07
MFJ16010	Random Wire Tuner	42.02

MFJ1701	6-way Antenna Switch 2KW SSB	30.72
MFJ910	Mobile Antenna Matcher	20.42

Accessories

MFJ250	1KW Dummy Load (Less Oil)	50.66
MFJ260	300W Dummy Load	28.35
MFJ1274	Packet Radio Terminal (with tuning indicator)	203.73
MFJ1224	RTTY/ASCII/AMTOR/CW computer interface Vic 20, TRS80, apple, CBM 64	111.82

MFJ1225	Universal Receiver only version of above	78.25
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MFJ752C	Dual Tunable SSB/CW Filter with peak/North	104.16
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MFJ723	CW Filter Switchable 80 to 180Hz	52.04
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MFJ204B	Built-in RF Generator up to 30MHz and 500 ohms impedance	84.12
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MFJ202B	RF Noise Bridge measures resonance and reactance to 100MHz	63.10
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MFJ815	2KW Cross Needle SWR/PWR Meter	57.32
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MFJ840	2M Power Meter 5W, 50 Ohms Load built-in (BNC Connector)	20.97
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MFJ841	2M In Line 5W BNC Conn. Switchable SWR/PWR	42.02
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HY-GAIN MULTIBAND BEAMS

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EXP 14	4 Element 20-15-10 M	449.00
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QK710	Add on kit for EXP 14 giving 40M or 30M	115.00
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TH2 Mk 32	Element 20-15-10M	249.00
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DISC 7-2	2 Element 40M	486.62
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DISC 7-3	Yagi Director Element 40M	305.70
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Monoband Beams

105BAS	5 Element 10M	187.00
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155BAS	5 Element 15M	288.00
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205BAS	5 Element 20M	524.17
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204BAS	4 Element 20M	357.00
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BN86	Balun	30.05
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18AVT	5 Band Vertical	146.00
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Rotators

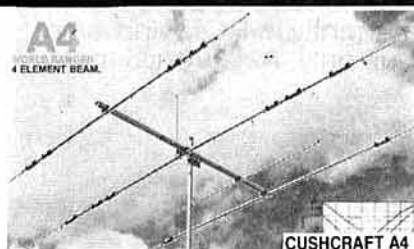
T2X	Heavy Duty Rotator	399.00
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HAM4	Rotator	329.00
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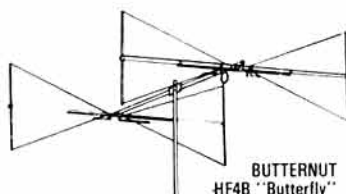
AR40	Lightweight Rotator	168.72
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CD4511	Rotator	219.00
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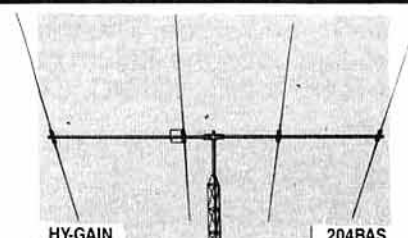
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CUSHCRAFT A4



BUTTERNUT
HF4B "Butterfly"



HY-GAIN

204BAS

ICOM

THE NEW



IC-761, HF TRANSCEIVER with General coverage receiver.

The new ICOM IC-761 H.F. Transceiver has many features making it probably the best top of the line Amateur transceiver available today. This all mode transceiver features an internal tuning unit and A.C. power supply. The A.T.U. boasts a 3 second band selection and tune up with a VSWR matching of less than 1.3:1. For the serious operator the 100kHz-30MHz general coverage receiver and 105dB dynamic range make it ideal for DX chasing. Frequency selection is by the main VFO or via the front panel direct access keypad. And for when reception is difficult, pass band tuning, I.F. shift, notch filter, noise blanker, pre-amp and attenuator should enable you to copy even those weak DX stations whether amateur or broadcast. The C.W. operator will appreciate the electronic keyer, 500Hz filter and full break in (40wpm) other filter options are available. The IC-CR64 high stability crystal is standard as is the CI-V communications interface for computer control. Twin VFO's and split mode for cross band contacts, the IC-761 features program scanning, memory scan and mode select scan and the 32 memories can store frequency and mode. The transceivers operating system is held permanently in ROM and is not dependant upon the lithium battery. The cell is used for memory back up only. A new style meter gives P.O., A.L.C., IC, VC, COMP and SWR readings.

Icom (UK) Ltd.

Dept RC, Sea Street, Herne Bay, Kent CT6 8LD. Tel: 0227 363859. 24 Hour.

Count on us!

FACE OF HF.

You can count on Icom HF Transceivers to give superior performance, take a close look at the Icom range and see for yourself. Authorised dealers throughout the U.K.



IC-751A.

Features:

- All mode.
- 100kHz-30MHz General Coverage Receiver.
- 100 watts.
- 12v Operation.
- 105dB Dynamic Range.
- 32 Memories.
- Electronic Keyer.
- Full Break In (40wpm).
- 500 Hz CW Filter.
- HM36 Microphone.



IC-735.

- Small Compact Size.
- 100kHz-30MHz General Coverage Receiver.
- 100 watts.
- 105dB Dynamic Range.
- FM Standard.
- 12v Operation
- Large LCD Readout.
- 12 Memories.
- CI-V Communications Interface
- HM12 Microphone.

Later in 1988 Icom are launching a terrific new HF transceiver, similar in size to the IC-735 but simpler to operate. This new HF rig is also realistically priced and aimed at a large section of Ham operators. The introduction of this new HF transceiver emphasises Icom's positive approach to market requirements.

Helpline: Telephone us free-of-charge on 0800 521145, Mon-Fri 09.00-13.00 and 14.00-17.30. This service is strictly for obtaining information about or ordering Icom equipment. We regret this cannot be used by dealers or for repair enquiries and parts orders, thank you.

Datapost: Despatch on same day whenever possible.

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RAYCOM give you MORE PURCHASING POWER!

FOR FAST SERVICE PHONE IN YOUR ORDER WITH ANY MAJOR CREDIT CARD OR IN MOST CASES WE CAN OFFER YOU INSTANT CREDIT OF UP TO £1,000.00 (SUBJECT TO STATUS RAYCOM ARE LICENSED CREDIT BROKERS APR 29.8% SUBJECT TO VARIATION FREE CREDIT ON CERTAIN PRODUCTS AT LIST PRICES. 50% DEPOSIT AND SIX MONTHLY PAYMENTS. PLEASE TELEPHONE FOR MORE DETAILS AND APPLICATION FORMS

NEW HELPLINE 0836 28228 (until 9pm Daily)

THROUGH YOUR CONTINUOUS AND VALUED CUSTOM, RAY WITHERS COMMUNICATIONS LTD. HAS MOVED AND EXPANDED TO ENABLE US TO OFFER YOU EVEN BETTER SERVICE AND PRICES - STILL WITH THE RAYCOM GUARANTEE, BEST EQUIPMENT, BEST SERVICE, BEST PRICES, BEST BACK-UP, AND PLENTY OF PARKING FACILITIES AND EASIER TO GET TO! WE NOW BOAST THE BEST CENTRAL FACILITIES IN THE COUNTRY, WHY NOT POP ALONG AND SEE THE LATEST TRANSCEIVERS, SHORTWAVE/SCANNING RECEIVERS AND ACCESSORIES? MOST OTHER PRODUCTS ADVERTISED IN THIS MAGAZINE ARE AVAILABLE AT RAYCOM, AND DON'T FORGET OUR EXCLUSIVE PRODUCTS AND MODS!

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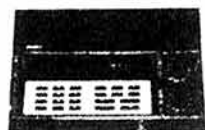
Come and see the NEW ICOM IC781 HF Professional transceiver with built in Band Scope, Auto ATU and PSU, the new KENWOOD RZ1 Mobile Scanner, the new YAESU VHF Base Station and Mobile, and the new FOX mobile Scanner... because of our purchasing power and overseas contacts we get the new models first! And offer the best introductory prices!

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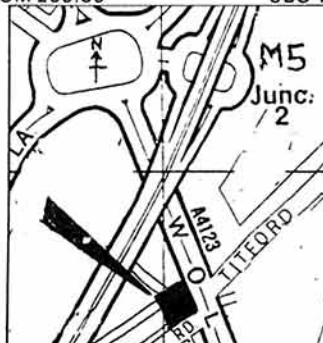


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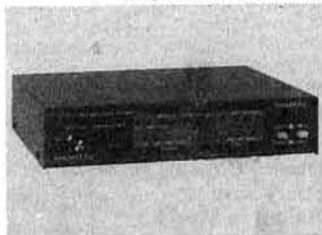
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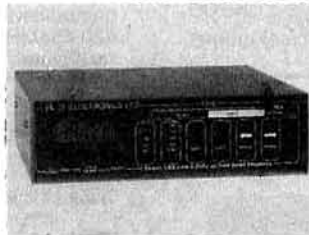


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50MHz

— A WORLD OF POSSIBILITIES

In this month's *News Bulletin* you will read the exciting news that France has made 50MHz permits available to some of its amateurs. To us, the parameters adopted by the DTRE – the French equivalent of the DTI – may seem a little conservative, but in a country where Band 1 television is alive it is very pleasing that 50MHz activity is to be permitted at all. The power limits of 3 and 10W erp, depending on distance from the tv transmitter, are probably not going to set the dx world on fire, but when all is said and done that is not the object of the exercise. The French authorities are adopting the same cautious and conservative approach taken at first by the DTI in the UK, and we would imagine that the initial restrictions are likely to be relaxed somewhat when experience has been gained. You may already have heard some French permit-holders on the 50MHz band by the time you read this – we hadn't as we went to press, but we were all set to welcome them to their new location. *Vive l'Entente Cordiale!*

So far in 1988, that's two new countries on 50MHz – France and the Netherlands. Remarkable to think that, until

quite recently, almost no European administration allowed amateur access to this exciting band. Considering that the vote to allow amateur access in Region 1 to 50MHz at the 1979 World Administrative Radio Conference was only lost by a narrow margin, and given that UK amateur operation on that band doesn't seem to have caused problems for either the European broadcasters or NATO, we wonder what will happen at the next WARC, which is likely to take place in 1992. Could it be that if all European national societies pull together and produce a coherent and convincing case for total Region 1 access to the band, we could have 50MHz back in its rightful place as a full-fledged allocation? What a wonderful result that would be!

So, as we approach the 1988 dx season on 50MHz, and the band once again begins to display some of its profoundly fascinating qualities (and let us be in no doubt that amateurs on 50MHz are already reporting results that are baffling the professionals) let's all resolve to justify the faith shown in the amateur service by the UK licensing authorities. Make a resolution to get on 50MHz this year, even if it's only with 3W to a dipole, and make a point of telling the Society about what you work and how. We're still not hearing all that much activity from Class B licensees on the band – is it just us listening at the wrong times, or are many of you still building equipment, waiting for the dx openings to happen or what? Let's see more special event stations using 50MHz and explaining to the public why the band is so special – and don't forget contests which are always good for finding out just what you can hear.

David Evans, G3OUF

Members' Mailbag

THE EDITOR,
RADIO COMMUNICATION,
LAMBDA HOUSE,
CRANBORNE ROAD,
POTTERS BAR, ENGLAND

PACKET RADIO

Sir—I am prompted by the recent letters from A K Forrest, P Cadman (November *Rad Com*) and Hans Kreuzer (June *Rad Com*) on the subject of packet radio.

It seems to be in the spirit of amateur radio that if a system works well over good communications links, we should push it to work over poor communications links. Although X.25 was not designed for use on high error rate links, it's related AX.25 protocol is established, works well most of the time, and is here to stay. Some other means are needed to improve the information rate under poor conditions.

The "retry" and voting algorithm suggested by A K Forrest has the prime advantage of not changing the AX.25 standard. It can be implemented by any amateur who has access to the source code of his terminal equipment. It is, however, inefficient in terms of information throughput. Three retries means a threefold reduction in information rate, and that doesn't allow for the protocol overheads.

I would like to point the packet radio fraternity to the excellent paper written by Prof A P Clark entitled "Digital Modems for Land Mobile Radio," *IEE Proceedings* Vol 132, Pt F, No 5 August 1985. This paper covers, at an elementary level, the modulation methods available for data transmission at frequencies between 30 and 1,000MHz. By treating AX.25 as the source, and sink of binary information at a given data rate, we can see the effects of various modulation techniques, both binary and M-ary. Amateur developments in these areas would not mean scrapping expensive kit; it may mean, however, some quite complex modem developments, probably involving digital signal processing.

Error detection and correction coding could be included in any modem development, probably by using rate 1:2 or 3:4 convolutional codes. It is worth noting that in a high-noise, high-error environment, error encoding often produces negative results.

D L Wright, GM8AOW

OPENING UP 50MHz

I am quite prepared to stand up and be counted with Mr R T G Freeman, G4SDJ ("Members' Mailbag, *Rad Com* September 1987), and replies thereto in *Rad Com* November 1987).

It seems to me that his critics have missed, or have deliberately sought to evade, the entirely valid points made in his letter.

What makes a Class A licensee potentially better equipped to act responsibly is not simply that he has passed the Morse test—but that he has exercised the determination and self-discipline to do so.

If Class B licensees, through their own indolence, lack of enterprise, or sheer bloody-mindedness, are not prepared to achieve this additional success, then let them eat cake!

T E O'Neil, GM4PRO

Sir—In this letter I hope I don't sound like Mr Freeman, G4SDJ, (Nov *Rad Com*). I don't intend to.

I congratulate you on getting 50MHz for your class B stations; however, I think they should be aware of the fact that USA stations are licensed to 2kW power levels. This is 20dB more than your power levels; equivalent to about 3-5-5 units! CW is copyable much further in the noise than is phone. If you hear someone from here, he may have no other way to copy you if you can't use cw! Most stations I know will be glad to work cross-mode or cw.

If I can but get the point across that people here are listening, maybe your Class B might consider memorising Morse. They don't have to be "speed demons", but I think they will find knowledge of Morse improves their weak signal capabilities. In short, learn Morse not because Mr Freeman says so, but for its utilitarian value.

What do you think?

Jim Foster, NN7K K7ZFG

Whether it's 1-8MHz or 10GHz, the fact remains that Morse is an excellent low-cost weak-signal mode—it's true of 50MHz as well.

WAB—For or against

Sir—G2VO's WABphobia is perfectly understandable, but at the same time the WAB net gives much pleasure to many people and is just one of the many facets of amateur radio. Personally, whenever I am operating /A on the Isle of Coll in the Hebrides I always spend a few hours with WAB. I always find their net controllers most efficient and courteous and often have time for a quick rag chew.

John Ogg, G4FPP

Sir—Following James Platt's letter on WAB intrusion, I feel I must air my views. WAB is like contesting, you either like it or you don't. Obviously from the numbers involved, over 8,000 WAB record books issued, there is considerable support. I do, however, respect G2VO's views and sympathies with his situation. No doubt you will receive many letters from avid WABers telling you how interesting and rewarding the activity is. I would like to skip this area and highlight an often forgotten aspect of WAB.

In May this year I was transferred by my company over the pond to Houston, Texas. WAB activity on 3-5MHz therefore had to give way to 14 and 21MHz operation. Ragchewing with Gs (propagation permitting) and square collecting at the same time became the order of the day and has proved very enjoyable. Perhaps the most rewarding feature, however, the comments received from the G stations for whom this was their first contact into W5 land. Many newly-licensed stations in the UK only operate with 100W into a G5RV and hence at this point in the sunspot cycle have little opportunity of getting past the USA east coast, let alone Texas. I know—six months ago my G5RV didn't do much to help me talking to stations further away than New Jersey. Calling CQdx WAB at least gives these "average" stations the chance to work new call areas.

This is one of the reasons why WAB was founded—to promote worldwide activity in working G stations. Currently there are at least another two hams very active in WAB over here, Jim, K9KQ, and Dave AA6DB. In particular, listen out for Dave, he may give you your first west coast contact. Courtesy of WAB, he will be calling you!

So, in reply to G2VO's letter, I would say to James, please be patient with us, as WAB does provide satisfaction to many, even to those not actively involved. I only hope in the coming months I have an opportunity to work GM2VO/A and perhaps demonstrate that WAB is not always a quick exchange of numbers plus letters but can be pleasure.

Andy L Burns, GW0ECQ/K5,
Houston, Texas

HROs etc

Sir—I fear that some of the critics of Pat Hawker's references to HROs etc have completely missed the points he is making. They do not appreciate the difference between a function and its implementation. Study of the HRO shows how a function, hf receiving, was implemented in 1936 by people who can only be described as masters. In 1988 there is still a lot we can learn from their design.

It is also important to realise the difference between professional radio engineering and amateur radio. Obsolete professional equipment may still be adequate for amateur use and provide an inexpensive route for the young to get into our hobby. Without articles like TT one can so easily get the impression that amateur radio is a hobby only for the wealthy.

Pat, keep up the good work, your balance is right.

G P Stancey, G3MCK

Dead right, we think—any other views on this topic?

PURCHASING COMPONENTS

Sir—As an enthusiastic home constructor, the purchasing of radio components becomes a fairly critical factor in the hobby. Gone are the days of the radio shop around the corner where you can purchase exactly what you want; although thinking back it was probably more a case of making do with whatever they could offer. Rallies provide a good source of components, but at the end of the day mail order is where most of my components come from.

Since Ambit (now Cirket) and Maplin have distributed their catalogues through the newsagents,

it is reasonably easy to acquire a fairly up-to-date listing of available components, although getting hold of them seems to be an art in itself. Maplin claim to offer a fast efficient service but in 10 years I have not received anything from them in less than three weeks. Cirket on the other hand can offer a fast service, but are equally fast in cancelling the critical 40 per cent of your order which is out of stock and often remains so for some months.

Over the last two years a new supplier of rf type components has emerged and frequents many of the rallies as well as providing a mail order service. The company called Bonex provides a comprehensive range of components and offers a fast reliable service. Perhaps the best supplier found to date is a regular advertiser in *Rad Com*, the C R Supply Co of Sheffield, their service is second to none, their prices are keen, and almost every time 100 per cent of the components ordered arrive by return of post.

It is ironic that as the range of components steadily increases, their availability seems to decline. It may no longer be cost effective to supply small orders to a declining number of hobbyists, and for that reason I think it is important to recognise those firms who continue to supply a good service to amateurs.

M J Grierson, G3TSO

As avid homebrewers ourselves we're aware of the problem. However, we've found that STC Electronic Services have a superb catalogue range and you can buy by credit card over the phone. If you have a computer and modem, you can even interrogate their computer system online and find out whether the bit you want is in stock. Also, RS Components now supply to the public via their "Electromail" subsidiary—and our Farnell Electronic Components rep tells us that they've just introduced a facility whereby anyone can obtain components from them via a telephoned credit card order. STC are on 0279 26777, Electromail are on 0536 201201, and Farnell's number is 0532 636311—and all seem to provide pretty well "next-day" service.

Sir—I was somewhat surprised to read Mr Peter McBeath's letter your December issue.

I would agree that Electrovalue is an excellent firm, but surely the modest amounts asked for catalogues from a number of firms is no reason not to purchase from a company who makes such a charge. In general these catalogues are not just lists of prices but contain much useful information. Perusal of the catalogue from Cirket, Electromail and Maplin Electronics will certainly make this point clear. From my own point of view the availability of a technical catalogue with the parameters of a wide range of components clearly presented is certainly a help for designs both now and in the future.

Even today most local radio/tv retailers support a service department, and I am sure that they would be willing to sell the "odd" component if requested. In addition there are many rallies up and down the country where truly "fantastic" bargains can be obtained. "Amazing Bargain Packs" are being offered in your December issue (Billington Valves, page 968). Go to Car Boot sales, held everywhere during the summer, and buy old cb radios or domestic radios/tv to strip for the components. Your local refuse dump usually has a pile of old valve radios in a corner, very good for two-and three-gang variable capacitors, just the thing for that atu or QRP transmitter! I am sure that even today most radio amateurs/swls have the inevitable "junk box" and would be pleased to help you out if requested. No, the RSGB should NOT retail components, as they have neither the expertise nor capital required.

Come on Mr McBeath, where is your spirit of adventure?

J D Harris, G3LWM

We've just discovered that Farnell Electronic Components—whose catalogue range we've used for many years and who seem to stock everything you could wish for—will now sell to credit card holders. Give them a ring on 0532 636311.

RSGB NATIONAL VHF CONVENTION

Sandown Park Racecourse, Esher, Surrey

Sunday 1 May 1988

- One-day exhibition and lecture programme
- Presentation of trophies
- Comprehensive trade exhibition
- Morse tests

- Specialist groups
- Equipment test facility
- Full lecture programme on vhf, uhf and microwave subjects

PROGRAMME

- 1030** **Convention opens.** Enter through main entrance. (Open to exhibitors from 0800 through More Lane entrance)
Refreshments. Snack bar in the hall will be open from 1100 to 1600, and the licensed bar will be open throughout the convention.
- 1130** **AGM** 6m Group
- 1330** **Convention address and presentation of trophies** by RSGB President Sir Richard Davies, KCVO, CBE, CEng, FIEE, G2XM

LECTURE PROGRAMME

Detailed arrangement for lectures will be notified on arrival

- | | A | B | C |
|-------------|---|---|---|
| 1415 | "Trends in tropo. The best dx is yet to come", Ray Flavell, G3LTP | "Measurements for the amateur station", Peter Chadwick, G3RZP | Morse test forum – Robert McEwan Reid, G4GTO |
| 1515 | "The consideration of tvf from a 144MHz transmitter", Angus McKenzie, G3OSS | NW Kent Beacon Group – Building microwave beacons | Remote Imaging Group AGM – Henry Neale, G3REH |
| 1615 | Packet Working Group, Mike Dennison, G3XDV | "Portable microwave operation", Peter Day, G3PHO | VHF Contests Committee forum |
| 1715 | Lecture session ends | | |
| 1800 | Trade exhibition closes, Convention ends | | |

ADMISSION

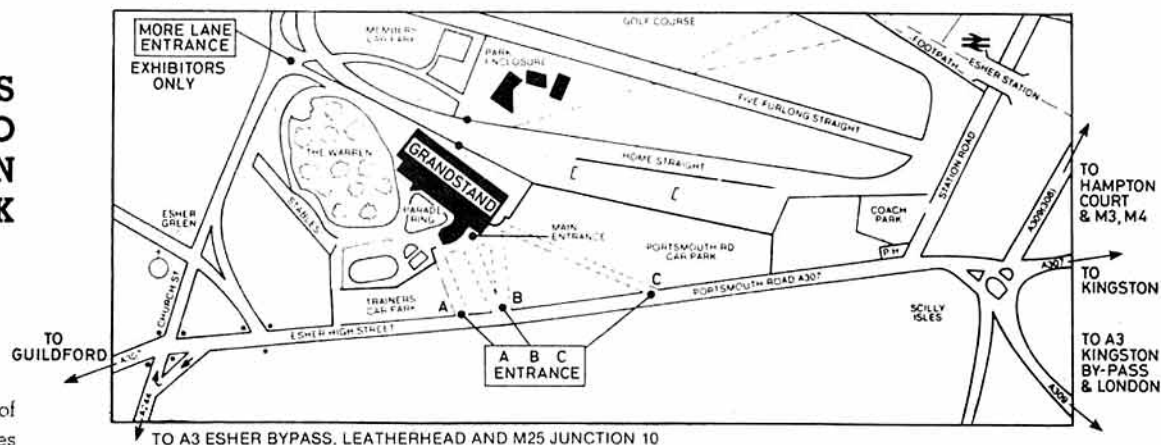
To simplify management and to reduce costs, it has been decided, as last year, not to issue admission tickets for this convention, either in advance or at the gate.

Admission will be by payment on entry as follows:

Convention and exhibition.....	£1
:: :: (under 18).....	50p
:: :: (under 14).....	Free

RAIL TRAVEL . . . Please note that British Rail's Esher station is closed on Sundays. One alternative is to go by British Rail to Kingston and then take a 218, 537 or 715 bus to Sandown Park.

ACCESS MAP TO SANDOWN PARK



Map by courtesy of
United Racecourses

A design for a desk microphone with automatic gain control

D MACIVER, G1SJU*

When I wrote "G1SJU Neck Boom Microphone", *Rad Com* December 1986, I had no idea it would be so popular. As I said in that article, I use one of these microphones in the shack at the home QTH on a fairly long lead to enable me to hold a QSO while still being able to move about the shack freely or use a soldering iron etc. However, it did still have its limitations, not the least of which was that the cable to the mic was a confounded nuisance at times, conspiring to wind itself around my feet or drag things off the bench whenever I picked it up.

I was very pleased with the excellent quality of audio given by the electret mic, and I have received many good reports which I am sure were due almost entirely to the electret's talents rather than to my audio endeavours. Then one day I heard about a chip known as a *voice operated gain adjusting device* (vogad). This small eight-legged beastie was (as it turned out) the answer to all my problems with long cables etc.

The 6270 vogad chip is an integrated circuit combining the functions of an audio amplifier and a vogad, designed to accept signals from a low-output microphone such as an electret and to provide an essentially-constant output signal of approximately 90mV for a 60dB range of input. The dynamic range, attack and decay times are controlled by external components.

The output of an electret insert is ideally matched for feeding to the vogad input stage. The vogad automatically compensates for low audio levels, and thus maintains a constant output to the rig regardless of your voice level or (within reason) your distance from the mic.

Provision is made for the gain of the preamp stage to be reduced by a switch for use when in close proximity to the mic or when there is a high background noise level, ie when operating mobile etc. Another switch selects the low frequency passband, allowing you to adjust the "tone" of your audio transmissions.

Although this design is for a desk mic, it is quite possible to fit the same pcb into the neck mic case and use it /mobile. In this case the gain and tone switching mentioned above would be pre-set to suit and the switches omitted.

Circuit description

Referring to the circuit diagram (Fig 1), it will be seen that there are three connections to the electret mic element. Apart from the output and ground there is also a positive supply. This is needed to supply the fet preamp fitted inside the electret capsule. The output from the electret passes through the decoupling capacitor C2 into one input (pin 5) of the vogad chip. The vogad has two inputs to enable inputs from balanced mic outputs, but in this case we only need to use one. The other input on pin 4 is ignored.

The first stage of the vogad is a differential preamplifier, the gain of which is age controlled by feedback from the output of the second stage. This age control voltage is fed back via a time constant circuit (R8 and C8) that sets the attack and decay times of the circuit.

The second stage gain of the vogad is controlled by R6 in parallel with an internal 10kΩ resistor. With R6 out of circuit via S2, the gain of this stage is set internally at maximum. This means that any signal between about 3mV and the maximum input level will be maintained at approximately 90mV.

The formula for determining the second stage gain set with the external resistor R6 is:

$$\text{Gain} = \frac{R6 \times 10,000}{(R6 + 10,000) \times 680} \quad (R6 \text{ is in ohms})$$

Thus the stage gain is 1.91 times with the 1.5kΩ resistor fitted, and other values give the following results:

R6 = 680Ω	= 0.93 times	R6 = 2.7kΩ	= 3.12 times
R6 = 820Ω	= 1.11 times	R6 = 3.3kΩ	= 3.64 times
R6 = 1kΩ	= 1.33 times	R6 = 4.7kΩ	= 4.70 times
R6 = 1.2kΩ	= 1.57 times	R6 = 5.6kΩ	= 5.27 times
R6 = 1.5kΩ	= 1.91 times	R6 = 6.8kΩ	= 5.95 times
R6 = 1.8kΩ	= 2.24 times	R6 = 8.2kΩ	= 6.62 times
R6 = 2.2kΩ	= 2.65 times		

Therefore, if R6 is changed for a different value, it is possible to tailor the sensitivity of the vogad to suit the environment in which the microphone is being used. If, for example, the same design was being modified as a mobile version, and was going to be used in a vehicle with a high level of background noise, R6 could be changed for a lower value in order to reduce the sensitivity to a level at which the vogad will only respond to the wanted sound (your voice) and will ignore unwanted sounds such as road and wind noise.

Frequency response

The bottom end of the frequency is set by C6 or C7 and is switch selectable at 0.1μF or 1μF. The top end of the frequency is set by C4 and has been fixed at 4.7nF.

These values as set should be found to provide very good results but of course the user is quite free to change these values if required. As a general guide, substitution by a smaller capacitor will raise the set frequency and a higher value will lower the set frequency.

Attack and decay times

The attack time is set by C8 at 22μF, which gives an attack time of 8-8ms. The formula, should you wish to change this, is:

$$\text{Attack time in milliseconds} = 0.4 \times C8 \text{ in microfarads}$$

The decay period is determined by the time constant of C8 and R8 and will be extended by an increase in the value of R8 or reduced by a decrease in value.

Output level

The output level is set by the trimmer RV1 and further reduced by about five per cent by the potential divider of R3 and R4. If it is found that the output level is still too high with RV1 turned almost fully down (clockwise) then try reducing the value of R3.

Assembling the pcb

The terminal pins and the chip socket should be fitted to the board first. Be careful not to overheat the pcb tracks, and only use a small quantity of solder. Too much will cause solder blobs that may bridge tracks.

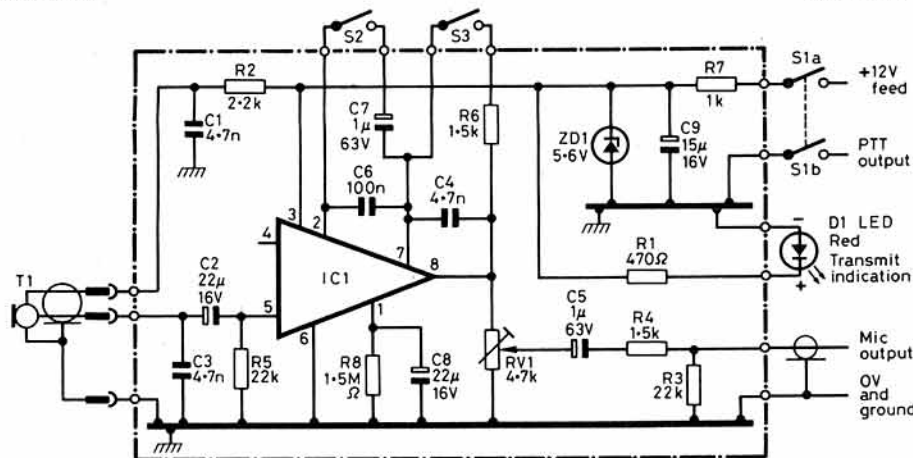


Fig 1. Circuit diagram

*176 Burges Road, East Ham, London E6 2BS.

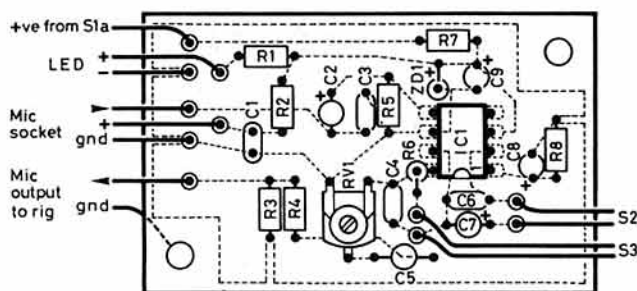


Fig 2. Components layout

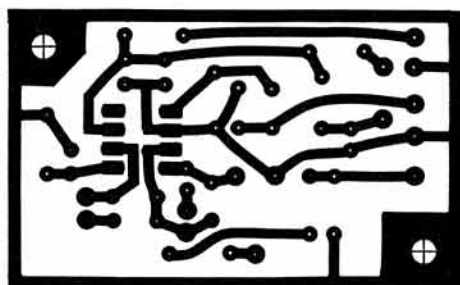


Fig 3. PCB copper side, actual size

Now insert all the resistors one by one. Check carefully to see that these are all correctly positioned, as it is much easier to remove and replace them now, than when all the other parts are fitted. The trimmer resistor RV1 should also be fitted now.

Next identify and fit the capacitors, being sure to place them as shown in Fig 2. On standard type electrolytics the negative lead is marked by a black stripe down the side of the body. Sometimes this stripe contains small (-) symbols. With tantalum types the positive lead is marked by a (+) symbol on the body. It is almost always the right-hand lead when looking at the side with the value printed on it.

The last soldered item is the zener diode. This should be placed with the positive lead positioned as shown in Fig 2.

Finally, check the board over very closely for solder blobs for dry joints. Solder blobs and bridged tracks are corrected by reheating and removing excess solder. Dry joints are usually very dull and crystalline and are the result of not heating the wire and the track equally when soldering, or of moving the component before the solder had set hard. If you have any dry joints, simply resolder them using some fresh solder.

The microphone module

Strip back about 0.5in of the insulation from one end of the small screened cable. This should have two cores, one red and one blue, as well as a copper screen. Solder the red wire to the positive terminal of the electret, blue to the mic output terminal and the screen to the ground terminal.

Note: It is very important to solder quickly and carefully or the electret will be damaged by excess heat.

Next, bend one end of the stiff wire back onto itself by about 0.5in, then insert the wire into the plastic tube together with the screened wire from the electret. Cut a piece of the heat-shrink sleeving about 1.5in long and shrink this down onto the electret capsule and the plastic tube. See Fig 4.

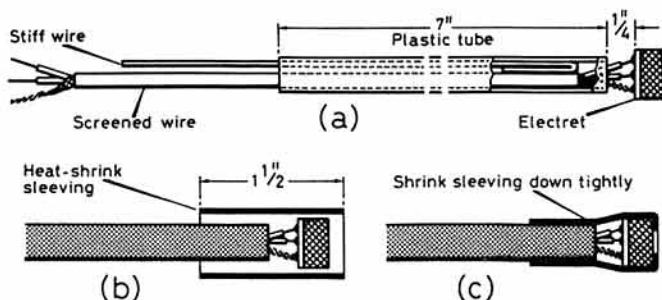


Fig 4. Microphone boom construction

Components list

R1	470Ω	1/4watt
R2	2.2kΩ	"
R3,5	22kΩ	"
R4,6	1.5kΩ	"
R7	1kΩ	"
R8	1.5MΩ	"
RV1	4.7kΩ	Min horizontal preset trimmer
C1,3,4	4.7nF	100V ceramic
C2,8	22μF	16V electrolytic
C5	1μF	reversible electrolytic
C6	100nF	100V ceramic
C7	1μF	63V electrolytic
C9	15μF	16V electrolytic
D1	Red	l.e.d (and mounting bezel)
ZD1	5.6V	zener diode BZX83C5V6
IC1		Vogad chip RS6270 or Plessey SL6270CDP
T1		Electret capsule (three-terminal type)

S1 Min dpdt toggle switch
 S2,3 Min spst toggle switches
 Printed circuit board to pattern
 Three-pin DIN socket (chassis mounting)
 Three-pin DIN plug
 Cable outlet grommet
 Metal case approximately 105mm by 60mm by 35mm
 Four rubber stick-on feet
 Length of four-core individually-screened cable to suit 12in of two-core screened cable (thin)
 7in of small plastic tubing
 8in of stiff bare wire
 2in piece of 9.5mm heat shrink tubing
 12 small terminal pins
 Solder tag
 Microphone connector to suit your rig
 A complete kit of parts to complete this project, including the pcb, is available by post at £15.95 inc p&p from: Digital Security, 176 Burges Road, East Ham, London E6 2BS.

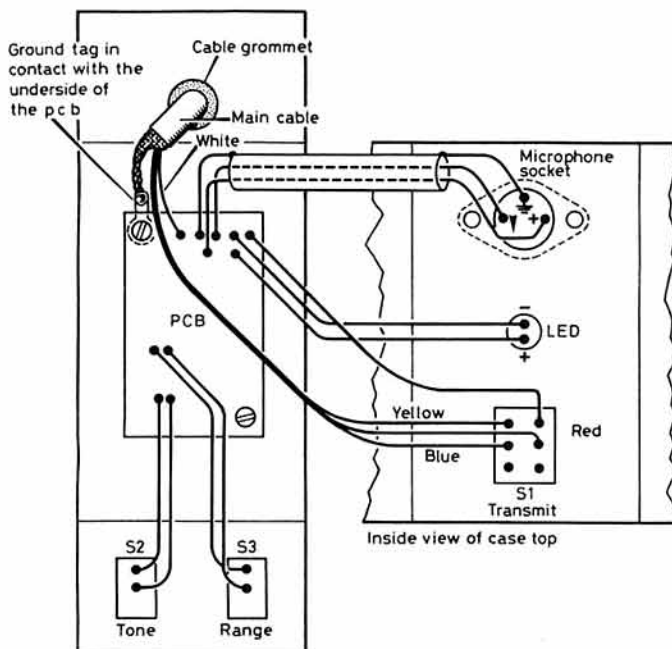


Fig 5. Microphone case wiring diagram

Note: When using the hot air gun, be sure to do this quickly to avoid damaging the electret element.

Refer to the mic module diagram for details.

Trim the mic boom to approximately 7in long and fit the DIN plug to the end. This should be connected as shown in Fig 5. Save the remaining 5in of wire for use inside the case.

The case

Start by marking out the holes as shown in Fig 6. Centre-punch and drill the hole positions using a small pilot drill of about 1/16in. This will make it easier to drill the larger holes. Then, using a sharp drill of the correct size, drill out the holes to the dimensions given. Fit the cable grommet, switches and the l.e.d. The DIN socket should also be mounted now.

The cable

Strip one end of the main cable back about 4in and separate all the screen wires from the core wires and twist them together. Trim the screen wire to

DXING WITH DIPOLES

Some practical considerations

D J Reynolds, G3ZPF*

Introduction

As an active hf type with a taste for dx chasing, I am occasionally called upon by the local radio club to give talks on antennas. It appears that my relative success using dipoles is taken as the result of magic, whereas persistence is nearer the truth. It amazes me to find that many are convinced that unless an antenna is erected *exactly* as per the book it will not work *at all*. In addition, vhf/uhf types almost all use commercial antennas. When transferring to hf the belief persists that no antenna can be any use unless it is aluminium and made in a factory. This often results in considerable amounts of money being spent on commercial "limited-space" antennas and consequent disappointment with the results.

I have yet to find an antenna that would fit in my garden exactly as described, but it has proved possible to take great liberties with the layout of wire antennas and still get worthwhile results. My five-band DXCC plaque was obtained purely on dipoles or their derivatives. Maybe this "canned-history" of dipoles used at various QTHs will be found useful to the newer Class A licensees. The intention is not to provide specific solutions to specific problems but to promote some experimentation. QTHs which seem physically identical can produce wildly differing results at rf, with a "super" antenna at one QTH giving disappointing results at another.

Initial decisions

The first decisions to be made have nothing to do with antennas, but relate to what exactly the precise areas of interest are: hf dxing, lower frequency ragchewing, contests, rtty, sstv - there are dozens of facets under the overall banner of hf, and few will have the time, space, or inclination to pursue everything. Any time spent as an swl will have already highlighted the main areas of interest, but for those without any ideas whatsoever I would recommend [1] as an excellent guide. As well as operating tips, it gives a summary of what can be expected of the various bands and is a goldmine of general information.

There are dozens of antenna books on the market, and I would strongly advise borrowing from the public library before deciding which to purchase. My own particular favourite is [2] which not only gives practical examples of antennas for limited spaces but also goes into the theory for those that are interested.

Dipoles

One of the simplest type of antenna to get going, and probably the first that many try, especially for 3.5 and 7MHz, is the dipole. In its basic form it is essentially a single-band antenna, with the oft-quoted exception of a 7MHz dipole which will also be resonant on 21MHz. Unfortunately most books omit to point out that the feed impedance on 21MHz will be somewhat higher than the usual 50/75Ω so the vswr on 21MHz will be about 2:1. This is no great problem for owners of valve rigs but some solidstate rigs might require the use of an atu to give of their best.

Table 1. Dipole lengths for each band, together with amount to be trimmed from each end to raise the resonant frequency by 100kHz

Band MHz	Dipole length (m)	Trim each end per 100kHz (mm)
1.8	83.33	2,190
3.5	42.86	595
7	21.43	150
10	14.85	70
14	10.71	35
18	8.33	20
21	7.14	15
24	6.03	12
28	5.36	10

Table 1 gives the basic dipole lengths for each of the bands, together with the amount to be trimmed off each end to shift the resonance by 100kHz. The lengths were derived from the simple formula, with no

*502 Lapwood Avenue, Kingswinford, W Midlands DY6 8SG.

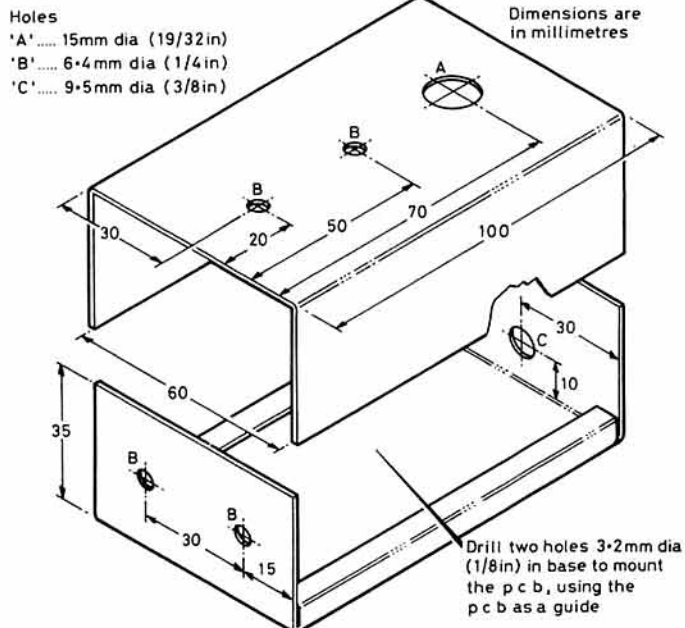


Fig 6. Case drilling diagram

about 0.75in long then slip a piece of the stripped-off sleeving (about 0.5in long) over the end. Solder the ground tag to the end of the screen braid.

Feed the prepared cable out through the case grommet from the inside of the case. Fit the circuit board into the case using two small bolts, nuts and spacers, and placing the ground tag between the spacer and the board on the bolt nearest the cable entry. This will both anchor the cable and make all the common ground connections between the cable and the board.

Wire up the other end of the cable to a plug suitable for your rig. The wires are as follows:

White	= Microphone
Blue and braid	= Ground
Yellow	= PTT
Red	= Positive voltage supply

If your rig provides a positive output at the socket of between 5 and 14V dc then this may be used for the red wire above. Alternatively, the red wire can be joined to a suitable length of heavier wire inside the plug (insulated with a small piece of sleeving), and brought back out of the plug for connection to the rig supply.

A second method is to use a PP3 battery built into the mic case. Since the unit only uses around 30mA maximum, a standard PP3 will last for quite a long while. The unit only uses current when switched to transmit, so a separate switch is not required. If a battery is used it is important that it is replaced before the voltage drops too low. When a battery nears the end of its working life the impedance increases. The effect of such an increase could lead to switching transients when the ptt is operated.

The case wiring

Join up the switches and the l.e.d with short lengths of wire to the solder pins as shown in Fig 5. The DIN socket should be wired up with the remaining length of the small screened cable (about 5in long) also as shown in Fig 5.

Final assembly

Check carefully that all connections have been made correctly and that there are no broken or trapped wires. Set the trimmer RV1 to about the halfway position. Plug in the vogad chip, taking care to insert it the correct way round. Apply power and test the mic on air with a QSO. Adjust the trimmer to a level that allows full modulation of your signal when speaking in a normal voice from about 12in away from the mic. If this is done correctly, you should find that you can talk normally from across the room without much effect on your signal.

The mic components have been selected to suit the "average" rig, and may be too high gain for yours. If all is well, close the case and sit back and wait for the compliments on your "audio" to come flooding in! □

corrections, but if cut to the lengths given they will almost certainly be slightly too long.

To judge from comments heard over the air, it seems to be a commonly-held belief that the feed impedance of a dipole at resonance is *always* 50Ω, but Fig 1 shows that this is certainly not the case. Even then I would presume the curves were derived from dipoles out in the clear and erected in a straight line. Add a few close buildings, together with a few dog-legs in the wire, and the feed impedance could be anywhere. All of this suggests that especially at lower frequencies there is no way that a dipole at 25ft or so can ever present a 1:1 vswr to 50Ω coaxial cable, yet any number of operators can be heard proclaiming their's does.

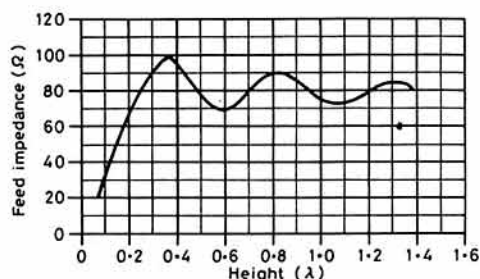


Fig 1. Graph showing variation of feed impedance with height above ground for a horizontal half-wavelength dipole

It all comes down to the way that the antenna has been adjusted. Like most things in life there is a correct way and an easy way. Naturally enough most people opt for the simple approach and, to be fair, providing the antenna is full-size the difference between the two methods (at low heights anyway) is hard to detect.

The correct way is to adjust the dipole for resonance using a gdo or a noise bridge and then accepting whatever residual vswr results. With solidstate rigs this might mean the use of an atu, and all that has happened here is that the lower amplifier "load" and "tune" controls of a valved rig are in an outboard unit. Incidentally, most of the small atus available are not really suitable for matching anything other than a residual vswr in a coaxial line, and perhaps ought to be referred to by some other name to avoid confusion. This also applies to the inbuilt automatic atus of more elaborate solidstate rigs which, it should be noted, are *not* in circuit on receive.

The easy way to adjust a dipole is to measure the vswr at the shack end of the coaxial cable and then cheerfully cut away at the ends of the antenna until the indicated vswr falls to some impressively low figure. In reality the antenna will be resonant at some slightly different frequency, probably higher, but as mentioned previously, this is unlikely to cause problems with full-size antennas. When experimenting with miniature antennas of any kind it is absolutely essential to adjust for resonance and then match the resulting feed impedance to 50Ω, or else losses will be high.

Multiband operation

There are three main techniques for multiband use of a dipole. They are sufficiently different to deal with each type separately, although it is possible to combine the techniques in a variety of ways.

PARALLEL DIPOLES. Dipoles for different bands can be operated from a common feeder, Fig 2, as described in any number of books, but there are pitfalls for the unwary. I found that considerable interaction occurred if the dipoles were spaced at less than 100mm from each other, with the vswr changing dramatically whenever it rained. After spending considerable amounts of time attempting to keep all of the dipoles equally taut, it turns out not to be necessary. Take out all the strain in the longest dipole and let the others just hang in the spacers. It helps to make the lower dipoles out of fairly rigid wire to avoid them moving around relative to one another in the wind and shifting the resonance slightly. A systematic approach to adjusting parallel dipoles to resonance is essential because even at 100mm spacing the dipoles load each other to a certain extent and it is very easy to end up chasing your tail. Taking a

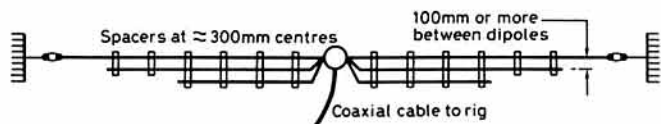


Fig 2. Dipoles can be put in parallel across a common feedline. Interaction can be minimised by keeping 100mm spacing or more between the wires

14/21/28MHz dipole as an example, adjust the 28MHz dipole first. This will undoubtedly shift the resonances of the 14 and 21MHz sections, but when moving on next to adjust the 21MHz section, this should only affect the 14MHz dipole. Presumably this is because the ends of the 21MHz dipole are beyond the ends of the 28MHz one. Finally, adjust the 14MHz dipole and the setup is ready for use.

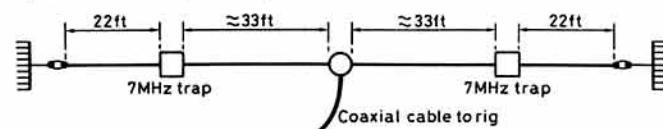


Fig 3. Overall dimensions of a 3-5/7MHz trap dipole with "W3DZZ" or "G8KW" traps. With LC ratio of given traps the antenna is said to be useable on all five (pre-WARC) bands but this presupposes the antenna is completely in the clear

TRAPS. The most common form of a trap dipole is shown in Fig 3 with the traps resonant at 7MHz to provide 3-5 and 7MHz coverage. Note that the overall length of the 3-5MHz section is reduced slightly by the loading effect of the coils within the traps. Dipoles of the type shown are often referred to as "W3DZZ" or "G8KW" dipoles, depending on where their user obtained the traps. With the LC ratio of these traps, it is often claimed to be a five-band dipole, but this generally depends on having feeders of a specific length and having the dipole well in the clear. With low heights and restricted space it is highly unlikely to present a reasonable match except for 3-5/7/21MHz.

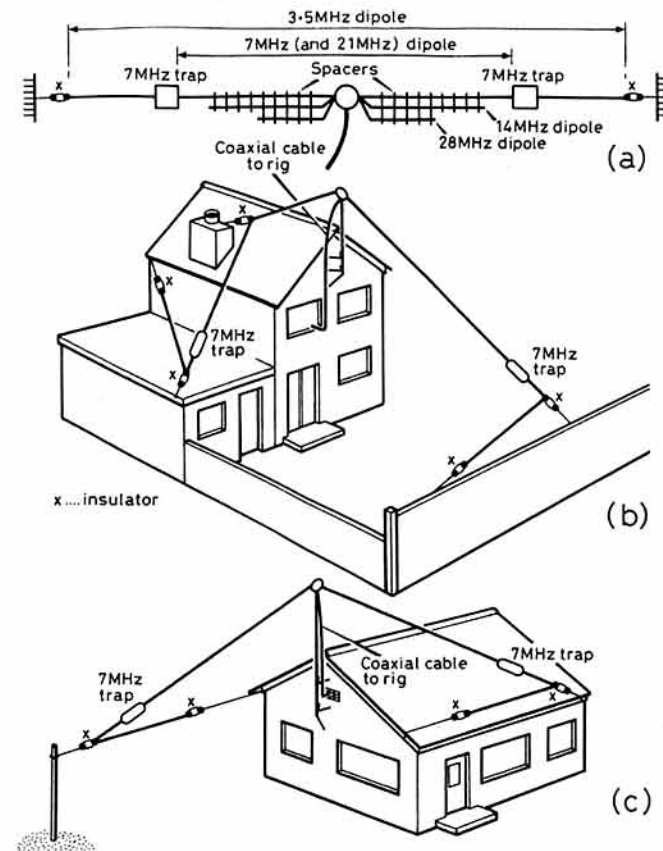


Fig 4. (a) As Fig 3 but with parallel dipoles for 14 and 28MHz to ensure five-band coverage. 21MHz coverage is obtained by virtue of 7MHz section. (b) Even when dog-legged to fit into a restricted space the antenna still proved effective. (c) Another QTH and this time the portions beyond the traps had to run back towards the supporting pole. It still worked

A combination of traps and parallel dipoles can be used, Fig 4, to give all-band coverage, together with the liberties that can be taken where space is limited. 7MHz traps encased in epoxy resin are obtainable from a variety of sources, but an item in *Technical Topics* [3] showed how to make traps for all bands from a small coil of coaxial cable—I've been using a pair for 7MHz traps to this design ever since. They worked first time and have caused no problems whatsoever. Although physically larger than the encased type, they are much lighter and do not bob

around so much in the wind. For those wishing to purchase ready-made traps, G2DYM [4] sells a complete range of traps for both wire antennas and beams and verticals.

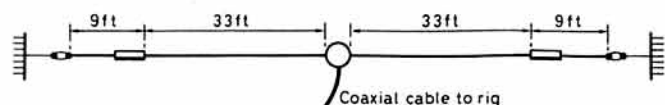


Fig 5. Overall dimensions of the "Sagant EL40X" compressed trap dipole for 3-5/7MHz. See also [5] for stockists

There is no reason why the LC ratio of the traps cannot be increased dramatically to shorten the overall length and Fig 5 shows the overall dimensions of one commercially-available "compressed" trap dipole [5], although there is no reason why traps cannot be made. High-voltage capacitors can be a problem but a length of coaxial cable can be used, instead, Fig 6, using one insulated core from a length of 13A mains flex around a piece of plastic pipe as the coil. The diameter is not critical, and I used a 200mm length of 25mm pipe that was to hand. Use a gdo to set the resonance to 7.05MHz while adjusting the length of coaxial cable, then seal the whole assembly with heatshrink tubing or whatever. Large coils reduce the amount of wire needed beyond the traps *but* reduce the useable bandwidth on 3-5MHz. With an overall length of 84ft the resonance on 3-5MHz will be about 75kHz between the 2:1 points. An atu can extend this range somewhat, but remember that the atu does not affect the swr between itself and the feedpoint, and losses will become excessive if the swr on the coaxial cable is much above 3:1.

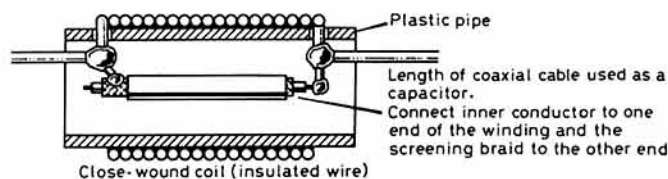


Fig 6. Section through homebrewed 7MHz trap with high LC ratio. With a 25mm diameter pipe, 200mm long, the resulting overall length was similar to that of Fig 5

TUNED DOUBLET. The use of open-wire feeders with a dipole has much to recommend it. The dipole can not only be operated on several bands but all adjustment is carried out from the comfort of the shack. Given the amount of rain we get in this country, the less time spent outside trimming antennas the better. Open-wire feeders do need the use of an atu with a balanced output though. There are some fairly elaborate and expensive atus on the market which achieve a balanced output by using a ferrite toroid on the output of a "single-ended" atu. These are not so versatile as the Z-match type of atu since atus balanced with a toroid will not be able to match such a wide range of impedances as they can in the single-ended mode.

In my experience toroids are quite happy with purely resistive feeds, but certain combinations of reactance can quickly cause them to over-heat. When experimenting with toroid balancing it proved possible to get a core rated at 1kW too hot to hold with just 100W of rf into a complex load. Maybe I was just unfortunate, but it is something to bear in mind. With tuned feeders there are no worries about what the feed impedance at low heights will be because the atu takes care of it and, unlike coaxial cable, there are no worries about having a high swr on the feeder. Where space is limited, the doublet can be less than one half-wavelength long and yet still be effective, but while most books point out how a 3-5MHz dipole with tuned feeders can be used on all higher frequencies, they do not often mention that this presupposes the antenna is horizontal. More on this later.

Inverted-Vs

There is nothing magical about an inverted-V, but the necessity for only one central support, together with the reduced length of garden needed, obviously makes them an attractive proposition for 1-8/3-5/7MHz. They seem to give virtually omnidirectional radiation at any distance, and give a good account of themselves for both inter-G and dx working at lower frequencies. The ability to receive close-in signals well is not particularly useful when trying to work some dx, but unless space permits a decent vertical and a low dipole together it is the price you have to pay. Regarding verticals, they are often claimed to be the antennas for lower frequency dxing from restricted sites, but to my mind there are some snags. In limited spaces the vertical will be surrounded, and hence screened, by buildings. Given a lack of space, even the most diligent

would be hard pressed to get down enough radials to do it full justice. As regards the low-angle radiation properties, [6] contains reference to the fact that verticals need to be *physically* one quarter-wave or more to achieve it, while [7] maintains that low-angle radiation is not an *inherent* property of vertical antennas, but that like most things in life it all depends. Furthermore, [8] contains the results of tests which seem to indicate that the feed impedance of groundplanes can be rather less than predicted.

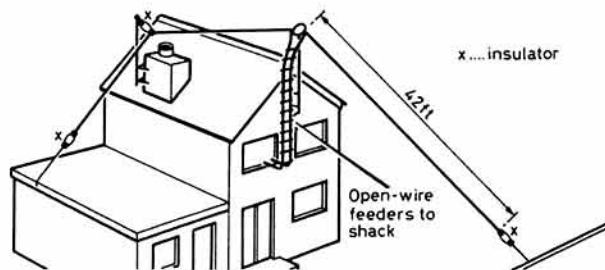


Fig 7. A tuned doublet with an 84ft top worked well on all bands in an inverted-V configuration. Longer doublets need to be horizontal to be effective on 21 and 28MHz

All of this has biased me towards dipoles or doublets, with restricted sites dictating an inverted-V configuration. Inverted-Vs for 3-5MHz do not give good results at 21/28MHz, and with the benefit of hindsight I would opt for an inverted-V for 3-5/7/10MHz (trap dipole or doublet) plus separate dipoles for 14/21/28MHz. For the hf bands, either parallel dipoles, trap dipoles, or even a separate doublet (perhaps vertical) could be used. After some experiments I found that the best top length for an inverted-V doublet for *all* bands was about 84ft (Fig 7). This is somewhat short for 3-5MHz but any longer and the 28MHz performance deteriorates dramatically. Even so, it did prove capable of working into ZL on 3-5MHz, which can't be bad.

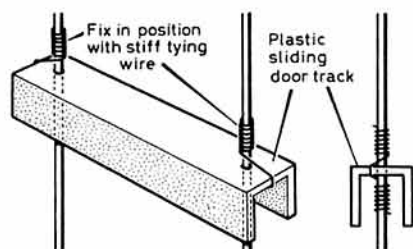


Fig 8. Spacers for open-wire line formed from plastic sliding door track or, alternatively, plastic spines for A4 sheets. Spacing between wires is not critical

Open-wire feeders

There seem to be two main objections to open-wire feeders, although cynics would generally say it is just the fact that you can't buy it ready-made which puts people off. One or two traders now supply patent spacers for open-wire line, but these can become expensive for long runs and I have used plastic sliding-door track (Fig 8). The "U" section does not roll away when you try and cut it, and the plastic seems resistant to UV degradation. Most diy stores stock it, but an alternative is to use the plastic spines for A4 sheets which can be purchased from stationers.

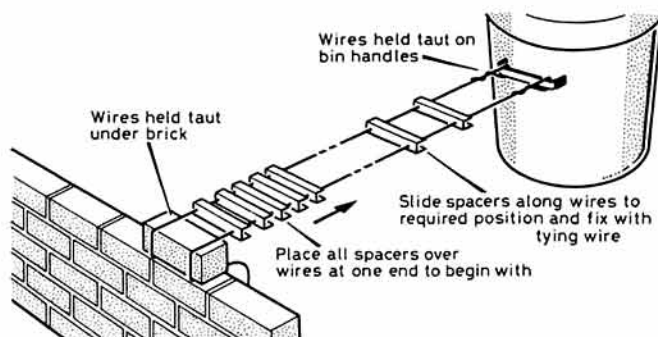


Fig 9. Keeping the feeders taut while positioning the spacers ensures the line will look neat and tidy when in its final position

Open-wire feeders can turn out to be a real rat's nest unless gone about in the right way, but after several abortive attempts the following method was evolved (Fig 9). Tension the wires at a convenient height, with all of the spacers slipped over one end. Then, using a ruler to give 12in spacing, slide the spacers up the wires and fix in position. The resulting feeder will retain its neat and tidy appearance when up in the air. The spacing between the wires is not critical, and I used 100mm purely because it looked about right!

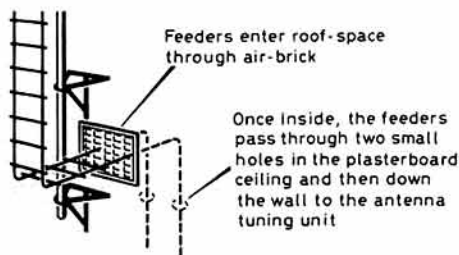


Fig 10. As an alternative to coming through a window frame, open-wire feeders can enter the roof space via an "air-brick" before coming down through the ceiling of the shack

Several people have mentioned the difficulty of getting open-wire feeders into the house, but there seems little difference in making two small holes for open-wire lines than one larger hole for coaxial cable. Fig 10 shows one way of getting an open-wire line into a house.

Baluns

You either swear by them, or swear at them. Perhaps I've been unlucky with the few that I've made or bought, but I found that a ferrite balun at the feedpoint caused spurious readings on a gdo when adjusting the antenna. Generally, baluns are stated to be essential to prevent currents circulating on the outer of coaxial cable and possibly causing bci/tvi by radiation within the building. This may well be true where dipoles are in a nice straight line and well in the clear, but at low heights with plenty of dog-legs the feeder rarely comes away from the antenna at right-angles. Currents could be induced on the outer from pickup of radiated rf, and a balun at the feedpoint would not prevent that. I prefer to use a few turns of coaxial cable through some ferrite rings where the cable enters the building (Fig 11). Not everyone will agree with this approach, and it is something for people to sort out for themselves.

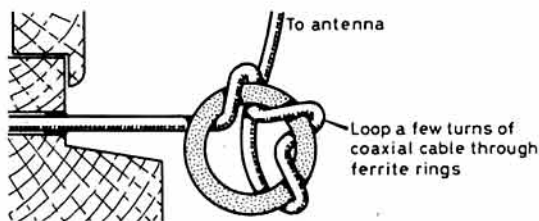


Fig 11. In restricted sites feeders cannot often come away at right angles to the antenna. Ferrite rings can help suppress currents picked up on the coaxial outer

Very small antennas

In restricted spaces there is a great temptation to try very small antennas, but it is an area where disappointing results will be obtained by the inexperienced. There are two main problems with very short antennas, the main one being that of matching. As the size of an antenna is reduced, the radiation resistance falls quite dramatically. Unless great care is taken with feedpoint details, the losses will be excessive, resulting in poor efficiency. Also, small antennas are very sensitive to the proximity of other objects and to wetting/drying during rainstorms, both of which can shift the resonant frequency.

Even with an efficiently-designed small antenna, the price to be paid for reduced size is reduced bandwidth. Commercial trap verticals, for example, will have a useable bandwidth of only 15kHz or so on 3.5MHz. A good rule of thumb is that an antenna can be reduced to between two-thirds to one-half of its full size (preferably with end loading) before efficiency starts to fall. Les Moxon goes into great detail about small antennas in his book [2]. Helical antennas are claimed to be effective down to about one-tenth of a wavelength, although I have never used one

used one myself. Again, care in matching is essential and bandwidths will be very narrow. A helical antenna for the amateur bands is made commercially [9] and G3JL reports using one to great effect indoors; [10] contains a section on the theory of helical antennas. Unless a great deal of time and care is taken in the construction of highly loaded antennas it might be better to dog-leg a full-length wire into the available space.

Operating

With modest power to a dipole, technique plays a great part in making yourself heard. It is unlikely that the dx will get a sufficiently strong signal to hear you above everyone else, so it comes down to making yourself heard among everyone else. Even so, there are times when a pile-up becomes so chaotic that you have to accept the fact that there is no chance of getting through. It is worth remembering that the guys with the towers and beams will be chasing the real exotica, if about, which can often leave the more mundane (to them) dx scratching around for contacts. It can pay dividends to find out when a dxpedition to a really rare spot is on the band. Not that you'll be trying to get through the resulting fracas, but with the world and his wife all heaped up on one frequency you would be surprised what can be found elsewhere on the band.

Operating times can play a large part in successful dxing. There is a well-known peak in propagation around sunrise and sunset, often referred to as greyline propagation. Details of calculating greyline paths with or without the use of a home micro are given in [11] [12] and [13]. In addition [13] gives details of the mechanics of the mode. One mechanical aid to finding greyline paths [14] consists of a world map plus overlays for each month with notes as to its use. Incidentally, for those who would like to expand their knowledge of propagation I would recommend [15] from the library. Much of it would only be of interest to professionals, but that still leaves a wealth of information and further references of use to amateurs.

With most amateurs aware of the benefits of being around at sunrise and sunset, the bands are usually quite busy then, but fortunately there are a couple of dodges to get around the crowds. At sunrise, Europe has full sun-up shortly before the UK, so consequently conditions start to fade for Europe slightly sooner than ourselves. The short time for which the UK still has dx propagation can sometimes be used to advantage.

The time of sunrise and sunset varies throughout the year. Since most people have difficulty in getting up early, anyone who manages to be on 7MHz by 0500gmt in September will find the band full of dx with few takers. As winter approaches, sunrise gets later and the competition increases with breakfast tv timebase hash as the *coup de grâce*.

If early mornings are out of the question, then 0000 to 0100gmt is a good time on lower frequencies. Most of the bc QRM on 7MHz seems to go away and receiver front-ends have an easier time. The 7MHz band is often thought of as pure noise, but most of it is generated within the receiver, and judicious use of a 20dB attenuator can work wonders.

With sunspots few and far between, conditions on the hf bands will be patchy for the next couple of years, but fortunately the lower frequency band conditions are superb during the winter months. They will not be this good again for another 10 years, so it pays to make the most of it. In addition, why not give cw a go? High speeds are not necessary and 15 wpm will do fine, although I would recommend the purchase of a cw filter. I first started using cw seriously several years ago when a bout of laryngitis prevented phone operation for several days, and now use it almost exclusively. It's a mode worth persevering with.

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- [2] *HF Antennas for all Locations*, RSGB.
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- [4] R Benham-Holman, G2DYM, Uplowman, Tiverton, Devon.
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MAKING PRINTED CIRCUIT BOARDS – A DIFFERENT VIEW

John Case, GW4HWR*

Sooner or later most home constructors find the need to make their own pcbs, and will probably use the methods that are so often described in various magazine articles. Here are some ideas of a different method of making professional-looking boards, and details that enable some of the equipment required to be built at low cost.

FOR MOST OF US the first attempts to make a pcb involve taking a piece of copper laminate, cleaning it carefully by means of fine wire wool or a special abrasive rubber, and then putting on the foil pattern by means of an etch-resist pen. This is relatively quick but cannot produce the fine detail required by most modern circuits.

The next step would be to lay down the foil pattern by the use of rub-down transfers which form a good etch resist and also allow the pattern to be laid down with a fair degree of neatness and accuracy. This method is slow and requires considerable patience (a commodity usually found in home constructors), but when copying a foil pattern from a magazine the actual method of transferring the pattern is quite difficult.

After considerable work using either of the two techniques, the board is etched and, hopefully, a successful pcb is produced, but things do go wrong: eg the etch solution is exhausted or polluted, the etch resist comes off during etching or, worst of all, the circuit has been laid down as a mirror image. The board is useless but, more important, all of the time and work in preparation has been wasted.

The photographic method of preparing and making a pcb avoids most of the problems and is not nearly so difficult as many people believe. The process involves producing a positive transparency which is placed in contact with a photo-sensitive board and exposed to ultra-violet light (Uv). At the end of the exposure, the board is developed in a simple solution in which the exposed areas of the photo-resist material are washed away leaving the foil pattern covered in resist material. After washing in cold water the board is etched in the normal manner. If there is a mishap, as previously mentioned, or if components need to be added or connected in a different way, the original transparency can be modified and another board produced with very little extra work.

Most constructors are unable to make use of this process because they don't have a suitable Uv light source. Sunlight can be used, but it is slow and variable, so that it is almost impossible to judge the correct exposure. A Uv light box designed for the above and other applications can be built for about £15 (the cost of buying two average prepared boards) compared with about £60-£70 for an equivalent commercial unit, and is described fully later.

Producing the transparency – Method 1

Use rub-down transfers onto a polyester drafting sheet that is Uv clear – in other words, ultra-violet light will pass through it. I prefer to use sheets carrying a 0.1 by 0.1 in graph matrix which makes it much easier to lay out the circuit, especially when designing your own; the graph pattern does not print when exposed to Uv. Drafting sheets are obtainable from a number of suppliers of pcb materials. The one I use most often is that sold by RS Components or their mail order connection Electromail. It appears rather expensive at about £6 for a pack of 20 A4 sheets, but a pack will provide a large number of transparencies. If drawing up your own circuit, lay it out from the component side of the board so that, when printing, the symbols will be against the photo-sensitive material. If a diagram from a book or magazine is being copied, it will be easier to copy the foil

pattern by laying a piece of drafting sheet over the diagram, holding it in position with small pieces of pvc adhesive tape and rubbing down the transfers to cover the pattern below. When this is printed the symbols will be separated from the board by the thickness of the sheet and some undercutting by the Uv will take place. This will not matter except when very thin lines are being used, and a way to minimise the effect will be mentioned later.

When buying rub-down transfers it is important to obtain those which do not crack or pickup those pieces already laid down when other fresh items are being rubbed down. This latter effect can be most frustrating when a fairly high density pcb is being drawn up. I prefer transfers of a tougher plastic nature, such as Alfac, to those supplied by RS Components. These are obtainable in many different shapes and from most radio component retailers. The actual types used obviously depends on personal preferences and on the kind of circuit being produced. Those I use most commonly are shown fullsize in Fig 1 together with the Alfac reference number. Keep completed parts of the work covered as far as possible to prevent damage by the sticky backing of the transfer sheets.

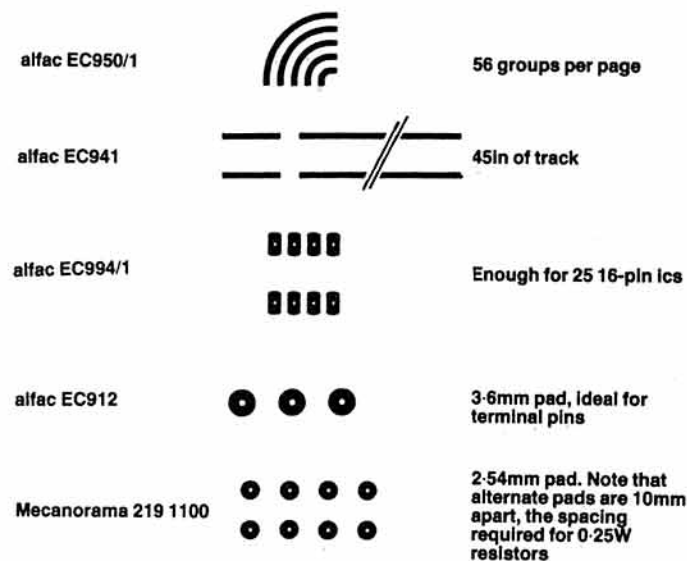


Fig 1. A selection of transfers shown full-size

In addition to the transfers, pens with waterproof and opaque ink are very useful. Staedtler Lumocolor 313 (very fine) and 317 (medium) are very suitable and are obtainable from most office stationery retailers. The fine pen can often be used with a straight edge to lay down straight track and the outlines of large areas that need to be made opaque. It can also be very handy when small cracks and other damage need to be repaired; in spite of all the care you take, some damage will occur so just keep the patience going. The same pen is used to prevent the undercutting previously mentioned when the foil pattern is being traced from a print. This is done by reversing the completed drafting sheet and carefully covering the reverse of the thin tracks using the fine pen.

Other useful tools are a fine pointed knife or scapel and a typewriter rubber (in the form of a pencil). The knife is used to cut straight track and curved transfers (while still on the backing sheet) to appropriate length and for removing any transfer or ink incorrectly laid down. The rubber is excellent for cleaning up an area after corrections have been made with the knife. Keep rubbing down the pattern already laid down with the special backing provided, using the rounded end of a pencil. You will find

*2 Abbey Close, Tyrlhiw, Taffswell, Mid-Glamorgan CF4 7RS.

that a medium soft pencil is better for rubbing down the transfers than a ball point pen which tends to split them. Large areas can be filled in using the medium pen and if difficulty is met in getting completely opaque areas, again turn the sheet over and repeat the fill-in on the reverse side of the transparency. When the foil pattern is complete, mark any terminal pins, eg IN, OP, LO etc, using alpha-numeric rub down transfers (Letraset). This helps the process of putting in the components at a later date and also makes life easier when connecting up. Also add your callsign, making sure that it will be the correct way round when printed. This is not just pride, it also serves as an indicator when placing the transparency on to the copper laminate. Now hold the completed positive up to the light or, better, lay it on an ordinary light box, if you have one, and examine it carefully for cracks in the pattern and repair as necessary. If you intend making a number of boards to the same pattern, it would be a good idea to make a more permanent copy as described later.

Hold the transparency so that the foil pattern is the correct way round, ie your callsign is right and lay the face you are looking at down onto the glass of the UV box. Take a small piece (off-cut) of photo-resist pcb and peel off the protective coating; avoid bright sunlight, normal daylight will not harm the coating. Lay the piece down on the transparency so that it covers a dense portion of the pattern and, of course, with the emulsion side down. Now make a test exposure, usually about 5-6min is necessary when using the light box described and RS drafting sheet. Develop in a solution of sodium hydroxide made by dissolving 25grams of caustic soda in one litre of water. Any friendly chemist will make this up for you, or if you wish to make it yourself, ask for industrial caustic soda and dissolve 25 grams, about four heaped teaspoons, in one litre of cold water. Take great care, the crystals are very corrosive. Replace the lid of the container tightly as the crystals are deliquescent (they absorb water) and the whole lot will become solid. The solution is mildly corrosive, so keep it off your hands and clothes. Use plenty of water to remove any that gets in the wrong places. After about 30s the image should appear and the etch resist will be washed from the clear areas. When the copper appears to be clear, wash the piece thoroughly in cold water, gentle rubbing with the fingers during washing helps to remove any redundant resist. Now examine the test piece carefully. If the pattern of the grid is clearly visible, the exposure was too short although small patches of faint grid will be etched away in the ferric chloride solution. If the strips on the board appear to be thinner than on the transparency, the exposure was too long.

Cut a piece of photo-resist pcb about 5mm bigger-all-round than the transparency, drill a small hole as close to one corner as possible and remove any burr. Strip off the protective coating from the board and carefully align the transparency in the centre of the photo-resist side, making sure that it is the correct way round. Two small pieces of Sello-tape may be used to hold the two together, then lay the combination on the glass of the UV box so that the transparency is against the glass. Time the exposure carefully.

Develop, and wash very thoroughly as before. It is important to keep the board wet until it is put into the etch bath, otherwise resist residue will dry on the surface and prevent correct etching. If the etch bath is deep, tie a piece of pvc "hook up" wire through the hole to make it easy to remove the board from the etching solution. Return the sodium hydroxide to the bottle, as it can be re-used many times.

Method 2. Photo-copy

This is suitable for foil patterns published in books and magazines. If the design is not exactly right for your needs, minor modifications may be made by whitening out the areas to be changed with type-writer correction fluid, and replaced with transfers or pen as previously described. If you do not wish to deface the original (it may not be yours) have a photocopy made and modify the copy. When satisfied that the pattern is that required, have another copy made but this time ask for a transparency. This is the same as any other copy except that it is made on transparent "paper". Most professional copiers will provide such a copy, but the price is a bit more than the standard. Don't be tempted to print this on photo-sensitive board; it is not dense enough and the resulting pcb will be patchy at the best. A good and very durable copy is now made using Reprofilm. This is an orange-coloured film that can be handled for short periods in ordinary room light, but in the long term is stored under light proof conditions like any other photographic film. When the film is exposed to UV light and developed in a special solution, the exposed areas become clear and the unexposed parts turn black. Cut a small piece of film about 1 by 2in and return the remaining film to its envelope. Lay the photocopy on the glass plate of the UV box and put the piece of film over a densely-populated part of the pattern, close the lid and expose for about

2-3min. The developer can be applied by means of a small wad of cotton-wool. Wipe both sides gently.

The pattern will appear almost immediately. There is no advantage in prolonging the development, wash the piece carefully in cold water. Hold the film up to the light and examine carefully. The clear areas should be clear, and the black a deep purple. If the clear areas are muddy the exposure was too short, and if the black parts only moderately dark or patchy the exposure was too long. When the correct exposure is found it should be remembered as it will be constant for other transparent copies when using your own light box. If during the washing process the print comes off, don't worry, as this is only the top layer and gentle rubbing with the fingers will remove the rest of it. If you are careful and sparing with the wash, the problem will not occur and a denser copy will result. The whole diagram can now be printed using a piece of film a little larger than the foil pattern. After washing, pin one corner to the edge of a shelf and allow to dry or speed up the process with the aid of a hair dryer. When dry, the transparency can be used to print the photo-sensitive pcb; an exposure of about 3min would be necessary, although it would be a good idea to make a test using a small piece of board. Again the time will be constant for a particular type of pcb.

If minor alterations need to be made in the photographic copy they can be done by carefully scraping off the black coating with the scalpel, but remember that the pattern is now on both sides of the film, then put in the new pattern by means of transfers or the Lumocolor pens. As already mentioned, the Reprofilm copy is very durable and if a number of identical boards are to be made it is a good idea to make a copy of a pattern laid out on drafting film, as this is very easily damaged. It must be stressed that printing with Reprofilm is very simple and there are none of the problems that are met with ordinary photographic processing; in fact, it is easier to make a copy than to produce the pcb! One problem does occur, however; the film and developer are easy to obtain but in rather large and expensive quantities. Instagraphics Products Ltd will supply a pack of 10 A4 sheets of film and a one litre bottle of developer for about £25. This quantity will make 40 to 50 medium-size pcb foil patterns. I would suggest that a number of people should get together to buy a pack and to divide it up. The same firm will also supply an excellent range of rub-down transfers and drafting film. They will provide a full catalogue free of charge, when writing, request also the Mecanorma catalogue of artwork aids.

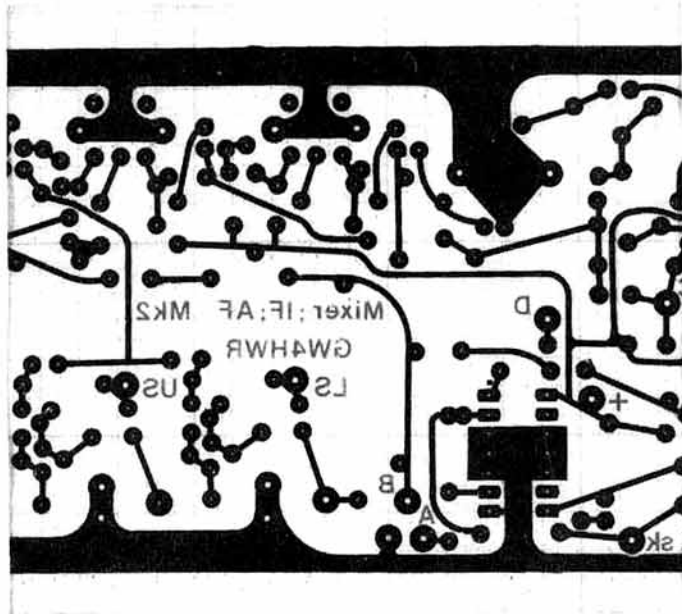


Fig 2. A finished transparency on drafting film. The side shown should be in contact with the sensitive side of the pcb material. The legend etc are mirror image and are on the reverse side

Method 3. Copy on to drafting sheet

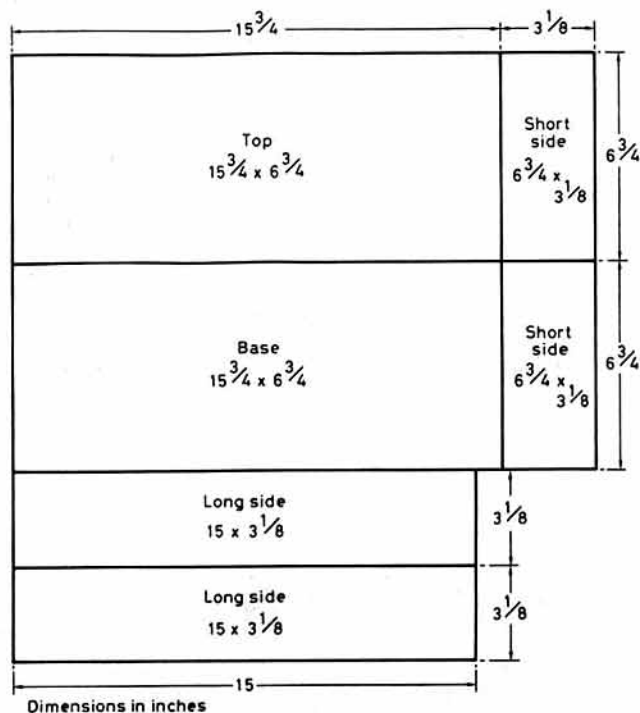
This is the easiest way of making a transparency from a printed foil pattern, but requires the facility of being able to put a piece of A4 drafting film into the copier. Put the drafting paper on to the top of the paper in the magazine and then print in the normal way. An excellent copy will result which can be printed in the UV light box on to photo-sensitive pcb.

Double-sided boards

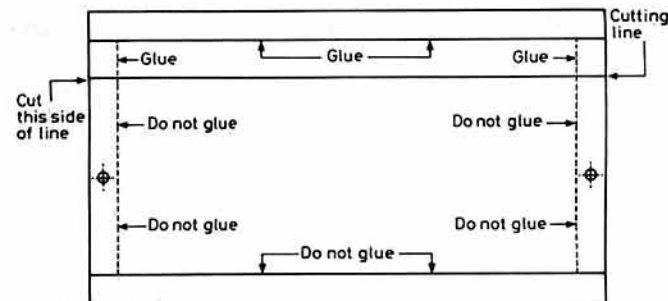
These are no problem when the UV process is used. Take a strip of pcb material a little longer than the foil pattern and about 0.25in wide. Use small pieces of Sellotape to attach one transparency to the strip so that it is just outside the pattern area. Hold the other to the other side of the strip and adjust the position until the correct holes coincide, then fix to the strip. Remove the protective coating from both sides of the pcb and slide it in between the two transparencies. Again fix with tape and expose both sides to the UV light in turn.

The light box

This is a very simple device requiring very little skill other than the ability to make a wooden box. The dimensions given are not very critical and may be modified to accommodate a large choke than the one quoted. The window area should not be made any bigger as it would then be possible to put boards and film in a position of reduced illumination.



Many would-be cabinet makers avoid making boxes because of the difficulty of making the top fit the bottom. This problem can be avoided and a top produced that will fit, even if the box itself is rather mis-shapen. Top and bottom are made up in one piece then the top is sawn off. If you are lucky you may be able to convince your diy supplier (especially if he is a builders merchant) to cut the six pieces for you. If not, a piece of 3/8in (actual dimension) ply about 21 by 20in will be required. Cut the pieces as accurately as possible and clean up the edges with a plane. Mark the top edge of all four side pieces and then draw a line exactly 0.5in below the top edge. Also draw a line on the outer surface of the top and bottom, 3/8in from each edge which will act as a guide for the nails. Use a good woodworking glue. (I prefer Cascamite made with a little less water than



recommended), and 0.75in panel pins. Note: 1in pins are too long and will foul the saw when the top is sawn off later. Starting with the top, drive pins (in the centre of the 3/8in strips) through the long and short edges so that they just emerge on the other side. A spacing of 3in is about right. Do the same with the bottom.

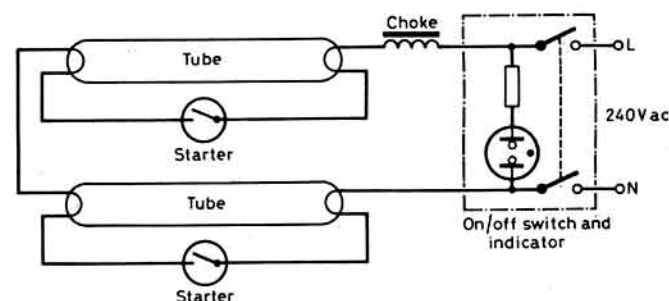
NOTE. The lower part of one short side must not be glued (see Fig 4) as this piece must be removable to allow access to the tubes and starters etc.

Coat the top of one short side with glue, align the top with the side and drive in the nails. Before the heads disappear, check the alignment and if not correct withdraw the nail with pincers or pliers and repeat moving the nail a little to one side of the first position. When satisfied that all is correct, hammer the nails right in. Next coat the top edge of one long side, bring the top and short side into position, making sure that there is no gap between long and short sides, and drive the nails in. Now coat the top edge of the second short side and top 0.5in only of the two long sides and nail. Do not drive the nails in the lower part of the short side all the way. Leave 1/8in protruding so that they can be removed later. If you have not already done so, nail the other corners but do not put nails closer than 0.25in of the line drawn 0.5in from the top.

Now glue and nail the bottom. Once again leave the nails in the unglued short side protruding. Wipe off any excess glue with a damp cloth. The next job is probably the hardest part. Leave the glue to set; at least overnight! When dry, tidy up the edges with the plane or rasp and sandpaper. Now cut off the top. Hold the box as securely as possible. If you have a Workmate-type bench it should be no problem, or perhaps you could borrow one for this task. If not, hold the box as tightly as possible. Starting at the short end which is not glued at the bottom, saw just to one side of the line drawn 0.5in from the top edge. It is now 7/8in from the top because of the top board. Try to keep the line just visible and saw very slightly below it so that the inside depth of the top is a full 0.5in deep. Turn the box as necessary and continue sawing. If it is necessary to clamp across the depth of the box make sure that the gap already sawn is not squeezed together. Put in pieces of card or pcb to keep the gap open and so prevent the saw jamming. Take special care when the cut is almost complete, hold the top so that as the last bit is sawn it does not break away. Clean up all the edges with plane, rasp or sander.

You should now have a box with a fitting lid. Using a small drill (2mm or No 44), drill holes in the centre edges of the unglued short end; right into the sides. See Fig 4. Remove the nails that are sticking out and gently tape the side piece out.

The hinges are let into both top and bottom so that there is almost no gap when the lid is closed. The recess can be cut with a coarse file. Drill a 0.25in hole in the right-hand short side about 1in from front and bottom for the mains lead. The mains switch should now be fitted about 1.5in from the right-hand edge and 1in from the top edge. The exact position and size of hole will depend on the type of switch chosen. Make sure that it is a mains type, preferably double pole and, if possible, with a built-in neon indicator to show when the light is on. Alternatively you could use a separate indicator.



The choke, starter lamp holders and lamp holders (or Terry clips) can now be fitted in accordance with the dimensions given in Fig 6. If Terry clips are to be used to hold the tubes rather than batten type tube holders, the centre of the tubes should be about 0.75in above the floor of the box. If less than this, use spacers under the Terry clips. I used OBA full nuts for this purpose. Check that the tubes together with their end connectors will fit, and then remove all parts from the box. Cut a piece of kitchen foil the same size as the bottom of the box, try to keep it free from creases and using dilute glue or wallpaper paste, glue the foil to the bottom of the box with the shiny side facing up. Smooth out as far as possible and press the foil over the component fixing holes with a finger to locate the screws

later. While the glue is drying locate the components in their approximate positions and wire up as shown in Fig 6. It is much easier to connect up this way as space inside the box is rather limited. Use mains-grade insulated wire. The inners of mains flexible cable would be in order. When the glue is dry re-fix the components in the box keeping the wires in the corners as far as possible. Fix the on/off switch and connect a 1.5m length of two-core mains lead. Connect the output side of the switch to the choke etc. Use a small cable clamp to prevent strain on the switch when the cord is pulled. A 13A plug top fitted with a 3A fuse completes the electrical installation which may now be tested. Note: the output from the 8W tubes is relatively harmless but do not leave switched on without the top in position and do not look closely at the lamps for more than a few seconds.

To get a professional finish the box can now be covered. A local bookbinder can usually supply thin book cloth which is ideal. Use carpenter's glue and allow an inch to turn in at the edges.

Enlarge the two holes in the small free end to accommodate 0.75in self-tapping screws. Fit the hinges and small catches so that there are no undue gaps between top and bottom. Cut two pieces of plastic sliding door channel to fit inside the long edge of the box. Screw and glue the

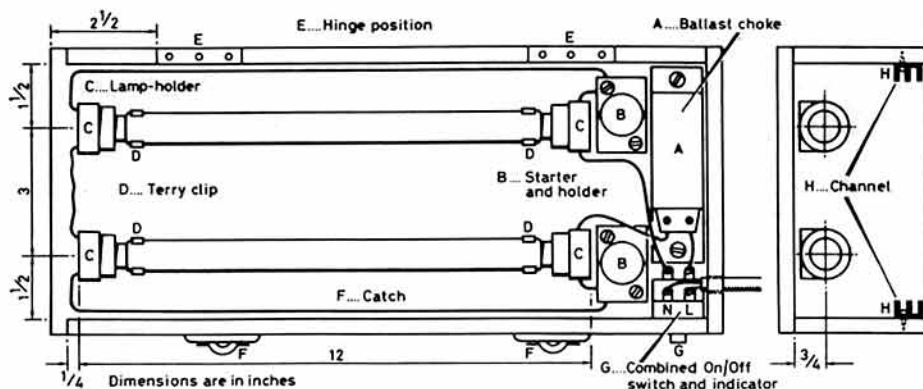


Fig 6. Layout of components and critical position of tubes

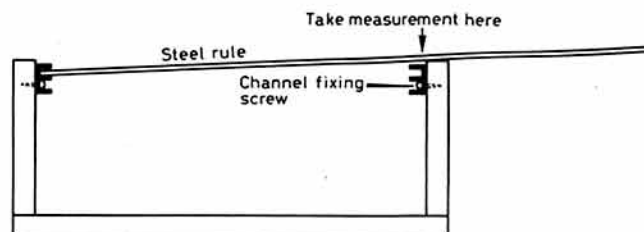


Fig 7. Measuring the required width of glass

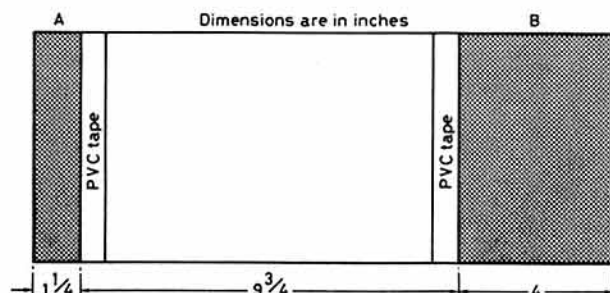


Fig 8. Masking the glass and area to be painted

Materials and useful addresses

Drafting film and rub-down transfers: RS Components (Electromail), Instagraphics Products Ltd, or Cirkut.

Reprofile positive film and Reproline developer: Instagraphics Products Ltd. Instagraphics Products Ltd. Ashfield Industrial Estate, Low Hall Road, Horsforth, Leeds LS18 4EF.

Electromail, PO Box 33, Corby, Northants NN17 9EL. 3M: Graphic Arts Group/3M, 3M United Kingdom PLC, 3M House, PO Box 1, Bracknell, Berkshire RG12 1JU.

This last address is very useful. Once you have a UV light source, lots of other processes become possible. Fancy labels is one. Write asking for details of Photolabels. They will give you details of local stockists and will probably send some samples and very nice illustrations of the type of label you can produce.

Light box parts

Two 12in 8W UV tubes TL @ £2.45 £5.90

Two starters @ 35p 70p

Two starter holders @ 40p 80p

One 13W choke (Optima) £2.60

All above from electrical wholesaler. Prices quoted are those paid by the author and do not include VAT.

Four Terry clips @ 12p 48p

One piece of book cloth 1 by 1.5m £1

One piece of 0.75in foam 30 by 12in 50p

3/4in ply, 0.75in panel pins, hinges and catches all in junk box

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channels so that they are almost level with the top. The 3/4in screws should be in the lower slot.

Use a steel rule to measure the distance between the bottoms of opposite pieces of channel. Check at both ends and in the centre and use the smallest measurement. Measure the length between the short ends and obtain a piece of 3mm or 4mm glass with these dimensions. Measure very carefully and reduce the width by about 1mm to make sure that it will slide into the top groove of the channel. Mask the glass as shown in Fig 8 and paint areas A and B using black paint. When dry, remove the tape. Slide the glass, painted side down, into the top slot of the channel and fix the loose end into position.

Finally cut a piece of soft 0.75in foam to fit inside the lid and hold in position with a few spots of glue. The foam acts as a pressure pad to hold the transparencies and film/pcb together. The box is now complete. □

TECHNICAL FEEDBACK

"A QRP transceiver for 1.8MHz", S E Hunt, G3TXQ. *Radcom* September 1987, p654.

In response to requests from constructors who wish to move the frequency to 3.5MHz, the author has supplied the following revised component values:

C27, 29 220pF silver mica.

C28 18pF silver mica.

C49 56pF silver mica.

L1,2 30t on T68-2 core tapped at 4t from ground.

L5 30t on T68-2 core tapped at 7t from ground.

Remove C26 and C30

Coverage will be approximately 3.6-3.8MHz.

A number of correspondents have had trouble in finding cores for T1.2 and T3.4. Alternatives to those specified can be obtained from Electrovalue Ltd, these are:

T1.2 Electrovalue Part No. K0038X830 ring core.

T3.4 Electrovalue Part No. A0004X030 twin hole bead.

"Reduction of rf breakthrough from the BBC microcomputer", J C Worsnop, G4BAO. *Rad Com* December 1987, p906.

Mr R Broadbent, G3AAJ, secretary/treasurer of Amsat-UK and editor of *Oscar News*, has pointed out that details of the "professional" zinc spraying, and many of the modifications in the article were included in a note available to Amsat members published in 1983. Many of the hints and tips were passed to me via the amateur radio "grapevine", and I was unaware of the published note at time of preparation of the article. He is not suggesting that the article should not have been published, and in fact has included the following extra information which may be of interest: "The price for the Decco spray zinc process is £20 plus VAT; the company will mask the cases, and refurbish them after spraying". He agrees that the main sources of radiation after case spraying are the connecting leads. In the original note it was stated that the plug top would not pass through the hole in the case, I still maintain that mine did!

G4BAO

Technical Topics

Pat Hawker, G3VA

FIRST THIS MONTH, I must thank the many readers who took the trouble to write and express their conviction that there is still a place for *TT* in its established form in which both new and "old" (but potentially useful) technology finds a place. Rather to my surprise there were no contrary views, at least in the letters sent to me. It is primarily a matter for editorial rather than contributor decision and it would be unduly self-indulgent to quote many of the letters; but, for example, L N Buck, G0DLR, shares my concern over a too uncritical acceptance of microprocessors built into transceivers for amateur radio, no matter how useful they may be for commercial and military circuits where the criteria are different and the contacts are not made for the interest and enlightenment of the operators.

G0DLR writes: "That microprocessor-controlled equipment is easy to operate is undoubtedly true, especially with solidstate power amplifiers and linear amplifiers that automatically tune themselves. However, when tuning and loading my old-fashioned FT101ZD with its unprotected valve output stage, and my equally outdated homebrew linear with its incredibly ancient 813s, I am in control of the equipment and do have a fair idea of what goes on inside; unlike, I suspect, a lot of the owners of the latest 'automated' equipment which does practically everything except hold the QSO (The latest generation of adaptive automatic hf radio systems developed for commercial/military applications by Plessey and Rohde and Schwarz does even that in designing the operator right out of the system - G3VA). Making radio gear so easy to operate is without doubt brilliant technology, but puts its construction and design beyond the abilities and pockets of all but a very few, and if equipment becomes so 'clever' that its adjustment and maintenance by the operator becomes unnecessary, one might as well use the telephone, which can give worldwide communication at a fraction of the cost."

"One of the features of modern equipment that intrigues me is the proliferation of memories. Do people actually find uses for these? Some years ago I was able to acquire at bargain price a remote digital vfo for my FT101ZD, and this is festooned with memory buttons. I'd love to be able to justify them! The vfo is occasionally useful but most of its life is spent sitting alongside the rig with its display and l.e.d.s glowing and looking impressive!"

In looking this month at some aspects of microprocessor-controlled transceivers and receivers I would also stress that such techniques require the use of synthesizers, which in the low-cost amateur-budget form place a finite limitation on performance in terms of near-in dynamic range, and often on the not so near-in. Purchasers need to balance the operational convenience against critical on-air performance.

Tomorrow's equipment

The recent items on the high-performance "ultimate" lf/mf/hf receiver developed by Ray Howego, G4DTC, have indicated that current, factory-built equipment designed for the budget-limited amateur market still involves a number of significant compromises, some demanded by features that many (though not all) have come to accept as essential. G4DTC highlighted problems stemming from all-solidstate front-ends with broadband pre-mixer selectivity, pll frequency synthesis, digital noise arising from inappropriate lay-out/inadequate screening/filtering of digital frequency read-out etc. He solved these problems by not using a pll synthesizer, by the use of two thermionic devices (PCC189 cascode rf amplifier/7360 beam-deflection mixer) and free-running Kalitron hf local oscillator and no microprocessor control systems, while emphasising that it is not sufficient simply to use such configurations without very careful consideration of such traditional factors as gain-distribution, gain-control and pre-mixer selectivity.

Coincidentally, the annual "receivers issue" of *Ham Radio Magazine* (November 1987) included two important articles on modern receiver design. Robert J Zavrel, W7SX, in "Tomorrow's receivers: what will the next 20 years bring?" refers to many of the same problems noted by G4DTC but forecasts that these may be gradually overcome in future by using new technology that has still to impact on amateur receivers and transceivers.

concentrating on increasing the dynamic range of mixers by the use of improved passive ring mixers in which a number of diodes are paralleled in order to improve their strong-signal performance. Such devices are costly and also require a great deal of local oscillator power. For example, to handle an rf signal of 100mW the oscillator output needs to be at least 1W, since a ring mixer needs roughly 10 times the rf signal power to achieve optimum results as a linear commutation (switching) mixer, preferably with the drive in the form of a near square-wave signal.

W7SX sees one solution to this problem in the use of the integrated passive fet ring mixer as exemplified by the Siliconix Si8901. This was described, following the receipt of information directly from Ed Oxner, KB6QJ, of Siliconix, for the very first time in any amateur radio journal in *TT* March 1986, and also in my contribution to IERE Conference Book No 64, July 1986 "Dynamic range: fact or fiction?" W7SX writes: "With this device, gate voltage rather than a forward-biasing current turns the switches 'on' and 'off'. Since the gates represent high impedances, voltage/power ratios can be increased, thus lowering the local oscillator power requirements dramatically. Indeed, to handle the same 100mW rf power of our diode ring example, the Si8901 requires about 25mW of local oscillator power instead of the 1W mandated by the diode rings. The other critical specification is the third-order intercept point, which is necessary for defining the useful dynamic range. Again, the Si8901 greatly surpasses the old diode ring mixer."

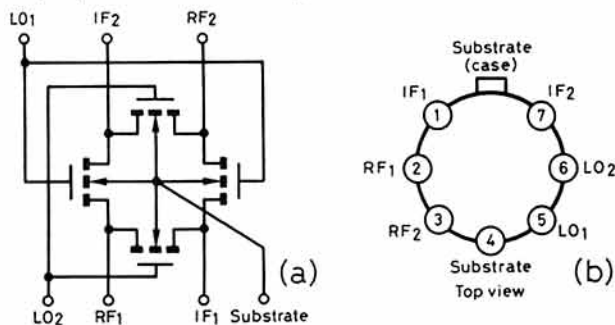


Fig 1. Siliconix Si8901 ring demodulator/balanced mixer: (a) Functional block diagram; (b) Pin configuration with Si8901A in TO-78 and Si8901Y as surface-mounted So14 configuration

In *TT* March 1986, KB6QJ reported his experimental Si8901 mixer with a resonant-drive transformer as achieving third-order intercept points of +39dBm (input) with only +17dBm of local oscillator power. Others had reported third-order intercept points of over 40dBm presumably with increase of oscillator power. Figs 1-3 are taken from the Siliconix publication "Designing a super-high dynamic range double-balanced mixer" which incorporates the Siliconix Application Note (AN85-2) on this device. As mentioned in *TT* August 1986, this is available from the Publicity Department, Siliconix Ltd, Morriston, Swansea AS6 6NE (tel 0792 74681). A recent enquiry indicates that this device is available both in a conventional can mounting as the Si8901a, and as a surface-mounted device. In small quantities the Si8901a costs just

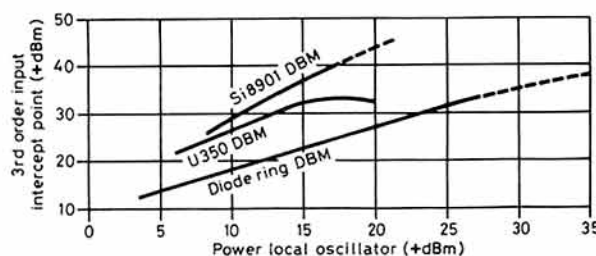


Fig 2. Performance comparison between Si8901 dbm, U350 fet active dbm and diode ring dbm

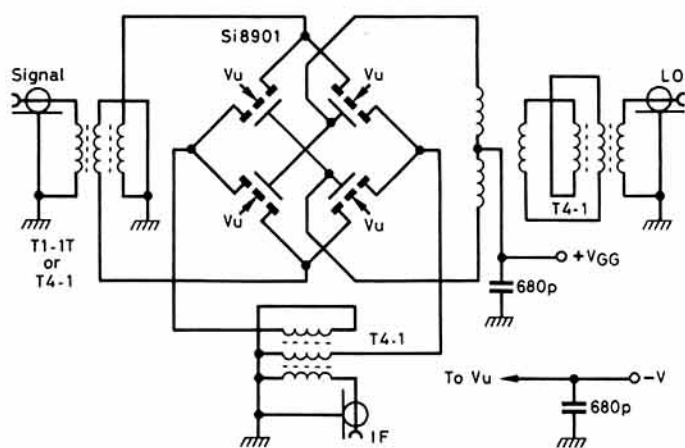


Fig 3. Ed Oxner's prototype commutation double-balanced mixer as described in the Siliconix application notes

under £13, which puts it in much the same price bracket as the 7360 mixer (you can't expect to be as lucky as G2AUB who admits to once buying three 7360 valves for three shillings!). W7SX believes that the Si8901 should also make an excellent active mixer, using the same concepts as for the old U350 jfet devices.

W7SX considers that synthesisers offer distinct advantages in that they can be directly controlled by microprocessors and do not require special mechanical rigidity or moving parts, but admits that at present it is difficult, if not impossible, to duplicate the permeability-tuned oscillators of the 'sixties with pll synthesis, given the constraints of typical amateur budgets. He notes, however, that another type of synthesiser – the “direct digital synthesiser” – holds great promise for the future. It is also possible that synchronous oscillators, as in the old-style synchrodyne receivers, may provide a solution.

Microprocessors in receivers

In the same "receiver" issue of *Ham Radio* (November 1987), another well-known designer of advanced military hf receivers, Professor Ulrich I. Rohde, KA2WEU/DJ2LR, contributes an article "Designing a state-of-the-art receiver", sub-titled "Readily understood - though not greatly utilised - concepts mean better performance". In this he stresses: "The state of the art in hf receiver design using semiconductors has improved greatly. The use of either CATV-type transistors (ie transistors developed specifically for the distribution amplifiers in cable television networks) and double-balanced mixers using hot carrier diodes or double-balanced mixers with switch-type fets have eased the large-signal handling problem of just a decade ago."

But he adds: "One weak link in the chain, however, remains; this is the synthesiser, with its inherent noise contributions. To a large extent the overall architecture of the receiver and the synthesiser determines the performance, and even the best high-performance components – placed in the wrong sequence – can cause a good design to fail."

DJ2LR devotes much of his article to the use of microprocessors in receivers, although he carefully distinguishes between the *essentials* of high-performance receivers and the additional "bells and whistles" features made possible by microprocessor-controlled synthesizers: Fig 4. He notes that these features include improved user interfaces or computer interfaces for remote control. Since the commercial and amateur markets are price-sensitive and also very sensitive to proof of performance, any claims of lower capabilities are noticed: "Consequently, when on-the-air tests of some late-model receivers suggested poorer performance than previous models, this raised the question of why, despite the knowledge acquired in recent years, such an inconsistency should occur."

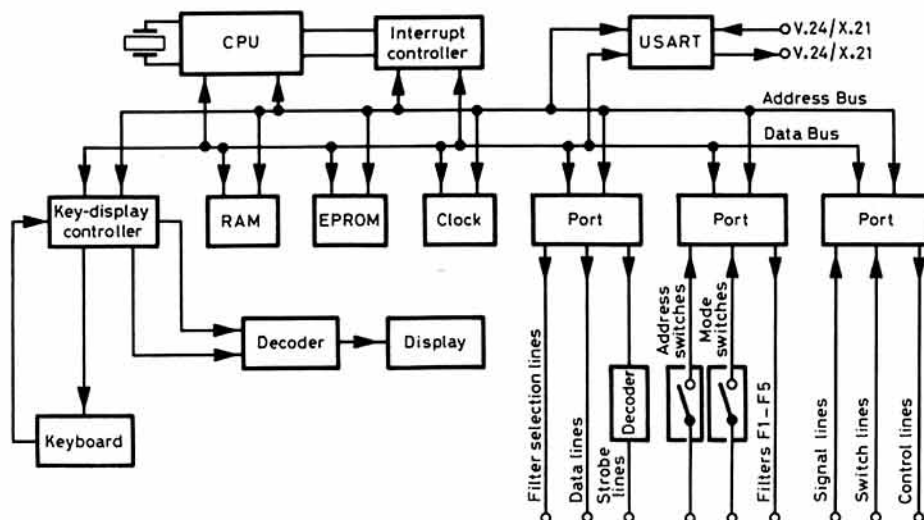


Fig 4. Architecture of the elaborate internal computer system found in modern professional fully-synthesised receiver (DJ2LR)

In effect, as I understand it, DJ2JR recognises that the inclusion of pll synthesisers in a high-performance, amateur-budget receiver, in order to provide "bells and whistles" features, still involves accepting some degradation of its basic performance as a receiver. It thus remains a matter for individual amateurs to decide which is the more important to them; the basic performance or the bells and whistles features.

DJ2LR notes that the sections of the synthesiser most vulnerable to picking up extraneous signals are the lines going into the output vco. Inexpensive solutions frequently lead to high-impedance feeding points which then become "antennas" collecting all the switching noise; another reason for noisy synthesisers is the use, in the synthesiser loops, of operational amplifiers that are too noisy. Either discrete low-noise amplifiers or Darlington stages should be used. Detailed analyses of the noise and jitter sources in pll synthesisers have been given in professional papers by such writers as Professor Mike Underhill, G3LHZ, and Peter Chadwick, G3RZP, in which they stress that on account of its basic simplicity the digital pll is likely to remain a major technique for frequency synthesisers in the years to come, while stressing that an acceptable compromise of low noise and good switching speed can be achieved *only by careful pll design*. For those who value near-in dynamic range etc, there is much to be said for G4DTC's advice that "synthesisers should be avoided like the plague" – at least in the highest-performance, hf receivers.

To do this would involve the omission of microprocessor control which, as DJ2LR points out, enables receivers to feature built-in clocks, frequency-scanning with variable scan rates, availability of at least 100 channels and channel scanning, plus a combination of receiver control functions such as the serial RS-232 or IEE-488 bus remote control capabilities. Because the bfo and the main oscillator are both synthesised, the combination of the two allows either passband tuning or variable bandwidth.

"Another area of interest in the use of microprocessors is the linearisation of the transfer characteristic of the tuning range of the oscillator and the linearisation of the S-meter. The microprocessor can also switch the tuning rates to correspond to the operating mode and select the appropriate bandwidth receiving crystal filters required for that same mode. Digital implementation of signal analysis allows demodulation of rty and morse code. Many other novel approaches are possible . . . One of the frequent mistakes made in this context is the use of only one microprocessor, which gets overloaded, or the use of four-bit microprocessors. In better radios, eight-bit microprocessors, which can handle all these functions efficiently, are used. The best approach is parallel processing."

Automatic receivers

In TT October 1987, I noted the Plessey work aimed at further de-skilling hf operation by using the increasing availability of low-cost computer power to develop an adaptive, fully automatic, hf radio system that can run unattended by any operators. Alan Williams, G3KSU, has sent along further information on this system (Fig 5) as published in the autumn 1987 issue of Plessey's *New Technology*. It is introduced as follows: "Historically, in order to establish an hf skywave link between two points, a pre-arranged frequency-time calling schedule, or a lot of luck, has been required. Assuming that the intended receiving operator is monitoring the correct channels, at the correct time, or using a large bank of receivers

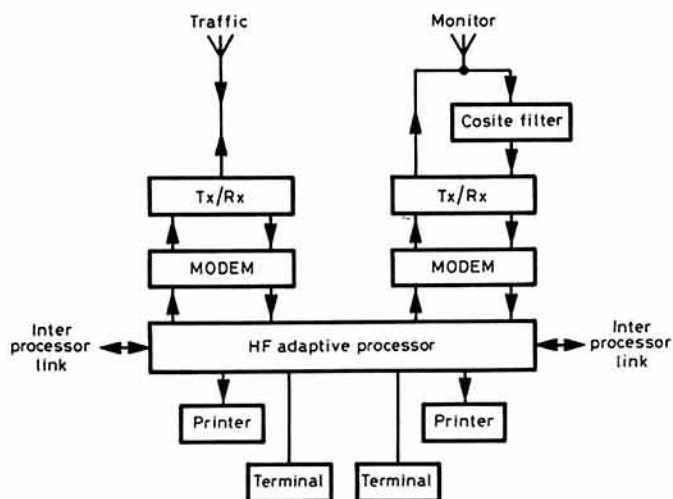


Fig 5. Station configuration of the Plessey automatic and adaptive equipment that finds and selects usable channels, makes contacts with other similar stations and passes traffic without requiring any operator to be in attendance

simultaneously, then the initiating operator would call on different frequencies, in turn, until a reply is received. This method requires skilled operators, and often a great deal of time, to establish a link. The links often fail during natural ionospheric disturbance, even though predictions can be calculated. The establishment and maintenance of communications, using skywave propagation, either without skilled operators or when the ionosphere is highly disturbed, requires an adaptive system with a linking protocol. Plessey Military Communications has designed and supplied to MoD an adaptive system which is both simple to operate and requires a minimum of operator interaction to establish and maintain a network of links. Since each station in the network may be container mounted, if necessary, deployment is rapid and requires a minimum of setting up, prior to traffic transmission.

During 1987, Racal introduced a new range of "modular" receivers (types RA3701-4) for a wide range of professional and military applications that rely heavily on processors, three back-lit crystal display panels and a four-key menu system to control up to 24 special features. The user is instructed how to proceed by messages in the display panel, and provided with elaborate "bite" (built-in test-equipment) facilities. As equipment becomes more and more complex, the requirement for bite facilities becomes more and more important. The Racal system is claimed to operate at five levels:

- (1) Automatically at power-up providing basic processor module and memory tests.
- (2) Continuous monitoring of correct operation.
- (3) Operator initiated confidence check, providing a complete automatic self-test of all modules.
- (4) Fault finding, which calls up any of the automatic tests on request and includes signature analysis. Tests requiring manual intervention, such as remote control loop-back tests, are included at this level.
- (5) Factory test. The receiver cycles continuously through its automatic self-test. Results of the tests are displayed and faults can be investigated further using the bite menu facilities, instructions being provided to the operator at each step.

So there we are, some of the wonders of new technology of digital electronics and microprocessors for those with very deep pockets. But take your choice as to whether all this adds much to the basic interest of amateur radio operating with understandable technology; or comes down to computer talking to computer, with the operator, if any, as an unnecessary passenger.

Powering 12V equipment from 24V supplies

TT (November 1987, p835) included an idea from a reader of *Electronic Australia* on the use of a series of bridge-rectifiers, producing a constant voltage drop for varying loads, to enable 12V equipment to be powered from a 24V vehicle system. Both Jack Wootton, G0AWP and Steve Damon, G8PYP, have expressed important reservations about the technique.

G0AWP writes: "Although this is a novel idea, it has one serious drawback. While admittedly, unlike a ballast resistor, it will provide a constant voltage drop, irrespective of current drawn, it will not provide a constant output voltage when used with a fluctuating input voltage. While

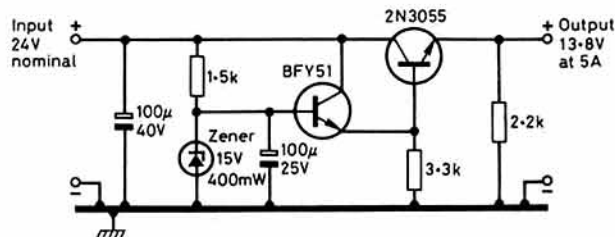


Fig 6. Stabilised voltage regulator suitable for supplying 13.8V equipment in 24V vehicles

this would not be a serious problem if used with a 24V battery not connected into a vehicle system, the supply voltages on vehicles having nominally 24V electrics can be well in excess of 30V when the engine is running, apart from any switching transients. In these circumstances, with a constant voltage drop of about 12V, the output from the diodes could be more than 18V, not to be recommended for a new £400 transceiver!

"I service radio and audio equipments installed in coaches and commercial vehicles, and know of many instances where even well-designed 24V equipment has been damaged by excess voltages, both transient and prolonged overvoltages. Some 24V equipments are fitted with a zener clamp diode across the supply (after the fuse), typically rated at 33V, 6W in order to avoid such damage.

"A much more satisfactory technique is to use a series regulator. The traditional Darlington arrangement with zener stabilization as in Fig 6 is ideal, and is extensively used commercially. Such a voltage regulator need be no more costly to make than purchasing nine bridge rectifiers, and may even be cheaper; many junk boxes will yield a 2N3055 and BFY51 and on a suitable heatsink will easily provide 5A, enough for a typical 10W fm transceiver. The principal advantage is that it supplies a fixed voltage output irrespective of supply voltage fluctuations as well as load variations. There is this not the hazard involved in using a diode chain to power rigs in 24V vehicles."

Steve Damon, G8PYP, raises a different objection to the use of a diode chain formed from bridge rectifiers. He writes: "The Australian writer has fallen into the 'age-old' trap of using bridge rectifiers rather than single diodes, presumably in an attempt to increase the current rating. Consider a bridge rectifier as used in this application: Fig 7. The rectifier consists of four diodes D_A to D_D , with forward voltage drops V_{FA} to V_{FD} . In the real, non-ideal, world, each of the diodes will have slightly different forward voltage drops.

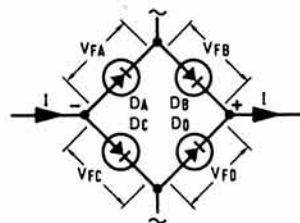


Fig 7. Diode bridge rectifiers have a maximum current rating when used as voltage droppers equal only to the rating of a single diode

"Then if, for example, we assume the voltages are: V_{FA} 0.58V, V_{FB} 0.59V, V_{FC} 0.60V and V_{FD} 0.61V. $V_{FA} + V_{FB}$ is 1.17V and $V_{FC} + V_{FD}$ is 1.21V. The result is that D_A and D_B will conduct, passing all the current, while the voltage across D_C and D_D will never be large enough for conduction to occur. Also, since D_A and D_B are connected in series, each will pass the full load current.

"The result is that the safe current rating of the complete rectifier block is reduced to that of one of the individual diodes. For a typical mobile application (3 to 4A load), it would be more economical to use, say, 18 MR750 (5A) diodes at 54p each, than nine KPC802 (8A) rectifier blocks at £1.37p each (prices taken from Farnell Electronic Components catalogue)."

It is perhaps worth noting that the use of either a series regulator or a diode chain represents an electrically inefficient system since one is drawing twice as much power (VA) from the 24V battery as is being used by the equipment, ie a maximum efficiency of only 50 per cent. This is not important in a vehicle in which the engine is running most of the time, but in circumstances where the recharging or float-charging of the battery presents a problem, a more efficient, though initially more costly, approach would be the use of a 24V/12V switched-mode dc/dc converter which can have an efficiency of the order of 75-80 per cent or so for a well-designed unit.

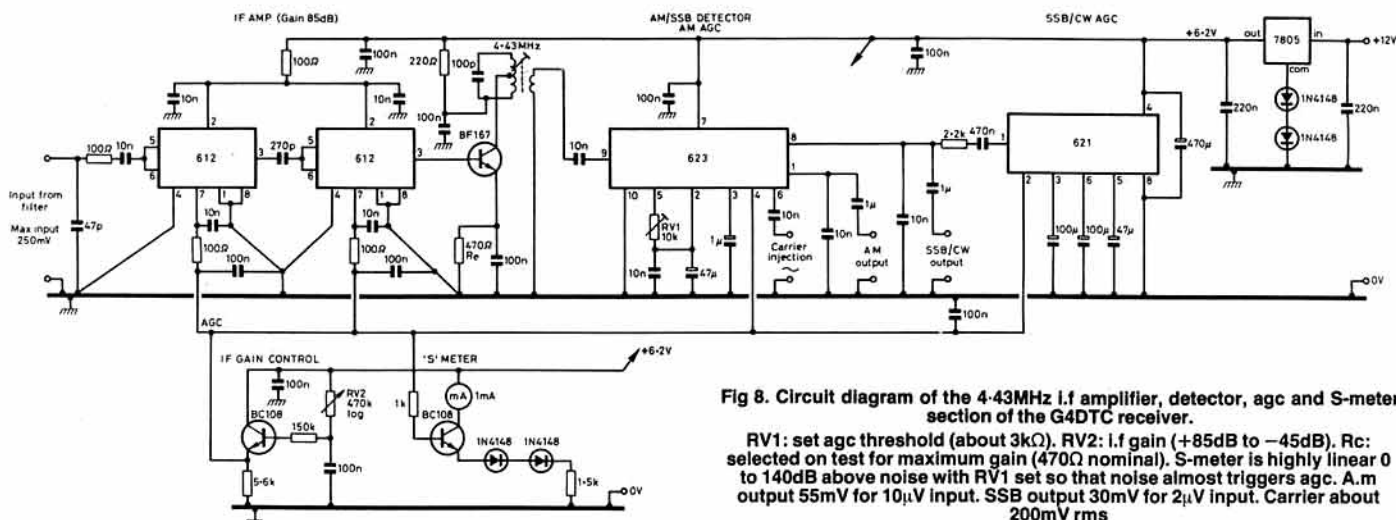


Fig 8. Circuit diagram of the 4-43MHz i.f. amplifier, detector, agc and S-meter section of the G4DTC receiver.

RV1: set agc threshold (about 3kΩ). RV2: i.f. gain (+85dB to -45dB). Rc: selected on test for maximum gain (470Ω nominal). S-meter is highly linear 0 to 140dB above noise with RV1 set so that noise almost triggers agc. A.m. output 55mV for 10μV input. SSB output 30mV for 2μV input. Carrier about 200mV rms

More on G4DTC's ultimate receiver

TT (December 1987, January 1988) has outlined the front-end and variable-bandwidth crystal ladder filter developed by Ray Howego, G4DTC, for his "ultimate" high-performance, general-coverage (vlf/lf/mf/hf) receiver. While it is unlikely that many readers would wish to duplicate this design *in toto*, the philosophy and circuit details provide a useful guide for less ambitious receiver projects.

This month sees the completion of G4DTC's notes, covering the i.f. strip, the usb/lsw carrier-injection/bfo circuitry, and some final thoughts. He writes:

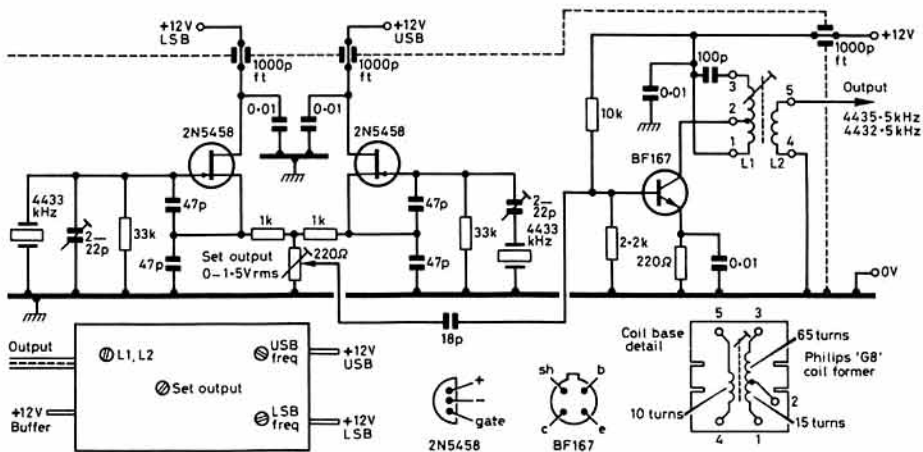
"The i.f. strip (Fig 8) was designed around the familiar Plessey 600-series of integrated-circuit chips. No doubt the cheaper 1600-series would do, although an equivalent of the SL623 appeared unobtainable. The i.f. gain control gives manual control of the agc line, with the BF167 providing the extra gain required for optimum agc operation on a.m. signals (if omitted, the agc voltage is insufficient and overloading occurs). The agc characteristics of the SL621 are superb for ssb reception. A point not stressed sufficiently by Plessey in their application notes is the importance of rf decoupling of the agc line. Three 100nF capacitors, evenly spaced along the line were found necessary. I feel certain that insufficient decoupling of this line accounts for the instability frequently encountered when using these devices.

"It should always be recognised that a broadband i.f. amplifier produces broadband noise. A second narrowband (crystal) filter at the end of the i.f. chain would be ideal. Plessey acknowledged this and suggest that some type of filter is necessary when the i.f. gain exceeds about 68dB. However, the high-Q i.f. transformer shown in Fig 8 was found to be quite satisfactory.

"The a.m. detector in the SL623 is capable of very low distortion but demands a rather high signal voltage (a common defect in practically all envelope detectors!).

"A suitable bfo circuit is shown in Fig 9. Low-cost 4-433MHz PAL colour tv crystals can be easily pulled by series or parallel trimmers to provide suitable frequencies either side of the i.f. carrier frequency so that specially selected crystals are not essential. The tuned BF167 buffer is essential to remove the second harmonic output which can otherwise cause distortion in the SL623 ssb detector.

Fig 9. Circuit diagram of the carrier injection/bfo used by G4DTC. L1 80ft 36swg on 6mm former tapped at 15t. L2 10t 36swg over 15t of L1. Set output to 200mV (150mV) peak into 1kΩ. Crystal frequencies pulled: usb 4,435.5kHz, lsb 4,432.5kHz



"The audio and final af power amplifiers are worth mentioning. I have been horrified to see widespread use of the LM380 ic as a power amplifier. These devices are so noisy that they can provide the dominant noise contribution in receiver. (For example, my domestic 30W hi-fi amplifier gives less noise at maximum gain than an LM380 with its input grounded!). Several well-known designs even precede an LM380 by a 741 op-amp which is an even noisier chip. It is far better to use the LM383. This device provides up to 8W output, higher gain and virtually inaudible noise. A kif is available from Maplin for £5.60. The 741N is a low-noise op-amp but at many times the cost of the standard 741, but chips designed specifically for low-noise characteristics are readily available (eg HA12017, OP-27, ZN459).

Table 1. Filter response referred to 1kHz level

-6dB at 3.2kHz	-6dB at 380Hz
-12dB at 4.6kHz	-12dB at 240Hz
-18dB at 6.0kHz	-18dB at 160Hz
-24dB at 7.8kHz	-24dB at 110Hz
-30dB at 10kHz	

Input level 1V rms

"Most receivers (including this one) can be cleaned up beautifully by a well-designed active audio filter. In particular, I regard a filter as essential for a.m. Of the many active filter designs tried, that published in *Amateur Radio Techniques* (7th edition, p115, and several earlier editions) by ZL2APC and using two fet devices has proved the best of the simple circuits. However, the source resistors (quoted in ART as 33kΩ) produce such a low standing current through the fet devices that it is difficult to see that this circuit could operate effectively with any type of fet. I believe this was a misprint for 3.3kΩ. The circuit (amended version in Fig 9) will then take virtually any type of filter. ZL2APC provided the Table 1 details of filter response referred to a 1kHz level, from which it will be noted that unlike most published active af filters this was designed for speech reception rather than cw, and was suggested for use in receivers having only modest i.f. selectivity in order to provide an

Reduce to 121mm

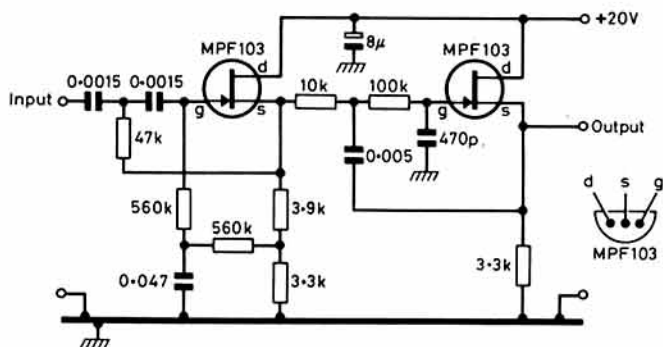


Fig 10. The ZL2APC active bandpass audio filter used by G4DTC to clean up the audio output, shown with amended values for the two source resistors

apparent increase in signal-to-noise ratio and improved readability of signals with high and low frequency heterodynes and audio chatter outside the filter passband noticeably attenuated making receiver operation a more pleasant task. If n-channel fets (eg 2N4360) are used, the polarity of the supply must be reversed.

"Digital frequency counters should be used with care in high-performance receivers. At worst, they can cover the entire spectrum with 'digital noise'. At best, they can produce some unexpected spurs. For example, the often used 7216A counter ic produces (in addition to its 10MHz reference oscillator) 500Hz harmonics (the display multiplex frequency) and harmonics of the 10MHz dividers (right down to 100Hz for the reference counter). Even if the counter is thoroughly screened, the display, clearly, *must* be visible somewhere! In addition, the counter will send its harmonics back down the lead which connects it to the receiver. Connecting a 7216 counter to an FRG7 receiver covered the entire spectrum with 100kHz markers! I note with concern that one *Rad Com* design has an unscreened 7216 chip on the receiver board only 3in from its rf wiring. Even when screened, low frequency, radiating eddy currents are induced in the screen!"

"The resulting 'ultimate' receiver is capable of exceptional performance, particularly on the amateur bands even if operated with maximum gain. Broadcast-band reception requires backing off the gain controls as there is simply too much gain. The rf amplifier, as noted in the December *TT*, can be operated at high loss to attenuate very strong signals without impairing the snr. The entire receiver has been constructed on double-sided pcb (including the two front-end valves) and looks decidedly 'state-of-the-art'."

Six-band QRP transmitter from BC348R receiver

During the second world war, many thousands of rugged, general-coverage communication receivers were manufactured for the US services. Of these the BC312, BC342 and BC348 were the best known and were among the most popular of the low-cost "war surplus" acquisitions by amateurs in the late 'forties. The BC312 was for operation from 12V dc supplies, the BC348 from 28V dc supplies. All three used 6.3V octal valves, mostly of the metal-octal type. With single-crystal i.f. filters they

had a respectable performance but, unfortunately for amateur use, they had no bandspread tuning and had a frequency coverage that stopped at 18MHz, necessitating the use of converters on the 28MHz band and also on 21MHz when this band became available as a result of the 1947 Atlantic City conference.

The BC348, for example, was a nine-valve superhet with two rf and three i.f. (915kHz) stages, usually with a valve line-up of 2 x 6K7 (rf), 6J7 (mixer), 6C5 (local oscillator), 6K7 (i.f.), 6F7 (i.f./bfo), 6B8 (i.f./demodulator), 41 (output) and VR91 (voltage regulator). There were two main groups having the same performance specification but differing in some circuit details; one group suffixed J, N and Q; the other suffixed E, M, P, O, R and S. Both groups were featured in a number of journals showing how they could be modified for amateur use with ac mains supplies, for example *QST*, January 1947 and November 1947.

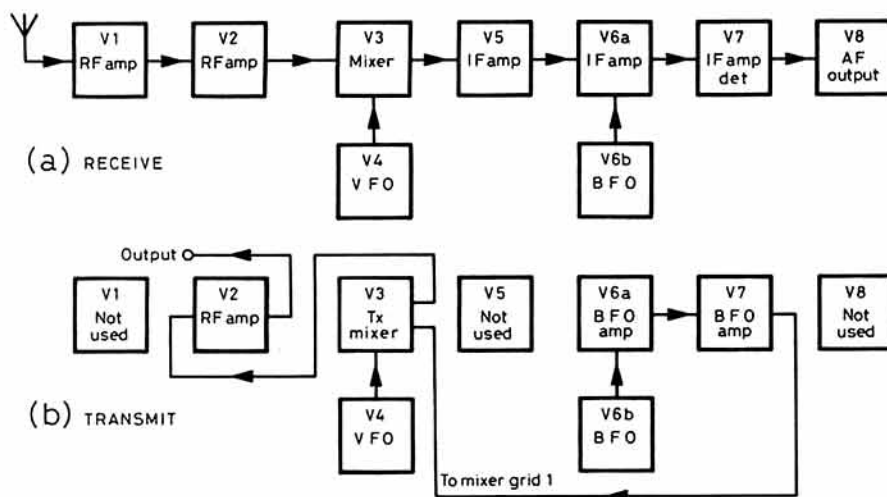
The mechanical ruggedness of these war-surplus receivers and the continued availability of the 6-3V octal range of valves has meant that quite a few of these receivers are still in working order, although probably not very often in operational use. Del Arthur, G0DLN, has come up with an ingenious idea that may shock those readers who feel that all such receivers should now be regarded as "collectors' pieces" to be kept in or restored to their original form. He writes:

"I feel that some of your readers would like to know that it is amazingly simple to convert many second world war receivers into effective cw transmitters or transceivers with minimal effort. I have done this with a BC348R, and the interest generated on the air with this rig is enormous. The normal BC348R block diagram is shown in Fig 11 (a). Most users of this receiver will have increased the bfo coupling to improve the reception of ssb. It takes less than half-an-hour to convert this receiver into a stable QRP cw transmitter covering six amateur bands (1-8, 3-5, 7, 10, 14 and 18MHz). The block diagram is then as shown in Fig 11 (b). Output from V2 (6K7) is at high impedance and is limited to about 100mW, so I use a compact external pa running about 10W. There is space inside the receiver for an internal driver and pa. To operate as a transceiver requires at least three relays to switch the signal path.

"It should be noted that adjustment of the bfo when receiving will shift the transmit frequency, so it is necessary to remember to return the knob to its original position when transmitting. One way round this is to cut out the bfo on transmit (another relay) and to turn V5 into a Miller oscillator on transmit (yet another relay). It would in theory be possible to use the existing audio output valve as the transmitter pa, but this is likely to increase the proliferation of relays to alarming proportions and I feel that a separate pa stage is simpler (unless possibly you have a separate receiver so that the BC348 or other surplus receiver can be hard-wired as a transmitter — G3VA).

"Harmonic rejection is excellent due to the use of the existing high Q tuned circuits into and out of V2. Birdies due to bfo harmonics are likewise rejected by the i.f. transformers in the bfo signal path. The existing rf gain control effectively regulates the rf output power.

"Many amateurs would love to get airborne with their own contraptions but are deterred by the cost and difficulty of finding the necessary components etc. This modification is essentially a cheap and cheerful way of doing this — and is great fun. The more cowardly types could easily do the transmitter modification only, and use existing black boxes for receiving."



I feel it should be added that before adapting an old communication receiver for transmission, it would be advisable to check carefully the stability of the local oscillator on the higher frequency bands, if you wish to use these, particularly in respect of the mechanical vibration likely to arise from the use of a straight morse key on the same table. Local oscillators did not have the large swamping capacitance across the tuned circuit, as found in old transmitter vfos. A good test is to tune the receiver to a 14MHz cw or ssb signal and then try the "thumping test". The US BC-series receivers, many intended for airborne operation, will probably pass, but many less-rugged receivers are likely to fail on the higher frequency bands.

Fig 11. G0DLN's method of converting a BC348R receiver into a QRP transmitter in a matter of minutes. By incorporating switching relays, it can be used as a six-band transceiver provided that the local oscillator stability is sufficient

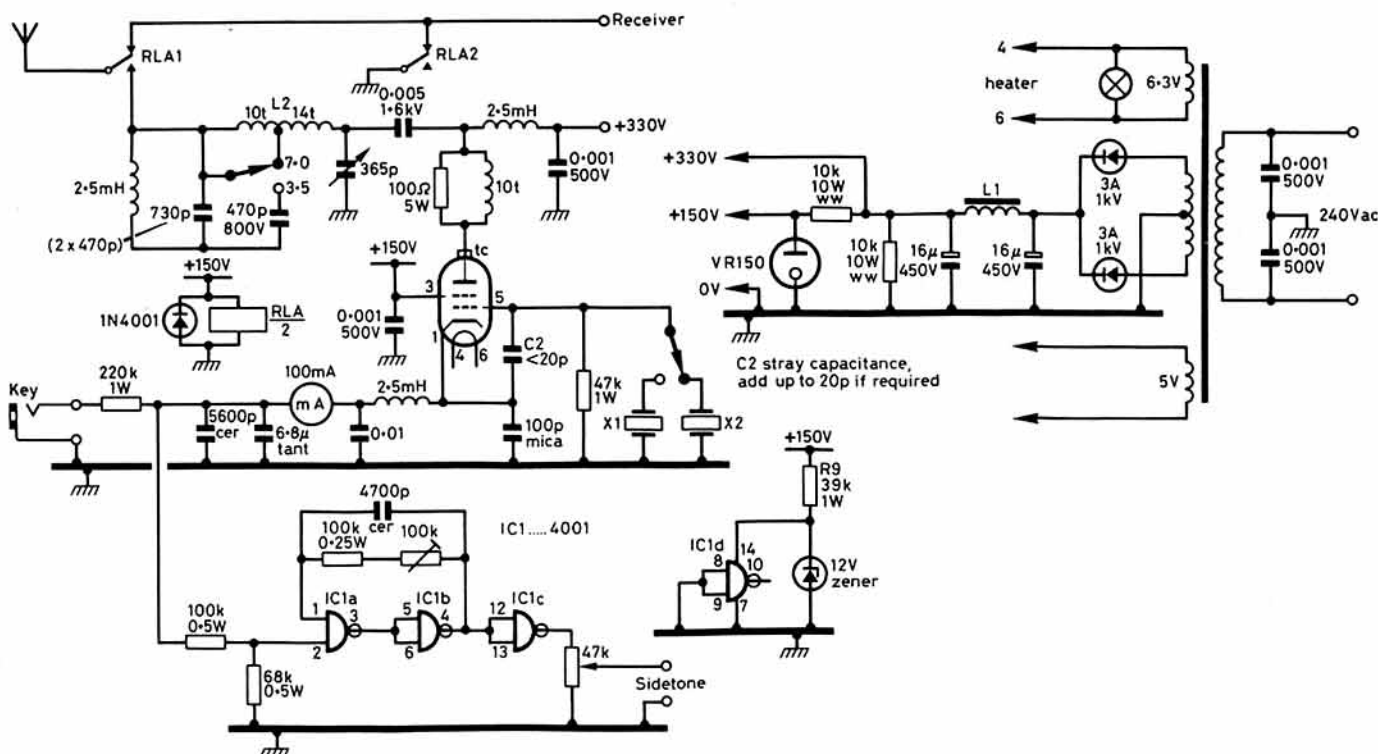


Fig 12. ZS6JC's simple 3-5/7MHz cw transmitter. L2 24t, No 24 wire or heavier wound on 30mm former and tapped as shown. L1 any choke greater than 1H at 75mA. RL1 relay dpdt with 15,000Ω coil or similar. Adjust working conditions with R9

Simple 3-5/7MHz cw transmitter

For the many readers who still feel that there is a place in amateur radio for very simple valve or hybrid valve/semiconductor transmitters capable of producing about 12W rf output, Fig 12 shows a rig described by John Lowmass, ZS6JC, in *Radio ZS* March 1987, brought to my notice by Dick Rollema, PA0SE. ZS6JC believes that there are still many young as well as older amateurs interested in getting on to the hf bands on cw at minimal cost while at the same time obtaining an insight into the simple valve technology not required for the RAE etc. Simple power crystal oscillators have the advantage of being very easy to construct and work surprisingly well with a minimum of constructional bugs and adjustments. His design, although based on those of the 'forties and 'fifties, does incorporate silicon diodes in the power supply, and uses a CMOS sidetone generator giving an output adequate for a small loudspeaker, with an antenna relay operated directly from the 150V dc line to provide single switch operation between transmit and receive, switching being carried out by breaking the centre tap earth line of the 300-0-300V transformer. An alternative is to use a relay controlled by a Darlington-pair transistor operated from an rf pick-up loop taken from the output, but the system shown has the advantage of being able to kill the receive signal if required without actually transmitting. The transmitter should operate equally well on 3-5 and 7MHz with suitable crystals. Cost can be kept low by scrounging bits from old valve receivers etc. Almost any of the old tetrode or pentode rf valves could be used, including the 6146, 807, 6L6 etc. With a 6146, ZS6JC gets about 12W rf output from 20W dc input. Crystals are preferably the older, more robust type capable of rather more crystal current than the modern miniature packages.

Groundplanes of zero extent

In *TT* November 1987, pp836-7, in "The groundplane dissected", it was reported that in his analysis of the groundplane antenna, Melvin M Weiner (The Mitre Corporation) referred to a groundplane of "zero-extent" without explaining what this implied. The term was unfamiliar to me, and I assumed wrongly that the author meant a quarter-wave monopole element with one or more thin wire radials, as opposed to the solid groundplanes of the other groundplane antennas analysed in his paper.

However, Dr Brian Austin, G0GSF, of the University of Liverpool, has followed up the references listed in Weiner's paper and has obtained, for the university library, a copy of the book *Monopole Elements on Circular Elements on Circular Ground Planes* by M M Weiner, S P Cruze, Li Cho-Chou and W J Wilson (Artech House, 1987). This devotes a

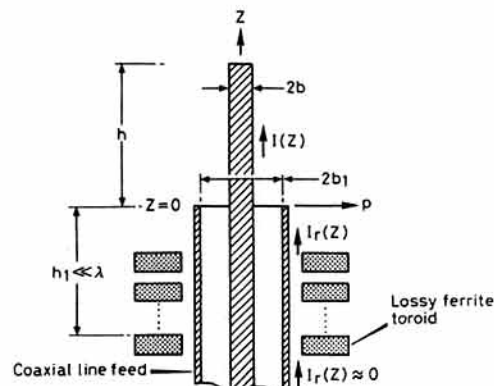


Fig 13. Zero-extent groundplane antenna as described by Melvin Weiner (Mitre Corporation)

special section to the concept of a groundplane of zero extent. It turns out to be precisely that: a quarter-wave elevated monopole with *no* radials. Such an antenna could be of practical value for some amateur radio as well as professional applications, as well as throwing fresh light on the role of radials. G0GSF writes:

"This antenna is effectively an electrically thin monopole element with no groundplane nor any semblance of one, even in the form of radials. What is interesting of course is how one feeds such a configuration, and Fig 13 from the book contains the answer. The use of the lossy ferrite toroids around the coaxial cable, providing a choke against the outer-braid current, does the trick. This is, in effect, the form of balun proposed by Walter Maxwell, W2DU, in *QST* March 1983.

"Weiner's experimental results (Table 2 in the IEEE paper) do not show this configuration though, so it leaves unanswered the question to some extent. What it does seem to suggest is that the usual horizontal radials are in effect playing no part other than acting as a shield which prevents (decreases?) the flow of current on the outer-braid of the coaxial feed cable. Tilting the radials downwards through an angle does indeed (as G6CJ has shown) increase the feed point resistance. But is this effect though not just because more current can now flow on the braid because of a decrease in shielding effectiveness of the tilted radials, thereby bringing the 'other half' of the dipole into play? There is clearly scope for some careful measurements in this area!"

The W2DU ferrite-bead choke balun (*QST* March 1983) referred to above was described in *TT* February 1984, pp134-5, and does appear to differ from the zero-extend groundplane in one important respect. The *TT* item noted that the choke balun "is obtained by placing numbers of ferrite beads or sleeves around the final length of coaxial feedline. By using the added lengths of small diameter cable of the same impedance as the main feeder, numbers of ferrite beads having an inner diameter of 0.197in and length of 0.190in can be threaded on to the extra cable to produce 'a superb, compact, wide-band balun'. Note that such a balun does not transform the impedance and so may not be directly substituted for a 4:1 ratio balun."

W2DU described a 1.8 to 30MHz choke balun, only 12in long including connector, using 50 No 73 ferrite beads (Amidon FB-73-2401 or Fair-Rite 2673002401-0, μ 2,500 to 4,000) over 50 Ω Teflon-dielectric RG303/U cable (or RG-141/U with the fabric covering removed). For 30 to 250MHz, use 25 No 43 beads (Amidon FB-43-2401, Fair-Rite No 2643002401, μ 950 to 3,000).

The ferrite beads used by W2DU form primarily an rf choke, blocking the flow of rf currents down the outer braid of the feeder, as an alternative to coiling into a few turns the final length of the coaxial feeder (for 14 to 30MHz several turns of cable of about 8in diameter should suffice). On the other hand, the Weiner groundplane requires the use of lossy ferrite, as used in tv filters, to absorb the power on the outer of the cable braid. To quote the book: "For sufficiently lossy ferrite toroids along the outside of the coaxial line, the current on the exterior of the coaxial line's outer conductor may be neglected."

What is by no means clear, at least to me, is whether this technique means that the feedpoint impedance of the monopole is raised to the extent of permitting direct matching of a 50 Ω feedline. There is obviously work to be done in evaluating this form of antenna, which could be likened to the once-popular "sleeve dipole" without the sleeve but with a considerable amount of power wasted in those lossy toroids.

Yet more on quiet tune-up/protection

Since writing the item on "More on the tune-up protection device" (*TT* February), an illuminating letter on the origins of this device has come in from Lad Kucera, N9AEG. He writes:

"The circuit published in the October *TT* appeared strikingly familiar. A bit of research turned up an article "Tune up swiftly, silently and safely" by William Visser, K4KI (*QST* December 1979) of which the author assigned rights to SST Electronics. While the advertisements for SST Electronics faded away some years ago, I believe they commercially produced this product before their disappearance.

"The unit which I built in 1980 from the *QST* article, has proven to be a

very useful test instrument. My station operates with resonant coaxial-fed antennas, consequently my use for the unit has been limited to the tuning aspect of antenna construction. Operators who are using non-resonant antennas, open-wire feeders and an atu, may find that having the unit in line continuously is the key to easy tune-up. There is some incentive to build the unit with a self-computing type of readout; however, thus far I have resisted the temptation to do so. Since the transmitter sees a constant load, the commonplace meter calibrate control is far less sensitive in response to impedance changes in the antenna load circuit.

"Those readers who are interested in constructing such a unit may like to know that it is not necessary to go through the procurement process for each component individually. The easiest method of construction is to obtain an existing reflectometer, discard the old rf sensing unit, and substitute the relevant components of the new circuit. This conversion process is rewarding in that the existing reflectometer will include the cabinet, meter, calibrations on the meter face, two of the controls, and two of the rf connectors. My personal choice for conversion was a Heathkit model AM-2. This long-obsolete model has a fairly large cabinet and is obtainable in USA fleamarkets for about five dollars. I am confident that many other reflectometers would be equally adaptable to conversion."

K4KI's *QST* article of 1979 was sub-titled: "Looking for an easy way to adjust your antenna-matching network? This tune-up indicator takes the guesswork out while it protects your equipment" and begins: "A bit of experimentation on my part led to the development of a simple swr bridge that has several real advantages when used with an antenna system requiring a matching network. It allows the transmitter to be operated directly into a dummy load while the antenna system is adjusted. It also keeps the radiated signal (during tune-up) at an extremely low level. Finally, it will shorten the time needed to get a rig on the air." The principle is undoubtedly the same as that advocated by Fred Piesse, VK3BYW: see Fig 14.

Coaxial fed multiband "Windom" long-wire antenna

Gian Moda, I7SWX, sends along details of a simple multiband antenna that works on all bands from 3.5 to 28MHz, including WARC bands other than 10.1MHz: Fig 15. It is in effect an adaptation of the twin-wire form of the 300 Ω Windom antenna but fed with 75 Ω coaxial cable by means of a 4:1 balun. He has used this antenna for nearly 10 years with powers up to 200W rf, and finds the swr at the transmitter is quite low, not more than 2:1 at the band edges. The 4:1 transformer is made of pvc wire (eg black and red wire used for connecting loudspeakers to hi-fi amplifiers) connected as shown. It does not saturate, I7SWX reports.

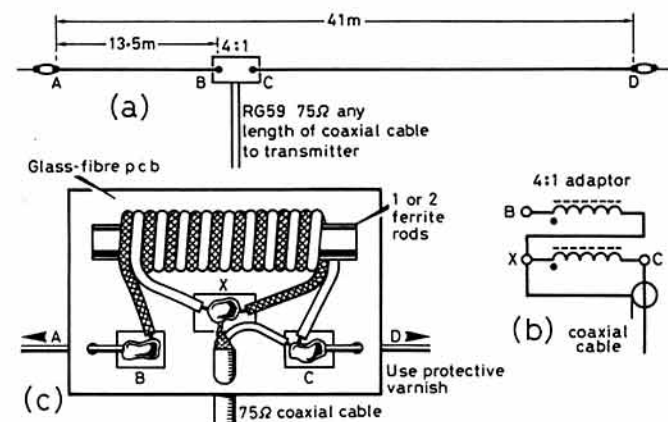


Fig 15. I7SWX's multiband antenna and 75/300 Ω balun transformer

Hints and tips

Shaun P O'Sullivan, G8VPG, adds some useful information in respect of a tip that appeared many years ago in *TT*. He writes: "For many years I have searched for a dentist's inspection mirror to view the hidden parts of a radio chassis. Genuine dentists' tools are, however, difficult to find and also quite expensive. However, an excellent dental inspection mirror designed for home-use is available from larger branches of 'Boots the Chemists', priced at only 89p. It is better for our purpose than a genuine professional tool since it has a plastic handle which will not cause any short-circuits. I have found this item to be an invaluable part of my tool box."

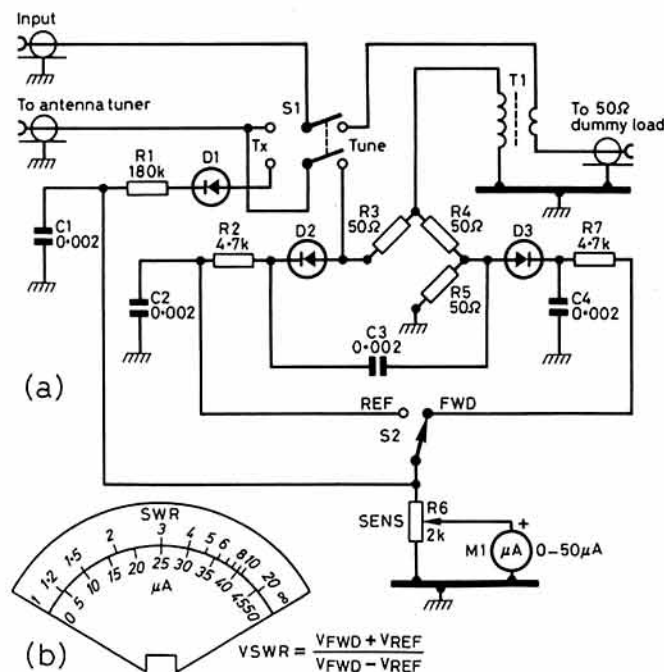


Fig 14. The original K4KI tune-up device (*QST* December 1979). T1 primary 2t No 20 insulated wire, secondary 10t No 24 insulated wire on Amidon T50-6 toroid core or equivalent. (b) Calibrated meter face, an advantage if direct swr readings are required

NEWS

BULLETIN

FRENCH GET 50 MHz — on permit basis with low ERP

Great news - another European administration has given 50 MHz access to many of its amateurs, with immediate effect. The French national society sent a letter to all its members recently, outlining the terms and conditions under which amateurs living more than 150 km away from a Band I TV transmitter can use the 50 MHz band, albeit with very low ERP for the moment.

Here's a translation of the REF letter;

"Dear OM,

"For some months discussions have taken place with the CNCL and the DTRE on the subject of 50 MHz permits.

"These discussions have led to a satisfactory initial result for radio amateurs. The positive attitude of the administration in this matter is welcomed. In effect, the act of authorising amateur transmissions in a band which will soon be used for TV (Channels 2, 3 and 4) broadcasting shows that the CNCL has understood the interest of French radio amateurs in this segment of the RF spectrum.

"It is evident that under these conditions permits cannot be granted to all OMs. Footnote 342 of the Radio Regulations (no interference to the primary TV service) applies. The power levels are very small, but they are sufficient for OMs to participate successfully in current experiments.

"We are convinced that OMs will understand the situation and abide by the restricted conditions.

"We hope that later on the protection distances can be reduced. The REF is working in this direction. To date we have the following conditions:

PERMITS:

These are precarious, personal and can be revoked, and are only for Class C, D and E licensees.

FREQUENCY BAND:

50-51 MHz

POWER LEVELS:

3W ERP at a distance of 150 km from a Channel 2 transmitter, extending to 10W ERP at a distance of 200 km. For Channels 3 and 4 the protection zone is the service zone of the TV transmitter.

MODES:

CW, SSB, RTTY and packet. Only fixed stations are permitted.

"You will find enclosed a nomogram (not reproduced here - it's like our own Erpogram - Ed) for calculating the effective radiated power. Please advise the REF that you have applied to the DTRE for a permit; their address is 246 rue de Bercy, 75584 Paris, CEDEX 12.

"The DX season starts in May. Radio-REF for March and April will give other useful information.

"Good luck & 73, de F8SH & F9LT"

We've reproduced (adjacent) the map sent by REF to its members. This shows the areas from which 50 MHz can't be used and the boundaries of the two power levels. The twin zones around the Amiens-St Just and Chartres transmitters knock out a fair amount of northern France, unfortunately, but it looks to us as though about two-thirds of the

(over) ▶



RADIOLYMPIA:

"Radiolympia 1939 will be very much more than 'just another Radio Exhibition'. It will reflect the prominent position which radio, after 17 years of existence, has won for itself in the life of the nation and the individual. The Exhibition this year..... emphasises the tremendous progress which radio has made and is making from year to year"

So said the Exhibitions Organiser of the 1939 "Radiolympia" exhibition, which took place even as the storm-clouds of the Second World War were gathering: the cover of the lavishly-produced publicity material gives the dates 23 August - 2 September, and a poignant section entitled "Radio in Defence" describing some of the exhibits to be seen at the show was to become all too relevant in the six years after "Radiolympia 1939". It is all the more surprising that, in leafing through its pages, there is no hint of the horror to come. And does this sound familiar?

"To-day not one of us could get away from it or do without it if he wanted to. It's in the home, on the sea, in the air, in cars and caravans and trains; in peace or in war, in entertainment, industry, (over) ▶

(from p.187 col.2)

country is fair game for 50 MHz fixed stations. It'll be extremely interesting to see how our French colleagues do with the very low ERP they're allowed at the moment.

As we went to press it was understood that several well-known French VHF types had put in for permits, but we haven't heard any F call signs on the air as yet.

(from p.187 col.3)

commerce, transport and communications, it's already indispensable"

No, not a recent advertisement for a cellular radiotelephone but another quotation from the Exhibitions Organiser of "Radiolympia 1939". And is this from a recent RSGB National Exhibition Centre trade letter, or is it older than that?

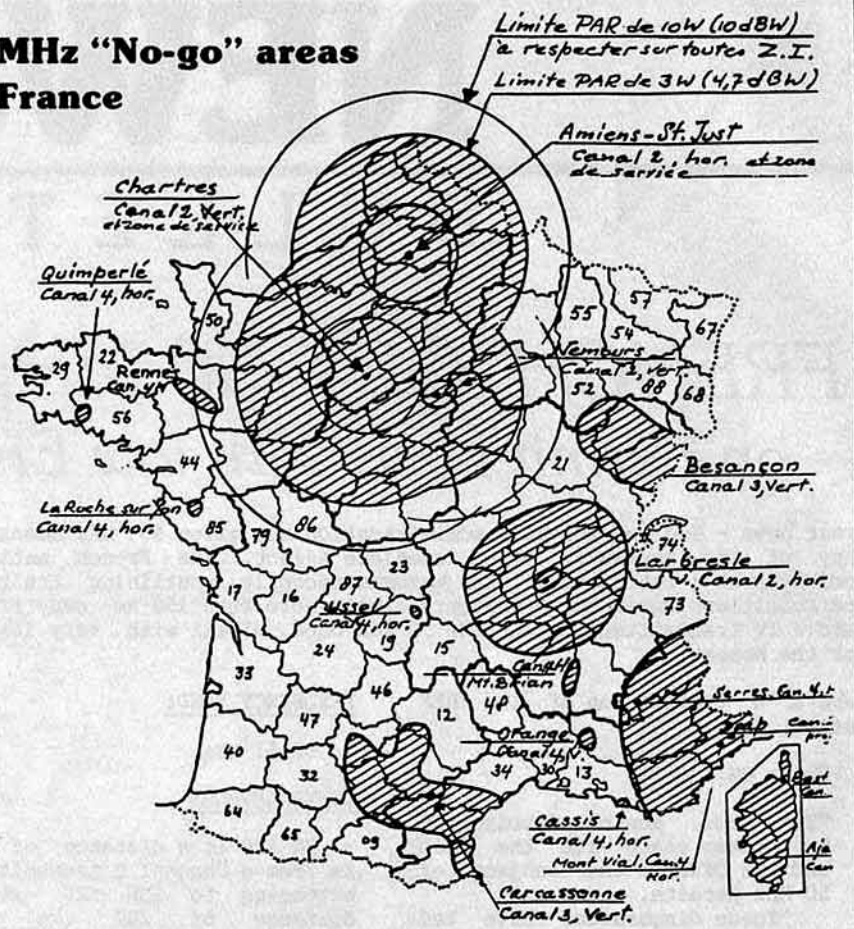
"Uniformity of scheme with maximum freedom to the exhibitor is the plan for this year's Show. Each exhibitor will have built for him a skeleton stand - island, corner, wall or divided. Within that structure he will have absolute freedom to express his individuality in displaying his products. The extra cost of stand erection by the organisers is obviously reflected in the price of the stands - but the manufacturer can, if he wishes, save a great deal of money by using the structure built for him, or adapting his own design to it".

Happy days - or were they? Television was a major feature of the 1939 exhibition, and there is the occasional touch of desperation in the publicity; discussing organised parties visiting the show, the writer says;

"....In short, they will lift radio from the background of being taken for granted and make it once again a subject of importance, novelty and interest"

In a sense, isn't that the Society's job in 1988? Difficult to do in an era where radio has long since lost its mystique and we curse when it goes wrong instead of being delighted when it works - but, certainly for the younger generation, it's vitally important to show them that there's more to radio than commercial or pirate broadcast, CB, Dad's cellphone or the PMR system in the local minicabs. There's a lot to do..... Incidentally, although the Society regularly attended Radiolympia, we

50MHz "No-go" areas in France



could only find a photograph of the 1936 stand, (L to R: Arthur Milne, G2MI; Joan - surname unknown; May Gadsden; Joan Clarricoats and John Clarricoats, G6CL).

PRESIDENTIAL INSTALLATION:

The installation of the 54th President of the Society, Sir Richard Davies, KCVQ, CBE, CEng, FIEE, G2XM, took place in the Town Hall & Corn Exchange, Ipswich on 30 January 1988. In addition to Society members, guests included representatives from the Radiocommunications Division of the DTI, the BBC and the local County Emergency Planning Office.

The retiring President of the Society, Mrs Joan Heathershaw, G4CHH, said that Sir Richard had held many high positions in the course of a busy life. He had done the Society a great honour in agreeing to become President of the Society, and his name would add fresh lustre to the Chain of Office. On behalf of all Society members, Mrs Heathershaw wished Sir Richard a most happy and successful year in office.

At this point Terry Barnes, G13USS, made the customary presentation to the President of a gift from radio amateurs in Northern Ireland.

In reply, Sir Richard said that it was a great honour to wear the historic chain, the weight of which was a foretaste of the burden of office. He said that his involvement in amateur radio dated back to 1934, when he had held an artificial aerial licence. In 1936 he had become G2XM, and many years later had learned that this was a re-issue of a call sign previously held by Downside School. Apart from periods abroad in the days before reciprocal licensing, he had been active on the HF bands in particular since 1965.

In the course of a recent contact, Sir Richard had learned that four of the Society's Past Presidents shared the same birthday, 25 August; the latest of these was the retiring President, Mrs Heathershaw. Sir Richard said that he was fortunate in having her wide experience of Society affairs to assist him in the most important year in the Society's history. He also wished to pay tribute to the efforts of the Society's volunteers and thank them for their efforts on its behalf.

Sir Richard added that as well as celebrating the 75th anniversary this year, the Society's plans included the increasing public awareness of amateur radio and the encouragement of young people.

RADIO COMMUNICATION March 1988

At present the numbers involved in the hobby were declining, and the Society planned to reverse this trend. He reminded the audience that the DTI have offered an award for the outstanding Young Amateur of the Year, and he thanked them for their initiative. Sir Richard said that the Society was also indebted to the DTI this year for permission to use the special prefix GB75 in respect of the anniversary celebrations. Other plans under way included the production of videos to encourage more young people into amateur radio and a Junior category of Society membership with its own magazine.

Sir Richard then said that the Society's plans to celebrate its 75th anniversary included a three-day exhibition at the National Exhibition Centre, and the Society's Patron, His Royal Highness the Duke of Edinburgh, had been invited to be present. Following this, there would be three open days for visitors at the Society's Headquarters, when much of the Society's memorabilia would be on display. On the following Friday and Saturday a Data Symposium would be held at Harrow School. The following week would see an international seminar on satellites, followed by the AMSAT-UK Colloquium at the University of Surrey. A brochure of the complete programme of events was due to be published shortly, and the Society looked forward to hearing from clubs concerning any related events which they were planning.

Sir Richard said next that he would like to thank the Society's loyal and hard-working staff for their efforts on its behalf; he added that some of them were present and asked them to identify themselves. He then introduced the Society's Executive Vice President for 1988, Dr J N Gannaway, G3YGF. Finally, Sir Richard said that he would like to congratulate the two newly-elected members of Council and presented Messrs J Allen, G3DOT and G R Smith, G4AJJ, with their badges of office.

In conclusion, Sir Richard said that in working for amateur radio, "what you get out of it depends on how much you put into it". He urged those present to encourage all amateurs to join the Society, thus making it stronger and allowing more benefits to all members.

CALLBOOK

Winter 1987/88 Edition

£6.49 (members by post)



MORSE TESTS

The following list shows the dates and locations of all the available test centres from early April to mid-May as we went to press. Because of space limitations, we cannot print a complete list of all the test centres notified to us, but these can be found on the application form itself.

Morse tests will be carried out in groups of three and will be of half an hour's duration. Details of the test, the venue and how to get there will be sent to you as soon as your application has been processed and your place confirmed.

COUNTY	TOWN OR LOCATION	DATE
Somerset	Burnham-on-Sea	03/04/88
Gwent	Newport	04/04/88
Guernsey	Guernsey ARS, St. Martins	07/04/88
Cambridgeshire	Cambridge	08/04/88
Hampshire	Winchester	09/04/88
Wiltshire	Swindon	09/04/88
Dumfries & Galloway	Stranraer	09/04/88
Staffordshire	Stafford	10/04/88
Fife	Leslie	12/04/88
Derbyshire	Clay Cross	13/04/88
Suffolk	Ipswich	14/04/88
East Sussex	Hailsham	16/04/88
Cheshire	Macclesfield	16/04/88
Cornwall	Liskeard	16/04/88
Humberside	Goole	17/04/88
Strathclyde	Glasgow	17/04/88
Lincolnshire	Lincoln	20/04/88
Greater London	Wood Green, London N22	20/04/88
Northamptonshire	Tiffield, Northampton	21/04/88
Nottinghamshire	Mapperton, Nottingham	23/04/88
Greater London	Dartford	23/04/88
Hereford & Worcester	Malvern	23/04/88
Essex	Colchester	23/04/88
Greater London	Croydon	25/04/88
Greater Manchester	Clifton	25/04/88
Essex	Chingford	25/04/88
Co. Durham	Great Lumley	27/04/88
Avon	Redland, Bristol	27/04/88
Leicestershire	Wigston Magna, Leicester	29/04/88
Surrey	RSGB VHF Convention, Sandown Park	01/05/88
South Glamorgan	Penarth	03/05/88
Grampian	Aberdeen	04/05/88
Dyfed	Carmarthen	05/05/88
Greater London	Eltham, London SE9	06/05/88
Lothian	Edinburgh	07/05/88
Mid Glamorgan	Rhydyfelin, Pontypridd	08/05/88
Central	Stirling	10/05/88
South Yorkshire	Sheffield	12/05/88
Norfolk	Norwich	14/05/88
Surrey	Guildford	14/05/88
Tayside	Kirriemuir, Angus	14/05/88
Isle of Wight	Binstead, Ryde	14/05/88
Lincolnshire	Grantham	14/05/88
West Sussex	Horsham	15/05/88
Strathclyde	Glasgow	16/05/88
Merseyside	Liverpool 15	17/05/88
Berkshire	Reading	18/05/88
Bedfordshire	Luton	19/05/88
Jersey	St. Clement	19/05/88

We receive notification of new centres almost daily and the application form gives a full list of those currently taking advance bookings for Morse tests.

Talking Point

ITU conferences and you

WARC-MOB:

No, not a World Administrative Radio Conference run by an unruly crowd but one dealing with the mobile service. Richard Baldwin, W1RU, was present on behalf of IARU at the last one - which took place in Geneva last year - and he's done a report on it which we're delighted to be able to publish in the Bulletin. Here it is;

"Every decade or so the International Telecommunication Union (ITU) holds a full-scale telecommunications conference, one which looks at every aspect of the International Radio Regulations. This is called a General WARC (General World Administrative Radio Conference), and whilst there are many aspects of such a conference which can have an effect on the amateur and amateur satellite services, we are always particularly concerned about the Table of Frequency Allocations.

"The last General WARC was held in 1979. Since then there has been a number of specialised WARCs, each dealing with some specific radio service or problem area. For instance, in the past couple of years there have been high-frequency broadcasting WARCS and mobile WARCS and geostationary satellite WARCS. Each of these has a specific and detailed agenda, which is agreed prior to the conference, and the work of the conference is not supposed to go beyond the bounds of that agenda. In other words, an HF BC WARC is supposed to deal only with the problems of the HF broadcasting service, within the frequency allocations for that service which were established at the General WARC of 1979.

"But life gets more complicated, and after a while there comes a time when the administrations begin to believe that they can no longer solve the problems of a particular service within the confines of the frequency bands already allocated. Pressure for another General WARC then arises, together with some re-allocation of the spectrum. And re-allocation means that if one service gains frequencies, another service has to lose them.

"There were two specialised WARCs during 1987, and out of both of them came recommendations that there be some sort of General WARC not later than 1992. The high-frequency broadcasting organisations believe that their present-day channel requirements cannot be met within the bands currently allocated to the HF broadcasting service. As a result of the mobile WARC held during September and October 1987, there were several recommendations to the effect that certain problems which were beyond the scope of the agenda of the conference should be referred to a "competent" WARC (which means some form of General WARC) to be held no later than 1992. And so the writing on the wall becomes more and more clear.

"The mobile WARC also ran into a number of problems in finding space for new uses within those frequency bands allocated to the various mobile services (i.e. aeronautical, land and maritime, including space). The agenda of the conference did not permit solutions to be found outside the currently allocated frequency bands if such solutions would have a significant effect on another service. Even with this restriction, however, some actions taken by the mobile WARC could have an adverse effect on the amateur and amateur satellite services. For example, Mexico introduced a footnote to the table of allocations which would have permitted that country to establish a land

mobile service as the primary service in the 430-440 MHz band. The first concern of the IARU observer team at the conference (W1RU, SP5FM, I1RYS, YT7MM) was that such an allocation could have an adverse effect on the amateur satellite service segment at 435-438 MHz. We persuaded Mexico to change their proposal to exclude that segment. Our second concern was that other countries, particularly in the Americas, would join in that footnote and thereby create something of a stampede. We were prepared to cope with that possibility but fortunately no other country joined Mexico in its proposal.

"A number of European countries added their names to a footnote which would have made land mobile a primary allocation in the 1700-2450 MHz band. That, of course, affects an amateur band. Similarly, Cuba introduced the radionavigation service as primary user in the 1215-1300 MHz band.

"None of these actions is by itself catastrophic, but there is a clear indication that we may be in for a rough time at the next General WARC, perhaps as early as 1992, and this may be the case especially in the vicinity of the HF broadcast bands and as far as microwave allocations are concerned. (We referred to this topic on page 234 of the April 1987 RadCom, in an editorial "Early warning - frequencies on the line" - you saw it first in RadCom - Ed)

"Fortunately IARU saw the warning signs and began preparations a couple of years ago. As in the period prior to the 1979 WARC, much of the responsibility will lie with the individual member societies of IARU. It is they who must thoroughly and adequately put forward the needs and advantages of the amateur and amateur satellite services to their respective administrations".

Nice piece, that, and we couldn't have put it better ourselves. RSGB is well aware of the work that needs to be done in this area, and no doubt we'll have a lot more to say about this subject in subsequent issues of the Bulletin. Remember the simple equation, ladies and gents; no bands = no amateur radio. ■

This Month :

*Dick Baldwin, W1RU
takes a look at
the implications
of the next
WARC*

HOW'S YOUR CYCLE?:

In the New Year's edition of the GB2RS News Broadcast, we ran an item by Charlie Newton, G2FKZ - compiler of the weekly solar factual data - which dealt with the sort of problems facing solar forecasters. We felt it was such a good piece that we'd run it 'in print' just in case some of you were still suffering from post-Hogmanay blues and missed the gist of what it was all about. So here it is;

The effect of violent solar activity on satellites can be catastrophic; it can damage the solar panels and ruin experiments that have cost several millions of pounds. With this in mind, there is considerable interest in the forecasting of solar cycle 22. There has never been a shortage of forecasters, but now that computers are readily available and everyone has their own pet system, the forecasters are proliferating like rabbits. So what can we make of it all?

First of all, let's look at the factual data. If we take September 1986 as the minimum and start of solar cycle 22, the first thing we notice is that cycle 21 - June 1976 to September 1986 - lasted just over 10 years instead of the usual 11 years. If we compare the smoothed data - which experience has shown to be the best method - cycle 22's sun spot minimum of 12.3 was comparable with that of cycle 21. However, the rate of rise in the sun spot count for cycle 22 is greater than that of the previous cycle. If we then look at the 2,800 MHz solar flux levels we see that the actual minimums were almost identical but, since the minimum, there has been a trend which

suggests that this cycle is rising at a slightly steeper rate.

The really interesting curve is the Planetary 'Ap' index. This is an average A index taken from a larger number of observatories spread around the world. The magnetic minimum usually occurs about one year after the sun spot minimum. However, at the present time it looks likely that the magnetic minimum occurred in April or May 1987 - in other words about three months early. A comparison between the two cycles - 21 and 22 - clearly shows that this cycle was very much quieter, magnetically speaking, than the previous one. But if we look at the 'Aa' index - or the Inda index, as it is referred to in the GB2RS news broadcasts - the discrepancy is even larger. The plain facts are that in 1987 we saw the quietest magnetic period for a very long time and this coincided with the summer season. Looking at the secular, or very long term magnetic changes, the UK is at the lowest magnetic dip angle we are likely to see for the next 800 years; in other words, the present horizontal magnetic field is the strongest it will be in any of our lifetimes.

You may well ask what is the importance of this? Quite simply we've seen the most remarkable sporadic E season that anyone can remember. Through June and July, E layer propagation was observed every day at 28 MHz and almost every day at 50 MHz. The Africa and South America paths at 28 MHz were open much more frequently than at any previous time; the openings to the USA at 50 MHz occurred not only in June and July, as would be expected, but continued into November. To crown it all, we saw the remarkable 50 MHz opening to Botswana in late October. The

strangest thing of all is that no one seems interested in minimums and it appears that there were no official predictions. The remarkable coincidence of the magnetic field aspects which will not be repeated for 800 years were pointed out but went unheeded.

There are so many forecasts of the maximum that you can take your pick of any smoothed number between 107 and 185, and a time scale of 1990 to 1991. However, it might be a good idea to forget these and look for the sporadic E, which is much more reliable and exciting.

RAE RESULTS:

Well, you certainly enjoyed the RadCom Annual Extravaganza in the December edition of the Bulletin. By the closing date we'd received nearly 100 entries and a few rolled in even after that - we allowed those which had been postmarked the day before and posted first class, however. Here are the winners:-

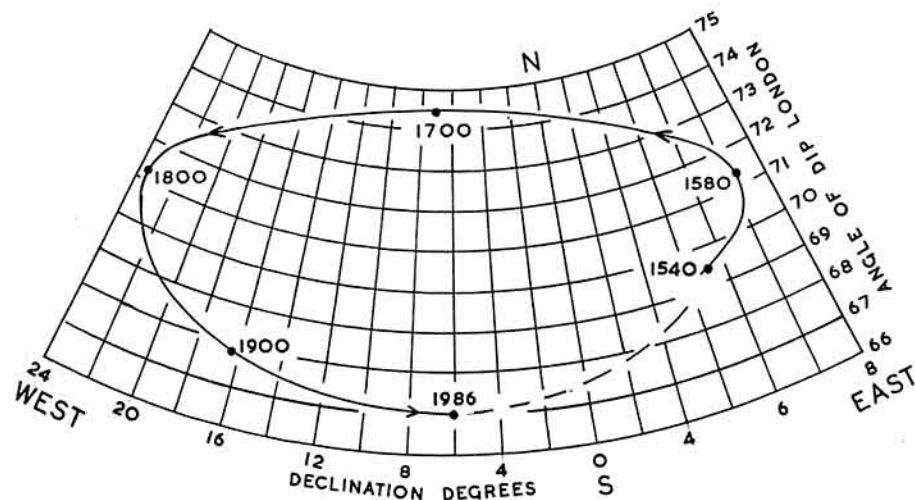
1. Roger Blackwell, G4PMK (all answers correct)
2. T D Jones, G4IPR (one wrong answer)
3. We had to invoke the tie-breaker here because several people got two answers wrong - G3FPK, G4RSN, G3NAQ and G3XGK. Of these, the winner - who had the astronomical total of 314 words, put our miserable total to shame - was R D Burman, G4RSN, who therefore comes third.

We're also making a special award of a Call Book to Petr Doudera, OK1CZ, for the "best DX entry"! Petr got a few wrong answers but it was smashing to receive a non-G entry - there's no way in the world we could pass the R.A.E. written in Czech or Slovak, let alone unscramble weird anagrams. Well done, sir - see you next year?

Thanks to those who entered into the spirit of the thing (and in some cases supplied alternative answers....) and the nice comments.

Here are the answers:-

- 1(c), 2(b), 3(b), 4(a), 5(d), 6(a), 7(c), 8(c), 9(d), 10(c), 11(b), 12(a), 13(b), 14(c), 15(d), 16(b), 17(d), 18(c), 19(b), 20(a), 21(b), 22(c), 23(b), 24(a), 25(d), 26(b), 27(c), 28(a), 29(a), 30(d), 31(d), 32(b), 33(c), 34(d), 35(c), 36(b), 37(c), 38(a), 39(d), 40(a), 41(c), 42(b), 43(c), 44(a), 45(d), 46(c), 47(c), 48(d), 49(a) - honest.



The secular field variations at London since 1540. This is drawn to show the 'auroral relationship' as we now have the lowest dip-angle since radio was invented and the 'H' field is at its strongest.

We were going to start a series entitled "Connector of the Month" this month, with a view to looking at the various types of RF connectors which we come across in the amateur world and how to choose them, put them on cables and generally get the best out of them. Yes, there are several ways of putting PL259s on to UR67 and no, none of them are especially brilliant. However, a visit to a local amateur's shack a few weeks ago gave some pause for thought regarding another sort of connector - the one you use to get the mains into your mains-powered equipment.

Said local amateur, who is relatively new to the hobby, had a home-brew HF linear amplifier - the usual type of thing, a pair of 813s doing an easy 400W between 3.5 and 28 MHz. Very nicely made it was too, except that the lead taking the wiggly amps from the 13A mains plug to the amplifier's power supply was terminated on a male octal plug which fitted a chassis-mounting octal socket on the rear drop of the chassis! In case you've never seen an octal plug, it looks like the base of those wonderful old glass and metal-envelope valves dating from somewhere about the year dot and including wonderful bottles like KT66s and KT88s - as used in high-class audio amplifiers before transistors came along. Trouble is, all the pins - which are about half an inch long - are nicely exposed ready for plugging into a socket. So our pal had 240V worth of phase, together with neutral and earth, appearing on pins which could either have shorted out to any nearby metalwork or - much, much worse - given him one hell of a belt if he'd absent-mindedly picked up the plug when power was on. What made it worse was that a multiway cable took all sorts of voltages (including about 400V for the screen grids and a 240V switched feed for the blower) from the power supply to the amplifier. Fine, except that an octal chassis-mounting plug, again with all pins exposed, was used on the rear drop of the power supply and a female cable-mounting socket picked them up and took them to the amplifier! So a stray brush of the hand across the plug and - especially if your other hand was on the chassis at the time - you could be in big trouble. If you don't believe us, read any of the standard things on the effects of electric shock.

When we mentioned this to Matey, he looked surprised and said words to the effect that he'd never bothered to think about it and just used whatever he'd had in the junk box - after all, it was "....only the mains, wasn't it?" A few comments were made about safety in the shack and all that and he was invited to visit the editorial establishment at his earliest convenience and raid the "technical stores" (posh word for variety of old cardboard boxes, etc, containing large quantities of - er, well, junk). The same evening he was presented with some suitable connectors, and Editor decided that maybe a little dissertation on mains connectors and things instead of RF connectors ought to be on the menu this time.....

You really MUST NOT take liberties with mains - and that isn't a polite authorial suggestion, it's cold fact. From the point of view of the home-brewer, this means that you've got to devote just as much thought to getting the mains from the wall socket into your pet project's power supply system as you have to the internal electronics. The trouble is, we all tend to sweat blood over the sexy electronics inside our nice home-brew boxes (actually I've spent hours lettering front panels to make home-built projects look like something Racal or Marconi built, except that they usually end up looking like the first prototype of something Bloggs Backstreet Electronics knocked up on a wet Monday morning) and then throw together the mains side of the thing as a sort of irritating afterthought - which is emphatically not the right way to go about it.

Let's consider what's necessary.

Assuming your piece of kit is mains-powered, you need to convey 240V AC from your standard domestic wall socket to its innards - and in the vast majority of residences these days, that'll mean a 13 amp plug going into a wall socket. Believe it or not, it's worth spending some time looking at the variety of 13A plugs available because - although in theory they all conform to a British Standard - some are much easier to wire than others, some have much more reliable cord grips than others, some have sensibly large screw terminals instead of little non-captive screws, some have nasty

riveted-on fuse clips and so on. We've always used either MK or Ever Ready and never had any trouble, but we've certainly had problems with El Cheapo ones from dubious sources. Actually, if your wonder device contains anything which might be sensitive to mains overvoltage transients it's worth thinking about buying a 13A plug containing varistors (a.k.a VDRs) which will clamp such nasties. The editorial radio station contains an Icom IC251E, which used to be prone to some sort of internal microprocessor crash causing it to lose its marbles and sit on the operating desk looking silly instead of receiving any signals - it had to be switched off and disconnected from the mains for about thirty seconds so that the micro could reset at the next switch-on. A 13A plug with VDRs on the business end of its main cable stopped that happening, and also incidentally stopped the domestic video having similar nervous collapses.

Having sorted that out, you need some mains cable. The main (sorry) thing here is the current rating of said cable and the fact that it really ought to be cable specifically made for the job. That's to say it ought to conform to British Standard 6500 and have a current rating appropriate to how much power you're going to abstract from the mains supply. The usual mains cable ratings are 3, 6, 13 and 15 amps, so choose on that basis - and we'd honestly recommend getting it either from a mail-order outfit like Electromail, STC, Maplin, etc or from a proper electrical shop. Whatever you do, don't be tempted to use any old cable that's hanging round the shack or to twist up three likely-looking lengths of gash wire and whack them into the plug.

Next job is to decide whether the mains lead is to be "captive" or not - by which we mean whether it's to be permanently fitted to the equipment or whether there's going to be a connector at the end of the cable which will mate with a similar connector on the equipment. If it's going to be captive, don't succumb to the temptation to drill a hole the diameter of the cable in the back of the equipment, run the cable through it and connect to switches, transformers, etc. whilst telling yourself you'll never pull the cable or step on it by accident or..... Sooner or later you will, and the odds are that the power

will be on when you do - result, a blown fuse at best and a loud bang and a yell at worst. You MUST make sure that a good sharp pull on the mains lead will have precisely no effect on the functioning of the equipment, and also that there are no sharp edges on the chassis or whatever which could cut through it as a result of flexing over a period of time. So first of all, the mains lead must pass through a suitable grommet which will ensure that the lead can't ever come into contact with chassis at the point where it enters - you can get these from all sorts of places and all you need to do is to drill a hole large enough for the grommet, ensure that you've removed any sharp edges and push it in. Then push the mains lead through the insulated hole. If the cable is tight in the grommet and doesn't want to go through, here's a tip - run a hand vigorously through your hair a few times and wipe it on the cable and it'll go through easily. If you're like me and haven't got enough hair for this trick to work, try a drop (literally) of the XYL's washing-up liquid.

Having got the cable safely through the hole, the next job is to anchor it so that there's no strain on the connections which you'll be making later on. If all else fails, tie a knot in it - this is crude but a whole lot better than no strain relief at all. Two better solutions are either a screw-on plastic clamp made for the purpose, which will cost you about 4p from an electrical shop, or a suitably sized "P"-clip which you can push on to the cable and then bolt to the chassis. Either way, when you think you've got it sorted out give your handiwork a test by yanking hard on the cable and making sure that there's no "give" in it.

For non-captive cables we need to think about suitable connectors. You'll no doubt have guessed by now that the object of the exercise here is to make sure that at no time can your little pinkies - or any other part of your anatomy - come into contact with any live conductors. This is why male octal plugs, or any other kind of unprotected male plugs, are a total and utter no-no on the equipment end of a mains lead. Furthermore, you must make sure that your mains connection arrangements are "Murphy proof" - which means making absolutely certain that your mains cable can't possibly be plugged into the wrong socket by mistake even though you're frantically trying to get the hilltop contest station on the air three minutes before the event begins and there are wires, connectors and other

operators flying around all over the place. This means using plugs and sockets which are ONLY used for mains and NOTHING ELSE. You might think we're making a real meal of this, but we can assure you that we've seen any amount of home-built amateur equipment which used the same type of socket for four or five different functions including the mains input. Remember Murphy's Law - "if something is capable of being incorrectly assembled, somebody will one day incorrectly assemble it". Or, "if it can happen, it will".

We'd strongly recommend using one of two types of mains connector, both of which are easy to get hold of and which are commonly used in amateur and professional gear. The first is the "IEC" connector - this is a three-pin job specifically designed for mains-type applications and takes the form of a chassis-mounting socket and a wireable plug. Icom rigs use them, as do various household things, and you can also buy the socket with integral mains filters rated at 2 or 6A. Just to make life even easier, you can also buy lengths of mains cable with integral IEC plugs moulded on one end. Other accessories for them include rubber "boots" to go over the socket terminals and insulate them from sticky fingers and cable clamps to make sure that you don't inadvertently unplug the cable when you fall over it, etc, and take the contest station off the air. You can also buy chassis sockets with integral fuseholders, which may be handy. Suitable cutters to cut out the specially shaped hole for the socket are available for a few pounds, and it might be a good move for a club to purchase one for loan to members. All in all, the IEC connector is a good bet and it's rated at 6A - which ought to be enough for any amateur application.

The other good bet is the Cannon XM and EP series, rated to 5 and 10A respectively. These are extensively used in professional equipment which is expected to lead a fairly hard life and come in male and female plug and socket versions for taking mains in and out of things - so you do need to be careful to choose the right ones. "Cannons" are very easy to wire and once they're on they never seem to go wrong - they feature positive mechanical latching, so when they're plugged in they won't unplug until you press the little latch on the connector. They're a touch more expensive than the IEC connectors but you sometimes see them at rallies and so on for very low prices, usually on the end of a length of cable.

So there it is - IEC or Cannon connectors are what we go for every time when it comes to home-brew, basically because they're fit-and-forget and there's no chance of anything nasty happening. Both are a damn sight safer than octals, DIN plugs, D-types, 10-pin video multiways and all the other weird and wonderful mains connectors we've seen on amateur equipment. By the way, if you need to take mains and other high voltages out of one piece of equipment to another (i.e. from a power supply and control unit to a linear amplifier) do use a decent multiway connector such as a Cannon KPT which is rated for the voltages you have in mind and which have good insulation and mechanical locking. Just because it says "amateur" on your licence, you really musn't take an amateur approach to high voltage in any shape or form.

Next month we'll try and get back to RF connectors - or the gentle art of persuading an N-type on to a length of UR67 without becoming suicidal....

AMATEUR IN TREASURE HUNT.....

At 8.30pm on Thursday 7 April, you'll be able to see well-known auroral operator Jim Williamson, G4MOFET, and his girlfriend Ann on Channel 4's programme "Treasure Hunt" - the one starring Anneka Rice and a couple of helicopters. The programme has already been recorded and Jim tells us that, although he couldn't sneak a mention of amateur radio into the show, sharp-eyed viewers will note that he's wearing his RSGB tie! Jim sent along an interesting extract from the "Treasure Hunt" book, which outlines how they do all the communications for the programme - we're a shade short of space in this month's Bulletin but we'll try and outline some of the tastier bits in a subsequent one. We like the idea of a helicopter-borne repeater..... Well done Jim and Ann, and we'll be glued to our screen seeing how you did.

AGM MINUTES:

We had hoped to get the minutes of the last Annual Meeting of the Society into this edition of the Bulletin. Unfortunately we were a shade optimistic in our timing and hadn't quite finished the write-up by press time even though we put in a load of late nights and thrashed the word processor to within an inch of its life. They'll definitely be in next month, though.

Helplines

SPECIAL OPERATORS REQUIRED:

During this year's 75th Anniversary Convention at the NEC in Birmingham there will be a special event station - GB75AC, which stands for 75 Anniversary Convention - running from 9-17 July. The station will be run by members of the Solihull ARS and will be active on all bands using all possible modes. However, because the station will be run on a 24hr basis, additional operators are required. If you wish to join the operating team you should be a current member of the RSGB, hold a current class A or B licence and should be willing to fit in with an operating rota, logging and some computer data entry. This will be a very prestigious station and will attract media coverage so other criteria will need to be met by applicants. Further details can be obtained from Mr Warwick Hall, G4WMH, 45 Dorchester Road, Solihull, West Midlands B91 1LN tel: 021-705 0488 (social hours please!).

HAM AID:

You've heard of Band Aid, Live Aid and Comic Relief - well now look out for "Ham Aid"! Members of the Devizes & DARC will be running a marathon 48-hour special event station over the weekend 28/29 May. They will be applying for special event calls with the suffix 'HAM' and hope to be operational on all bands, using as many modes as possible, to raise money for third world relief by sponsorship on the number of contacts made during the period. How can you help? First of all, you can listen out for the stations and work them if possible. Secondly, the group is looking for all kinds of sponsorship help to make the event a success. They need equipment and antennas as well as sponsorship for the QSL cards etc. If you can help in any way, please contact Noel Woolrych, G4TIX, QTHR, telephone 0380-4533, Prestel mailbox 103804533 or Telecom Gold mailbox MAG10342.

PLINK, PLINK, FIZZ.....

In the course of a 144 MHz QSO the other day someone mentioned a rather interesting point about charging batteries which hadn't crossed our mind before. Seems that he'd bought a piece of equipment which featured a rechargeable battery of the increasingly common sealed lead-acid type - that's to

say not a NiCad pack but a miniature sealed version of a car-type battery. These are charged from a constant voltage of typically 2.35V per cell, so for a 12V battery you need a shade over 14V. The odd thing was that when on charge with the pukka charger supplied with the gear in question, the battery emitted quite a distinct "fizzing" noise. This worried our man since he wasn't sure whether a) there were copious amounts of hydrogen being emitted - one spark in the shack and Goodnight Vienna or b) the battery was on the point of exploding. The manufacturer seemed to think this phenomenon was probably normal but a few other people thought it was anything but!

These batteries are becoming quite common in things like broadcast ENG gear, portable cellular telephones and so on and no doubt they'll start appearing at rallies and whatnot in the not too distant future. We'd like to know whether they're at all dangerous if incorrectly used or whether they're prone to blowing up and demolishing the shack. Any battery specialists out there who can advise us? A line to the Bulletin's editor QTHR or via HQ would be much appreciated.

QL PACKET?:

GM4JKL is looking for information on software for his Sinclair QL computer to run packet, AMTOR, RTTY or CW transceive. Can you help? If so please ring him on 0236 23153 or write QTHR.

YAESU MANUALS NEEDED:

The Pembrokeshire RS has recently purchased its first HF station for use with the club's callsign GW0EJE. The equipment comprises two separate units; the Yaesu FR100B receiver and FL200B transmitter. Although the transmitter came with every valve missing, the club has managed to get it up and running - after a fashion. In order that the members can restore these two fine pieces of equipment to their former condition, they urgently need literature, workshop manuals or operating manuals. If you have any information please contact:-

Brian Smith, GWOIER
2 Redlands Cottage
Liddeston
Milford Haven
Dyfed SA73 3PY
tel: 06462 2825

WANT A USA CALL?

US FCC examinations were conducted during last year's National Convention at the NEC and the HF Convention in Oxford. The examinations proved to be very popular and, as a result, a further opportunity to take the FCC exam will be made available in the next few months in central London. Anyone interested should get in touch with:-

Don Field, G3XTT
105 Shiplake Bottom
Peppard Common
Henley-on-Thames
Oxon. RG9 5HJ

NO GOOD IN UK:

Gerald, GOGXM, has just received a letter from a Swedish amateur regarding an offer of logbooks. Gerald asked us to warn other members about this offer, since the logbooks are of a loose-leaf variety and as such are NOT legal for use in the UK (clause 6 of the licence). Although these logbooks are quite inexpensive, please don't be tempted to use them - there are many logbooks available in the UK from various sources (including RSGB, subtle hint) which comply with the regulations.

COLLINS VETERAN CLUB?:

Sten Tegfors, SM4CTI writes to ask whether the rumours concerning the existence of a "Collins Veterans Club" here in the UK, which assists Collins owners in exchanging spare parts and information on mods etc, have any foundation. If there is such a club, Sten would very much like to join as he is an ardent Collins fan. Sten can be contacted at:-

Vikhyttan 2487
S-776 00 Hedemora
Sweden

HIGH FLYING FUND-RAISER:

The Humberside Scouts are in the middle of a major fund-raising exercise and Roy Andreang, G4CMT has come up with a novel idea for sponsorship. Roy has been involved with the Scout movement for many years and on the Saturday nearest his 64th birthday, which is on 6 April, he intends to make a 10,000 feet tandem parachute jump with one of his scouts, Steve Hodgson, who
(cont p.203 col.1) ▶

Trade Talk

What happened to muTek?

We're often asked this question and we've heard many people speculating on the air about why they're not advertising any more. We thought that the demise of this excellent British company was very sad, and it seemed to us to be a good move to get the facts from the horse's mouth, as it were - so we asked Chris Bartram, G4DGU, to drop us a line and reveal all. He did, and here's what he has to say;

"When I set out to manufacture amateur radio equipment during 1979, I wanted to make things that I'd be proud to be associated with. I'd felt that few items of equipment available commercially were capable of the sort of performance that radio amateurs need, particularly at VHF. I also felt that the manufacture of amateur radio equipment of the kind I had in mind was an engineering challenge at least equal to that presented by the avionics test equipment with which I'd been previously associated.

"muTek grew steadily for its first five years. We never aimed at spectacular financial growth; indeed, despite suspicion's I've heard voiced to the contrary, the margins involved in the manufacture and retailing of amateur radio equipment are small and wouldn't allow spectacular growth. Despite this we were happy to live modestly and invest heavily in the development of new products.

"I believe we made several significant advances in the state of the art. I'm particularly proud of our development of the use of non-dissipative negative feedback techniques in GaAsFET low-noise VHF amplifiers. To the best of my knowledge, muTek was the first company in the world - either in the amateur radio or professional communications field - to develop this technology. Others, including multinationals, have tried and failed. The GBFA144e 144 MHz masthead preamplifier, which we developed in late 1982, combined noise figure and strong signal handling characteristics of an order which it would still be difficult to beat five years later.

"In mid-1985 Jane - my wife and the company's administrative director - was diagnosed as

having multiple sclerosis. This led to a restructuring. We were still growing nicely and had introduced our first transverters; the TVVF230c 144 MHz to all HF bands (another first) and the TVVF50c and TVVF50a 50 MHz transverters. We'd also looked at our export distribution network and appointed a full-time distributor in the USA, but I wasn't able to spend the proportion of time I'd previously enjoyed designing the products. Despite this we got the TVVF144a high performance 28-144 MHz transverter into production and I did most of the groundwork on a very high performance transverter for the band I love most of all - 430 MHz.

"At the end of 1985 we had two serious bad debts. The first was owed by a very well known "independent" UK amateur radio retailing firm who claimed (falsely) that we had sold them faulty goods, and we were within 24 hours of obtaining a county court judgment before they settled. The second was with our US distributor - the VHF Shop, owned by Tom Waldron, KQ3R. This latter debt has never been settled, despite attempts to pursue the matter through the legal systems of both England and Pennsylvania. The sum of money involved wasn't enormous, and we had the financial depth to continue, but it caused problems with cash flow and this - combined with our changed home circumstances and my wish not to lose touch with engineering - led Jane and I to the decision that we were not prepared to continue.

"We wound production up slowly, both because I wanted an ordered end to the company's affairs and also to allow potential purchasers of the company's design portfolio the opportunity to continue to produce the product range. However, there was surprisingly little interest from the established trade. In retrospect, the reason for this seems to be a lack of real understanding of the technology; most established companies simply can't see large enough margins on their amateur radio business to justify employing staff with sufficient experience

and knowledge to tackle the complexities of manufacture. Manufacturing amateur equipment - or indeed another form of radio equipment - isn't a job for amateurs.

"Since late 1986 muTek has been wound down gracefully, and we have taken steps to support our customers. muTek's former production manager, Nigel Lay, G8FXG, is now operating Beronheath Limited and is well equipped to service and repair all muTek's former product range to the highest standards, as well as making very high performance RF distribution amplifiers for professional applications. They're on 0409 24 548.

"In retrospect, I suppose that I enjoyed my seven years' involvement with the "trade", and I'm grateful to all those who made it possible by buying various pieces of muTekery. What I don't regret is the passing of those twenty or so Sundays each year when I'd be woken by the alarm clock at 0300 and would then drive for several hours to spend the day in a wet, muddy field or a dusty and smelly hall trying not to snarl at potential customers making inane comments - or, even worse, biting my lip at the comments made by those extremely clever people who were absolutely certain that they could do much better for far less and that either the whole thing was a big rip-off or that our equipment couldn't possibly work as well as we claimed.

"I'd like to think that someone, some day, will again start to manufacture high performance amateur radio equipment in the UK. I very much doubt whether it will ever happen, though".

Incidentally, now that the poor old Bulletin Editor can't buy one direct from muTek (sob, sob, wipe tear stains off shirt with dirty hanky), anybody got a muTek TVVF144a 28-144 MHz transverter surplus to requirements and looking for a good home? He's after one in order to improve the editorial radio station somewhat but everyone keeps beating him to it when one appears in the small ads! Please put him out of his misery - contact GW4FRX QTHR or via RSGB HQ.

Council Brief

26 November 1987 & 30 January 1988

26 NOVEMBER 1987:

At this meeting Council began by discussing the current management accounts. The Finance & Staff Committee chairman reported that the finances of the Society were in a surplus position; the total income was satisfactory although slightly down on budget. The area causing most concern was the sale of books, which were below the budgeted figure. Book pricing policy was raised and discussed in depth, and the Secretary said that he was concerned about the ill-will which appeared to have been generated in regard to the costs of some imported publications and was currently looking into how prices were derived. Future policy relating to book production was discussed, as were the likely advantages and disadvantages of in-house typesetting.

Council was informed by the Secretary that main components of the Society's IBM 38 computer had now been paid for; this contributed a saving of some £12,000 per annum.

Expenditure for NEC and the recent mailing shot were also discussed; just under 1,000 new members had been recruited as a result of the latter and the exercise had been very beneficial.

The Secretary then gave his report.

He referred to three papers which had been circulated to Council, on encouraging beginners into amateur radio, the Young Amateur of the Year Award and the student licence. It had been decided to make a video aimed at young people, with two presentations on the same tape; this was intended to be ready for the NEC in July. With regard to the student licence, the Society aimed to be in a position to begin discussions with the DTI by the middle of 1988. The Secretary also outlined his proposals for the Society to improve its mechanism for influencing the Government and described the outcome of some recent meetings. Council voted in favour of the Society taking a higher political profile where necessary.

Council discussed recommendations from the Finance and Staff Committee with respect to the formation of a Publications Management Group. The proposals

were approved in principle, with the Secretary chairing the group initially until it had become established.

The Secretary closed his report by saying that the draft of the full Society response to the CSPI Report had been circulated to LAC and was awaiting discussion.

Recommendations and discussions arising from Council minutes were then dealt with; these related to:-

- a) book production
- b) the Rouse Trophy
- c) the EMC IARU Representative
- d) Council of Europe Radio Amateurs Club
- e) the RLO scheme
- f) the European Directive for Electromagnetic Compatibility
- g) 75th anniversary celebrations
- h) future UK country prefixes
- i) the role of the President

Outstanding business for the year was discussed and priorities for the coming year were set; these were books and youth into electronics via amateur radio.

In addition, Council discussed recent correspondence.

Mr Brinkworth had received a letter stating that the Society had not responded to the CSPI report. The Secretary replied that the Society had in fact made an initial response to the DTI and was now producing a full formal reply.

The President had received a letter from G6LX reporting on his recent visit to Hanover. Great interest was being shown in the Society's forthcoming 75th anniversary.

30 JANUARY 1988:

The Society's 1988 President, Sir Richard Davies, G2XM, took the chair for the first Council meeting of 1988, which was held in Ipswich, Suffolk. The Town Hall/Corn Exchange in Ipswich was to be the venue of the Presidential Installation to be held later in the day.

Early business on the agenda was the appointment of various officers and the appointment of a Council representative for Scotland (Zone G). It was noted that a casual vacancy existed with respect to Scotland, since no member had been proposed to fill the vacancy on the 1988 Council. Such a casual

vacancy could now be filled by Council under Article 26. Following some discussion, Frank Hall, GM8BZX, was unanimously appointed as Council member for Scotland until the end of 1988.

The appointment of the Society's Executive Vice President is a matter for the first Council meeting of each year. Again, following some discussion Dr Julian Gannaway, G3YGF, was appointed Executive Vice President for 1988.

The appointment of a new Honorary Treasurer for the Society, following the recent resignation of David Cornish, G3COR, for health reasons, was discussed in some detail. It was noted that since the upgrading of the Society's accounting staff in recent years, the role of the Honorary Treasurer had changed to some extent. After further discussion, Mr Basil O'Brien, G2AMV, was appointed the new Honorary Treasurer for the Society. In view of Mr O'Brien's appointment this now created a casual vacancy amongst the ordinary members of Council. It was agreed that this matter would be discussed at the next meeting of Council.

Under the heading of the Financial Report, the Secretary read out a short statement which he had agreed with the Chairman of the Society's Finance and Staff Committee. The statement related to an exercise which had recently been completed by the Society's Accountant in order to ascertain the profit/loss situation at the end of the first six months of the 1987/88 financial year. All the normal considerations had been taken into account in arriving at an estimate of the financial position at the end of December 1987. As a result, it appeared that the Society had made a small surplus of some few thousand pounds. It was felt that the new management accounting scheme had been beneficial in monitoring both income and expenditure. In the context of the financial situation, Mr G. Smith, G4AJJ, had submitted a proposal to Council with regard to the monitoring of the financial situation. The President explained to Mr Smith that some quite fundamental changes had taken place during 1987 as a part of the reorganisation of HQ and that it was now considered that monitoring was improved. As a result, Mr Smith withdrew his paper.

(cont p.203 col.3) ►

RADIO COMMUNICATION March 1988

Around the Groups

Beginning with this issue, the 'Around The Groups' section of the Bulletin has been expanded to include more items of interesting news from clubs, groups and societies. We are looking for the kind of news which will be of interest to other amateurs and clubs - such as special awards, DXpeditions, user groups, special interest groups, etc. In addition, we'd like to know if your club has an interesting project on the go or is doing something to encourage youngsters into amateur radio. Basically, we'd like to hear about anything which might inspire fellow amateurs and clubs to do something similar. Have a look at the items below for examples of what we have in mind.

If you have any interesting items of news, with good black & white photographs if possible, please send them direct to HQ marked "Around the Groups - Bulletin". We may not be able to use all items sent in because of space limitations but we'll try and fit in as many as possible.

The deadline for the MAY issue is Wednesday 30 March but if you can send items in earlier it would be much appreciated.

ISWL '87:

The International Short Wave League has been growing in strength after its sad demise and re-emergence last year as ISWL '87. Many, if not all, of the founder members are still involved in the league; G2IZ, G2WQ and G2BRR being just three of the famous old callsigns who were determined not to see the death of a club with such a fine history.

ISWL '87 is able to offer its members a great deal; SWL contests, awards and so on. In addition, the league's monthly journal, "Monitor", is always packed with information on amateur and broadcast bands as well as interesting articles for the broadcast and amateur short wave listener. There is no shortage of licensed members either and they run regular SSB nets on 80m:-

Tuesdays 7pm - 3700 kHz
Saturdays 10am - 3685 kHz

The short wave listener is never forgotten on these nets - indeed each new member is issued with a unique identification number consisting of their country prefix followed by a series of numbers.

The league also offers a QSL bureau service.

Have a listen to the nets or join in if you are licensed, and if you'd like further details please contact:-

Mr J May, Hon Sec ISWL HQ
10 Clyde Crescent
Wharton
Winsford
Cheshire CW7 3LA

THE AVONCROFT AWARD:

The Bromsgrove & DARC, in conjunction with the Avoncroft Museum of Buildings in Worcestershire, announces the Avoncroft Award.

This award is open to all amateurs and SWLs and to obtain it you must obtain the following number of points:-

DX claimants - 10 points
European - 15 points
UK - 20 points
VHF all areas - 15 points

Five points can be gained for having worked/heard any of the Bromsgrove & DARC club stations or special event stations (G3VGG, G6VGG, GE3VGG, GB2RUB, GB2WED etc.), three points for any of the Bromsgrove & DARC members, and one point for any station in Worcestershire.

There is no time limit, past or present - hence the old GB calls listed above - but contacts must all be from the same address and QSLs may be required. Contacts via repeaters are not valid for this award.

To claim the award, send a log extract plus £1.50, 7 IRCs or \$3.00 to the Award Manager, Mr John Harvey, G4IVJ, who is QTHR in the latest callbook.

WAB NEWS:

1) What is WAB?

The Worked All Britain Award scheme was devised in April 1969 by the late John Morris, G3ABG. His aim was to promote a series of awards based on the geography of Great Britain and Northern Ireland using the National Grid Squares, counties and rateable districts. Since that time WAB has grown through the voluntary efforts of many individuals, and aims to live up to its motto "To Assist Others". It creates more on-the-air activity by British amateurs and, in doing so,

fosters many lasting friendships within the UK and with countries overseas.

Awards are available for working stations in the large 100km squares, small 10km squares, counties, rateable districts and bookholders. Because of the way in which the awards are structured, participants gain a good geographical knowledge of the UK and this has encouraged many people to travel to the more remote parts of the mainland and islands in order to activate rare squares. The progress of these expeditions is followed by the many keen WABers around the UK and overseas. At the same time, it is hoped that WAB activity of this kind will enhance the status of G stations by making them wanted by DX stations. Many European stations already join in the HF & VHF nets and there is a growing interest from DX countries such as Israel. The WAB group hopes that UK stations will take the trouble to work out their WAB square and be prepared to give the details to foreign and other UK stations if asked. Including the area on your QSL card, alongside your Maidenhead Locator, is also a good idea. Details of how to work out the WAB square are given on page 68 of the current RSGB Callbook (available from HQ, another subtle plug...)

Many keen WABers activate rare squares which have no resident amateurs in them. Mobile operation and expeditions are encouraged and WAB gives an award to those who carry out this kind of activity for the benefit of other WABers.

WAB also helps amateurs and SWLs who are less fortunate by making donations to organisations like RAIBC and QTI - which provides a fortnightly tape magazine for the visually handicapped. The group has no allegiance to any social, political or religious organisation and is independent of any other amateur radio group whilst remaining an affiliated group and full supporter of the RSGB.

How can you find out more? By listening to some of the nets, eg. 3760 kHz and 144.3-144.44 MHz, or by sending a large stamped addressed envelope (or, in the case of overseas enquiries, a self addressed envelope and 1 IRC) to:-

Brian Morris, G4KSQ
22 Burdell Avenue
Sandhills Estate
Headington
Oxford OX3 8ED

The current cost of a WAB Book, which gives lifetime membership of the group, is £6.00 inc p&p in the UK. Many members have more than one book (eg. one for HF and one for VHF etc.) but each member has only one vote at the group's AGM, irrespective of the number of books held.

So there you have it. WAB can be lots of fun but, above all, it puts back the sharing into amateur radio because although you are collecting areas yourself, you can also activate those rare squares for others. You can collect squares by joining in the nets where there is usually a mobile station running through a number of squares, or you can collect them on your own - it's up to you. WAB runs a number of contest throughout the year and this can also be a means of logging some more elusive squares.

2) Rare square to be activated.

On Sunday 3 April (Easter Sunday), GB10VA will be active from WAB square OV00. This area has been activate before on HF but the problem with VHF is that it is a very small area of foreshore at the base of a 500' cliff near Ravenscar in North Yorkshire. The station will be on 144.375 MHz and, although G10VA made 6 valid contacts in October 1987, it is hoped that the station will be running more power (100W) and a 13-element antenna. Steve, G1SGB, will be QRV from a site near to the cliff-top running 250W to 2x13-element antennas and he will act as the control station. Also, members of the Scarborough club hope to be active from the same square on 14 MHz. If weather conditions permit, they hope to raise the height of the antennas using balloons.

3) This month's new firsts.

The first 50 MHz award goes to G6ZGO for working 100 bookholders and the first Platinum WABEMA award, for activating 750 areas on 80m CW, goes to G5LP/M. G1NUS has become the first station to achieve the 1988 Decade Award for working 100 areas during 1988 with numbers between 00 and 99. Finally, G6STI has received the first award for working 900 series 3 bookholders on 144 MHz SSB. Congratulations to all concerned.

4) WAB Contest Results.

The WAB 80m CW Contest took place last November and the winners in each section are as follows:-

Single op - G40GB, 11,550 pts
Multi op - G4MWS, 2,100 pts
Mobile op - G5LP/M, 5,775 pts



GB2LNM with Alan Devereux, GM8VJV on the mic and Danny, GM4LDU assisting. Taking a keen interest are children from the Balain Primary school.

MONSTER STATIONS AT LOCH NESS - 2: EUROPEAN YOUTH CLUBS' DAY:

In January's Bulletin and in GR2RS last December, we mentioned the special event station GB2LNM (Loch Ness Monster), being run by the Mid-Lanark ARS in conjunction with the Scottish Tourist Board. Paddy, GM3MTH, has sent us a report on the first activity period which took place on 13/14 December together with the photograph above. The station was set up in the Clansman Hotel, on the banks of Loch Ness at Drumnadrochit, Invernesshire, adjacent to the Loch Ness Exhibition Centre. The guest of honour was Mr Alan Devereux, CBE DL, GM8VJV, Chairman of the Scottish Tourist Board, who did his fair share of operating on 20m and 80m. Local children from Balain Primary School also attended and the event attracted some considerable media coverage - all to the benefit of amateur radio.

The second operating period took place between 15 December and 11 January from the QTH of GM4LDU and netted a total of 8,000 contacts in 150 countries. The certificate, mentioned in January's Bulletin, will be available in a month or so and will make all recipients members of the 'Radio Amateurs' Nessie Appreciation Society'.

The third operating period is planned for the summer, possibly in June, and will be for one week with the station located again at Loch Ness. More details as we have them.

Saturday 30 April is European Youth Clubs' Day, an event which is held annually and which provides an ideal opportunity to promote amateur radio to young people.

Last year, members of the West Manchester Radio Club set up an amateur radio station in close cooperation with Atherstone Youth Concern. The event was the first of its kind and was a great success with the station operational on HF and VHF using SSB, RTTY, FM, QRP, CW and FAX. Youth club members were kept busy by sending greetings messages, log-keeping, writing out the QSL cards and collating information on the many stations worked. They also made and displayed flags of all European countries and manned various display stands. This year, the two groups will get together again at the Youth Club, Devonshire Hall, Devonshire Road, Atherstone to run the special event station GB2EYC.

As we said at the start of this item, this is an ideal opportunity to show youngsters how amateur radio can help them make friends abroad and give them a flavour of the kind of challenges it can provide in both construction and operating - in much the same way as Jamboree on the Air does. If you'd like to run a special event station for your local youth club on European Youth Clubs' Day, that's fine but you haven't much time. Apply for your GB call now, since

you must have your completed form in to Headquarters 28 days before the event. If you'd like more details on European Youth Clubs' Day, write to:-

Les Jackson, G4HZJ QTHR
or
Graham Joyce
Youth Clubs UK
Keswick House
30 Peacock Lane
Leicester LE1 5NY
tel: 0533-29514.

INTERNATIONAL MARCONI DAY:

It's ten years since the Cornish Radio Amateur Club last organised an International Marconi Day, and during a recent meeting it was decided that the time was right to run another similar event. The 1978 event earned a place in the Guinness Book of Records when - seven days and several hot valves later - it became the longest running non-stop special event station.

Monty, G4ZKH and Norman, G4USB decided to set up a small committee to organise this year's event with the aim of making it a very special one. From the outset it was agreed to involve the South East Amateur Radio Group of Eire, with which the Cornish Club is twinned. The group was most enthusiastic about the project and plans have progressed quite rapidly. There are now six special stations around the world, all of which have a connection with Marconi, taking part in the event.

The Cornish club will be running a station at Poldhu Cove, near Mullion on the Lizard Peninsula, the site from which Marconi made his first trans-Atlantic transmission. The callsign of the station will be GB4IMD.

In Eire, the South East Amateur Radio Group will operate from a site at Crookhaven, close to where Marconi carried out his first Irish experiments. The callsign there will be EI2IMD.

Across the pond in the United States, the group received the full support of Whitey, K1VV (who also took part in the 1978 event) and together with some of his friends he will run a station at Cape Cod - the site from where the first contact between Europe and the USA was made. The callsign for that station will be K1VV/IMD.

Further north, the Society of Newfoundland Radio Amateurs will be operating from St. Johns and the station will be set up on Signal Hill, the exact spot where the first trans-Atlantic contact was made. Confirmation of the callsign VO1MD has now been received.

Another Canadian group backing the project is the Sydney Amateur Radio Club of Nova Scotia and its

station will be located in the Marconi Museum, Glace Bay - the site from which the first east-west Atlantic contact was made. The callsign there will be VE1MD.

Last but by no means least, from Bologna in Italy - the birthplace of Marconi - the Sasso Marconi Radio Club will run a station using the official Marconi callsign, IY4FGM.

Such is the enthusiasm of all those taking part that the event now looks likely to be held annually, taking place on a date as near as possible to Marconi's birthdate. This year's event will start at midnight GMT on 22 April and run for 24 hours until midnight 23 April. Operation will be in the 80m to 10m bands, using SSB only this year, and the Cornish club hopes to be active between the following frequencies:-

3770-3780 kHz (80m)
7070-7080 kHz (40m)
14.270-14.280 MHz (20m)
21.250-21.260 MHz (15m)
28.530-28.540 MHz (10m)

Unlike most special event stations, it is not the intention of the group to work as many stations as possible in a given time. They hope instead that as many stations as possible will attempt to make contact with all the participating special stations listed above. With this in mind, the Cornish club will be offering an award to any station who can work five out of the six special stations. All direct QSL cards for GB4IMD and award claims should be sent to:-

C.R.A.C.
PO Box 100
Truro TR1 1XP

Further details will be given nearer the date, but in the meantime you can find out more by contacting any of the following, all of whom are QTHR:-

Monty, G4ZKH
Brian, G4ODV
John, G0FKF
Mike, G4WQL
Tony, G4ZUI
Norman, G4USB.

RNARS NEWS:

The Royal Naval Amateur Radio Society (London HMS Belfast Group), will be active from Thursday 17 March to Wednesday 13 April to mark the 50th anniversary of the launch of HMS Belfast and they'll be using the special callsign GB5RN.

Activity will depend on the availability of operators except from 2-10 April, when the station will be operational on a full-time

basis. The preferred frequencies are as follows:-

CW - 1845, 3520, 7020 kHz,
10.117, 14.052, 18.071,
21.052, 21.120, 24.900,
28.052, 28.120,
144.035 MHz.
SSB - 1970, 3660, 3740, 7052,
7088 kHz, 14.140, 14.190,
14.278, 14.310, 14.335,
21.360, 28.410, 28.933,
144.375 MHz.
FM - 145.350, 145.400 MHz.

A special QSL card will be available and will be sent via the QSL Bureau. If you wish to QSL direct, please send your card together with a stamped addressed envelope to Derek Costello, G4UKJ, who is QTHR in the latest callbook.

RAIBC NEWS:

There's been a lot happening in RAIBC recently, including putting the entire membership records on to computers. This helps to provide a much better service to RAIBC members by permitting a faster response time in dealing with needy cases. The magazine, 'Radial', is now in the hands of a new and more reliable printer, although the despatch is still handled 'in-house' by members of the committee. Finances have recovered somewhat from the all-time low of last summer, but funds are still needed urgently to purchase good second-hand equipment when the opportunity and need arises.

There are now almost 2,000 full members, local representatives and supporters of RAIBC and although the committee has appointed zonal co-ordinators for Scotland, Northern Ireland, the north of England, the Midlands and Wales, they are still looking for zonal co-ordinators for the south west and south east who have some administrative experience and an interest in the aims of RAIBC.

All donations are now acknowledged and RAIBC is grateful for any legacies and equipment. Further information can be obtained from Angus McKenzie, G3OSS who is QTHR in the latest callbook.

ATHERSTONE ARC 2m DF HUNT:

Following the very successful 2m DF hunt competition held last year, the Atherstone ARC has decided to make the event an annual one. The competition will be in four individual stages, and the winner's shield will be awarded to the highest scoring entrant who has taken part in at least three of the stages. Entrants may be individuals or teams, perhaps representing their own club. Each event will

start at 7.30pm and finish around 9.30pm in a local hostelry! Only 2m FM is required and at least two of the stages will be designated as 'portable', where the hidden station is located off the road but on public land - take your wellies! The dates of the four stages are:-

Monday 23 May
Monday 11 July
Monday 8 August
Monday 5 September

The event is not arduous and makes for a good evening's entertainment. A small entry fee is charged to cover the cost of administration and the winner's shield. Full details can be obtained by sending a 9"x4" stamped addressed envelope to the club secretary, John Arrowsmith, G4IWA, who is QTHR in the latest callbook. Good hunting!

MARCONI TO MICROWAVES:

That was the name of an exhibition which was held at Stamford Museum, in Lincolnshire from 8 December 1987 to 9 January 1988. The exhibition was mounted jointly by the museum and the Stamford & DARS. It marked fifty years since the death of Marconi - the 'father' of radio - in 1937 and the 75th anniversary of the founding of the RSGB in 1913. Part of the display was devoted to photographs of Marconi and his inventions, together with examples of early commercial and amateur radio equipment. The other part of the display was a working demonstration of amateur radio in the form of a special event station, GB5SM, and a static display covering some of the work of the RSGB. Many amateurs and non-amateurs visited the exhibition and had the opportunity of passing greetings messages. The exhibition was the brain-child of Peter Fancourt, G3HEE, who - together with members of the Stamford club - managed to find some very old and interesting pieces of equipment. These included a two-foot tall water-cooled transmitting valve from BBC Brookmans Park (hope that didn't take Radio 4 off the air for the duration of the event - Ed) and a good example of a suitcase spy-radio used by the SOE and other clandestine organisations during WW2. Much of the equipment was loaned by amateurs around the country, and particular thanks go to the National Wireless Museum on the Isle of Wight for their assistance.

The Society is hopeful that the "Marconi to Microwaves" exhibition will form part of the exhibition of radio equipment on show during this year's national convention.



Left to right: Peter, G3HEE; Olaf Scutsch, a visitor from Denmark; Paul, G4OSJ, Chairman of the Stamford & DARS (kneeling); Mick, G0IET; Jim, G4PZB and Hugh, G4MTX (both seated).



Part of the display of radio equipment at the Stamford Museum's "Marconi to Microwaves" exhibition.

THE KEN STOREY CONSTRUCTORS TROPHY:

Each year the Goole Radio & Electronics Society holds a constructor's competition. The competition is open to all home-brewers in Humberside, Yorkshire and north Lincolnshire and the winner is awarded the 'Ken Storey Constructors Trophy' in memory of G3LEA, a keen home-brewer. This year, the judging will take place on Friday 18 March and although there is not much time to get your entries in, further details can be obtained from:-

Richard Sugden, G0GLZ
tel: Goole 69968.

GREEK SPECIAL EVENT STATION:

Not only is 1988 the 75th anniversary of the founding of RSGB, it's also the 30th anniversary of the Radio Amateur Association of Greece. To mark the importance of this occasion, Greek telecommunication authorities have granted the special call sign SX1RAAG to the official club station of the Greek national society, RAAG. The station will be active between midnight UTC on Saturday 30 April and midnight UTC on Thursday 30 June. A special QSL card will be sent via the bureau for all contacts on all HF bands from 160m to 10m on CW and SSB (30m CW only) with the exception of the 17m and 12m bands.

C.E.R.A.C. SPECIAL PREFIX:

The Council of Europe Radio Amateur Club, call sign TP2CE, has informed us that it will be using a special prefix, TPO, to mark the 1988 European Campaign for North-South Solidarity. There will be three periods of activity during the year.

The first period will be from 11-13 March and the second will be from 24-26 June. The dates of the third period have not yet been finalised, but it is hoped that it will coincide with the visit of His Holiness Pope John Paul II to the Council of Europe Headquarters on 8 October. If all goes according to plan, the call sign used on that occasion will be TPOPAX.

JOTA '87 REPORT:

We've just received a copy of the 1987 JOTA report from Les Mitchell, G3BHK, and it makes very interesting reading. However, there is one problem which Les faces each year when compiling the report and that is the poor response from JOTA stations who do not send in their individual reports. Len only received a disappointing 21.5% return, so many of the statistics

he has produced for the report had to be based on 'guesstimation'. The true picture may be quite different. Having said that, here are his statistics for the 1987 event with the figures in brackets for 1986:-

373 (341) UK JOTA stations took part in the event and made contact with 443 (490) different scout stations in 53 (47) overseas countries. Of the 81 (96) stations who submitted a report, 67 (86) gave details of the numbers of scouts and guides involved. At those 67 stations, 1109 (1668) scouts and guides were involved in running the stations or were present as long-term visitors, 1591 (2456) came along for a short visit together with 1753 (1727) parents, friend or members of the general public.

If those figures were taken as a typical example for all of the 373 UK JOTA stations, a total of around 15,000 scouts, guides, cubs, Brownies, Venture Scouts, Rangers and Leaders would be a fair estimate of the level of involvement around the country. Add to that nearly 10,000 parents, friends and members of the public and we see around 25,000 people in the UK alone who may have come into contact with amateur radio in one weekend. Of course, this is only a guesstimate based on the reports sent in to Les.

This year's Jamboree On The Air will be held over the weekend of 15/16 October.

Each year, Len Jarrett, VE3MYF, compiles the World JOTA Report based on the information from each country's national report. Typically it runs to around 25-30 pages of A4 and is available from the World Scout Bureau in Geneva from late March or early April. Copies are also available in the UK from:-

Duncan Wheelhouse, G8TRP
Fern Lea
Lazonby
Penrith
Cumbria CA10 1BG
tel: 076883 569

The exact cost will not be known until the report is printed, but is usually around £2.50. (TNX G3BHK)

Incidentally, Duncan is the editor of the "Scout Radio Newsletter" which is published quarterly. The next three editions will be published at Easter, in July and just prior to the JOTA weekend in October, and you can obtain a regular copy by sending £3.00 (£3.50 for overseas) for a year's subscription to Duncan at the address above. Cheques should be made payable to "Scout Radio

Newsletter" or you can pay by Giro into account No. 16 216 4904. Back issues, to July 1986, are available for £3.00 the set.

MORE POWER TO OTLEY ARS:

Fifteen newly licensed members of the Otley ARS between the ages of 15 and 70 are presently involved in building what for most is their first home-brew project - an 8A power supply. The club has designed and had made all the transformers and has been able to provide the ready-bent metalwork. Other members are providing advice and assistance with the project, in an aim to encourage the art of home-brewing. The club hopes that completion of this project will encourage the participants to look at building other amateur radio equipment in future and will provide additional interest to youngsters who may be put off taking up amateur radio by the spiralling costs of black boxes. Good idea, that - how about some clubs running a junior constructors' section to build a simple receiver?

ITALIAN 80 METRES DOWNGRADED:

We hear that the "shared primary" status of Italian amateurs between 3.5 and 3.8 MHz has been downgraded to secondary status. The Italian government is in the middle of preparing a national frequency plan for all frequencies below 27.5 MHz, in conjunction with the Italian Ministry of Defence.

G3PAO MEMORIAL LECTURE:

The Verulam ARC will be holding its annual 'G3PAO Memorial Lecture' on Tuesday 22 March at the RAFA HQ, New Kent Road, St. Albans, starting at 7.30pm. This year's lecture is entitled "Pan-European Cellular Radio - a glimpse of things to come" and will be given by Chris Morcom, G3VEH.

Talk-in will be provided on S22 and all are welcome. There are bar facilities at the venue and the club will be running a bumper raffle. Further details from Hilary, G4JKS on 0727-59318.

WORK THE WALL:

Hadrian's Wall is one of the finest military monuments in the whole Roman Empire. It is 72 miles long, stands at a height of 16 to 18 feet and averages 10 Roman feet thick.

During the weekend before Easter, the Hazelrigg ARC will be running a special event station from the Vallum Lodge Hotel at Bardon Mill. This is about 8.2 miles east of Greenhead on the B6318 and about 32 miles west of

Newcastle. The station will be set up in a glass fronted shop, adjacent to the hotel with a large carpark all around it and the group hopes the hotel will be able to offer out-of-season accommodation rates to visitors.

The station should be on the air from Friday evening, 25 March and close down on Monday morning, 28 March. Activity will be in the 80m, 20, 15m, 10m and 2m bands using all modes. The callsigns will be GB1HW and GB4HW and special QSL cards will be available. There is lots to do in the area and visitors will be very welcome. Further details can be obtained from Michael, G8BGU.

EX-G RADIO CLUB NEWS:

The Ex-G Radio Club was founded in 1959 by Reg Cherrill, W3HQO, a native of Kidderminster, and others with a similar background and love of Great Britain and its citizens. Full membership is open to all amateurs born in Britain and now living abroad. Associate membership is open to any amateur living abroad who is not British born but whose parents or spouse were. Details of membership can be obtained by sending a stamped addressed envelope to:-

Ken Haswell, GM2CWL
6 Cameron Avenue
Balloch by Inverness
Scotland, IV1 2JT.

The "Ex-G Bulletin", published quarterly, contains about 20 pages of articles and information about the activity of members and the editor, George Nixon, G13ION/W6 is always looking for interesting items. George can be contacted at 1140 Sherman Avenue, Menlo Park, CA 94025, USA.

The club also runs a number of nets and these take place as follows:-

Sat 1830z "CW Net"	- 14.065 MHz
Sun 1730z "Canadian"	- 14.105 MHz
Sun 1900z "Worldwide"	- 14.346 MHz
Daily 1230z "Family"	- 14.333 MHz
	- 21.410 MHz
	- 28.850 MHz

A more recent innovation is the informal net on or around 7090 kHz daily at 1200z.

GB4XXX:

Three amateurs, G4LPX, G4AUX and G4CAX, will be active from Chwilog in north Wales (NGR: SH 43 38, Locator: IO72TV) between Thursday 10 March and Sunday 13 March. The callsign will be GB4XXX, since all the callsigns of the operators end in 'X'. Activity will be in all HF bands and, hopefully, 2m. This will be their sixth DX-pedition.



Operators of 9N7YDY and 9N5QL seen here with Krishna B Khatri, 9N1MC, Head of the Licensing Division of the Ministry of Communications, Nepal. (Left to right, front row: Krishna B Khatri, 9N1MC; Iris Colvin, W6QL; Toshikazu Kawanishi, JA8RUZ; Masakazu Seizaki, JN1XWO - back row: Kuniya Koizumi, JH7WKU; Lloyd Colvin, W6KG; Tetsuya Sakabe, JA7XBG and Yasuo Makiyama, JA7BOB.

KING'S BIRTHDAY STATIONS:

Two special amateur radio stations were set up to celebrate the 43rd birthday of His Majesty King Birendra Bir Bikram Shah Dev of Nepal on 29 December 1987.

The first, 9N7YDY, was issued to the Japan UNICEF Ham Club of Hokkaido, Japan and ran from 21-28 December. In addition to the 10m, 15m and 20m bands, the club was allowed to use the 40m, 80m and 160m bands for the first time, with SSB, CW, RTTY and packet being the modes used.

The second station, 9N5QL, was issued to Iris, W6QL, and Lloyd Colvin, W6KG of the YASME Foundation, California. Operation began on 27 December and permission was given for the callsign to be used until they managed to complete DXCC from Nepal. By 7 January they had more than the 100 countries required and on Friday 8 January, Iris and Lloyd set off for Burma in an attempt to operate from there before continuing to Sri Lanka.

Both callsigns were issued by Krishna B Khatri, Head of Licensing at the Ministry of Communications, Kathmandu, Nepal. Krishna is also licensed as 9N1MC and is a very keen and active amateur. Amateur radio is not well understood by either the Government or the general public in Nepal but Krishna is working very hard to promote the hobby. He receives support from both ARRL and RSGB as well as

from publishers of the many DX bulletins around the world who send books and other publications to him free of charge to help in his efforts to promote amateur radio in Nepal.

QSL BUREAU NEWS:

Ted Allen, G3DRN, the RSGB's QSL Bureau Manager, has written to say that many members are still not sorting their outgoing QSL cards alphabetically by prefix. Not only does this delay your own cards but slows down the whole operation of the Bureau by adding to its workload. The guidelines for using the Bureau are given in the current callbook as well as being sent out to all new members of the Society with their membership pack.

One question which arises quite frequently is what to do when operating away from home in a location which involves a change of prefix (eg. a G station working /M in Wales or a GM working /A in England). The answer's quite simple - just send a separate set of envelopes to the appropriate Sub-Manager who deals with the callsign series for that country. He will receive cards resulting from any contacts you may have made. This will cut out the need for double-handling, save time and postage, and prevent any possible loss or damage to your cards.

A full list of the QSL Sub-Managers can be found in the

current callbook or can be obtained by writing to the Membership Services Department at RSGB Headquarters.

There is a change of address for the QSL Sub-Manager dealing with the G4NAA-NZZ series of call signs. Envelopes for the receipt of cards in that series should now be sent to Mr M J Musgrave, G4NVT, at:-

49, Vowler Road
Langdon Hills
Basildon
Essex SS16 6AQ

GB75IOM:

The Isle of Man ARS will be running a special demonstration station on Sunday 20 March as part of an exhibition covering all aspects of amateur radio. The exhibition will be held at the Sea Terminal in Douglas and will be open to the general public. The IoM ARS has also invited youngsters from all the island's schools in an attempt to promote the hobby as part of the "Youth into Electronics via Amateur Radio" project, to be launched officially at the RSGB National Convention in July.

GB75IOM will consist of two HF stations, two short wave listener stations, one VHF station, plus slow-scan, packet and RTTY. There will also be an exhibition of antique and home-brew equipment. Further details can be obtained from Mr Mike Dunning, GDOHYM. Incidentally, this year is also the 40th anniversary of the Isle of Man Amateur Radio Society and we'd like to extend our best wishes and congratulations to all its members.

Helplines (cont from p.194 col.3)

is an instructor at the Grindale Parachute Centre near Bridlington. During the descent, Roy hopes to make contact with as many amateurs as possible using Morse. All the money raised by this venture will go towards the Humberside County Scout funds and the County Training Centre. If you don't think you'll be able to contact Roy during his descent but you'd still like to support him, you can apply for a sponsorship form. Roy's telephone number is Hull 812115.

VHF AWARDS MANAGER WANTED:

After 21 years of sterling service, Jack Hum, G5UM, has decided to stand down from the post of Honorary VHF Awards Manager.

Jack took over the post from G3GMY in 1966 and since then he's issued countless operating awards and contest certificates. As a result of his decision to stand

down, the post of VHF Awards Manager will become vacant and may be filled by any Corporate Member of the Society. Brief details of the VHF Awards Manager's duties are as follows:-

- To be responsible for issuing operating awards and certificates for all frequency bands above 30 MHz. This includes scrutinising applications to verify their accuracy and conformity with the rules for the particular award.
- To issue certificates for contests on all frequency bands above 30 MHz as directed by the VHF Contests Committee.
- To scrutinise applications made by UK amateurs for ARRL operating awards in the VHF bands (previously carried out by G8VR).
- To be responsible to both the VHF and Microwave Committees and to advise on the rules for operating awards.
- To liaise with RSGB Headquarters for the production of awards rules, application forms and certificates.
- To produce an annual report covering the year's activities for inclusion in Radio Communication.

The VHF Awards Manager is appointed by Council following recommendations made by the VHF and Microwave committees and the appointee will become a Corresponding Member of both committees.

Applications are invited from Corporate Members of the RSGB who should write initially to the Chairman of the VHF Committee:-

Mr Malcolm Appleby, G3ZNU
Willowbank
Chapel Road
Otley
Ipswich IP6 9NX

...enclosing a brief CV which gives details of any relevant experience, positions held in local or national clubs, and of their interest in VHF and/or microwaves.

DTI TELEPHONE NUMBERS:

Just to clarify our piece on this a couple of months ago, there are three DTI telephone numbers which you might like to make a note of in case you need to use them;

General switchboard -
01-215 7877
Amateur radio section -
01-215 2263
Answerphone (publications etc)-
01-215 2072

Council Brief (from p.196 col.3)

The Secretary referred in his report to the work which had been undertaken in relation to publications. He was looking into the Society's book pricing policy as a result of complaints which had been received in recent months; one such at the recent Annual Meeting. At the present time, he was looking into the question of overheads which needed to be considered in the light of the different types of publications and items which the Society offered for sale. Council considered this a matter of priority and called for a report from the Finance and Staff Committee in time to be considered at its next meeting. The Secretary also referred to the recently formed Publications Management Group which had been tasked with bringing together all aspects of the Society's book publication programme. One main aspect of the work of the new Group was to consider desk top publishing and the Secretary reported on progress made to date. The Secretary also reported that the HQ Manager was looking into further ways of improving the HQ telephone system. Other matters referred to by the Secretary included further information with regard to bringing young people into amateur radio, a brief report on various Government spectrum reviews including progress by LAC on the CSPI response, and a communication which he had received from John Klein, the son of Rene Klein, one of the RSGB founders who had been pictured on the front cover of the January issue of Radio Communication.

Council considered a number of recommendations from the VHF Contest Committee and one from the EMC Committee.

The Secretary reported that a number of clubs and groups had put forward proposals with regard to the venue of the 1988 Annual Meeting of the Society. After the various proposals had been discussed, Council voted unanimously that the 1988 Annual Meeting would be held at the University of Manchester Institute for Science and Technology, subject to making sure that the venue was suitable. Members of the Northern Amateur Radio Society Association were thanked for their comprehensive proposal. Letters would be sent to the other groups who had also put forward suggestions requesting that they consider submitting their proposals again for 1989.

(cont p.206 col.1) ▶

Events Diary

CLUB NEWS

Beginning with this issue, the "Events Diary" has been expanded to include Club News. However, in an attempt to reduce the number of pages previously used for Club News, we are using a more abbreviated format listing clubs alphabetically under counties and giving the date and subject of the meeting. As in CB2RS, natter nights and committee meetings are not listed. The full details of when and where clubs meet, the contact person and telephone number will be published twice yearly in the UK Callbook and twice yearly (90% out of phase) in the Bulletin. However, changes of venue and details of any new clubs will be included in the list below.

AVON:

- * Bath & DARC - 2, Quiz; 16, VHF on the air/pre-AGM meeting; 30, video.
- * Bristol ARC - 3, rebuilding shack; 10, testing aerials; 30, on the air. *NEW VENUE* St. Aidens Church Scout Hut, Fir Tree Lane, St. George, Bristol, Thurs 7.30pm.
- * Bristol FM TV Group - 22, AGM/Social.
- * Bristol RSGB Group - 28, Ladies' night/Video "A Day in the Life of Bristol".
- * North Bristol ARC - 12, lecture "Soldering on Your Own PCBs"; 17, RTTY; 26, 80m activity.
- * South Bristol ARC - 2, microwave workshop; 9, QRP activity; 16, inter-club 'Bullseye' contest; 23, contest planning; 30, RSGB films & videos.
- * Thornbury & DARC - 8, lecture "Converting 27 MHz Rigs"; 22, project.
- * Weston-super-Mare ARS - 14, illustrated talk "Amateur Radio in Kenya 1954 to 1986"; 28, constructors.

BEDFORDSHIRE:

- * Shefford & DARC - 3, junk sale; 10, lecture "QRP"; 17, radio quiz; 24, brewery visit.

BERKSHIRE:

- * Burnham Beeches RC - 7, AGM/lecture "C6A Land"; 21, junk sale.

BORDERS:

- * Kelso ARS - 7, operating; 14, project; 21, lecture; 28, visit.

BUCKINGHAMSHIRE:

- * Chesham & DARS - 9, technical topic; 23, lecture.

CAMBRIDGESHIRE:

- * Cambridge & DARC - 4, constructors; 18, lecture "Another Part of the Spectrum"; 25, AGM.

CENTRAL:

- * Stirling & DARS - *NEW VENUE* Throsk, nr Stirling, Thurs 7.30pm. Tel: Jim, GMOH2M 0877-30714.

CHESHIRE:

- * Chester & DARS - 22, "40 Years On".
- * Mid-Cheshire ARS - 2, activity; 9, contest review; 16, lecture "Coax Cables"; 23, rally planning; 30, construction.

CORNWALL:

- * Cornish RAC - 17, activities.
- * Cornish RAC Computer Section - 14, lecture.

DERBYSHIRE:

- * Derby & DARC - 2, junk sale; 9, illustrated talk "From Russia With Love"; 16, on air; 23, AGM; 30, visit Rugby Royal Observer Corps HQ.

DEVON:

- * Exeter ARS - 14, lecture "Pre-War Transmitters & Receivers".
- * Plymouth RC - 14, visit British Aerospace.
- * Torbay ARS - 12, annual dinner; 26, slide show "DX trips".

DORSET:

- * South Dorset RS - 1, junk sale.

Co DOWN:

- * Bangor & DARS - 4, lecture "Choice".

ESSEX:

- * Braintree & DARS - 7, DTI film show.
- * Chelmsford ARS - 1, lecture "General Servicing of Amateur Radio Equipment".
- * Colchester RAS - 3, lecture "Batteries, Chargers & Analysers"; 17, lecture "British Red Cross".
- * Loughton & DARS - 25, RSGB film show.
- * Southend & DRS - 4, lecture "Radio

Communication & Telemetry Used by Anglia Water Authority"; 11, annual dinner.

Co FERNAGH:

- * Lough Erne ARC - 16, lecture "RSGB".

GRAMPIAN:

- * Aberdeen ARS - 4, March; 11, Packet Radio Demonstration.

GREATER LONDON:

- * Acton, Brentford & Chiswick ARC - 16, discussion "Members' Problems".
- * Civil Service ARS - 7, lecture "Lightning Protection".
- * Ealing & DARS - 8, Morse training; 15, preparation for RTTY contest; 22, lecture "Innovations in Japanese Equipment"; 29, junk sale.
- * Edgware & DARS - 10, technical team game; 24, lecture "Some Modern Developments in Terrestrial Broadcast Transmission".
- * Silverthorn RC - *DETAILS NOT IN CALLBOOK* meets Fridays, 7.30pm at Friday Hill House, Simmons Lane, Chingford, E4.
- * Sutton & Cheam RS - 18, constructional contest; 26, annual dinner.

GREATER MANCHESTER:

- * South Manchester RC - 4, lecture "The Mechanism of Colour Photography"; 11, discussion "Future Club Policy"; 18, lecture "CadCam"; 25, surplus equipment sale.
- * Stockport RS - 9, Microwave Modules; 23, lecture "Satellite TV".
- * Wigan & DARC - 8, RAE "Simple & Practical Electronics"; 15, illustrated lecture "Introduction to Amateur Radio"; 21, RAE revision.

GWENT:

- * Blackwood ARS - 4, BBC Engineering lecture "Colour TV Fundamentals"; 18, packet radio demonstration.
- * Ebbw Vale College RS - *NEW* meets at College in Room 8, Science Block, 7pm. GW1IKW tel: 0495-370286.

HAMPSHIRE:

- * Andover RAC - 2, talk "The RLO, G3KWU"; 16, 2m contest planning.
- * Fareham & DARC - 2, lecture "Radio Security Service - Part 2"; 16, lecture "FAX"; 30, lecture "Radio Measurements".
- * Farnborough & DARS - 9, lecture "PSN Data Modem"; 23, "The RLO, G3KWU".
- * Horndean & DARS - 3, lecture "Introduction to Amateur Radio".
- * Itchen Valley ARC - 11, AGM; 12, annual dinner; 25, lecture "Build Your Own Black Box".
- * Lymington & DARS - 19, lecture "Experience With 'JYM Operating'".
- * Three Counties ARC - 2, lecture "CW and the Test"; 16, lecture "Air Traffic Control"; 30, lecture "Radio Controlled Models".
- * Waterside SWC - 22, lecture "The RLO, G3KWU".
- * Winchester ARC - 18, lecture "EMC".

HEREFORD & WORCESTER:

- * Bromsgrove & DARC - 11, AGM.
- * Kidderminster & DARC - 1, lecture "VHF/UHF Aerials".
- * Malvern Hills ARC - 8, lecture "Measurement Techniques".
- * Vale of Evesham ARC - 4, Microwave Modules.
- * Wythall RC - 8, on air; 15, rally post-mortem; 22, on air; 29, construction.

HERTFORDSHIRE:

- * Cheshunt & DARC - 2, lecture "Data Transmission"; 16, lecture "50 MHz One Year On"; 30, lecture.
- * Stevenage & DARS - 1, construction; 15, AGM.
- * Verulam ARC - 8, workshop; 22, G3PAO Memorial Lecture "Pan-European Cellular Radio".

HUMBERSIDE:

- * Goole R&ES - 4, junk sale; 11, visit; 18, judging the Ken Storey Constructors Trophy; 25, social.
- * Hornsea ARC - 2, lecture "Farming & Farm Machinery"; 9, lecture "Ham Radio Activities".

ISLE OF WIGHT:

- * Binstead ARS - 28, lecture "Astronomy".

KENT:

- * Meopham Parish RC - 13, lecture "Amateur Radio Awards".
- * RC of Thanet - 8, lecture "Compact Disc Players"; 22, lecture "Bomb Disposal in WW2".
- * SE Kent (YMCA) ARC - 9, lecture "Frequency Counters and How They Work"; 23, construction contest.

LANCASHIRE:

- * Bury RS - 3, lecture "Clandestine Radio".
- * Central Lancs ARC - 7, HF on air; 21, lecture "Working for HF Awards".
- * Thornton Cleveleys ARS - 14, surplus equipment auction; 28, lecture "Computer Frauds".

LINCOLNSHIRE:

- * Lincoln SWC - 2, on air; 9, video "Weather Satellites"; 16, on air; 23, illustrated lecture "Raynet"; 30, on air.

MERSEYSIDE:

- * Liverpool & DARS - 1, quiz; 8, open night; 11, Old Timers' Get Together; 15, lecture "First Aid Update"; 29, lecture "Experiences".

NOTTINGHAMSHIRE:

- * Workshop ARS - 1, magazine sale; 15, lecture?

POWYS:

- * South Powys ARC - 1, lecture "Meters Part 3"; 15, social;

SOUTH GLAMORGAN:

- * Barry College of FE RS - 17, video "Amateur TV as Used in Our Hobby".
- * Barry RAF St. Athan ARC - *CHANGE OF DAY* now meets Tuesdays.
- * BT South Wales DARC - *NEW TELEPHONE NUMBER* Mr J Foley, 0222-379619.
- * Cardiff RSGB Group - 14, lecture "HF Linears".
- * Highfields ARC - *NEW SECRETARY* Mr R Selleck, GWGMBU tel: 0446-711146.

SOUTH YORKSHIRE:

- * Sheffield ARC - 7, lecture "Principles of Aerials"; 28, lecture "How To Give a Talk".
- * UK FM Group (Northern) - *CHANGE OF VENUE* now at The Dove Inn, Doncaster Road, Barnsley, 1st Sunday of month, 7.30pm. Details G4UNA QTHR.

SUFFOLK:

- * Ipswich RC - 9, constructional contest; 30, South Anglian Repeater Group.

WEST GLAMORGAN:

- * Llanelli Coleshill ARS - 14, lecture "General Fault Finding".

WEST MIDLANDS:

- * Wordsley RC - venue details incorrect in Callbook and Radio Communication. Meetings at the Rose & Crown, High Street, Wordsley. Secretary GOAOW, QTHR.

WEST SUSSEX:

- * Horsham ARC - 3, grand spring junk sale 7pm.
- * Mid-Sussex ARS - 3, discussion "1988 Contests"; 10, lecture "Prospects for Solar Cycle 22"; 24, lecture "The Banana Transmitter".

WEST YORKSHIRE:

- * North Wakefield RC - *CHANGE OF DAY* Mondays, not Thursdays as in Radio Communication. 3, visit "Birkenshaw Fire Station"; 10, RSGB RLO G3ZKX; 17, club project; 24, lecture "Power Generation & Dinorwig".
- * Wakefield & DRS - 1, on air; 8, lecture "A Morse Adaptor for Your FM or Other TX"; 15, club project surgery; 29, video & photos "Club Activities".

WILTSHIRE:

- * Trowbridge & DARC - 30, lecture "2m Operation & Working DX".

Items for inclusion in the MAY issue must be sent to HQ marked "Club News - Bulletin", and be received by Monday 21 March latest.

MOBILE RALLIES

This is a list of all rallies, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telephone numbers direct to HQ and marked 'Bulletin'.

5 MARCH

- * Blue Star Rally - High Gosforth Park (Newcastle Racecourse). Usual traders, refreshments. Details Terry G6VEG, tel: Tyneside 2866908.

6 MARCH

- * Welsh Mobile Rally - The Barry Leisure Centre, off Holton Road, Barry. Details Mike GW8CMU, tel: 0446-711426.

Events Diary

13 MARCH

- * South Essex ARS Mobile Rally - The Paddocks Community Centre, Canvey Is, Essex. Rally opens 10am. Talk-in on S22. Details G0BBN, tel: 0268-755350.
- * 3rd Annual Wythall RC Rally - Wythall Park, Silver Street, Wythall (south of Birmingham on A435, 2 miles from M42 junc.3). Opens 12 noon, 3 large halls, usual traders, junk and flea market, bar & snacks. Talk-in on S22. Details Chris G0EYO, tel: 021-430 7267.
- * Bury HamFeast - New venue, The Castle Sports Centre, Bolton Street, Bury, one mile from M66. 12,500 sq ft, all on ground floor, usual traders, bar and catering facilities. Details G4JAG, QTHR.

20 MARCH

- * 8th Annual Pontefract Components Fair - Carleton Community Centre, Pontefract. Opens 11am, trade stands, bookstall, prize draw, car-boot sale, bar and refreshments. Talk-in on S22. Details Colin G0A00, tel: 0977-43101.
- * Mid-Devon Rally - Pannier Market, Tiverton (8 mins from M5 junc.27). Opens 10am, 2 halls of trade stands, bring & buy stall, displays, snack bar and full refreshment facilities. Talk-in on S22, well signposted. Details G4TSM, Mid Devon Rally, PO Box 3, Tiverton, Devon.
- * Cambridgeshire Repeater Group Junk Sale Rally Extravaganza - Phillips RCS (Pye Telecom) Canteen, St Andrews Road, Chesterton, Cambridge. Opens at 10.30am (auction items accepted from 10am). Junk sale auction, bring & buy stall, trade stands, refreshments. Talk-in on S22 and via GB3PY by G5PI. Details G8XMS, tel: 0220 23-3362.

27 MARCH

- * White Rose Rally - The Refectory, University of Leeds. Details G0EGH, tel: 0532-676368.

10 APRIL

- * North Cornwall Radio Rally - Launceston Town Hall. Opens 10.30am, talk-in on S22 by Launceston ARC. Details Maggle, RS90696 tel: Launceston 5632.
- * Lough Erne ARC Rally - Killihevin Hall, Enniskillen. Details Billy, tel: 0365-24905.

17 APRIL

- * Trafford Rally & Components Fair - Lancashire County Cricket Ground (Old Trafford), Talbot Road, Old Trafford, Manchester. Opens 11am (10.30am for disabled visitors). Usual traders and attractions, bring & buy stall, refreshments, cash draw, talk-in on S22. Details Graham G11JK, tel: 061-748 9804.

24 APRIL

- * BAC Rally - Rugby Post House Hotel, Crick, Northants, (M1 junc 18). All the usual traders situated in a marquee. Lecture programme and demonstrations including satellite TV in the hotel. Details Trevor G8CJS, tel: 0532-670115.
- * Swansea ARS Rally - *NEW VENUE* Swansea Leisure Centre. Opens 10.30am. Trade stands, bring & buy, bookstall, refreshments, raffles, talk-in on S22 and via RB6. Details Roger G4HSH, tel: 0792-404422 evenings.
- * Marske-by-the-Sea Rally - Marske Community Centre, High Street, Marske, nr Saltburn, E.Cleveland. Details Jimmy G1VLC, tel: 0642-219586.

1 MAY

- * RSGB VHF CONVENTION - Sandown Park Racecourse, Esher, Surrey. Usual traders, comprehensive lecture programme, large RSGB bookstall, RSGB Committee stands. Details G3FZL. Trade - Les, G5HD tel: 040 928-342.
- * 5th Anglo-Scottish Rally - Tait Hall, Kelso. Opens at 11am, all the usual attractions. Details Andre G3VLB, tel: 0573-24664 (evenings).

2 MAY

- * Mid Cheshire ARS Rally - Civic Hall, Winsford, Cheshire. Opens at 11am. Details Mrs Fraser tel: 0606-553401.
- * Doncaster Radio Rally - Bircotes Sports Centre, nr Bawtry, Doncaster. Details Audrey Wilson, tel: 0302-721259.

8 MAY

- * Drayton Manor Rally - Drayton Manor Park, nr Tamworth, Staffs. Details Norman, tel: 021-422 9787.
- * Yeovil ORP Convention - Preston Centre, Monks Dale, Yeovil. Opens at 9am. Trade stands, junk sale, lecture programme, old & new ORP rigs, refreshments. Talk-in on S22 from 9.30am. Details Dave G1MMH, tel: Yeovil 79804.

15 MAY

- * 31st Northern Mobile Rally - Great Yorkshire Showground, Harrogate. Opens at 10.45am. More traders, *RSGB stand*, children's show, raffles, bar & refreshments. Talk-in on S22 by G8ONMR. Details Harry G3CQO, tel: 0943-602118.
- * Cambridge & DARC Rally & Car-boot Sale - Coleridge Community College, Radegeund Road, Cambridge. Opens at 10.30am (10am for

disabled), trade stands, bring & buy, car-boot pitches, refreshments. Talk-in on S22 by G2XV. Details Brian G4TRO, tel: 0223-353664.

- * Mid-Ulster ARC Mobile Rally - *NEW VENUE* The Silverwood Hotel, just off the Lurgan/M1 roundabout. All the usual activities and more. Oxford Island recreation area nearby. Details G3WEM, QTHR.

22 MAY

- * Swindon & DARC Radio, Electronics & Model Engineering Fair *CHANGE OF DATE* - Science Museum, Wroughton, nr Swindon, Wilts, signposted from M4 junc 16. Opens 10am, all the usual amateur radio attractions plus museum, model railway swap-meet, model aircraft flying display, radio controlled boats and cars, model steam engine rally, helicopter rides, vintage vehicles, traction engines and many other attractions for the whole family. Talk-in on S22 by G82SMW and 70cm by G83TD. Details Ken G8SFM, tel: 066689-307.

29 MAY

- * 12th East Suffolk Wireless Revival - Civil Service Sportsground, Bucklesham, nr Ipswich. Opens at 10am, all the usual attractions, children's play area, model flying display, good family day out. Details Jack G4IFF, tel: 0473-464047.
- * Plymouth RC Mobile Rally - Plymstock School, Plymstock, Plymouth. Opens at 10am, usual trade stands, demonstrations, raffles, refreshments. Talk-in on S22. Details Joe G1RXR, tel: 0752-662511.

IN BRIEF - More details later.

5 JUNE

- * Southend Mobile Rally - Rochway Centre, Rochford, Essex. Details G8EFG, tel: 0268-755331.
- * Spalding & DARS Mobile Rally - Springfield Arena, next to Springfield Gardens, Spalding. Details G4TWR tel: 0775-2940.
- * Bolton ARC Mobile Rally - The Deane Sports Complex, New York, Junction Road, Bolton. Details Kenneth G6ZJL, tel: 0204-696906.

12 JUNE

- * Elvaston Castle Mobile Radio Rally - Elvaston Castle Country Park, nr Derby. Details John G4PZY, tel: 0332-767994. Trade enquiries, Peter, G3WPU tel: 0332-700265 (evenings).
- * RNARS Annual Mobile Rally - HMS Mercury, nr Petersfield, Hants. Details G4UJR tel: 0703-557469.
- * Mid-Lanark ARS Open Day - *NEW VENUE* The Community Centre, Newarthill, by Motherwell (approx 1/2 mile from Wrangholme Hall). Details David G1MSA, tel: 0698-732403.

18 JUNE

- * RAFARS Golden Jubilee Radio Rally - RAF Halton Air Show, Wendover, nr Aylesbury, Bucks.
- * *RSGB stand*. Details Terry G4PSH, tel: 0296-85760.

19 JUNE

- * Denby Dale Mobile Rally - Shelley High School, 5 miles SE of Huddersfield, W.Yorks. Details G3SDY tel: 0484-602905.

26 JUNE

- * 31st Longleat Mobile Rally - Longleat House, Warminster, Wilts. Brian G4FRG, tel: Portishead 848140.

10 JULY

- * Worcester & DARC Strawberry Rally - Droitwich High School. Details Steve, tel: 0905-424151.
- * Sussex Mobile Rally - Brighton Racecourse. Details Bob G110S, tel: 0798-43841.

24 JULY

- * McMichael 88 Rally - Haymill Centre, Burnham, nr Slough. Details Bob G0BTY.
- * Anglian Mobile Rally - High Woods Sports & Leisure Centre, Severalls Lane, Colchester.
- * *CHANGE OF DATE* Details G6HQ1, tel: 0206-862403.

31 JULY

- * Scarborough ARS Rally - The Spa, Scarborough. Details Ian G4UQP, tel: 0723-376847.

7 AUGUST

- * RSGB MOBILE RALLY - Woburn Abbey, Bedfordshire. Details RSGB HQ. Trade - Norman, G3MNV tel: 0277-225563.

14 AUGUST

- * Derby Rally - Lower Bemrose School, Derby. Details Jack G3KOF, tel: 0332-772361.
- * Flight Refuelling Hamfest '88 & Craft Fair - Merley, near Wimborne, Dorset. *CHANGE OF DATE* Details John G0API, tel: 0202-691649.

21 AUGUST

- * Red Rose Rally - Bolton Sports & Leisure Centre, Silverwell Street, Bolton. Details David G1100, tel: 0204-24104, evenings.

28 AUGUST

- * Torbay ARS Rally - STC Social Club, Brixham Road, Paignton, Devon. Details G3KZJ.

4 SEPTEMBER

- * 21st Preston ARS Rally - University of



15/16/17 JULY

RSGB 75 - NATIONAL CONVENTION: National Exhibition Centre, Birmingham. Details RSGB HQ. Trade - Norman, G3MNV tel: 0277-225563

This year's event will be the largest ever and will include an exhibition of amateur radio equipment from the last 75 years. Social events will be held on Friday and Saturday evenings. A special 75th anniversary luncheon will be held on Friday. G875AC (75th Anniversary Convention) will be active from 9-17 July.

18 JULY

RSGB HEADQUARTERS CLOSED FOR ONE DAY

19/20/21 JULY

RSGB 75 - HQ OPEN DAYS: Visitors welcome from 10am to 4pm each day. Details RSGB HQ

22/23 JULY

RSGB 75 - DATA SYMPOSIUM: Harrow School, Harrow-on-the-Hill. 2-day symposium covering all aspects of data communication.

24 JULY

RSGB 75 - FAMILIES' & ACTIVITIES DAY
An opportunity for all clubs, groups and societies to celebrate the RSGB's 75th anniversary in their own way. Almost anything goes but the event should involve the whole family and, if possible, the public. Please run an amateur radio demonstration. A prize will be awarded for the most original idea.

28 JULY

RSGB 75 - INTERNATIONAL SATELLITE SEMINAR: Near Guildford. By invitation only. Details RSGB HQ.

29/30/31 JULY

RSGB 75 - AMSAT UK COLLOQUIUM: University of Surrey, Guildford. First day special technical meeting by invitation only. Last two days full lecture programme and social events for all delegates. Details Ron G3AAJ tel: 01-989 6741 (social hours please)

FULL DETAILS AND BOOKING FORM FOR ALL EVENTS WILL BE PUBLISHED WITH THE APRIL OR MAY ISSUE OF RADIO COMMUNICATION

Lancaster. Details Godfrey G3DNQ.

- * Telford Radio Rally & Exhibition - Details Martyn G3UKV tel: 0952-55416.
- * 5th Northern Amateur Radio Car Boot Sale - The Shuttleworth Collection, Old Warden Aerodrome, nr Biggleswade, Beds. Details Tony G0C00.

11 SEPTEMBER

- * Lincoln Hamfest '88 - Lincolnshire Showground, 4 miles N of Lincoln on A15. *RSGB stand*. Details John G8VGF, tel: 0522-25760.
- * Vange ARS Rally - Nicholas School, Leinster Road, Basildon. Details Alan G4QJN, tel: 0277-624386.

17 SEPTEMBER

- * Scottish Amateur Radio Convention - Aberdeen Exhibition & Conference Centre, Bridge of Don, Aberdeen. Details Graham G8FFX, tel: 0224-630526.

18 SEPTEMBER

- * Bristol Radio Rally - Brunel's Great Train Shed, Temple Meads Station, Bristol. Details Dave G4WUB, tel: 0272-839855.
- * Peterborough E&RS Rally - Wirrina Sports Stadium, Bishops Road, Peterborough. Details Fred G4NOC, tel: 0733-77032.

25 SEPTEMBER

- * RSGB HF CONVENTION - Belfry Hotel, nr Oxford. Details RSGB.
- * Harlow Mobile Rally - Harlow Sports Centre. Details G4KVR tel: 0279-22365 (daytime) or G4MIS tel: 0279-722622 (evenings).

2 OCTOBER

- * Great Lumley AR & ES Rally - Community Centre, Great Lumley, Chester-le-Street, Co.Durham.
- * Wakefield Mobile Rally - Details Steve G4RCH.

Events Diary

- * Welsh Amateur Radio Convention - Oakdale Community College, Blackwood, Gwent. Details B.Davies GW3KYA, tel: 0495-225825.
- 8 OCTOBER (Provisional)
- * Midlands VHF Convention - Details Peter G3UBX.
- 9 OCTOBER
- * Armagh Rally - Drumhill House Hotel, Armagh. Details G1BRNK.
- 28/29 OCTOBER
- * Leicester Amateur Radio Show - Granby Halls, Leicester. Details Frank tel: 0533-553293 daytime.
- 13 NOVEMBER
- * Bishop Auckland Radio Rally - Venue to be advised. Details Morris, tel: 0525-314638.
- * West Kent ARS Tonbridge Rally - Angel Centre, Tonbridge. Details Nigel G4KIU, tel: 0892-515321 or 515432.
- * Red Rose Rally - Bolton Sports & Leisure centre, Silverwell Street, Bolton. Details David G1100, tel: 0204-24104, evenings.

THROUGHOUT 1988:
GB75RS - 75 (ANNIVERSARY) RADIO SOCIETY (CB):
RSGB HQ, Lambda House, Potters Bar, Herts.
Watch out for GB75HQ later in the year

- 1 MARCH:
GBOCDE - COASTAL DEFENCE "E": Fort Purbrook. Locator IO 90 LU. Details G0DHZ.
- GB1MWS - MACCLESFIELD WIRELESS SOCIETY: Details G1NUS.
- GB2EC - EISTEDDFOD CASNEWYDD: Caerleon, Newport, Gwent. Details GW4ZUL.
- 3 MARCH:
GB6DP - DENBY (DALE) PIE: Woolley, Wakefield. Details G4GJB.
- 4 MARCH:
GBOCDX - COASTAL DEFENCE "X": Golden Hill Fort, Freshwater, IOW. Details G3RJK.
- 5 MARCH:
GBOCDT - COASTAL DEFENCE "T": Bridge Mary, Gosport, Hants. Details G0GIA.
- GB4BR - BARRY RALLY: Barry Leisure Centre. Details GW3WSU.
- 9 MARCH:
GB4RRA - RED ROSE AWARD: Bolton. Details G0FRL.
- 10 MARCH:
GBOMSC - MERSEYSIDE: Details G6HMD.
- 11 MARCH:
GB50AP - SOAP: Unilever House, London EC49. Details G4SYT.
- 13 MARCH:
GB2ESS - EAST SUSSEX SCOUTS: Beacon Hill School, Crowborough. Details G4YJW.
- 17 MARCH:
GB5RN - ROYAL NAVY: HMS Belfast, London SE1. Details G3HZL.
- 18 MARCH:
GBOLBL - LEVER BROTHERS LTD: Gladstone Hall, Port Sunlight. Details G4EFF.
- 19 MARCH:
GB8PX - PREFIX: Annan, Dumfries & Galloway. Details G4NNC.
- 20 MARCH:
GB0CCC - CARLETON COMMUNITY CENTRE: Pontefract. Details G0AAO.

- 23 MARCH:
GB5CO - COLONSAY: Isle of Colonsay, Argyll. Details G4OBK.
- 25 MARCH:
GB1HW/GB4HW - HADRIANS WALL: Vallum Lodge Hotel, Bardon Hill, Hexham, Northumberland. Details G4UOE.
- 30 MARCH:
GB4MEB - MIDLANDS ELECTRICITY BOARD: Halesowen, Birmingham. Details G0DJA.
- 31 MARCH:
GB4BBR - BUCKS BIRTHDAY RALLY: Sandford-on-Thames, nr Oxford. Details G4UXA.
- 1 APRIL:
GBORFC - ROYAL FLYING CORPS: Whitby, North Yorks. Details G3DAV.
- GB10VA - OSCAR VICTOR ACTIVATED: Stretch of coastline nr Ravenscar, North Yorks. Details G1SCB.
- GB2EC - EISTEDDFOD CASNEWYDD: Fairwater, Cwmbran, Gwent. Details GW0BNP.
- GB2MWS - MACCLESFIELD WIRELESS SOCIETY: Details G0AMU.
- GB2RFC - ROYAL FLYING CORPS: Marske-by-the-Sea, Cleveland. Details G0BIA.
- GB4RFC - ROYAL FLYING CORPS: North Shields, Tyne & Wear. Details G4PUL.
- GB6RFC - ROYAL FLYING CORPS: Peterlee, Co.Durham. Details G1WOU.
- 2 APRIL:
GB4CMT - CONTINUOUS MODULATE TONE: Grindale Parachute Centre, nr Bridlington. Details G4CMT.
- GB4SDC - ST DUNSTONS COLLEGE: Sidcup, Kent. Details G4OHX.
- GB4SC - SAINT GEORGE: Lancing, W.Sussex. Details G3LQI.
- 4 APRIL:
GBOCDX - COASTAL DEFENCE "X": Golden Hill Fort, Freshwater, IOW. Details G3RJK.
- 5 APRIL:
GB2WFC - WALSALL FOOTBALL CENTENARY: The Saddlers Club, Walsall. Details G4FAJ.
- 7 APRIL:
GB4RRS - RED ROSE SILVER: Bolton. Details G0FRL.

GB CALLS

The list below shows ALL the special event stations licensed for operation during February (as at press date)

It is taken direct from the GB Calls file on the HQ computer. These call signs are valid for use from the date given but the period of operation may vary from 1 to 28 days. There's now no need to send details direct to the editorial office.

NOTE: This list is taken from the Headquarters' database during the first week of the month prior to publication. If you have an event which is taking place during the latter part of the month of issue, you must send your form in to Headquarters at least 10 weeks in advance to ensure that it can be processed ready for the listing, otherwise it will miss the copy date.

(cont from p.203 col.3)

Council had noted that Mr R.R. Watters, BRS90281, had recently alerted coast guards after picking up a distress call from a ship 700 miles off the coast of Ireland. It was agreed that this was a very meritorious action and the Society would be sending a certificate to Mr Watters in recognition of his actions.

Council considered a complaint which had been received regarding a letter sent by Mr D. Smith, G4DAX, during the Zone A election for the 1988 Council. After some discussion, the President said he felt that this might be regarded as healthy electioneering, although he added that it was unfortunate that a recommendation for a particular candidate had been included in the end of term report to clubs written on Mr Smith's Council Member stationery.

Under the heading of the role of the President, Sir Richard Davies expressed his gratitude to Mrs. Heathershaw, G4CHH, for her willingness to continue to take an active part in Society business, acting as his special adviser in

compliance with Council's wishes, during 1988. Sir Richard commented that he felt there was a need for a Steering Group to ease the process of decision-making for Council. He wished to take further advice on this matter.

Under the heading of Any Other Business, the President referred to a matter which had been raised by Arthur Milne, G2MI, at the recent Annual Meeting of the Society. (It is hoped that the Minutes of the Annual Meeting will be published in either the April or May issue of the Bulletin). The President referred to the fact that apparently another GB2RS newsreader had complained direct to the DTI about a fellow newsreader. Sir Richard Davies said that he considered this action to be extraordinary. At this point, Mr G. Smith, G4AJJ, identified himself as the complainant. In the ensuing discussion it was noted that the complaint referred to the introductory and closing paragraphs associated with the GB2RS news script which are inserted at the request of the Society and are not a licence requirement. Thus any abbreviation of these paragraphs necessary for the timing of the

broadcast were not a matter for the DTI. Mr Smith then offered to write a letter of apology to Mr Milne, which was accepted by the President.

Other matters discussed by Council included: the quality of the print used in the latest Call Book, insurance for EMC co-ordinators, the RSGB approved ARIS insurance scheme, the Student Licence, the 75th Anniversary celebrations, reduced and waived subscriptions and recent affiliations to the Society.

NB:

At the last meeting Dr J N Gannaway G3YGF, was appointed Executive Vice President for 1988.

Mr Basil O'Brien, G2AMV was also appointed as the Society's new Hon. Treasurer. He replaces Mr Cornish, G3COR, who resigned for health reasons. The casual vacancy created by this appointment will be discussed at the next meeting.

Mr Frank Hall, GM8BZX, was unanimously appointed by Council at the same meeting to fill the casual vacancy for a member for Scotland.

NEWS AND VIEWS

HF

John Allaway, G3FKM*

IT IS UNDERSTOOD that the president of JARL has received a letter dated 19 December 1987 from CRSA president Qin Duxun, informing him that all Chinese broadcasting transmissions in the 7.0 to 7.1MHz band have ceased. Recent lists of intruders in the 7MHz band prepared by the IARU Monitoring System show an all-round reduction in the number of intruders — even of broadcasts from Albania. No doubt a result of the vigilance of the IARU observer team at the HF Broadcasting Conference early last year.

The problems with *Rad Com* production were still considerable at the time of writing, and once again readers may not receive their copy before my deadline. Rough guidance for the estimation of closing dates is to make them one day earlier than they were in 1987 — but this won't always happen!

Several kind readers have pointed out that John Hooper's former callsign was G3FJH, not G3FJK as given in the November column. Does anyone have an old *Callbook* showing John's name and address?

Expedition to Inner Hebrides

G4OBK and G0EJK, sponsored by the Central Lancashire ARC, are undertaking an expedition to Colonsay in the Inner Hebrides. This will take place from 23 to 30 March. The IOTA reference is EU08 and the WAB square NR39 Strathclyde. The callsign will be GB5CO, and activity will be cw and ssb on the usual expedition frequencies. The station will be a multi-operator entry in the CQWW WPX Contest. Antennas will be verticals and dipoles and there will be limited operation on 144MHz where 100W to a nine-element Yagi will be available.

To list...or not to list

The following item by John Devoldere, ON4UN, appeared in *Radiosporting* and was sent in by LA5HE/OZ8RO.

"In my search for skeds with new countries on top band I have been listening a lot on 20m. I have been amazed at the number of nets on that band. While the band sounds almost dead, there are a number of nets (a few between 14.175 and 14.190kHz) where some good dx is hanging around. Instead of each of them working dx stations by themselves and each on a different frequency (like the good days when dxing was a challenge), they sit there and wait until some net control brings them a QSO (?) on a silver platter. The net serves as a red carpet...Some of those net controls don't even allow you to make a proper QSO, and start relaying things (its good for their ego trips!) Ugh!

During a visit to the Far East last August, Bill, G4ZVB, looked up some of the local "celebrities" in Hong Kong. L to r: G4ZVB and xyl Sylvia; Drake, VS6EK; Bret, XX9TDM/VS6UP/KB7G; Ted Miller, 9M8EN, and Phil Weaver, VS6CT. VS6CT has taken his antennas down at his current QTH, hence his absence from the bands, but he will be back on hf when his new apartment has been completed, hopefully later this year. Photo: G4ZVB



"One night I was listening to a YU4 station on 80m working N America. At one time he was called by XE10H. He came back to him as W1...and gave him a 59 report. He commented on the strong signal and signed without having copied his call or anything even close to his call. When I broke in to give him the call, his comment was 'You are closer to XE, that's why you hear him better'. The point is that whether you are close or distant doesn't matter, but when it takes you several repeats to even get the call (or if you need a relay to get the call) a Q3 or Q4 at best is in order. One minute later a VE1 called him and he returned a W1 call with a 59 plus 20 report. When called by W7 in Arizona he didn't hear him. Next, AD3V called him. His reply was: 'What?' When he asked the W3 which antenna he was using and received a prompt answer, the reply was 'please repeat'. One second later the response from the YU was: 'You have a tremendous signal 20dB over S9. I thought you were my neighbour'. None of the information that the AD3 gave him was copied at the first try. Really funny... I guess that is one way of building up an image of being a 'good' dxer. Maybe it works with some of the newcomers. But it really is ridiculous."

DX news

In a news release on 9 December, the ARRL announced the addition of Aruba to the DXCC list. The new listing is now separate from the Netherlands Antilles and by virtue of Point 1 (Government) of the Country Criteria. Credit will be given for contacts on or after 1 January 1986. The release says that cards for P4 credit should not be submitted before 1 April 1988, and that before Aruba credit can be given to those who already have credit for the Netherlands Antilles, a Netherlands Antilles card must be resubmitted. Therefore, along with the creditable Aruba card, please also resubmit any card confirming contact with Curacao or Bonaire, or an Aruba card for a QSO on 31 December 1985 or earlier.

The "International DX Spot 88" will take place at the Solli Tourist Centre at Geilo, in south-central Norway, on 4 and 5 June. The programme will include talks by ON4UN on low-band dxing, propagation forecasting, dx antennas and their construction, tips and hints for dxers, and a dx panel. Lodging is available in cabins, apartments and hotels. It is organised by the LA-DX Group, and more information will be available later.

In his *DX Report* dated 28 December, Jim Smith, VK9NS, said that he had received a letter of "agreement in principle" to his joint venture to Baker and Howland Is which should take place this month. It will be a joint exercise between the HIDXA and the US Department of the Interior Fish and Wildlife Service. A recent call to the shipping company had shown everything to be in order. Licensing was in hand. Probably Howland Is will be the island used, but there could be a three-day side-trip to Baker Is which will be of interest to those working on the IOTA Award. A number of operators are expected to be on the expedition.

The operation by C9MKT seems to have been legal, and QSLs will be accepted for DXCC purposes. Ron had authority to operate from 23 November to 6 December. SM7DZZ — who operated as 8Q7CH — was to be in Mozambique during February, and is believed to know the Minister who issued the C9MKT licence.

Steve, WA4UAZ (who has also been CR9G, F6IKV, GM5AXO, WA4UAZ/HC1, HD1A, KZ5BP and VS6DR) is currently in Morocco and active as CN8FC. He is expected to be on all bands 1.8 to 28MHz. *DX News Sheet* reports FD1MXQ/TT8 active with the hope of acquiring a full TT8 callsign soon.

*10 Knightlow Road, Birmingham B17 8QB.



Tony Waltham, HS1AMH/G4UAV, calling in to SEANET from HS0B, the club station in Bangkok. At present only two stations, HS0A and HS0B, are authorised to operate from Thailand, though the situation could change in the future. Station equipment is a TS930S and TH6 beam. Photo: G4ZVB

JE1MAS is on Zanzibar for a year, and on the air as 5H1HK. *DX-NL* raises the interesting point that perhaps both Zanzibar and Tanganyika should have been deleted from the DXCC list in 1974 and replaced with a new entry from that date, ie Tanzania. This would seem to be logical, as this is what happened to Papua Territory and New Guinea when they merged to become Papua New Guinea! 4Z4MS had been in Ghana for a while but has been unable to obtain operating permission — the situation in that country does not seem very favourable to amateur radio.

FH5EF (formerly TL8RC) is in Mayotte for two years, and some activity by FR0EH/J took place early in 1988, but nothing is known about him at the time of writing. FT8XC is believed to be restricted to operating above 7,050kHz on 7MHz and above 14,050kHz on 14MHz.

Special call signs will be in use in S Korea during the Olympic Games. HL8A, HL8N and HL8V will be special stations on from the Olympic village and hall. HL8N will also use 6K88SOG; HL8V, 6K88KOG; and HL8A, 6K88A actually during the games. Other Korean amateurs may use 88 in their prefixes. *DX News Sheet* says that rumours of an expedition by UA9OBA to Vietnam seem to be quite strong and that USSR stations are already even discussing likely 3.5MHz frequencies. This is being written in mid-January, and hopefully much more will be known by the time this is being read, but the idea seems a little optimistic to me.

One of the column's regular contributors — Chris Baker, G4LDS, is in Salalah in the Sultanate of Oman. Unfortunately there is no arrangement for reciprocal licences between our two countries at present, and he is limited therefore to using the club station A4XCB which is active on 3.5 to 28MHz using a TS830 and FL2100B and also an FT101E with TH3 and W3DZZ antennas. The 28MHz band has been open and many cb signals heard, so Chris asks people to listen for A4. At the time of writing, the station was on 21MHz from 1100 to 1200, when it moved to 14MHz. There will be special activity on 3.5 and 7MHz, particularly after 1600 on Saturdays, and schedules can be arranged direct with Chris at PO Box 18530, Salalah, or via his brother G4DJC (see "QTH Corner").

DL1VU was scheduled to leave Frankfurt on 3 January for a wide-ranging Pacific expedition. He was due to pick up a linear in Guam before going to Saipan where he may be KH0/DL1VU, and obtain KC6 licences. Then he goes to KX6 and Nauru (but no activity from the latter). From here he goes to Fiji, 3D2VU and Tuvalu (?T22VU) where he spends up to four weeks. Then back to Fiji where he will try to organise a boat trip to either KH1, T31 or KH5, returning to 3D before going to H44VU, 5W, ZK1XG, FO0VU, 5W, 3D again, C21, KC6(E), KC6(W), DU, A9 and home! Quite a trip, and it is expected to last about four months. Frequencies to watch are 1,825–1,830, 3,500–3,510, 7,000–7,010, 10,105, 14,027 18,073, 21,027 24,900 and 28,027kHz.

ZL3ASH is on Penryn Is in the N Cook group for two years as ZK1WL. He uses cw and ssb on all bands. The VK9NS *DX Report* says that Rob, VK9ZR, is now active from Willis Is for a six-month stint. Unfortunately he does not use cw but tends to check into the 14,220kHz or RF0FWW nets almost daily, something which should cause a lot of hair to be torn. *Long Skip* mentions a possibility that Joe, VE3CPU, may try to operate from Palmyra Is (KH5) this year. Transport is available on a large sailing vessel, and more operators are sought. Dates are not finalised but it is expected to be a two or three-week trip.

The station on the air from the Council of Europe in Strasbourg from 11 to 13 March and again from 24 to 26 June will use the call sign TP0CE.

Much confusion was caused recently by CR9BZ, who had a very loud signal. Obviously many didn't know that he was in Madeira rather than Macao. Madeira uses CQ3, CQ9, CR3, CR9, CS3, CS9, CT3 and CT9. The Azores Is use CU1 to CU0 inclusive, and mainland Portuguese stations use the CQ, CR, CS and CT prefixes with 1,2,4,5,6,7,8 and 0 as the numeral.

The High Speed Club

The HSC was founded in 1951 as a community of like-minded operators within DARC. Today there are members in more than 50 countries in all continents. It is a member of the European CW Association (EUCW) and co-operates with other telegraphy clubs. The club station DL0HSC transmits the "HSC Bulletin" every first Saturday in each month at 1500 on 7,025kHz in English and on about 3,555kHz at 2100 in German. There are two HSC contests each year, and the club also issues two awards (which are also available to listeners).

Club members tend to use 25kHz up from lower band edges (plus 3,570kHz) and anyone wishing to become a member should try to work as many members as possible at the same time operating at not less than 25wpm or higher. If possible use full break-in. Keyboards, decoders and computers are not allowed! After a few QSOs ask a member to send his recommendation to you. Note that only contacts lasting at least 30min will be accepted. After collecting five recommendations send them with eight 1rcs to: The Secretary, DL1PM, Ansgarstr 14, D-2105 Sevetal 11, FR Germany.

HSC wishes to dissociate itself from "HSC eV" which is a registered society founded in late 1979 and which has no connection whatsoever with the original HSC.

Awards

The Z2 Award

This new award is available from the Zimbabwe Amateur Radio Society to those who have made contacts with the necessary number of Z2 stations on or after 1 January 1987. Zimbabwe stations need 15, stations in CQ zone 38 need 10, and all others five. Any bands or modes may be used and applicants should send certified log details of their contacts, plus US\$ 1 or 10 1rcs to Z2 Award, PO Box 2377, Harare, Zimbabwe.

The Calvados Award

This is being issued by the REF regional club of the Department of Calvados in Normandy. Applicants must have worked (or heard) 10 stations located in the Calvados district (No 14) on any band or mode. Special endorsements are available for hf, vhf, shf and cw, rty etc on request. Missing stations up to two may be substituted with one QSO with the club station FF6KCZ (hf)/FF1KCZ (vhf). Send log details, certified by two other amateurs, plus 10 1rcs, to Pierre Roger, F1CJN, 8 Rue des Petites Haies, F-14440 Douvres La Delivrande, France.

Den Helder 200 Years Naval Port Award

Den Helder celebrates its 200th anniversary as a naval port this year, and this award is available to both licensed amateurs and listeners. QSOs must take place during 1988 with stations in Den Helder. Europeans need two club or special station contacts plus four others, and each may only be counted once. Send certified log extract (signed by two other amateurs) plus eight 1rcs or £2 to: MARAC Activity Manager, PO BOX 205, BB Den Helder, Netherlands. Special stations which will be active include PI4s ADH, DHV and MRC, PI5s KOM and DD, PI12H and PI1ARS, and PI9ZKD.

RAFARS Golden Jubilee Award 1988-1989

To celebrate the Golden Jubilee of the foundation, on 1 April 1938, of the Royal Air Force Amateur Radio Society (RAFARS), the society takes pleasure in inviting all radio amateurs and swls to apply for the Golden Jubilee Award for contacts made (or for listener reports confirmed) with members of the society between 1 April 1988 and 31 March 1989.

WORKED ALL CONTINENTS AWARD

The Worked All Continents Award is an IARU award, but obtainable in the UK via the RSGB. Confirmed contacts are required with each of the six continents: Europe, North America, South America, Africa, Asia and Oceania.

Applications should be made to the RSGB hf awards manager, who will certify the claim and forward it to the IARU headquarters in the USA. Please enclose a self-addressed stamped envelope for return of the cards, together with proof of RSGB membership. There is no other charge for the award. Various endorsements, including "All 1.8MHz", are available. Both a five-band and six-band WAC may also be claimed, but in this case contacts made before 1 January 1952 do not count. For all WAC awards, contacts must be made from the same location, defined as an area not exceeding 25 miles (40km) in diameter.

The WAC awards are also available to swls on a heard basis.

For full details of the scoring scheme, together with special log sheets, please send a large sae to the awards manager: Tony Gilchrist, G8BVJ, 6 Mansion Hill, Halton, Aylesbury, Bucks HP22 5NL.

Contests

Bermuda Contest

0001 19 March to 2400 20 March

1988 is the 30th anniversary of this event, which has the biggest reward for the winner of any contest that I am aware of.

All stations must be single-operator only and may only operate for a maximum of 36h in total. Off-air periods must be clearly marked in the log, and each of these must be for a minimum of three consecutive hours. All entrants must operate from their own private residence or property. Top winners of the 1983, 1984, 1985, 1986 and 1987 contests shall be eligible for area awards only. The contest covers 3-5.7, 14.21 and 28MHz cw and phone, but no cross-band or cross-mode contacts are allowed. Exchange RS/T, and, in addition to this, Canadian stations will indicate their province, USA stations their state, FR German stations their DOK, and UK stations their county. Bermuda stations will give their parish. UK stations may only exchange reports with Canadian, USA and Bermudian stations. Each completed QSO counts five points, and a phone contact and a cw contact with the same station on the same band counts only if the contacts are made at least 30min apart. The multiplier is the total number of Bermuda stations worked on all bands—the same VP9 can be worked on all bands. All log times must be in gmt (utc) and a separate sheet used for each band. Dupe sheets must be enclosed for any band on which more than 200 QSOs have been made. Each log sheet must be clearly marked with the contestant's callsign, band and date, and all contestants must enclose a signed statement that they have observed the rules of the contest and the terms of their licence. A penalty of three points will be deducted for each unmarked duplicate, and excess duplicates can result in disqualification. All logs must be received by the Contest Committee, Radio Society of Bermuda, PO Box HM275 Hamilton MH AX, Bermuda, not later than 1100gmt on 1 June 1988. Overseas entries should be sent by airmail; if you wish for an acknowledgement of receipt please enclose ircs and sae. The top scorer in each province, state, county, DOK and parish, will receive a printed certificate provided that at least 100 QSOs have been made. Overall winners in the USA, UK, Bermuda and the FR Germany will also receive a trophy which will be presented at the RSB's annual banquet during Radio Week (16-22 October 1988) and round-trip air transport and accommodation will be provided.

Results of the 1987 CQ 160 Meter CW and Phone DX Contests have appeared in CQ magazine. UK scores are as follows:

CW SECTION. SINGLE-OPERATOR			
G4OBK	—	152,145	points
G4VGO	—	124,800	..
G4BYG/A	—	100,978	..
G4BBV	—	45,068	..
GM3RAO	—	23,347	..
G3ESF	—	20,400	points
G3SJS	—	17,252	..
G3TFF	—	3,048	..
G4BWP	—	2,684	..

In the multi-operator section GM3IGW scored 161,184 points and G3FVA 78,642.

In the Phone Contest the only UK entrant was GW4IOI who scored 45,193 points. (Certificate winners are listed in bold type).

CQ WW WPX Contests

0000 26 March – 2400 27 March (SSB)

0000 28 May – 2400 29 May (CW)

1-8 to 28MHz (excluding WARC bands). QSOs with own continent count two points on 14.21 and 28MHz, and four on 1-8, 3-5 and 7MHz. With other continents they count three and six respectively. Own country may only be worked for multiplier credit but not for points. The multiplier is the total number of different prefixes worked – each counts once only even if worked on more than one band. Exchanges consist of RS/T plus serial number (from 001). There are single-operator single- and multi-band and multi-operator multi-band single-transmitter categories. The last mentioned must have one transmitter only and remain on a band for at least 10min at a time before QSYing. There is a QRP section for stations running no more than 5W output, and entries in this class must be clearly marked "QRP". Single-operator entrants may only operate for a maximum of 30h, and may take up to five rest periods which must be clearly marked in the log. To be eligible for an award single-operator entrants must operate for a minimum of 12h and multi-operators 24h. The final score is the total of QSO points times the number of different prefixes worked. Logs must show date, time, station worked, numbers sent and received, if new prefix, and points claimed. A prefix check list must be included. Entries for the ssb event must be addressed to: CQ Magazine, WPX Contest, 76 N Broadway, Hicksville, NY, 11801, USA, and postmarked no later than 7 May 1988. Official log and summary sheets are most useful and are available from CQ – copies of the official rules are available from me (sae please).

SP DX Contest

1500 2 April to 2400 3 April

This year this contest is phone only, 1-8 to 28MHz. Exchanges consist of RS and serial number (from 001). Polish stations will also send two letters to indicate their province. Each QSO counts three points, and the multiplier is the number of different provinces ("powiaty") worked – each counts once only. There are single-operator single- and multi-band, multi-operator multi-band, and listener sections. Mail logs before 30 April to: PZK, SP DX Contest Committee, PO Box 320, 00-950 Warsaw, Poland.

UBA Spring Contest

0700-1100 1 March (3-5/7MHz ssb)

0700-1100 15 March (3-5/7MHz cw)

This is organised by the DST section of UBA. Photocopies of rules are available from me. (NB: there is also a vhf section on 5 April.)

Welcome...

... to the following new members: DA4TL, EI4DI, EI7EH, EL8K, KD5M, K0VV, N4AR, PA0XSA, V8SHUW, WA0S, YO3DIU, and listener members J Vedin (SM), G Zadeh Esmail (EP), and Ari Kekki (OH).

FINAL 1987 28MHz COUNTRIES TABLE

G3VOF.....163	G0AEV.....105	G4RWP.....39
G4JBR.....162	GD4XTT.....102	G4IDF.....36
G4XAH.....151	G4NXG/M.....93	G0BXQ.....35
G4VPM.....147	G0HOF.....91	GM4CHX.....46
G3XQU.....130	G0AGP.....88	GW4TEJ.....27
G4MUW.....114	G4DXW.....78	G4IDF.....25
G4OBK.....109	G0FYD.....76	G5HD.....10(QRP cw)
G0ELY.....108	G4OTU.....69	G4YWG.....9
G0DNV.....108		

1988 28MHz COUNTRIES TABLE

G4JBR	50
G4MUW	32 (ssb)

10MHz COUNTRIES TABLE

	All-time	1988
G3PJT	101	—
G4VDX	71	—
G4YWG	64	—
G4OBK	57	—
G4YSN	1	—

1987 ALL-BAND TABLE No 6

Callsign	1-8	3-5	7	14	21	28	Total
G4OBK	49	100	112	134	112	109	616
G4ODV	44	77	145	101	107	77	551
GW4RHW	30	56	69	205	114	38	512
G4QUT	35	36	70	128	115	69	453
GM3YOR	44	55	108	61	52	32	352
G3TFF	36	41	74	140	39	18	348
G0FYD	1	29	71	68	65	76	310
4X4FL	—	10	37	53	84	63	247
G4GOF	7	17	20	54	10	2	110
G0HGA	—	21	6	22	25	—	74

(Next deadline — for the first 1988 table — scores to reach G3GIQ by 8 March please)

TABLE SERIAL No 23

ALL TIME TABLE WITH DELETIONS NO 15

Callsign	1-8	3-5	7	14	21	28	Total
G3KMA	125	240	308	333	334	318	1,658
G3GIQ	71	209	261	337	333	312	1,523
GM3CS	64	212	263	323	324	306	1,492
G3XTT	156	204	245	292	283	251	1,431
G4DYU	66	186	233	313	305	287	1,390
G3UML	31	220	234	334	298	255	1,372
G2DMR	59	184	204	314	313	269	1,343
G4GIR	96	201	237	284	263	253	1,334
G4BWP	100	214	238	283	246	247	1,328
GW3AHN	16	109	114	364	359	330	1,292
G4FAM	63	180	238	268	268	242	1,259
G3XQU	50	176	194	297	273	244	1,234
VK9NS	80	184	226	290	243	192	1,215
G4LJF	28	198	205	267	235	198	1,131
G3TFF	62	163	183	260	252	211	1,131
G3NOF	4	85	82	343	324	278	1,116
G3YMC	80	107	172	240	244	189	1,032
GW4OFQ	52	225	199	217	190	138	1,021
G4OBK	119	138	162	231	191	163	1,004
GM3YOR	75	137	183	221	199	181	996
GM3PPE	59	143	158	189	175	141	865
Average	69	177	207	286	269	238	1,246

(Next deadline- for the current all-time listing — please send scores to reach G3GIQ by 8 April.)

Ex-G Radio Club

Several changes took place in the management of the club as and from 1 January 1988. Don Rayner, W3CTR, has resigned as hon secretary/treasurer on account of his wife's illness, and the task has been taken over by Ernie Poole, WA8TGA (5835 Miranda Drive, Fort Wayne, Ind, 46835). Frank, G2FUX, has also given up the position of hon UK secretary, and has been succeeded by Ken Haswell, GM2CWL (6 Cameron Av, Ballock-by-Inverness IV1 2JT). Both Don and Frank deserve thanks for their long and devoted service to the club.

Band reports

Near normal service has now been resumed and the G8KG report is back in its usual place. It reads as follows: "November was the first month of the new cycle to have a monthly mean solar flux above 100sfu but subsequently, as cautiously predicted earlier, the rise in solar activity slowed down somewhat. As a result conditions on the higher bands during December and the first half of January were somewhat disappointing though there were some good days.

"After taking account of the October to December sunspot figures, NOAA Boulder have up-rated their forecast for the peak, now predicting a most probable value of 174 in December 1989, higher than the Cycle 21 peak, but the margin of error remains large, the 90 per cent probability range being 92-256. Put another way, this forecasts that there is an even chance of a peak of 174 or more—but by next December the prediction should be much nearer to the final outcome. Note that in the meantime SIDC Brussels continues to forecast a low peak in the region of 70-100."

The following have very kindly supplied information for this month's column: G2HKU, G5JL, GM3CSM, G3s GVV, IGW, KSH, LDK,

QTH CORNER

EP2RA PO Box 13185-276 Tehran, Iran. (Do not mention amateur radio on envelope.)
G5SCO G4OBK, "Sundale", Buckholes Lane, Higher Wheelton, Chorley PR6 8JL.
J20VD G6FYD, 17 Res Du Nouveau Parc, F-78570 Andresy, France.
J50AS via Salvatore Aleccio, IT9AZS, via G. La Masa No 65, 90019 Trabia (PA), Italy.
J56AS Dr J B Smith, 8 Heathcote Place, Bursley, Hants SO21 2LH.
VK9AD via G4UKB, 16 Bellevue Drive, Bestwood Park Estate, Nottingham NG5 5PG.
VK9ZR GW8VHI, R Woolley, 7 Old Rd, Raglan, Port Talbot, W Glam SA12 8TR.
VP8BPZ SARL, PO Box 2327, Johannesburg 2000, Rep of S Africa.
ZS21RSA P Zamboli, I8YGZ, Via Trieste 30, I-84015 Nocera Super, Italy.
3X0A JH4RHF, Junichi Tanaka, 1-4-6 Kotobuki, Hattori, Tayonaka, Osaka 561, Japan.
5H1JK Box 287, Entebbe, Uganda.
5X5GK Chris Pedder, Thorncliffe, 5 Royalty Lane, New Longton, Preston PR4 4JD.
8P9EM Yasme Foundation, PO Box 2025, Castro Valley, Cal, 94546, USA.
9N5QL JA8RUZ, Toshikazu Kawanshi, PO Box 166, Asahikawa, Hokkaido, 070-91, Japan.
9N7YDY

10MHz 0800 JA1IFP. 0900 N5VV, VK2,3,7, W4,0, ZL2,3. 1200 TA1D. 1500 C31LBB, PY7LO. 1600 W6OV. 2100 W1,3, J6LAD/9Y4.
14MHz 0700 BY4SZ,HL,WH6BLQ/KH3. 0800 BY1PK, FK8FF, H44JA, JA, KC6s IN,SL,NY6M/KH2,VE7,VK2,3,ZL1,2,3, 3C1MB. 0900 BV2FA, BY4AA, KH0AC, N2PC/KX6, PY0FNI, VK9AD, VS6DO, 3C3CIM. 1000 BY4RB, KL7P, 8P9EM. 1100 HC2SL, KL7IG, LU6XPA, VK9ZR, VU2XV, 9N5QL, 9N7YDY, DF5UG/457. 1500 FT5ZB. 1600 T5GG, T19M, VE6-7, VK9YE, W6-7. 1700 S79DW, V31PC. 1800 C9MKT, FROEH, JY5DL, VE8CDX, ZD9CS. 1900 CE9AT, J50AS, N6IV/KL7, V2AZL, VKs 2AVA, 9NS, VP8JC, ZD7AF, 9Q5NC. 2000 J20YD, VP8AEF, 2100 FROEH, TR8CA, W6. 2200 CE, HR, J, TR8JLD, VP8ML, ZD7BJ. 2300 CX0CY, F5EM, VK6RU, T19M, ZD7XY.
18MHz 1400 VE3JPW, 4N3KV. 1500 KP2J, N5VV, VE2,3.
21MHz 0800 BY5QA, JA, PA3AXU/SU, VK, ZL, 9Q5DA. 0900 C53EE, FY7AN, J20YD, VK9YV, X9XWW. 1000 FM4DN, VK9YD, VS6UO, VU2TJW, Y11BGD, ZL2AAJ, ZL3VP4, 1100 FR5DX, VP8BPZ, 9N1RN. 1200 H21AB, S79WS, VP2MU, 8P9GP, 9Q5DA. 1300 FP5HL, FT5ZB, TA2L, VP5SL, 9M6DA. 1400 T12JP, VP2EZ, V3XN, W5, 0, 5H3BH. 1500 CE0FFD, ZF2LQ, 5L7Q. 1600 J50AS, WW6FVPS, W6, ZD9BV. 1700 FH8CB, HH7PV, PY0FNI, VE6-VE7, W6-W7.
28MHz 0800 JH1AJT. 0900 BV2FA, FT5ZB, TA, TZ6VV, VK6RO, 9V1WW. 1000 FR5ZN, J28EO, TR8JLD, VK6HQ, VU, 3B8FU. 1100 A22BW, VP2EZ, Y10BF, 5H1HK, 5X5GK, 9Q5NW. 1200 G13VJ/C73, TA2AO, VK6ABQ, DF2ALP/ZS3. 1300 FY4OE, KP2J, PJ6/WA3ZBI, T18CBT, VP2MU, Y11BGD. 1400 FM4DN, HK0UE, JY9LC, KP2AH, OA9K, VP8ADE, 3D6CA, 6W6JX, 6W7OG. 1500 CE, HC, J87CD, TI, T1JCH, V31JJ, VP2ED. W4. 1600 FH8CB, FY5BB, OD5GZ/LU, VP8s BKK, BPZ. 1700 FY4EE, TU2QQ, W1-W4, W8, 5N3BHF. 1800 W1-4, W8. 2000 A22FN.

Acknowledgements and thanks to the following for information extracted: *CQ Magazine* (W1WY), *DXNL* (DL3RK), *Long Island DX Bulletin* (W2IYX), *DX News Sheet* (G4DYO), the *EX G Radio Club Bulletin* (GI3OEN/W6), *Long Skip* (VE3IPR), *Lynx DX Group Bulletin* (EA2JGO), *DX Family Newsletter*, *DX Report* (VK9NS), and *DX'press* (PA3CXC).

Closing date for May is 15 March.

□

HF F-layer propagation for March 1988

The time is presented vertically at two-hour intervals 00(00)gmt for each band, ie 00=0000, 02=0200, 04=0400 etc.

The probability of signals being heard is given on a 0 (indicated by a dot) to a 9 scale; the higher the number the greater the probability with 1 meaning 10 to 19 per cent of days, and so on. Additionally 50MHz F-layer and 1-8MHz openings are indicated by a plus (+) sign in the 28 and 3-5MHz columns respectively.

Time / GMT	28MHz	24MHz	21MHz	18MHz	14MHz	10MHz	7MHz	3.5MHz
	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802	000001111122 024680246802
** EUROPE								
MOSCOW	.....11.....	.....12232.....	.....355651.....	.....1677773.....	.....5777782.....	312655556874	875322223688	+53.....3++
MALTA	.....1111.....	.....123321.....	.....466663.....	.....17778861.....	.....477778951.....	553755556896	998532224689	+++2.....3++
GIBRALTAR	.....1111.....	.....1111.....	.....134343.....	.....3666661.....	.....78777895.....	231575556895	897753334689	+++42.....3++
ICELAND	.....1111.....	.....1111.....	.....1111.....	.....13443.....	.....1577773.....	.....56667883.....	663553334678	+++42.....3++
** ASIA								
OSAKA	.....1.....	.....1.....	.....231.....	.....452.....	.....2654221.....	.....132123541.....	.....1.....1462.....	.....3.....
HONGKONG	.....11.....	.....2331.....	.....14563.....	.....2666521.....	.....1454555.....	.....12124652.....	.....1.....1475.....	.....42.....
BANGKOK	.....1222.....	.....34441.....	.....256673.....	.....2576752.....	.....12545671.....	.....2.....2124764.....	.....2.....1477.....	.....44.....
SINGAPORE	.....22221.....	.....134452.....	.....2576751.....	.....3576773.....	.....12545671.....	.....2.....2124775.....	.....2.....1477.....	.....44.....
NEW DELHI	.....2223.....	.....14445.....	.....256771.....	.....356674.....	.....22345621.....	.....411.....1124676.....	.....62.....1478.....	.....3.....4+
TEHRAN	.....33331.....	.....15563.....	.....3567761.....	.....5566773.....	.....1.1423456721.....	.....7441.....12477.....	.....852.....1478.....	.....3.....4+
COLOMBO	.....33331.....	.....15563.....	.....3567761.....	.....5566773.....	.....1.12456832.....	.....61.....12478.....	.....852.....1478.....	.....3.....4+
BAHRAIN	.....34441.....	.....15663.....	.....4667762.....	.....5566783.....	.....2.422466743.....	.....8531.....114788.....	.....861.....1478.....	.....3.....4+
CYPRUS	.....44443.....	.....1666752.....	.....4888885.....	.....68888872.....	.....312766667964.....	.....876433335799.....	.....8852.....112588.....	+++2.....25+
ADEN	.....45553.....	.....1666761.....	.....4667884.....	.....54457872.....	.....411311246865.....	.....9641.....13789.....	.....872.....1478.....	+++4.....4+
** OCEANIA								
SUVA/S	.....1.....	.....1.....	.....12.....	.....23411.....	.....2444451.....	.....23212362.....	.....31.....13.....	.....3.....
SUVA/L	.....1.....	.....1.....	.....41.....5.....	.....11.1631.....261.....	.....111464321652.....	.....253211362.....	.....21.....13.....	.....3.....
WELLINGTON/S	.....1.....	.....1.....	.....2321.....	.....244431.....	.....1554454.....	.....43212362.....	.....21.....141.....	.....3.....
WELLINGTON/L	.....1.....	.....1.....	.....1.....	.....1.....	.....122252.....253.....	.....12432.....1531.....	.....21.....131.....	.....3.....
SYDNEY/S	.....11.....	.....2311.....	.....156432.....	.....3775542.....	.....4654566.....	.....232124741.....	.....21.....143.....	.....3.....
SYDNEY/L	.....1.....	.....1.....	.....1.....	.....37.....31.....	.....11.641.....63.....	.....14211352.....	.....21.....1475.....	.....3.....
PERTH	.....332.....	.....15551.....	.....377731.....	.....4776532.....	.....1.245446731.....	.....2.....12124785.....	.....141.....11.....	.....3.....
HONOLULU	.....332.....	.....15551.....	.....377731.....	.....4776532.....	.....1.245446731.....	.....2.....12124785.....	.....141.....11.....	.....3.....
** AFRICA								
SEYCHELLES	.....24553.....	.....1457761.....	.....3567884.....	.....44467872.....	.....421211346865.....	.....962.....13789.....	.....85.....1478.....	+++2.....4+
MAURITIUS	.....45564.....	.....1677762.....	.....3667885.....	.....1.445678831.....	.....521212346875.....	.....962.....13689.....	.....84.....1478.....	+++.....4+
NAIROBI	.....456651.....	.....1667873.....	.....36668861.....	.....1.544478841.....	.....631411146886.....	.....9841.....13689.....	.....883.....1478.....	+++.....45
HARARE	.....467762.....	.....377885.....	.....26668883.....	.....21.454478952.....	.....651521146897.....	.....9952.....13689.....	.....884.....1478.....	+++.....4+
CAPETOWN	.....347874.....	.....5688861.....	.....177789841.....	.....1.365568973.....	.....631532236898.....	.....98541.....13689.....	.....8851.....1478.....	+++2.....4+
LAGOS	.....467775.....	.....6788871.....	.....76678951.....	.....22.275457973.....	.....771552125898.....	.....99762.....2689.....	.....7883.....378.....	+++5.....4+
ASCENSION I	.....2533651.....	.....4755772.....	.....7765785.....	.....12.86445882.....	.....573263112697.....	.....99863.....389.....	.....88841.....168.....	+++5.....3+
DAKAR	.....1566651.....	.....3777772.....	.....6766785.....	.....1.76556882.....	.....464264225697.....	.....99863.....379.....	.....88841.....158.....	+++5.....2+
LAS PALMAS	.....34343.....	.....2666661.....	.....5888884.....	.....78888971.....	.....242386666895.....	.....898754334689.....	.....99863111379.....	+++3.....4+
** S. AMERICA								
STH SHELLAND35651.....1677772.....377885.....1.15667772.....464245345565.....788632112235.....57841.....13.....	245.....
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R DE JANEIRO442351.....664572.....875675.....1.7644672.....354135311366.....898532.....48.....88841.....16.....	+++52.....3
BUENOS AIRES	.....155551.....	.....376662.....	.....677675.....	.....1.7655661.....	.....353145422355.....	.....8985421.....26.....	.....78841.....3.....	+++52.....
LIMA	.....3233.....	.....54452.....	.....76564.....	.....654441.....	.....122.21431124.....	.....6873421.....3.....	.....68841.....1.....	+++3+2.....
BOGOTA	.....2223.....	.....43451.....	.....65554.....	.....654441.....	.....111.13421134.....	.....6763321.....4.....	.....68841.....1.....	+++52.....
** N. AMERICA								
BARBADOS	.....2233.....	.....154452.....	.....475565.....	.....6654561.....	.....121.15422255.....	.....7773321.....26.....	.....88741.....4.....	+++52.....
JAMAICA	.....1112.....	.....33341.....	.....55553.....	.....65561.....	.....11.12432234.....	.....6652321.....4.....	.....88841.....3.....	+++52.....
BERMUDA	.....1112.....	.....33341.....	.....155564.....	.....265661.....	.....11.4432355.....	.....6652221.....25.....	.....78841.....3.....	+++4+2.....
NEW YORK	.....11.....	.....12231.....	.....34453.....	.....465551.....	.....21.2443354.....	.....55311211.124.....	.....68741.....2.....	+++3+2.....
MEXICO	.....11.....	.....222.....	.....4442.....	.....16543.....	.....1.343222.....	.....34313111.1.....	.....27741.....	+++452.....
MONTREAL	.....11.....	.....122.....	.....24452.....	.....45554.....	.....21.2443453.....	.....552112111124.....	.....68741.....2.....	+++3+2.....
DENVER	.....1.....	.....221.....	.....221.....	.....2442.....	.....35322.....	.....331.1.112.....2.....	.....26631.....	+++352.....
LOS ANGELES	.....1.....	.....221.....	.....221.....	.....442.....	.....25321.....	.....221.1.131.....	.....14631.....	+++52.....
ANCOVER	.....1.....	.....221.....	.....221.....	.....111.....	.....3431.....	.....12.1.13211.....	.....13431.....	+++42.....
AIRBANKS	.....1.....	.....221.....	.....221.....	.....111.....	.....11232.....	.....11.121113431.....	.....11241.....111.....	+++42.....

The provisional mean sunspot number for December 1987, issued by the Sunspot Index Data Centre, Brussels, was 26.5. The maximum daily sunspot number was 43 on 18, 31 December and the minimum was 10 on 24 December. The predicted smoothed sunspot numbers for March, April, May and June are respectively: (classical method) 36, 37, 37 and 38, (SIDC adjusted values) 42, 44, 45 and 46.

VHF/UHF

Ken Willis, G8VR*

IN HIS POPULAR *Technical Topics* feature in the December issue, Pat Hawker obviously felt that the time had come, having been the mainstay of our journal for some 30 years, to wax philosophical on the subject of what is or should be expected of the writers of regular columns, commenting that in his opinion they should "neither expect to nor attempt to please everybody all of the time".

Any writer worth his salt seeks to provide what the majority of his readership wants to read. However, in a hobby as diverse as ours, the generic title of vhf operator conceals such a variety of activities as between one amateur and another that they amount almost to separate hobbies, and often the only link between them is the use of a vhf/uhf communication path.

If you live in a tower block with no antenna facilities, it will bring little comfort to learn that G7XYZ, from his country location where his antenna tower supports 8x17-element Yagis, has worked Japan "off the moon" on 432MHz yet again. If what turns you on is weak-signal tropo, those "dreadful" fm operators who seem only to maintain their licences to rag-chew in local nets will be (to you) just creators of QRM and a waste of good spectrum space. Similarly the fm operators might be forgiven for wondering why part of their territory has been given over to things like beacons ("which you can never hear anyway"). The list is quite a long one: repeaters, meteor scatter, rtty, fax, packet radio etc - all activities pursued by vhf/uhf operators, yet their calls may seldom be heard on the air if their choice is a branch of the hobby different from your own.

When writing this column I try to mention individual correspondents by name and callsign whenever possible, especially when it helps to give a better picture of an event. For example, if something happens which is reported by amateurs in GJ and GM, the event was fairly widespread; whereas when 50 or more stations in Yorkshire work Yugoslavia by sporadic-E, the event itself is worth recording for reference purposes, but a full list of all who took part at both ends of the path may not tell us very much, and serve only to use up column space which is always at a premium.

Early vhf columns tended to include long lists of "who worked what", which was useful information at a time when vhf operators were few and their equipment largely home-brew. Some reporters still prefer this format (*Dubus* is one), but with modern gear and a far greater amateur population, contacts which were outstanding in the 'fifties and 'sixties are now commonplace. However, this is your feature, so if readers prefer such lists they can be provided, but I believe that a wider approach results in better and more interesting copy. As I see it, my job is to use the space available to report on the widest possible range of vhf/uhf interests, and at the same time to present news and views in a style that is readable, even when the particular topic is of only limited interest to an individual reader.

I have always regarded it as a privilege to be allowed to write a column which keeps me so closely in touch with vhf/uhf events, and through which I have gained so many close friends, even though many are known to me only through their correspondence. Which leads to another matter. Since this column depends entirely on readers' letters, should they ever stop coming I would have to choose my own theme each month, which could result in a more restricted and possibly unbalanced view of events in the world of vhf/uhf. Fortunately, in more than five years since I took over the column, I have never had to worry about what should be included, but rather what has to be left out through lack of space.

Times are changing, however, and it is becoming more difficult to provide the service to readers to which I think they are entitled. Most of what you read in the regular columns was written some five weeks beforehand because magazines require this sort of lead-time for their preparation. Thus a sporadic-E event in July will not be reported on in *VHF/UHF* until September or even October, depending on how close to deadlines the event occurred. More recently, the *News Bulletin* has become a regular part of *Radio Communication*. Its pages are produced by a faster process than the rest of the journal, so that a report of an event could appear in it an issue earlier than it would in *News & Views*.

I suggest, therefore, that all *News & Views* columns in *Rad Com* should in future be produced by the faster process, and included in the

News Bulletin. It will no doubt be argued that one day RSGB will be so high-tech that copy will go straight from the author's own word-processor to the printed page, but until that happy day arrives, my suggestion would surely improve the situation. (It is, in fact, planned to do just that as soon as full desk-top publishing can be introduced - Ed).

Meteor scatter

The Geminids shower in December followed closely by the Quadrantids in January resulted in quite a lot of activity, and the meteor scatter mode seems to have lost its cloak of mystery and is being used more and more these days.

From radio reports it is not always easy to say when the peak of a shower occurred. Sometimes the time for the visual peak quoted in the astronomical journals shows quite clearly that the radiant will not favour radio amateurs in Europe at these times, yet we get reports of good ms contacts around these hours which give rise to individual estimates of the peak time, which may vary considerably. Since sporadic meteors are always around in some measure, the increased activity which always occurs during shower periods may account for many contacts being completed which are assumed to be "peak shower" QSOs, but which are, in fact, made via sporadic meteor trails. The following reports give some indication of the levels of activity and the conditions experienced in the two showers.

Geminids 12-14 December

50MHz

GJ4ICD: "The Geminids were very good, in fact quite spectacular. I was QRV on 12, 13 and 14 December both early am and late pm, and both periods proved to be fantastic. On 12 December at 2000gmt, many GM and GI stations calling "CQ", signals very strong up to 30-40dB over 9, with bursts of +2min, with GM4DGT just like a local. 13 December was about the same, with signals from GI8YDZ, GM4DGT every time the rig was switched on. Many GMs and GIs were worked. I was sorry not to have my 144MHz antennas up for this event."

GM4DGT: "On 13 December I had S7/8 QRM from a street lamp. Reflections were very strong but of short duration. I heard GJ4ICD, G8VR, G6XR, G1EWJ, G4IJE and G3LEW, and managed a QSO with GJ4ICD for about 1 min. Worked G4JCC on sked with 26 reports both ways. On 14 December when the street lamp was off I worked GJ4ICD, G3IMW, G4XDZ, G4IJE and heard G4UXC."

GI8YDZ: "Was not QRV on Saturday, but on Sunday evening (13 December) copied very good signals from GJ4ICD and a few G stations, but only worked GJ4ICD. On 14 December I again worked GJ4ICD and heard G8VR, but then had to go QRT. The only other station worked was G4IJE. All in all a poor shower this year. Not as much activity as in the Perseids."

144MHz

G3IMV: "If I had made skeds with short/medium range stations like SM, DL, OK, HG etc, I think most of them would have been completed, and I would have thought it a good shower. But for skeds with stations at a QRB of 2,000km, the picture would be quite different. On 12 December at 0500 I tried with UV1AS (PT03A) and heard nothing. The only other sked that day was with HG5PT at 1900 which went through with no trouble. On 13 December I got some reflections in a sked with UA3IDQ (QQ) but I am not sure if they were from him! My next, with I5YDI at 1900, was terrible, only two or three short bursts. The final sked that day was with UC2OF (PM) and not a dicky bird. I did not stay up overnight so I don't know what happened, but I think that the shower probably peaked around 0400 on 14 December. I got the impression that the shower was poor since several people were bemoaning the fact on the vhf net."

G3NOH: "I made 16 skeds, all but three on cw. Four were completed, all on cw and with YUs. One complete contact with HG on random cw, and pings received from UR, UA and I. Missed completing with OE by the skin of my teeth, but was pleased with my first attempt at meteor scatter."

Quadrantids 3/4 January

50MHz

GM4DGT: "Worked GJ4ICD 1438-1449gmt and EI9FK on 70MHz at 1500 when both 70 and 50MHz were quiet. From 0100 on 4 January, was calling and getting loud but extremely short bursts. At 0900 tried with G3CCH and received only short bursts. It appears that the vertical angle of my beam is the critical factor. Tried a three-element on a pole with 30° elevation and worked GW3JXN/A and heard G3CCH plus stations calling on cw. The longer paths seem better with my beam." (More of this next month - G8VR).

GI8YDZ: "Quadrantids a bit better than the last shower. Worked GJ4ICD at 1016gmt on 3 January, then late in the day, LA6QBA, LA9RAA, LA3EQ, G4IJE and G3LEW, the last three after midnight. On 4 January at 0920 worked G3ZSS, but activity very poor despite GB3NHQ beacon being good all day."

GJ4ICD: "I found that the best time was 1300gmt on 3 January. Stayed awake until 0300 on 4 January but found things poor. On 3 January it was good with massive long bursts from GM4DGT, GM3WOJ, LA6QBA, GM0HBK, GI8YDZ and GM4CPX."

144MHz

G3NOH: "Not a great deal of success to report. Had no skeds but on random heard and called I3YXQ, I4BXN, IT9LK, OE3JPC and OK1KRA. No contacts. Completed

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with HB9BZA in three periods and EA3DXU in six periods, all on cw. Shower was better than the Geminids in that there were much longer pings, though activity was lower."

G3IMV: "Not much success in this shower, but had only a few skeds. Those I arranged were mostly difficult ones, UC2OF (PM), UZ3DD (SQ), UV1AS (PT) and RT5UB (PK) and not a tweet from any of them. My easier skeds were with EB3CNX and EA3MD in BB, and HG5CW7 in JH, all completed. The sked with EA3AM on 4 January at 1100gmt was fantastic, with so many bursts I could not process them fast enough. We completed in about 12min and finished by sending fb 73 and gracias! Listening around on 4 January I heard many skeds being completed with EA, HG, LA so it would seem that it was quite a good day."

Seventy megahertz

Although the 70MHz band has been somewhat eclipsed by the wider release of 50MHz facilities, there are fortunately still some operators who find the band interesting. One enlightened use of a part of the spectrum not exactly burdened by QRM is by the Stratford-upon-Avon & District ARS, which by now should be operating a club net on 70.475MHz fm. As soon as the band was allocated to Class B licensees, they looked around for some low-price 70MHz rigs, and subsequently were able to purchase 22 GEC Worcester transmitter-receivers at a favourable price. When Clive, G0CHO, wrote, they were awaiting crystals for these units, and were considering the use of vertical polarisation since some of the members wanted to try mobile operation on the band. This seems to me to be a great idea for keeping club members in touch with one another, quite apart from it being the sort of group project which is missing in so many amateur radio clubs these days. It will be good to hear how the scheme progresses, but let's hope that the Stratford club will start a run on similar equipment purchases with a marked increase in activity on this band.

"Use it or lose it" is a hackneyed phrase, but one which still should be heeded with commercial interests hungry for new spectrum space.

Alan Doherty, G8YDZ (Co Antrim), says that G14SZU should by now be QRV on 70MHz since he (Alan) helped him to align his transverter. Bill, GM4DGT, in recent correspondence mentioned a contact on the band with EI9FK, so here are two more nice ones to work. Finally, the Cambridgeshire Repeater Group in its newsletter No 14 (secretary G8XMS), gave instructions for tuning the Pye Westminster for use on 70MHz, so things could be looking up on that band this summer. If only someone would design a small antenna for 70MHz which looked more like a standard tv or fm broadcast array, more people might feel inclined to use the band.

Repeater news

I liked the cover picture on the Cambridgeshire Repeater Group's Newsletter No 14, reproduced here. It relates, of course, to the group's packet radio repeater GB3PX which, the newsletter says, came on the air



within 48h of the licence being received on 13 August, and was soon digipeating some 5,000-8,000 packets per day, half of them in the evening period between 7pm and midnight. Most users seem to be located within 80km of the repeater, though there are some regulars 100km or more distant. The repeater has direct paths to Potters Bar GB3HQ, Bury St Edmunds GB3EA, and Norwich GB3NP, and thus provides a vital link in the UK packet radio network. The group is lucky to have James Miller, G3RUH, as a local. His amateur radio software is well known and greatly respected, and in this newsletter he has contributed a short article "Packet Radio - Reading the Mail".

The Cambridgeshire group also operates the video repeater GB3PV (RMT2) which has been QRT for maintenance work but should now be operational. Some snippets of news of its other repeaters: GB3PI (R6) now has its over-deviation meter set at 6.4kHz and a new antenna fitted; for GB3PY (RB14) a move back to Madingley was in process when the newsletter was published and there was interest in using the system for experiments with a uhf diversity system like the one described in an article by G8DOR in *Rad Com*; there were plans for fitting a real-time clock to GB3PT (RB12), and, finally, GB3PS (RM3) had suffered a postage failure, now rectified, and the repeater operates in beacon mode on 1,297.075MHz when not otherwise in use.

Another newsletter, this time from the Aylesbury Vale Group, gave notice of its agm on 17 February when the group membership stood at 180, (including three swls). The annual subscription of £3.50 seems very modest since the group provides three repeaters in GB3VA (R4), GB3AV (RB2) and GB3BV (RB1). The group sought its members' views on proposals to install a digipeater and tv repeater in the Aylesbury area, but the response was not large enough to justify further action at present. GB3VA suffered from a few irritating faults which were soon cleared, while GB3AV has been the subject of a major revamp of the antenna system which necessitated a shut-down for a couple of days in July. This has improved the repeater's coverage and also enabled some annoying interference problems to be identified and cleared up. When the QRM persisted after a change of mast and antennas (now Jaybeam stacked dipoles), a fuller investigation showed that the culprit was no more than a faulty BNC plug on a lead from the transmit cavity filter unit. Replacement by an N-type which avoided the use of adaptors solved the problem. Food for thought here! GB3BV lost its power for a couple of days in the October hurricane and so was off the air as it does not have battery back-up facilities. This repeater is used mainly by mobiles passing through the area.

Central Scotland FM Group's winter 1987 newsletter acknowledged the tenth anniversary of GB3CS (R6), and was crammed with its usual wealth of information which would make very interesting reading if only I had space to reproduce it here. Colin Dalziel, GM8LBC, has produced no less than 40 issues of this newsletter since taking on the job as editor, and it goes from strength to strength under his guidance, so either borrow a copy or join this active group! A recruitment campaign by the CSMG has borne fruit, and new members to the group are welcomed in this issue and also encouraged to submit their own articles for publication; a point which editors of all newsletters will want me to mention, I am sure.

The switch-on of repeater GB3NG (North Grampian, R1) during November was announced. It shares Channel R1 with GB3PA and GB3HG, and also OY3REA on the Faeroes, sometimes copied in Scotland. GB3NG is located on Mormond Hill between Fraserburgh and Peterhead, and should link up 144MHz coverage from GB3GN (R7) to the south and GB3SS (R0) to the west. The newsletter also comments on the growth of packet radio, with 27 such repeaters listed as active and five more in the licensing process.

Also reported is the very good news that Mike Dennison, G3XDV, RMG chairman, is back at work after a spell of ill-health from which a full recovery may take some time. It is doubtful whether the majority of operators who use repeaters realise what they owe to Mike for his untiring and often unrecognised work on the administrative side, which leaves him little time to do anything else with his spare time, let alone go on the air. We wish you well, Mike.

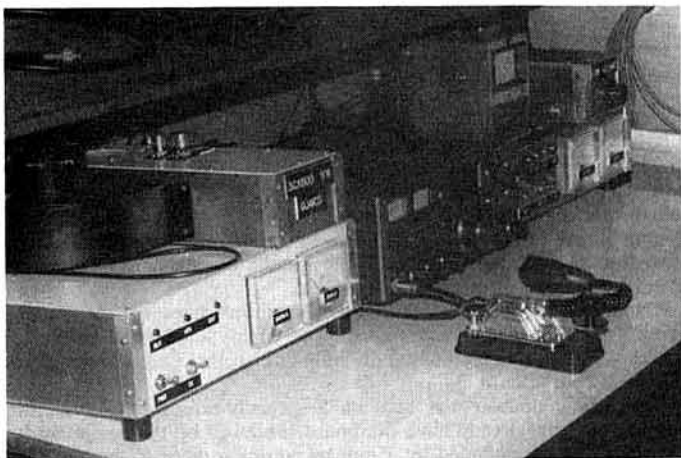
From here and there

If you think our vhf bands are becoming crowded, perhaps you would like to try Japan. In a letter to *Oscar News*, Shinichi Sudo, JQ1HXT, wrote "Japan is a small country, but there are 727,000 amateur stations, more than 30 per cent of them in the Tokyo area, and they use 144/430MHz fm rigs to make an easy QSO. Maybe you can't imagine the battle to find a clear frequency and keep it after finding it".

I checked the population of Japan and found that in 1979 it was 113 million (UK 56 million). On this basis, the population density works out at 303 to the square kilometre, the UK figure being 228, not so very different you might think. However, looked at another way, the figures imply that taking Japan as a whole, one in every 155 of its citizens must hold an amateur licence, compared with less than one per thousand in the UK, so not all of those black boxes manufactured by Yaesu and Icom go for export. Here's the crunch, though. If 30 per cent of Japanese licensed amateurs live in Tokyo, then one in every 50 of the population of that teeming city is a radio amateur, some 220,000 operators in all! I think I will settle for Broadstairs.

John, G3IMV (Bletchley), has worked 405 squares on 144MHz and has

394 of them confirmed. This was achieved using the "normal" modes – that is, no eme – which some contenders for the UK top spot use to wrinkle out the rarer ones. Incidentally, there are very few G stations with scores above 300 featured in the higher echelons of the *Dubus* World Wide 144MHz Top List, but this could be because they don't bother to report. G3IMV would very much like to receive cards from ZB2BL and EA9HW, both worked in sporadic-E events on 144MHz, since not only are they prized contacts, but cards from these stations would bring John closer to 400 squares confirmed. Has anyone else worked ZB2 on



The GJ4ICD linear amplifiers, for 144 and 432MHz, on either side of the transceiver. These amplifiers use a 3CX800 valve and are easily capable of full legal output when driven from a 10W source. Photo: GJ4ICD

SWL

*Bob Treacher, BRS32525**

The general certification rule

Any swl interested in award hunting will have come across the general certification rule (ger), which is the generally accepted method of proving that you actually possess the cards required for an award. The applicant provides the sponsor with a list of the QSL cards held which meet the requirements for the award, and indicates that the information is correct. The ger is a statement on the claim which says something to the effect that the information and/or QSL cards have been checked and certified as being correct by one or two licensed amateurs. Most sponsors require two signatures and dates of witness, some will require a club officer to sign, others will specify officials of an IARU associated club. Some, however, will ask for the signature of a person from a national organisation, in such cases, the cards/information can be sent to GW4BKG, who does this job on behalf of the RSGB. It is most important that you read the rules carefully and comply with them.

UHF/VHF contests

Last year produced an exciting finish to the UHF/VHF Listener Championship, but the number of listeners participating was quite low. It is surprising that so few listeners apparently take vhf seriously, and that even fewer take part in the extensive programme of contests which the Society runs and which are open to listeners during the course of the year. I wonder why that is? I would be interested to know.

The winner of the Listener Championship receives a cup to keep for the year, so there is an end result. Hopefully, the number of listeners taking part in 1988 will show a significant increase, and the VHF Contests Committee will be suitably encouraged and might even consider increasing the number of contests which have listener sections. A list of the contests with listener sections in 1988 is given below, but it is also worth noting that the committee encourages check logs from swls when there is no swl section. Indeed, for 1988 there are to be two new contests on 50 and 70MHz on 2 and 3 April (and 50MHz on 23 October) which fall into

144MHz by any mode? I have always felt that Gibraltar suffers from lack of 144MHz activity, rather than the distance from the UK being the reason for the country being a rare one for the band.

Geoff Brown, GJ4ICD, is tape-recording all significant 50MHz signals during 1988, and has already sent some interesting tapes of the Quadrantids and the aurora on 2 January.

The tape recorder which I use is a modified stereo-deck supplied a few years ago by Oscar, SM5CHK, which as well as being good for meteor scatter, sits well on the shelf with all its controls in convenient positions so it is immediately available for general recording when things are happening. Hundreds of feet of tape collected over the years have provided useful demonstration material for club talks, sometimes effective in preventing members of the audience from dozing off! By regularly dubbing off the interesting bits, tapes can, of course, be re-used, and if the tape recorder is equipped for variable speed operation, running the tape at very low speed enables the normal cassette time to be increased considerably without quality being greatly affected.

QST for December 1987 contains topics of interest to vhf operators. An article by Steve Powlshen, K1FO, discusses the optimum design of Yagi antennas for 432MHz, commenting: "The latest rage seems to be for extremely long antennas – more than 10 wavelengths". Steve mentions NC11, who successfully used 16 Yagis, each about 24ft long in the boom, for eme work. I reckon that an array like that could certainly bring in the Syledis at my location.

In the same issue, Doug DeMaw, W1FB, describes a home-brew vhf wattmeter which is not very frequency sensitive and so good for both 50 and 144MHz, and very easy to construct. He also gives details of a receive noise-bridge based on a 555 timer chip and a couple of 2N2222A transistors. He comments: "If you have never built or used a noise bridge, this may be the time for you to do it. You will find this instrument particularly handy if you are an antenna experimenter. It tells you much more than your ordinary swr indicator can". □

that category. If you are an swl who is new to vhf, and you have converters for these bands, it might be worth having a listen and submitting a log. You might then feel like having a go at a longer event when your entry will also count for points in the Listener Championship. Another fact to bear in mind is that on the Continent there is always a vhf or uhf contest on the first weekend of each month, which, if conditions are reasonable, will net you a few new squares etc.

Date	Contest	Time
5/6 March	144/432MHz	1400-1400
28/29 May	144MHz	New contest
2/3 July	VHF/NFD	1400-1400
30 July	144MHz Low Power	1500-2300
31 July	432MHz Low Power	0900-1500
31 July	144MHz	1400-1400
18 Sept	70MHz	0900-1600

Other contests with an swl section but which do not count for the championship are:

21 February	432MHz AFS	0900-1500
1/2 October	432MHz	1400-1400
4 December	144MHz AFS	0900-1700

If I have whetted any appetites, look for the rules for the contests at the appropriate time in "Contest News", and do not forget that the general rules for swl contests must also be adhered to.

The irc, sae and sae

Our newer readers might find these paragraphs useful (and some older hands might benefit from a friendly hint!). Most of us know what an irc is: it is an international reply coupon, which is the universal unit of exchange for anyone who collects QSL cards, awards etc. They can be used to purchase postage stamps to pay for the return of that QSL (or award – in which case the number of ircs required will also cover the cost of the certificate). Any number from 5 to 10 ircs is usual for such purposes). IRCs are often available at reasonable cost from QSL managers, but failing that, they can be purchased from any Post Office. It should be noted that they are valid only if the current edition is used (they do change on an irregular basis) and are stamped by the issuing office on the left-hand side. One irc is sufficient for a return card from Europe, while, in general, you will need two to get a QSL from the USA or Africa, and three from Oceania and Asia.

SASE means self-addressed stamped envelope, which is an elaboration of sae, which in amateur radio parlance, means self-addressed envelope. An sae should be used when asking for a QSL card direct from any

*93 Elibank Road, Eltham, London SE9 1QJ.



The shack of Maurice Wilcox, BRS50930

British amateur. An sac should be included with your irc when trying to get a direct QSL card (or any reply) from abroad. (Generally, of course, sac means stamped, addressed envelope – you are unlikely to get a reply from an advertiser who requests an sac unless it is stamped – Ed).

Any questions?

I have received several questions in the mail, the answers to which will benefit many others. The first one is about logging both sides of a QSO in hf swl contests. If both sides of the QSO can be heard, both can be claimed for points. This is done as shown below.

Date	Time	Station	Station	Report	Points
12/1	2245	PA0XXX	DL3YYY	59	1
12/1	2245	DL3YYY	PA0XXX	59	1

Secondly, I have been asked if the Society produces a logsheet specifically for the swl; the answer is, not at present, but as there would be advantages it is something I will pursue with the HF Contests Committee.

The third query is about tv-dxing. I have some knowledge of this, as I purchased a dx tv in 1987 specifically to monitor European broadcasts on vhf in an effort to know when sporadic-E openings might occur on vhf above 30MHz. There are two ways of proceeding – either find a commercial outlet which sells tv sets which are set up for use on the Continent, or pick up a Labgear "Televerta" which will enable you to use your domestic tv for the purpose. The topic can be expanded, and I will try to do so in a later column in readiness for the summer vhf sporadic-E season.

Finally, a query about swl membership of the society. If you are under 18 you should quote "ARS" (Associate Receiving Station) on QSL cards, correspondence etc. "BRS" is reserved for members who are over 18 years of age.

News bulletins

Listeners will be interested to know that the ARRL transmits daily news bulletins, which include propagation forecasts, from W1AW, while VERON provides weekly bulletins of dx news from PI4AA. The following schedule was correct at the time of compiling the column.

W1AW: CW at 18wpm. Daily at 0100, 0400 and 2200gmt, and Monday to Friday at 1500gmt on 3.580, 7.080, 14.070, 21.080 and 28.080kHz. SSB: Daily at 0230 and 0530gmt on 3.990, 7.290, 14.290, 21.390 and 28.590kHz.

PI4AA: SSB: Fridays at 1845gmt on 3.602 and 14.103kHz.

Around the bands

Quite a few reports this time to reflect activity during the Christmas and New Year holidays. Colin Watson, BRS46598, spent some time on 3.5MHz and heard J6LRV, OD5VT, VP5EE, VS6DO (around 2315) and ZC4AP.

Michel Monteil, FIATZ, updated things from mid-France. The end of 1987 provided the usual exotic call signs at the top end of 3.5MHz, including N7JW (Idaho), VK2AVA and YB0WR. Also heard were no less than four stations from Iceland. The 28MHz band provided Y10BIF, A4XKA, XX9WW, 5H3SW, four TZs and A22RB. The pick of the crop on 14MHz was FR4DO.

Robert Small, BRS8841, had a good month, but thought that conditions on the lower bands had been poor, with nothing of real significance being heard. He had not heard much on 28MHz, compared to Michel's list. Best dx was FT5ZB on 7 and 21MHz. 5H1HK on 3.5MHz and VK9YD/VK9X on 21MHz. On 24MHz he had added TI2KD, and 7MHz had also given him two stations from Nepal. 9N7YDY and 9N5QL, and PY0FNI on Fernando de Noronha. Robert points out, quite correctly, that P4 (Aruba) can now be added to the DXCC list and included in figures for the all-time table.

Finale

Due to the late arrival of the January magazine, the 1987 Countries table has been held over. The final table will appear next month.

News and views for inclusion in the May column must be with me no later than 7 March, with late copy received by 15 March. □

MICROWAVES

Mike Dixon, G3PFR*

A local oscillator multiplier for 2,176MHz

This low-power active doubler was designed to work with the G4DDK local oscillator (lo) board and gives two outputs at 2,176MHz suitable for transverters covering 2,320 to 2,322MHz using a 144MHz i.f. For an input of 10mW at 1,088MHz, the two outputs are +5dBm (about 3mW) and 0dBm (1mW), the former suitable for the transmit mixer and the latter for a receive converter, eg interdigital.

A special pcb is not needed since the output lines are air-spaced striplines made from brass or copper strip suspended above a groundplane. This method of construction gives higher Q than microstrip printed on epoxy board.

The original doubler was built on a specially-extended G4DDK lo board but if you already have the board produced by the components service, it can be extended by 35mm by cutting a piece of double-clad board and "bridge"-soldering it to the end of the lo board using narrow strips of thin copper or brass. The board will no longer fit in the original diecast box!

The circuit and component values are given in Fig1, and the layout in Fig 2. Both are largely self-explanatory.

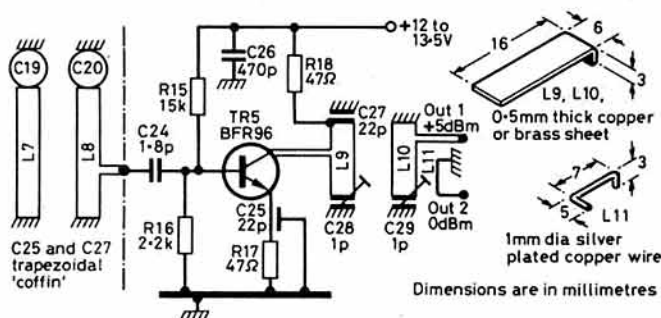


Fig 1. Local oscillator doubler circuit

C28 and C29 are mounted through holes drilled 8.5mm apart in the board. The wire connection at the top of the trimmer is the "wrong" way up and the tuning screw is "hot". This means that an insulated trimming tool must be used for alignment. C27 is soldered with its centre about 15mm from C28. L9 is soldered to C27 at one end and C28 at the other. L10 is soldered to ground at one end and to C29 at the other. A 2mm-wide strip of copper is soldered to L10 5mm from the bend and connects to the spill of the output socket. L11 is soldered in place as shown. It is spaced 1 to 2mm from L10 with the output end level with the end of L10.

The output sockets are miniature types such as SMA/B/C. These are mounted on the end walls of a box formed by sheets of double-clad pcb material (or tin-plate) soldered around the board. TR5 collector lead is soldered 8mm from C28 and is kept as short as possible. C25 is soldered to the groundplane as shown. TR5 base-lead supports R15, R16 and C24. C24 leads should be made as short as possible.

The lo board should be crystallised for output at 1,088MHz (high-stability crystal at 90.66667MHz) and it is wise to check that at least 10mW at 1,088MHz is available before attempting to align the multiplier. Refer to the original article in *Microwaves* Feb/March 1987, for details of alignment. In the absence of a spectrum analyser, connect an absorption wavemeter tuned to 2,176MHz to the output. Tune C28 and C29 for maximum output. Slightly readjust the position of L11 to obtain 1mW at Output 2. It will be necessary to retune C29 if L11 is moved too far. If

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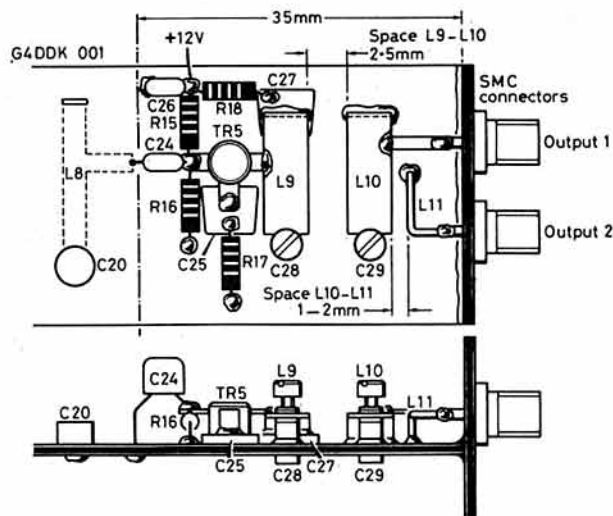


Fig 2. Physical construction of the doubler circuit

Output 2 is not needed, then remove L11 completely: this should be worth a few extra decibels at Output 1.

Although not tried, it should be possible to tune the output circuit to at least 2.4GHz, thus opening the possibility of using the lo for low-power transmitter or beacon purposes. The addition of an Avantek MSA04 ModAmp (or similar) would allow more than 10mW to be generated: more than enough for a short-range point-to-point link, especially if high-gain antennas are used at both ends!

My thanks to G4DDK for these details of a most useful addition to his basic lo board.

Errors and omissions

My apologies for a number of minor "typographical" errors which have recently gone uncorrected, due mainly to the production problems of which most readers will be well aware. However, a couple of errors have also crept in. First, the 1.3GHz beacon on Brown Clee is, of course, GB3CLE (correct in the text but not in the caption to the photograph) and, second, Martyn, G0CZD, prompted me with the fact that that beacon was built and is operated and maintained by members of the Shrewsbury (not Telford) ARC.

Just a further quick thought about "personal" beacons. Instead of placing the output in the beacon sub-band as recommended by the statement "Don't forget the band plans", if all personal beacon users settled on a common frequency, just below the bottom of the beacon band say, other band users would know where to look for such signals: this could provide quite a useful unofficial service! Ideas, please. □

SATELLITES

Bob Phillips, G4IQQ*

Oscar 10

The satellite has provided some very useful communication opportunities since it came back into service in mid-November, but further analysis by James Miller shows that the sun angle will be such from the beginning of March that the illumination will fall below the critical 50 per cent value. Hence, unless otherwise informed, use of the Mode B transponder should cease from that time for a period of several months. For those who may wish to use the satellite's beacon signal for equipment checking purposes, I have included the visibility chart for the satellite for the month. Very high elevation angles (up to around 60°) will be experienced both at the beginning of the month and during the third week or so.

Amsat-Oscar 13

The latest news about the launch is that a window around noon between 30 April and 4 May has been selected, but this is critically dependent on no further problems with the next Ariane launch. If the above date is

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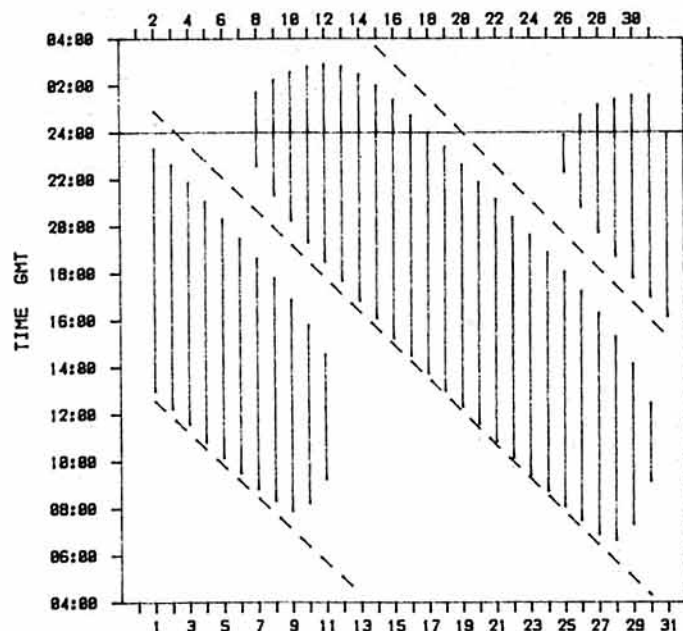


Fig 1 OSCAR 10 VISIBILITY (London area) - MARCH 1988

—— satellite in view — — — — perigee (MA=8)

adhered to, it should be remembered that a check-out period of at least four to six weeks will be required before the satellite can be declared operational.

Uosat

The command station suffered further storm damage during the inclement weather in January, but operation of both satellites has been possible with only minor interruptions. Problems with the new software for the Uosat Oscar 11 satellite diary have required a return to the original version so that checks may be carried out on the area of memory allocated to the Forth diary. Special software routines check-out the suspect 32kbyte memory section will be run to identify defective memory locations.

The University of Surrey has provided a pre-recorded telephone message system for a number of years providing information on both satellites. Uosat Oscar 9 data can be heard on Guildford (0483) 61707 and that for Uosat Oscar 11 on 0483 61202. The university is currently reviewing the provision of this service and would be pleased to hear from users before coming to any decisions on future activities.

Fuji Oscar 12

At the time of writing, the satellite's bulletin board was not in operation and hence the schedule was not known.

Other news

Planning for the launch of Amsat-UK's balloon transponder, HART, continues, and it is hoped that two separate flights will be made in the near future. The beacon unit has been undergoing check-out from G4CUO, and appears to be functioning well.

The three-month transpolar skitrek by a combined Canadian/USSR group will start around the beginning of March. Leonid Labutin will be among the group and will be making use of the Uosat satellites for communication and navigation purposes. Details of the progress of the group will be relayed using the Uosat Oscar 11 digital speech synthesiser, allowing reception on small nbfn receivers.

The USSR-manned space station Mir has caused a great deal of interest both in respect of the record-breaking feats of the cosmonauts and their radio activity. The frequency 143.625MHz is used a great deal and has attracted a growing group of listeners. Typical equipment consists of a simple antenna with a 144/28MHz convertor feeding a cb receiver (Channel 3!). Proposals to use parts of the amateur satellite sub-bands at 144 and 435MHz for terrestrial fm operation in Japan have resulted in a storm of protest from most regions of the world. The Japanese Amateur Relay League has received some 700 letters of protest against the proposed action. It is understood that JARL has been taken by surprise by the level of interest and concern, and has undertaken to take the comments into account when finalising its position on the matter. □

DATA COMMS

Ian Wade, G3NRW*

The 1987 UK packet experiment

The RSGB Packet Working Group (PWG), under the chairmanship of Mike Dennison, G3XDV, recently produced its report on the progress of the 1987 UK packet experiment. The full text of the report is contained in the January 1988 issue of RSGB's *Connect International* packet newsletter, but here for non-subscribers is a summary of the key points.

A copy of the full report is available from RSGB Publications (Sales) at a cost of £1 (members) or £1.18 (non-members) inc p & p.

A brief history

By mid-1986, packet radio in the UK had increased from the original handful of pioneers to several hundred stations. In August 1986 some 14 digipeater proposals (known as Phase 1) were submitted to the DTI, and most of these were licensed just six weeks later. In March 1987, the PWG was set up in its present form, as a sub-committee of the Repeater Management Group (RMG), and comprised those most active in the field at the time.

All 14 of the Phase 1 GB3 digipeaters were operational by March 1987, with four of them running mailboxes. It had been intended that these units would form the experiment, and that after the end of 1987 more licences would be applied for. However, by mid-1987, the volume of traffic had risen to such a level that applications were solicited for a second phase of digipeaters, and as a result a further 13 became operational by November.

Thus, by the end of December, there were 27 GB3 digipeaters, some of them by now linked with network level software (eg NET/ROM), and five official mailboxes, located at various points throughout the UK. These were complemented by several hundred *ad-hoc* digipeaters and around 60 other mailboxes. Unfortunately, with such a high level of uncontrolled activity, almost all of it being on a single frequency (144-650MHz), the formal experiment was swamped, and the active experiments originally planned were largely reduced to passive observations. In particular, the worst loss was the inability to experiment with real-time communication over long distances, as the channel was overloaded for much of the time with mailbox-to-mailbox traffic.

On the other hand, what would have been a very limited experiment became a viable country-wide service, providing some real-time capability and a comprehensive mailbox service with overnight forwarding between stations. The large number of mailboxes also allowed most useful observations to be made on what level of congestion slows down communication, and what ultimately prevents it altogether.

Band planning

International band planning, essential to the coexistence of a great many modes of operation, is determined by the IARU. Many months before the IARU Region 1 conference in April 1987, RSGB submitted a paper concerning packet radio band planning, proposing the use of the 430MHz band as the main packet network access band. At the same time, the DTI were asked for a single frequency in that band for formal network nodes. But, much to RSGB's surprise, the DTI rejected the application because the primary user had refused permission for any new networks on the band.

This forced the temporary abandonment of plans to establish a formal network on 430MHz, and led to the setting up of the limited-duration experiment on 144MHz. A compromise agreement was reached at the IARU conference, whereby no formal linking was to be carried out on 144MHz, but the sub-band 144-625 - 144-675MHz would be allocated to data comms.

Also, around this time, it became apparent that the allocation of a primary-user segment of 50MHz in the UK would permit very rapid licensing of GB packet stations (a few weeks, compared with 1-2 years on 430MHz), and the RSGB VHF Committee allocated 50-6-50-7MHz to formal packet nodes. However, just as packet operators started to conduct experiments, the DTI announced that it was not, after all, able to permit large numbers of unattended stations on the band, owing to international considerations. Back to square one, almost, except that the DTI has since indicated there may no longer be objections to using 430MHz, and moves are now afoot to streamline the licensing procedures for that band.

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Congestion

The carrier sense multiple access (csma) method used in AX.25 works reasonably well, and allows several stations in an area to share a frequency. However, in certain parts of the country, 144-650MHz reached saturation long ago. One well-sited station near London, G4SWY, carried out an activity survey, regularly monitoring between 150 and 250 different stations each day. At the peak of congestion, it can take several minutes to pass each packet frame, making useful communication virtually impossible. By far the highest proportion of traffic arises from mailboxes talking to each other, and that is why the PWG is convinced that mailboxes need special co-ordination, best achieved by special licensing.

Licensing

The amateur licence was written many years ago when the hobby was fairly stable, and packet radio was certainly not envisaged. At the start of 1986, the DTI agreed in principle to change the licence. The proposed changes (not yet implemented at the time of writing) are as follows:

1. "Third party traffic" is to be interpreted to mean traffic originated by or destined for non-amateur stations.
2. Permission to be granted to run under automatic control (eg using a tnc).
3. Unattended operation to be permitted on the 144-146MHz band, at the licensee's home address, and with a power limit of 25W erp. This will have the effect of permitting *ad-hoc* unattended 144MHz digipeaters without the need for GB licences.
4. A log may be kept on magnetic disc.
5. Logging of digipeater operation will only require start and finish of period of availability of use.
6. Mailboxes will be explicitly declared as illegal without a special licence.

Secondary station identifiers (ssids)

An ssid is a decimal number in the range 0 to 15, and is an extension to a callsign, intended to denote a particular application or to distinguish between several stations running simultaneously under the same callsign (eg G3XDV-0, G3XDV-1, G3XDV-2, and so on). It is often useful to know on which band a particular station is working when setting up a multi-band path, and so the PWG has proposed the following ssid assignments:

For formal (GB7) packet nodes

- 0 Not allocated
- 1 Microwave band
- 2 144MHz
- 3 3-5 or 7MHz
- 4 70MHz
- 5 14, 21 or 28MHz
- 6 50MHz
- 7 430MHz

For non-network stations

- 0 A real human operator at home
- 1 /A or /P
- 2 (Not allocated)
- 3 /M
- 4 (Not allocated)
- 5 (Not allocated)
- 6 (Not allocated)
- 7 (Not allocated)

NET/ROM stations use ssids -8 to -15 for downlinks.

Packet radio in 1988

It is expected that packet radio will continue to change at its present very fast rate during 1988. The PWG firmly believes that it should continue with its present policies, rather than make any major change in direction. Since we are unable to comply with IARU recommendations regarding frequencies for formal networks, the 144MHz experiment will continue for another year. With the licensing of additional bands for mailboxes and trunk nodes, more and more linking will move off the 144MHz band. This will make mail forwarding quicker, will make real-time contacts possible, and will speed up communication with mailboxes and network nodes on the user access frequency.

The PWG, via the RMG and VHF Committee, will seek to alter IARU policy regarding 144MHz, especially in respect of gateway stations. This will be done by submitting papers to the vhf managers' meeting in the summer. The PWG will also continue to liaise with the DTI regarding licence conditions and licensing procedures. An urgent matter will be the speeding up of the link licensing procedure. There will be close liaison with the RSGB HF Committee regarding planning for formal hf packet nodes. It is hoped that hf mailboxes and links using both Amtor and packet can be connected to the UK network, resulting in simple and rapid worldwide message handling.

It is anticipated that by the end of 1988 the UK packet network will look significantly different from the way it does now. Most formal nodes will be licensed, with user access traffic and link traffic being totally separate. The PWG's projected fully-interlinked multi-frequency network should have become a reality, and both real-time and mail traffic will be fast. It will then be a matter of building and improving on that network, and experimenting with Level 3 and above, rather than the radio side of networking. It is also expected that packet radio will become more of a tool, and less of a hobby in itself. □

Contest News

50MHz Fixed Station Contest results

Conditions for this first 50MHz event were generally poor, although enlivened for some by a sporadic-E opening into Iberia and some evidence of Es between Scotland and the Channel Isles. Many stations complained of tv timebase QRM.

Not surprisingly, the contest produced a number of problems, particularly relating to the scoring system and to contacts with Spain. Advice was obtained from RSGB HQ regarding the legality of Spanish 50MHz operation, particularly as the station in question was stating over the air that he could not work in contests! As a result, all Spanish contacts have been disallowed. Given that the best UK dx was generally around 300km (exceptions included G4MFR to G4JICD at 870km), the contest became something of a lottery between those who did work CT4KQ and those who didn't. This distortion in scoring will be dealt with in future contests so as to make chance E- or F-layer contacts less influential. In many logs, a contact with CT4KQ accounted for between 30 and 60 per cent of the overall score.

Several stations commented on the lack of GW activity, and this was borne out by the logs with very few GWs appearing. A cry of anguish was issued by G4MFR who heard nothing outside Scotland other than GJ, emphasising the marked change in propagation between 50 and 70MHz, a point echoed by G3XBY.

One station lost many points through neglecting to obtain the full QTH information required by the contest rules. The onus is on the contest operator to obtain this information if it is not offered, but is available.

Overall, the contest was well received, the main complaint being about the lack of promotion for it in *Rad Com*. Unfortunately this was beyond the control of the VHF Contests Committee. Several of the more masochistic contestants suggested another contest in June or July, to take advantage of the more enhanced propagation and its accompanying pandemonium. This idea will be considered, bearing in mind the possible increased risk of interference to Continental broadcast services.

The new Telford Trophy will be awarded, subject to Council approval, to the overall winner, G3XBY. Certificates and congratulations go to G3XBY and G3JXN in the single-op section and to G4JIE in the multi-op (operators, G4JIE, G4CPU).

G4WAD

SINGLE-OPERATOR SIX HOURS					
Posn	Call sign	Points	QSOs	Loc	Best dx Km
1	G4WAD	49,723	120	IO83JA	OK1KDO/P 1,178
2	G4BLX	38,626	118	IO90WV	DF9LJP 802
3	G4CWH/P	24,864	81	JO02AA	OK1KDO/P 940
4	G4XEN	22,579	85	IO92PH	DL0NF 897
5	G4CLP/P	21,736	66	IO84KD	DL58G/P 998
6	G4HVC	19,202	69	IO93QA	HB9BZA/P 877
7	G4SCZ	18,776	70	IO81KI	DL8NE/P 784
8	G4ARI	18,570	76	IO92IO	DL0NF 947
9	G4SND	17,273	58	IO82UI	DK8ZB/P 873
10	G4HAS	16,187	56	IO91BN	DK8ZB/P 835
11	G3BOC	16,187	56	IO85LT	OK1JKE/P 1,149
12	G3VIP	14,180	37	IO93XN	OK1KTL/P 956
13	G4VPE	11,930	49	IO92GU	DL58G/P 827
14	G3WRJ	10,616	43	IO81JX	DK8ZB/P 732
15	G4HEE	9,953	34	IO93GL	DL1HDT/P 766
16	G4WVD/P	8,402	26	IO70PP	DK8ZB/P 801
17	G4ATR	6,712	35	IO92KP	DK8ZB/P 723
18	G4BZP/P	683	5	IO84KF	G3XBY 238

Disqualified: G4THB/P, G3WKS/P, G3LET General rule 3.

MULTI-OPERATOR 24 HOURS					
Posn	Call sign	Points	QSOs	Loc	Best dx Km
1	G4NUT	135,832	290	IO91OW	OK1KKG/P 1,508
2	G4RGK/P	65,279	182	IO91OO	SP6PAZ 1,303

MULTI-OPERATOR SIX HOURS					
Posn	Call sign	Points	QSOs	Loc	Best dx Km
1	G5RS/P	27,183	94	IO91PC	DF2ZC 799
2	G4RFR	19,297	67	IO90AS	HB9BZA 847
3	G4CWC	12,002	59	IO92AL	DL1HBT/P 765

SINGLE-OPERATOR 24 HOURS					
Posn	Call sign	Points	QSOs	Loc	Best dx Km
1	G3XBY	126,708	250	IO92DG	OK1KKG/P 1,572
2	G4MFR	87,234	119	IO87WB	OE1XA/P 1,582
3	G4WAD/A	73,636	176	IO82XC	SP9HWY 1,481
4	G4GO	42,916	106	IO91OF	OK1KEI 1,153
5	G4UZN	37,348	77	IO93FU	SP6GWB/6 1,310
6	G4OUT	37,672	101	IO92AT	OK1JKT/P 1,077
7	G3ISL	32,839	39	IO94SH	SP9BNM 1,397
8	G4ZVS	30,652	99	IO92BK	OK1KEI 1,227
9	G4OBK	17,263	30	IO93RQ	OK1KTL/P 1,119
10	G3EDD/A	16,902	27	IO70MN	DL58G/P 963
11	G3JZ	16,614	70	JO01AJ	HB9BZA/P 708
12	G4HGA	8,396	41	IO91VV	F6GQE/P 799
13	G2DHY	8,307	30	JO01BK	dk8ZB/P 680

70MHz CW Contest results

Compared to 1986, this year's contest had greatly increased activity and a few more entrants, most of whom called for a repeat event in 1988. The VHFCC will review its decision to drop the event in the light of the welcome feedback from the competitors. Most entrants who commented thought the event was a little short, possibly more time would allow fixed stations to "winkle out" those last few contacts.

Log-keeping standards were only fair, mistakes being made on call signs, reports and location. Information cross-checking is straightforward in 70MHz events. All entrants enjoyed the contest, even G4ZUK/P who endured icy conditions, temperatures having dropped to minus 13°C the night before at the portable site.

Congratulations to the winner and the runners-up who will receive certificates.

Posn	Call sign	Points	Loc	QSOs	Best dx	Km	Antele
1	G4BVP/P	242	82LB	37	GMZUK/P	543	7
2	G4ZUK/P	240	86RW	19	G4RFR	686	4
3	E19FK/P	240	63WC	20	G4ZTR	497	5
4	G4ZTR	213	01LV	26	E19FK/P	497	5
5	G3UKV	205	82RR	36	GMZUK/P	467	5
6	G4RFR	204	90AS	26	GMZUK/P	686	12
7	G3XBY	178	92DG	34	GMZUK/P	521	3
8	G3VIP	175	93XN	23	GMZUK/P	407	4
9	G4CWH	157	01CV	26	E19FK/P	449	5
10	G3BPM/P	95	80OU	15	G3TBK	284	4
11	G4ARI	92	92IQ	22	G4RFR	218	XD
12	G3SSO	82	81WV	23	—	—	4
13	G4JNT	67	90IV	14	—	—	4
14	G2DHY	47	01BK	7	G4BVP/P	230	3
15	G5UM	39	92MP	11	E19FK/P	360	3
16	GM3TAL	32	86GA	4	G4BVP/P	452	4
17	G4AHN	26	91OE	4	G4BVP/P	176	5

Many thanks for Checking, G4NZU.
Disqualified: G4ASR, Rules 3 and 13

70MHz Fixed Contest results

1987 has seen a significant increase in activity on 70MHz since the welcome opening of the band to all UK amateurs; most entrants commented on this and asked for more contests in 1988. This activity goes against the trend on the higher frequency bands, where tv and the effective withdrawal of the DTI (formerly BT) engineering services preclude most amateurs operating QRO in contests from home, although most will find breakthrough can be horrific on 70MHz.

Most entrants enjoyed the contest and thought it the correct length even though conditions were described as being between "naïf" and "awful"; log keeping

SECTION S - SINGLE-OPERATOR STATIONS									
Posn	Call sign	Points	QSOs	Loc	Pwr(W)	Ant	Best dx	Km	
1	G3XBY	483	107	92DG	25	4Y	CT4KQ	1,374	
2	G3JXN	452	93	91UM	20	4Y	CT4KQ	1,342	
3	G4ZAP	441	86	93DC	10	5Y	—	—	
4	G4JICD	410	60	89WF	20	4Y	—	—	
5	G2BSJ	391	84	91NV	7.5	3Y	GM4DGT	509	
6	G6IAT	309	77	91TV	25	5Y	GJ4ICD	321	
7	G4UXC	285	79	92BC	20	5Y	—	—	
8	G3FDW	256	46	84ME	35	2Y	—	—	
9	G4GDY	245	48	92GJ	25	3Y	CT4KQ	1,394	
10	G3ZSS	188	43	91TH	10	2Y	CT4KQ	1,318	
11	G0CZD	144	45	82QS	18	3Y	—	—	
12	G6ZHV	131	44	82SP	20	3Y	—	—	
13	G4XEN	127	22	92PH	10	Dip	CT4KQ	1,407	
14	G3AEZ	124	32	91UE	8	3Y	GJ4ICD	253	
15	G4ZJY	119	60	82SQ	10	5Y	G8TOL	288	
16	G4AFJ	103	13	92HO	10	6Y	CT4KQ	1,417	
17	G4INL	99	30	81WV	25	3Y	—	—	
18	G4ILI	93	33	81WV	10	3Y	—	—	
19	G8CUB	93	31	01EP	25	3Y	GJ4ICD	305	
20	G1KDF	91	21	83NN	20	5Y	—	—	
21	G3NEO	89	11	93IL	10	3Y	CT4KQ	—	
22	G4IDF	72	26	82VE	12	3Y	GJ4ICD	328	
23	G4MFR	46	7	87WB	15	4Y	—	—	
24	G5UM	45	14	92MP	10	4Y	G4HKS	158	

SECTION M - MULTI-OPERATOR STATIONS									
Posn	Call sign	Points	QSOs	Loc	Pwr(W)	Ant	Best dx	Km	
1	G4UE	398	81	01CT	20	5Y	CT4KQ	1386	
2	G4RFR	270	50	90AS	10	5Y	G1LSB	271	
3	G3ZME	252	65	82SP	20	3Y	—	—	
4	G1YNR	126	18	93PD	15	2Q	CT4KQ	1490	
5	G4MGR	113	35	83KH	80	Dip	—	—	

Disqualified: G1UBL, Rule 3 (No cover sheet); G4HKS, Rule 13(i) (No times). Checklogs received with thanks from G3VKK/A, G4NBS and BRS32525.

144MHz CW and Marconi Memorial Contests November 1987 results

Conditions for these contests were exceptionally good, especially on the Saturday evening, the latter being enjoyed by the 24-hour contestants. Propagation paths extended eastwards from the whole of the UK with many QSOs into OK, SP, HA, HG and OE. In fact, the logos of many stations looked more like those of an hf contest. The maximum distance achieved by many stations was in the range 1,500-1,700km. An unusual event was reported by G3BOC who heard UB5IGO at 1015 on 8 November (2,800km) and UA6BPM at 1022 (3,200km). No other contest entrant appears to have heard this, although QSOs were believed to be in progress. The mode of propagation has not been established although meteor scatter seems most likely.

Surprisingly there was only a small increase in contest entries compared with last year but scores are dramatically increased. Needless to say, everybody was delighted with band conditions.

Certificates go to the winners of each section, and entries for both 6h and 24h sections have been sent to ARI (Italy) for the Marconi Memorial Contest. As before, many of the 6h entrants have done well enough for a good placing in the IARU 24h contest.

G3FZL

standards were good with few mistakes, but a few stations fell foul of penalties on the entry paperwork; everyone please read the rules carefully and double check your entry for signatures, county checklists and the correct log and cover sheets.

Many thanks to all entrants; congratulations and certificates go to G3UAX the operator of G4LNV, the Reading BT Radio Club station and to G4NBS, the winner and runner-up in the single-operator section. Also to the Derbyshire Hills CG G4ZAP the winner of the multi-operator section.

SINGLE-OPERATOR SECTION

Posn	Call sign	Points	Loc	QSOs	Mult	Best dx	Km
1	G4LNV	9,312	91MK	55	32	G3JYP	361
2	G4NBS	7,680	02AF	48	30	G3JYP	308
3	G4SEU	7,488	92FM	52	32	G3YJX	320
4	G3VIP	7,317	93XN	36	27	GM0FRT	411
5	G3YJX	6,256	70NM	24	23	G3ZIG	476
6	G4ULS	6,214	82TI	57	26	G3JOC	249
7	G3FDW	5,420	84ME	31	20	G4RFR	386
8	G3TCU	5,376	91QE	40	24	G3JYP	395
9	G4BYY	5,025	82TD	43	25	G3YJX	269
10	G4IJE	4,784	01CT	38	26	G3YJX	382
11	G4AFJ	3,816	92HO	31	24	G3YJX	355
12	GW4HBK	3,234	81KP	29	22	G3VIP	298
13	G8PNN	3,145	95EF	24	17	G4RFR	495
14	GM0FRT	2,167	87WB	11	11	G4RFR	699
15	G8DXC	1,920	02DL	20	16	G4MGR	247
16	G3BPM	1,456	80OW	19	16	G4ZAP	251
17	G6XM	781	70XR	11	11	G4ZAP	304
18	G3NKS	540	81XU	16	10	G3ZIG	231

MULTI-OPERATOR SECTION

Posn	Call sign	Points	Loc	QSOs	Mult	Best dx	Km
1	G4ZAP	21,084	93DC	80	42	G4TDJ	408
2	G4RFR	16,355	90AS	73	39	G8PNN	495
3	G4MGR	12,192	83KH	59	32	GM0FRT	422
4	G4ATH	6,425	83LU	35	25	G3YJX	390
5	G1RZR	2,880	93JA	32	20	G4RFR	255
6	G6FPX	1,921	83OK	23	17	GM0FRT	406

Check log from G0FRE.

Disqualified: G3XBY rule 3, G4ASR rule 3 and rule 13.

Jubilee VHF National Field Day 1988 rules

As part of the celebrations of the 75th Anniversary of the Society, special jubilee certificates will be awarded to every affiliated society submitting a valid entry to this year's VHF National Field Day.

This year's rules are similar to last year's, no changes in the bands used have been made.

Stations wishing to take part in this year's VHF NFD must register their site by 1 June at the latest, see rule 2.

SWL entries will be very welcome and will count towards the VHF Listeners Championship.

The general rules published in "Contest News", *Rad Com* January 1988, will apply except as modified by these rules.

1. Duration. 1400gmt 2 July 1988 to 1400gmt 3 July 1988.

2. Site notification. Each group intending to compete must send details of the site to be used to: VHF Contests Committee, c/o J H Quarmby, G3XDY, 12 Chestnut Close, Rushmere St Andrew, Ipswich IP5 7ED, to arrive no later than 1 June 1988. The details required are: the name and address of the person responsible for the entry, the name of the group, the call signs to be used on each band, the section (open or restricted), the locator and national grid reference of the site, and sufficient access information for an inspector to locate the site (preferably a sketch map). A stamped addressed postcard should be included if confirmation of receipt is required.

3. Bands. Up to four separate stations can be used, operating on the 70, 144, 432, 1,296 and 2,320MHz bands. Single-band entries for 144MHz will not be accepted. Only one station can score or give points on each band. On 70MHz, stations must use cw only during the period 1400-2200gmt, phone only during the period 0600-1400gmt, and close down between 2200gmt and 0600gmt. The same call sign must be used on 1.3 and 2.3GHz, with no simultaneous operation on these two bands.

4. Operators. Any RSGB member or group of members operating from the British Isles (excluding Eire) may enter. Groups operating from the same site may combine their scores subject to rules 3 and 5.

5. 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. All equipment, including antennas, must be installed on site not more than 24h before the contest, and the site must not be used by the entrant for transmitting activities during the five days prior to the contest. Only portable accommodation can be used to house the stations. Power for all equipment must be derived from an on-site generator or battery. The public mains supply may not be used.

6. Scoring. Contacts will be scored by the radial ring system. Scores from the two 70MHz sessions will be added to give the final 70MHz score. Scores on 1.3 and 2.3GHz will be added together to give a final microwave score. The overall score will be determined as per general rule 10 using the final 70MHz, 144MHz, 432MHz and microwave scores.

7. Contest exchanges

(a) On 70MHz the contest exchange must include the QTH, given in a different form in each session. Serial numbers start from 001 in each session, and one scoring contact can be made with a given station in each session.

(b) On 144, 432, 1,296 and 2,320MHz, QTH information need not be exchanged. One scoring contact can be made with any given station on each band.

(c) Contacts with stations whose call signs appear on any of the group's cover sheets will not count for points.

8. Sections. There will be two sections:

(R) Restricted section:

(i) The power output on any band must not exceed 25W p.e.p at the transmitter.

(ii) The height of any antenna must not exceed 10m above ground level.

(iii) Only one antenna per band may be used (eg no stacked, bayed or colinear

CONTESTS CALENDAR

RSGB HF CONTESTS

12, 13 Mar	Commonwealth (Rules in November issue)
3 April	Ropoco 1 (Rules in January issue)
17 Apr	Low Power Fixed (Rules in March issue)
15 May	Region Round-up
4, 5 Jun	NFD (IARU CW) (Rules in February issue)
25, 26 Jun	Summer 1-8MHz
9, 10 Jul	SWL
17 Jul	Low Power FD
17 Aug	Hopscotch
28 Aug	Ropoco 2
3, 4 Sep	SSB FD
Sep-Oct	28MHz Cumulative CW
9 Oct	21/28MHz SSB
16 Oct	21MHz CW
12, 13 Nov	Second 1-8MHz
Nov-Dec	28MHz Cumulative Phone

RSGB VHF CONTESTS

5, 6 Mar	144/432MHz and SWL (Rules in January issue)
13 Mar	70MHz Cumulative (Rules in January issue)
27 Mar	70MHz Cumulative (Rules in January issue)
2 Apr	50MHz Fixed (Rules in January issue) (Note: time is 1800-2200gmt)
3 Apr	70MHz Fixed (Rules in January issue)
9, 10 Apr	144MHz and SWL (Rules in January issue)
17 Apr	10GHz Cumulative (Rules in January issue)
7, 8 May	432MHz-24GHz (Rules in March issue)
15 May	10GHz Cumulative (Rules in January issue)
29 May	432MHz Trophy and SWL (Rules in March issue)
12 Jun	432MHz FM (Rules in March issue)
19 Jun	10GHz Cumulative (Rules in January issue)
2, 3 Jul	Jubilee VHF NFD (Rules in March issue)
10 Jul	10GHz Cumulative (Rules in January issue)
30 Jul	144MHz Low Power and SWL
31 Jul	432MHz Low Power and SWL
7 Aug	10GHz Cumulative (Rules in January issue)
14 Aug	1,296MHz Trophy and 2320MHz Trophy
3, 4 Sep	144MHz Trophy/IARU VHF and SWL
11 Sept	10GHz Cumulative (Rules in January issue)
18 Sept	70MHz Trophy and SWL
1, 2 Oct	432MHz-24GHz/IARU UHF/SHF
6 Oct	432MHz Cumulative
14 Oct	1-3/2-3GHz Cumulative
22 Oct	432MHz Cumulative
23 Oct	50MHz Trophy
30 Oct	1-3/2-3GHz Cumulative
5, 6 Nov	144MHz CW
7 Nov	432MHz Cumulative
15 Nov	1-3/2-3GHz Cumulative
23 Nov	432MHz Cumulative
1 Dec	1-3/2-3GHz Cumulative
4 Dec	144MHz Fixed and AFS and SWL
9 Dec	432MHz Cumulative
11 Dec	70MHz CW
17 Dec	1-3/2-3GHz Cumulative

OTHER CONTESTS

Jan-Dec	UBA SWL (Rules in December HF)
1 March	UBA Spring (SSB) (Rules in March HF)
5, 6 March	ARRL International DX (Phone) (Rules in February HF)
15 March	UBA Spring (CW) (Rules in March HF)
19-21 Mar	BARTG Spring RTTY (Rules from G6LZB, QTHR)
19, 20 March	Bermuda (Rules in March HF)
26, 27 March	CQWW WPX (SSB) (Rules in March HF)
2, 3 April	SP DX (Rules in March HF)
9 April	Israel 40th Anniversary International (Rules in February HF)
16, 17 Apr	Spring VHF/UHF RTTY (Rules from G6LZB, QTHR)
28, 29 May	CQWW WPX (CW) (Rules in March HF)

arrays, or switching between two or more antennas). A slot-fed Yagi or quad antenna is permitted. Dish or backfire antennas must not exceed 2m diameter.

(iv) 2-3GHz contacts will not count for points in this section.

(O) Open section: as per licence.

9. Inspections. All stations are subject to inspection by members of the VHF Contests Committee or nominated representatives. Should the inspector be unable to locate the site due to inadequate or incorrect information, the entry will be disallowed. In the event of a last minute change it is the responsibility of the group to make suitable arrangements for the inspector to find the site. The inspector must be given immediate access to all parts of the site with the right to stay as long as desired, and the ability to return at any time during the contest.

10. Entries

(a) All entries must be postmarked no later than 25 July 1988.

(b) Entries must be addressed to: VHF Contests Committee, c/o J H Quarmby G3XDY, 12 Chestnut Close, Rushmere St Andrew, Ipswich IP5 7ED.

11. Awards. The Surrey Trophy will be awarded to the overall winner of the Open section, the Arthur Watts Trophy to the overall winner of the Restricted section, the Tartan Trophy to the leading Scottish entry, and certificates will be awarded to the winners and runners-up on all bands in each section, and to the leading stations in each country.

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Members' Ads

The Conditions of Acceptance are published below the Member's Ad form circulated with every issue of *Radio Communication*.

The current rate is £2.30 for 40 words or less: advertisements containing more than 40 words will cost an additional £2.30 for every additional 40 or less words. Each advertisement must be accompanied by the correct remittance, either as a cheque or postal order made payable to Radio Society of Great Britain.

FOR SALE . . .

TRIO (EX LOWE) TS520S inc CW filter, £350 ono. Remote VF0520, £35 ono. MC50 desk mic £25. All good condx in orig. pkg. with manuals. On air demo by arrangement. Stuart, G3SNA, not QTHR. Tel: (Manchester area) 04577-2790.

TRIO 9130 2M multimode, new condx., mobile brkt, manual, boxed, £375. LCL2740 conv for 10m, mobile brkt, manual, but no mic, £25. Pye PFI on RB4, £5. Paul, G1HNH, QTHR. Tel: 0449-672710 (daytime), or 675908 (evenings).

HALLICRAFTERS SX62A rx. 5-108MHz vgc £120. Ikegami b/w tv camera, cosmic lens, ok atv, £35. MM144-28 cvtr, £15. Heathkit IM13U bench valve voltmeter £20. Datong auto speech processor, £50. WANT: Welz SP200 pwr/swr meter. Hf gear, WHY? Bob, G4AFY. Tel: (Kidderminster) 0562-747480.

ICOM IC202S 2M SSB/CW tcvr, good condx, mic, box, etc., £110. LMW 23cm tvtr kit, built & boxed etc, requires alignment £65 ono. J-beam 2m 14-ele parabean, £17. G6CQO, QTHR. Tel: (Beeford N. Humberside) 026-288-330.

KW2000B WITH PSU, kw match swr bridge, and H/B atf/balun, £180 the lot. ARRL hf pa module 2x MRF454 100W out, £30. G4JNT, QTHR. Tel: (Nr. Southampton) 04892-87424.

FT790R 70CM MULTIMODE tcvr, mint condx, boxed with manual, £265 ono. Bob, G1ECL, QTHR. Tel: (Wymondham, Norfolk) 0953-604019.

DRAKE TR7 fitted with 300Hz CW filter and 1.8KHz SSB filter power supply, PS7 FV1 external VFO service manual. Good condx, one owner, £750. GW3ARS, QTHR.

SHARP M280K COMPUTER. Built in vdu, recorder, etc. plenty of radio software inc. rtty, morse, etc. Built in PIO inc. many Z80A utilities. £50, no offers. WANTED: Datong audio filter, TL122 linear, SP120 or swap above. G0AYZ, QTHR. Tel: 0705-589560.

YAESU FT480R mint condx inc. original box, £300. G6JDB, QTHR. Tel: (Sheffield) 0742-304151.

FT757GX AS NEW, £625. FC757AT ant. tuner, £225. Top quality multiband trap dipole, £40. Yaesu mic £10 etc. £850 ono for the lot. G0DTJ. Tel: (work) 01-920-3723, (home) 0206-852960.

CD100 OSCILLOSCOPE, £35. S770R VHF receiver + spares, £50. 4-chn 2m boot mounted storno, £30. Two hi-volts transformers, offers. Various QVO** valves. Numerous radio magazines, again offers. Buyer collects or arrange carriage. G4EUQ, QTHR. Tel: 0747-870959.

FT290R NICADS, chgr, case/mic, headset, mic, £245. Roy, G8VGR. Tel: 041-557-1630.

R71E MINT C/W remote control narrow CW filter, FM units fitted, £650. Would consider swap for TS430 or similar cash adj. as necessary. G4LTH, QTHR. Tel: 0375-674301 (evenings).

HANDHELDS, Boxed c/w chargers, manuals, batteries. Icom IC02E, £180. IC04E, £190. Also BP30 charger and BP5 fast charge battery, £75. All in excon. owner going dual bander. Bill, G4TOV, QTHR. Tel: 091-4102990.

FT290R BOXED, FT790R boxed, Trio PS30, Welz SP350 Welz CH20N coax switch, Welz TP05X power meter. Trio SP180 speaker. Yaesu YM38 mike. BNOS LPM 144-1-100 linear. AKD.WA1 wavemeter. Kenpro KR500 elevator. SMC polarphaser. Herschman 250 rotator. Trio 7800. All perfect. Tel: 01-464-0593 with offers. G6XWL, not QTHR.

FT790R WITH NICADS and soft case, little used, £300. Icom IC2E with remote mic, .5W antenna, and HP7 battery pack, £100. G6ANI, not QTHR. Tel: (Southampton) 0703-813344.

FT208R HANDHELD, mobile bracket, NC9C charger, case, YM24A spk/mic, manual, £100. Mizuho KX2 rx/atu, £20 ono. Datong active ant, £30. Rapid results Home Radio Amateur Course - full course - £25 ono. G1CIA, QTHR. Tel: 061-6265597.

SCOPES; Tektronix 545A, CA plug-in, 24MHz D/BM, manuals, £55. Solartron CT316 10MHz? faulty, £10. ZX81 faulty, new 16k ram, ext. keyboard, books, £8. 36t turns counters £2.50. 50W carbon resistors 50/72 ohm, £1. Meters, 100UA-100MA, £2.50. G3TTC, QTHR. Tel: (Surrey) 01-391-2514.

RTTY/AMTOR terminal unit. Maplin TU1000, fixed and variable shifts, £30. NOAA/Tiros vhf satellite rx. Professionally built Maplin Kit in cabinet, £45. WANTED: Atari 520/1040 ST radio related software, your price. G10JX, QTHR. Tel: 01-894-2507.

TRIO's FAMOUS PAIR. See Angus McKenzie report in Buyer's Guide to Amateur Radio. TS711E, 2m and TS811E 70cm, in fbc and never been touched internally. TS711E, £575. TS811E, £675. G8WYT, QTHR. Tel: (Sussex) 0444-450265.

YAESU FT-ONE as new condx with all options like FM board. All filters, Curtis keyer, fan mod. noise blanker mod. DC lead, non-volatile memory, £1,075. Peter, G8WYT, QTHR. Tel: 0444-450265.

FT690R, £275; BNOS 6m linear LP50-3-50, £125. Both as new. G4RSY, QTHR. Tel: 01-651-0633.

TRIO TS700G base station, 2m multimode tcvr. Good condx, £290. Tel: 0773-715694.

STANDARD CS800 25W 144-148MHz scanning m'mode tcvr; ten memories; memory scan; frequency scan; steps 10/100Hz-1KHz; 5-12.5-25KHz; fast/slow search busy or free channel; rpt shift +/-; beautiful rcvr; £300. Laurence, G0AOTQ, QTHR. Tel: 0475-87871.

TONO 5000E communications terminal, covers codes. rtty. Amtor ARQ modes A&L. Amtor FEC mode B. Morse AFSK to tx. AF or TTI input. Centronics o/p for printer. Built in vdu and much more. £650. G8WYT, QTHR. Tel: (Sussex) 0444-450265.

TONO 550, £180. ZX spectrum, £70. Scarab terminal £40. CW audio filter, £5. CW tx rx software, tx interface Spectrum, £14. Datong FL1 audio filter, £35. George, G4RNU, QTHR. Tel: 0344-54848.

YAESU FT101, some mods, £210. HQ1 minibeam 10/15/20m, £45. TF144G sig gen + TF801A sig gens 85KHz-300MHz. The pair, £30. Vibrokey, £20 vgc. Epson TX80B Printer beeb etc. compatible, £65. Buyer collects. Offers. Paul, G3XAT. Tel: (Dorking) 0306-886253.

DRAKE TR7 transceiver, matching vfo, atu, psu, workshop manual, offers? Yaesu FT780R 70cm multi-mode, manual, £310. Both equipments in ex.condx. and appearance. Mint unused Scopex dual 25MHz scope, leads, case, manual, £160. G3LYD, QTHR. Tel: 0983-840588.

TRIO R2000 with cw filter, £475. Hallcrafters SX24 Skyriver Defiant, £50. Codar CR70A with preselector, speaker, £40. Eddystone 90A, £100. BC221 with psu, £25. Telequipment D32 oscilloscope timebase u/s, £25. G4HHZ, QTHR. Tel: 0703-268705 (evenings/weekends), 0962-822401 (day).

HEATHKIT RA1, £40. KW77, £60. Labgear LG50, £20. Heavy so buyer must collect. Reluctant sale due to lack of space. G4WBZ, QTHR. Tel: Chester 675794 (after 6 pm).

RTTY TERMINAL UNIT, Maplin TU1000, as new, offers. Power supply Lambda 13.8v 30A. Any reasonable offer accepted, buyer collects. WANTED: Yaesu FRG7700 with memory option. Must be mint condx and ideally with maintenance manual. Tel: (Canterbury) 0227-458970 (after 6 pm).

COLLINS 75A-2 ham bands rx, includes ssb, £150. Trio R600 rx, £200. Buyer collects. G8WYT, QTHR. Tel: Malvern 4968.

COMPLETE RUN RADCOM FROM Jan 66-Dec 87. Offers. Collection only, cash. G3VPZ, QTHR. Tel: 0903-45876.

TRIO AT250 automatic atu mint, £220. Drake TR7 500Hz filter, £45. Collins 516F2 round emblem psu, mint, £195. AEA CP1 computer patch with BBC software, £120. Tel: 0247-455162.

FT708 HANDHELD, as new, boxed, £120. 48-ele 70cm J-beam, £15. Low band Westminster, £30. Sony C6 video, slight fault, £60. 20MB Winchester, £35. 20 character drum printer, £30. G3ZNY. Tel: 0908-562780.

TET 23M MINI-BEAM, good condx, £85. Tel: Torquay 844471.

AMT1, £120 ono. Matched pair National 6146B valves, £20, pair matched RCA 6146W valves, £28. GE 12BY7A valve, £3. WANTED: Tokyo hi-power 110L, 144MHz linear. Mervyn, G0BNT, QTHR. Tel: (Devon) 0752-777777.

ICOM IC720A ALL BAND TCVR, general coverage rcvr, all solid state, 100W output, twin VFO's, PBT PS20 power supply, speaker, SM5 desk mic, original total cost, £1160, mint, £625. WANTED: Drake 'C' line. G4LW, QTHR. Tel: Trowbridge 3166 (anytime).

TONO 9100E, £500. Yaesu FY301 scope, £200. Hammarund H0180, £80. ICS FAX-1, £190. Epson LX86 printer, £150. 9" green monitor, £30. IBM XT clone, £200. G4MIB, 29 Ryde Vale Road, London, SW12 9JQ.

SX400 ONE OF THE BEST scanning rx's. 26-520MHz, no gaps. Exc. condx. £350. G0GSA. Tel: (Rugby) 0788-832887.

YAESU FT23R 2M handheld, LCD display, 10 memories, scan, priority etc., brilliant little set. Battery pack, charger, boxed, vgc, £175. Alinco 2M tcvr, green screen display, 5/25W memories, scan, etc, super for mobile or shack. Boxed as new, £175. Tel: 051-428-6731.

FT101ZD FM MK3, £450. FDK multi 750XX, £250. Datong D70 morse tutor, £35. SEMZ trans match, £50. FF501DX LPF, £20. Dectron 5A psu, £30. PM2000A peak wattmeter, £35. Buyer collects. G4TQE, Tel: 0691-662128 (evenings).

FT290R, USED VERY LITTLE, original packing, case rubber duck, £250 ono. Complete TH3JNR, £200 ovno, plus carriage. Rotator KR400RC, £100 ovno, plus carr. G4KYD, not QTHR. Tel: (Cheshire) 0625-33705. OH! also modern 3-bed det house for sale £56,000.

JAYBEAM MINIMAX TRIBANDER beam, KR400RC with lower mast clamp, 35m UR67, 35m 6-core cable. Moving QTH forces sale, all items only 2 months old, all ex condx, cost over £560, sell £390. Tel: 0474-362578.

TRIO HF STN for sale. TS520S with spare matched PAS, SP520 speaker, DC5 dig. readout, AT200 ant. tuner, all units matching and near mint, prefer no split £500. G4QKW. Tel: (Southport) 0704-47992.

WHY BUY NEW! FT980, keyer, FC757 auto atu band change with 980, MD1 base mike, paddle, general cov. tx kit, manuals boxed, little use. Buyer inspects/collects. £1100 ovno. Carr. at cost. G0DKM, QTHR. Tel: 0934-862708 (after 6 pm please).

HY-GAIN TH3JR plus stollie rotator co-ax balun and cables, £150. C4FZA. Tel: (Milton Keynes) 0908-510570.

ICOM IC271E 25W 144MHz multimode base station, £575. BNOS LPM144-3-100 linear, £125. Welz SP10X swr/pwr meter, £20. Tokyo hy-power HRA2 144MHz masthead pre-amp, £60. Light duty rotator, £25. Tonna 13-ele, £20. Two met SQCY4 phased £30. G1LGH. Tel: 0454-773057.

TP10, TS440S with auto atu and P550. Hardly used, mint condx, £1150 ono. AMT2 Amtor, rtty, cw, ASC11 with all software for Commodore C64 and TS440S, £150. G4HBD, QTHR. Tel: 0202-767583.

R2000 GEN COV RCVR, with VHF module, all cables, DC-DC and AC, 6 months' old, unwanted gift, still under guarantee by Lowe Electronics. Reasonable offers please or WHY? G3SGH, QTHR. Working order. Collect or carriage extra.

FDK750X 2M MULTIMODE, £300. FT690R Mk11 with 10W linear, little used, £425. 5A power supply, £10. Azden A5-6F speaker, £10. J-beam 05/2M antenna, £25. J-beam 4 ele 6m beam, £35. Antenna rotator, £60. Also amateur radio magazines, books, etc. Will separate or whole lot for £850. G1TWS, QTHR, (South East Essex). Tel: 0268-779484 (after 6 pm).

MICROWAVE MODULES, MMT2/70 transverter (rptr shift), £105. Tandy 100 lap held computer (Centronics/RS232), bargain £135. BMC colour monitor, £145. Canon AE1, auto reflex camera, £99. All mint condx. 70cm whip, £14. Sinclair QL cassettes £1 each. Tel: (Oxford) 0865-863333.

TRIO TS430S, FM board, AM filter, £700. Trio TS811E, £800. AOR2001, £250. Phase track F1 high performance HF rx. Tonna 144/9, 432/19, plus harnesses. B & O 3000 hifi rx. Peter, G3SMT, QTHR. Tel: 061-439-6746 (after 6 pm).

RACAL SA535 COUNTER timer, powercard 12-15v 1A, ITT Metrix clip-on ammeter voltmeter 150-600V, 10-300A. Weir Minireg 402-1 bench psu 0-30v 1.0A. Selectest multimeter, AV08, Weller soldering iron with psu. G8WTB, QTHR. Tel: 0279-34471.

TRIO TS780 2M/70CM multimode base tcvr. Mint condx in orig.pkg, £725. SSB masthead preamps, 2m and 70cm, £35 each. 2 x 21-elle Tonna yagis with pwr splitter, £30. Buyer inspects and collects. Tel: 0202-578698.

NEC PC8201 LAP portable computer. CMOS all battery operation. RS232 Centronic printer, cassette ports 8x40 LCD screen. 6kk. £125, offers considered. Mike Valentine, 240 Great North Road, Woodlands, Doncaster. Not QTHR. Tel: 0302-722450 (during day and Sat. am).

EDDYSTONE COMMUNICATIONS receiver, Model 730/4, c/w Joymatch atu. Frequency range 28-500MHz. Manufacturers operating instructions and circuit diagram. Pristine condx. G0HRH, Macclesfield. Tel: 0625-72062.

ICOM PSU30, £175. Eddystone 840C, £65. EA12, £150. Realistic 50 mm scanner, £125. Yaesu separates, FRDX400, £225. Trio 9R590S, £50. Microphones Shure 526T, £40. Electrovoice 727, £20. Lars atu, £30. Vomag speech processor, £45. Tel: 01-534 3460 (evenings), 01-553-7308 (days).

SUPERB QTH. Very modern Wimpey super-warm, immac. 3-bed semi. Located between Colchester and Chelmsford, Essex. Prime village position. Large garden backing fields. Permission for 60' tower. Good amenities. Easy access M25. Liverpool St. one hr. £62,000. G4LPC. Tel: 0376-84478.

70CM TOKYO HY-POWER linear HL30-U. 3W input for 30W out. Switched independent Gaasfet preamp, LED relative power bargraph display, £75. 70cm ATV station, MM tx, cvtr, video demodulator, mono camera, monitor, £200 or exch ATV for FT690R. G4RNI. Tel: 091-4690316.

YAESU FT1012, FC902, FV1012 and spare valves, £675 ono. VHF rotator and controller, £25 ono, slightly used. G1KSO. Tel: 02302-3897.

HQ1 MINIBEAM, £75 ono. G4TLK, QTHR. Tel: (Norwich) 0603-410229.

EDDYSTONE 958/5 £150. SP430 spkr, £18. FTV107R with 6m + 2m, £260. ICOM IC24C, £95. Sony 2001D, £230. AN1 ant, £30. Weller solder station, £110. Exchanges WHY? WANTED: FT208, 6m module FT726. Allan, G3PYW. Tel: (Maldon-Essex) 0621-52041.

MMT144/28R serviced Dec. 87, £150. J-beam 10XY/2m as new, £30. Datong automatic RF speech processor, £30. Drae vhf wavemeter, new, £20. G0BGY, QTHR. Tel: 01-949-5549.

TRIO TS180S C/W cw filters, DFC and WARC bands fitted. Ex condx and even in orig pkg. Inspection welcomed, £450 (inc erg.) G4PPQ, QTHR. Tel: (Bedford) 0767-40772.

SHACK CLEAROUT: Drae 24A psu, £120. Skyking SU4000 rotator, £55. Hirschmann HIT-R0250 rotator, £20. 6-elle quad (2m) £15. Lowe FX1 frequency absorption meter, £20. All plus post. G4PPQ, QTHR. Tel: (Bedford) 0767-40772.

TRIO TR780 in orig box. Well used and works well, £135 + post. Mobile (gutter) mount and 7/8ths whip £35. G4PPQ, QTHR. Tel: (Bedford) 0767-40772.

ICOM IC4E 70cm handheld with accs and h/book,

ICOM IC4E 70cm handheld with accs and h/book, £180 ono, or PX for Trio TS8400 70cm mobile. Must be in good condx. Graham, G4NTB, QTHR. Tel: (Weybridge) 0932-851918 (weekends only).

FT101 HF 80-10 ABCD 230/12v, mint condx, manual, £280. FT480R 2m 10w multimode, vgc, £280. G1LCI, QTHR. Tel: (Bourne End, Bucks) 26493.

FT7 MOBILE HF TRCVR, 80-10 AB 15w manual, boxed, exc wkg order, £250 ono. G1LCI, QTHR. Tel: (Bourne End, Bucks) 26493.

ICOM IC251E, 2M MULTIMODE, with mutek front end, inc IC-SMS desk mic. A superb rig, £550. Icom IC2E helical case, nicad pack, BP4 pack, mobile charging lead, ext mic, £125. Crge ext. GUBTCP, QTHR. Tel: (Guernsey) 0481-47918.

SILENT KEY SALE. BR590083. Wayne Kerr universal bridge CT492, £40. Rascal RA1218, £150. Electronic multimeter CT471, £40. Standard Telephone attenuator 74615A 1-90dB, £35. Rascal RA117E, £100. Advance fm/am sig/gen type 63A, 7.5-230MHz, £60. WD oscillator test set, CT212 8.5KHz-32MHz, £30. Avomitor, £5. Redifon radio switch RSU14, £10. Thermal noise generator, CT82 15KHz-160MHz, £25. Valve voltmeter No.3 CT208, £25. Micronta transistor tester, £10. Micronta digital probe, £7. Commodore mini computer, SR1800, £15. Radio amateur handbook 1987, £8. Mrs Stanley. Lists. Tel: Cooden 2829.

COLOUR VIDEO CAMERA Konica CV303, very compact and lightweight, low consumption, exc. picture, as new condx and boxed, £185. WANTED: Yaesu FT680. Tel: 09277-63773 (evenings).

TRANSVERTER, MMT144/28. Used only six months. 10w out, any mode, £70. J-beam 6-elle quad, twelve months of use, £15. Buyer collects, or postage arranged. G4TLZ, QTHR. Tel: (Castleford) 0977-514048.

CIGARETTE CARDS: "HOW to make valve amplifier" BDV 1924. "How to make your own wireless set" BDV 1923 "How to build a two valve radio" Godfrey Phillips, 1929. "Wireless explained" Salmon Clockstein, 1923. "Broadcasting" Ogdens, 1935. Enquiries tel: 0604-718707.

2M MULTIMODE TCVR, FDK750E, gwo, £225. Admiralty Handbook of Wireless Telegraphy, 1938 Vol.1, £5. 25w 10m linear, 4w in, £10. PEX 1100 FAX machine with paper and instructions, £35. G0EFZ. Tel: (West Midlands) 05645-5802.

NEMS CLARKE 1301 special purpose VHF-UHF receiver; covers 5MHz-260MHz am/fm. Continuous vfo tuning. In good condx, £80 ono. Aquarius computer, micro soft basic, printer and cassette ports, £15. G0CAD, QTHR. Tel: Dave, (Oxford) 0865-341428.

IC/R7000 RX, brand new, boxed, unopened, £795 ovno. Tel: (Guildford) 0483-62586.

ICOM IC202E COMPLETE, boxed, unmodified, £120. WANTED: microwave modules, MMT1296/144, 23cm trvtr. G4IYA, QTHR. Tel: (Sittingbourne) 0795-21207 (evenings/weekends).

TRIO 9130 2M MULTIMODE. As new, boxed, £350. J-beam 2m colinear, £40. 6-elle quad beam 2m, £25. G1FXS, not QTHR. Tel: (Malvern) 06845-68317.

FACTORY BUILT Heathkit monitor scope, HO-10 with brand new transformer from agents which needs to be fitted. Otherwise ex condx, manual, £40. Inspect and collect, no offers. G3RRD, QTHR. Tel: (Amberley) 045-387-2365.

ICOM ICR7000 RECEIVER, as new with Icom discone, £700. Commodore C64 computer with C2N recorder, £50. 1541 disk drive, £70. 1525 printer, £70. Crofton 9" b/w monitor; £45. All ono. Tel: John, (Colchester) 0206-860238 (7-9 pm only please).

CAPCO SP300D, £180. Drake WH7 2kW meter, £60. Both one month old. SB610 monitor scope, £40. Trio MC50 desk mic c/w ptpone, £20. Comdel speech processor £15. Datong RFA, £15. J-beam 14 PBM, £10. WANTED: Drake MMT200. G4JBH, QTHR. Tel: 0935-824225.

ICOM IC2BE 2M TRANSCEIVER (picture page 893 Dec. RADCOM). As new, £265. AR2002 scanning rx mint condx, £295. Philips car radio/cassette. Quartz 553, LCD display, 4-spkr system (speakers not inc.) £65. Carr extra, or collect. G3IWE, QTHR. Tel: 0925-601485

MODEL AIRCRAFT. Futaba 5-chan radio control. Servo reverse tx/rx equipment, c/w 6 servos, nicads and access. 4 gliders ready to fly, £235. p/x for radio, photography equip. cash, either way. G6XRL, QTHR. Tel: (Poynton) 0625-876192.

DRAKE TR7A TCVR, PS7 HD psu and filters. NB both with fans, all manuals, hand mic, in vgc, £750 to include Securicor delivery. WANTED: FC102 atu, must be late model, mint condx with manuals, boxed, give £150. G4WRLP, QTHR. Tel: 0286-3567.

BIRD 43 IN good condx and c/w 50w and 1000w slugs for 100-250MHz, £175. Write to G6JNS, QTHR, or tel: 0905-620041.

PSU 40A 0-20V twin meter, 240v AC input, large heavy unit, GC AC/DC output, £60. Buyer to collect. Peter, G4VUN. Tel: (Cleveland) 0642-456327 (daytime).

TRIO TS700 2M TCVR multimode base station with 12v facility. Good condx, £325. G6LDK, QTHR. Tel: Wakefield 270770.

TRIO 120V HF Trans. 20w PEP CW filter, mic, etc. vgc, £275 ono. Tel: (Weymouth) 0305-813202.

TWO KT88. Used 1 hr, £15 each or offers. 1616 heavy duty vacuum rectifiers, carbon anodes, £1 each. Two 10MFD 750v oilfilled condensers, £1 each. Woden 12Hz choke 500MA. All postage extra. G8ML, QTHR. Tel: 0242-51609A.

HF STATION, FT102 c/w CW filter, fm board, mic, £470. SEM transmatch atu, £50. BK100 bug key, £10. 10m fm rig, £25. Buyer collects. Paul, G0ACP, not QTHR. Tel: (Wymondham, Norfolk) 0953-604380.

SX200A SCANNER. Good condx. Recently serviced by Gaxex, £150. G40LH, QTHR. Tel: Ian, 06845-69375.

VC10 INTEGRAL VHF converter for R2000. Mint condx. Tel: (Chester) 0244-533051.

YAESU FT480R MULTIMODE, mint condx, very little use as base station only, c/w mobile mount and orig. pkg, £325. G4ENG, QTHR. Tel: Dave (West Midlands) 0922-417677.

YAESU FT726R vhf/uhf multimode, £650, inc 2m module fitted, 70cm (needs attn) Duplex satellite unit. Yaesu SP102 speaker/af filter unit (matches 726), £30. Adonis AM503 base station mic (compressor up and down scanning), £40. Microwave module 2m linear 50w preamp, £55. Tono 70cm linear, 60w preamp, £95. Antenna switcher units (2) 2m/70cm 'N' type, £15. Alinco EHR400 heavy duty rotator and control unit, £60. SMC 2m/70cm dual band antenna, £15. SMC duplexer for above, 50w, £15. J-beam, 2m 10-elle crossed yagi, £40. 70cm 12-elle crossed yagi £45. (above inc. harness and coaxial cable). Power supply (heavy duty) 7 amp, instant, £25. Contact G0C01, QTHR. Tel: (Essex) Halstead 473168. Genuine/urgent reason for sale. No reasonable offer refused. £1000 the lot.

MML432/100. 100w 70cms amp, £125. 3CX800A 144MHz metalwork unit, QRV, £100. 3CX800A 144MHz amp, inc psu, small and neat, £750. Lots panel meters, various values £1 each. GJ4ICD. Tel: 0534-77067.

FDK MULTI 750 2m multimode, £200. Eddystone EC10 Mk2 with mains power pack, £60. Joystick, VFA and Joymatch, £10. 2m 5/8 mobile whip, £10. GADPY. Tel: (Near Retford) 077-784-560.

AMT2 UNIT, rtty amtcr cw. c/w software for pc compatible, £165. Taxan Kaga mono computer monitor, (amber screen), £110. Yaesu FP75HD psu, £110. G0FXU. Tel: Murray, 01-581-1477 ext 257 (between 0930-1645 weekdays).

HF MODULE FOR Yaesu 726R. Surplus to requirements, £200 ono. Also want HF 8/9 band rig. WHY? G6MSH, QTHR. Tel: (Sussex) 0323-840209.

SILENT KEY SALE. Trio R5000 rx, 7 months' old with am filter, £650. Yaesu FRT7700 atu, £30. G3BBR, QTHR. Tel: 0737-76179A.

DRAE morse tutor, £35. 6-elle 2m beam, £10. G1HPG, QTHR. Tel: 0226-713854

TRIO 430S c/w psu, £625 ono. Wrasse sstv converter SC1. As new, any sensible offer or phone 0534-24018 (day) or 0534-24119 (evenings/weekends) and haggle.

SPECTRUM ANALYSER plugin Tronix 500 series, with h/b, £25. Sampling oscilloscope 1GHz Tronix modular, leads, h/b (timebase requires attn), £35. RF generator, 110KHz-32MHz, £5. Audio generator, low distortion, 30Hz-30KHz, £5. BC221-AK exc condx, calibration mains, £10. Modems, racial, V21 mains, £10. AVO MK47A, £10. XYT plotter vacuum bed A3, £10. 75 Baud modems, ex GPO £5. Disk drive new 8", + data, £10. Tetrodes, YL1550, conduction cooled, sealed manufacturer's pkg, maximum dissipation 300w, maximum 500MHz, £7.50. G8JEM. Tel: Bognor 861916.

JRC TCVR, pow/sup, £590. Daiwa 2.5kW auto/atru, £85. Kenwood SP230 spkr+filters, £40. AMT2 all mode term/unit, £80. MBA morse, Baudot, ASC11, reader, £40. Transmatch 10-160 atu, £40. FT290 mutek F/E nicads, charger, £180. Heathkit RLC/bridge, £30. BBC 'B', Cumana twin 40/80 drive, £80 second processor, Epsom RX80FT printer, microvitec colour monitor, software, £550. Wetz DC p/s 12v 6A, £25. ETM8C electronic keyer, £45. M/M 30w 144MHz amp/preamp, £35. G4SMO, QTHR. Tel: 0482-42715.

BELCOM LS202E 2M multimode, h/h, boxed, soft case, nicads, chargers, etc., £225. MML144/100S linear, £100. MML144/100LS linear, £100. John, GIUDF. Tel: 0484-722168 (9 am/4 pm weekdays).

TRIO 3600E 70cm handheld, with fast basestand/charger, spare battery pack, speaker-mike, and soft case, £175. GHOEFJ, QTHR. Tel: 041-334-0802.

TRIO R1000 GENERAL COVERAGE communications rcvr with instruction manual, vgc, £220. Martin. Tel: 0423-872997.

CAPCO SPC300 ATU, vgc, £100. Harrier CB converted ten metres fm, £20. G4VYC, QTHR. Tel: 01-657-4104 (evenings only).

ICOM IC24G 2M FM Transceiver. 12.5KHz channels, repeater shift, listen on input, 10w output, £115 ono. Remote frequency control head for above, £15 ono, or both for £120. G8XPZ, QTHR. Tel: Nottingham 389911 (after 8 pm).

TS130S fitted 1.8KHz and 270Hz filters. Mic has Heil sound HC3 insert. VFO-240 suitable for TS130S, TS530S or TS830S. Both mint condx and rig never used mobile, £450 or will separate. G4LBE, QTHR. Tel: 0595-4270. Price includes insured postage.

HEATHKIT ET3400 micro-processor trainer with course, cassettes and components, £200. Consider part exchange 2m base station or mobile, or hf multiband vertical antenna. Tel: 0342-822843 (evenings).

YAESU FT1 ALL options fitted, exc condx, £1100. PK232-6 with CBM64 software + extras, £300. ATV transceiver, with built in monitor, £75 ono. Commodore 64 plus printer and drive, inc many discs, £275. G4MPP, QTHR. Tel: (Rotherham) 0709-554665.

MC60 MINT, unused, surplus to requirement, £50 ono. G4VMV, QTHR. Tel: 0993-841281.

YAESU FT726 2m/70cm sat-board, speaker unit SP102, £850. Yaesu 209 hand/held, £200. G1EMW, QTHR. Both boxed, good condx.

TOSHIBA HX10 computer as new, manuals. Exchange for frequency counter or Racal equipment RA63 ssb adaptor, atu, cabinets, linear, amp or sell £75. G6XNC, QTHR. Tel: 01-462-4461.

LOOK! LOOK! LOOK! will exchange twin manual Baldwin organ with percussion and bass pedals, immac walnut finish, for FRG7, RA17L in good working order. Recent disability forces disposal. Evans, Rochdale area. Tel: 0706-85-2267 (day or night).

KW1000 LINEAR AMPLIFIER, hardly used, £330. Base and mobile low band, fm transceivers, new condx £275 pair. Three Westminster W30 low band, am transceivers, all working, £60. Tel: 0624-22342 (evenings).

AKAI VT110 and VT120 .25" VTRS and VC110 camera. Not working, but useful for spares or experiment. £50. G6ALK, QTHR.

WELZ SP400 SWR and power meter, 130-500MHz, 150w, vgc, £60. Chris, GIUZZ, QTHR. Tel: 047-482-3797.

YAESU FL2100Z hf linear. Includes new bands, extra cooling fan fitted, £525. G3OLK, QTHR. Tel: 0734-776351.

PSU's PRO BUILT. Sense and current limit facilities. IC regulated. 18a+ at 13.8v o/p. As new, £35. G6GYM, QTHR.

MICROWAVE MODULES, MML144/100-S 100w, 144MHz linear amplifier, with receive preamp, £100. G3ROD, QTHR. Tel: 01-455-8831.

KENWOOD TR7625, (25w version of TR7600) mobile 2m fm rig. 800 channel plus memory channel. Ex condx and perfect working order. With mobile mount mic, leads and handbook, £135 plus carr. Paul, G4AZC. Tel: 0843-61448.

WIDE SPACED HF variable capacitors, ideal for 2kw linear, £15 each. All spares including heads for Phillips V2000 series VTR's. New boxed valves, 5763, £2.50; EF91, £1; CV287 (B40RX) £2. All carr extra. Paul, G4AZC. Tel: 0843-61448.

ATTENTION B40/62B owners. You don't need any spares now but you may later. This is the last time of advertising. Write my number on the backspace now for future reference! Everything available except valves and plugs. Paul, G4AZC. Tel: 0843-61448.

TRIO TS830S, fitted YK88CN cw filter, VFO120, MC50 microphone, £700 inc. technical handbook. Daiwa AF606K active filter, £40. G3HRY, QTHR. Tel: 0908-616519 (Newport Pagnell).

2M MOBILE TRIO TR7730 c/w mobile mount, and 2

mics, £200 ono. 70cm mobile co-linear £5. AVO sig/gen 2-225MHz, £5. Unwin, GOFMT, 11 Carlton Rise, Melbourne, Royston, Herts. Tel: 0763-61215.

IC251E, IC251E, with mutek front end 2m base multimode in first class condx, £450. GOCPB, QTHR. Tel: 04246-4723 (evenings/weekends).

LINEAR MML144/100LS 1/3w in 100w out, with preamp. As new, £105. Oscilloscope, Marconi TF2201 DC-30MHz dual trace. 50mV-50V/cm, 50ns-500ms/cm, slide-back voltage and time measuring scales. Good working order, with manuals, £90. Mark, G6FKN, QTHR. Tel: 01-876-4379 (evenings).

FT203R PORTABLE 3.5/0.4w nicads, charger, vox, headset. Little used, boxed with handbook and case, £165. G6EMM, QTHR. Tel: (Dorset) 0929-425305.

YAESU FT2700RH dual bander, 2m/70cm fm, 25w, boxed with diplexer, £350 ono. G4LOD, noth QTHR. Tel: 0932-854393.

FT73R UHF HANDHELD, pristine condx, £210 or would swap for IC-atu 100 with cash adjustment. VHF converter FRV7700 type F, ex condx, £35. Tel: (Gainsborough) 0427-5266.

YAESU FT225RD mutek f/end, £500. MML144/100S, £85. Eddystone EC10 c/w mains and battery units, £55. Dragon 64 with Cumana disc drive, £200. 8-ale xy-2m beam, £20. H/brew 12-ale ZL Spec, £15. G3CBW, QTHR. Tel: (Tees-side) 0642-788280.

TRIO TS130S + AT130. CW filter, vgc, £500. GMOBUE, QTHR. Tel: 041-776-6084.

KW1000 HF LINEAR amplifier, good condx, boxed with manual, £330. Also Datong morse tutor, vgc £35. G0BWF, QTHR. Tel: 0940-28438.

FT290R CASE, nicads, charger, MMB11, mint condx, boxed, £275. G8MXE. Tel: 0993-813004 (evenings and weekends).

RTTY STATION, Hal Communications model ST5000 demodulator, DS2000KSR keyboard transmission reception terminal, with 12" monitor display unit. Can be seen wkg, £200 ono. G3BXI, QTHR. Tel: (Trowbridge, Wilts) 0373-830804.

P30 TOWER, 3-ale dual bander, Kenpro 600RC rotator, £300 the lot. 5-ale 4m beam, £20. Discone £15. 2-ale 6m beam, £20. 2.5Kv transformer, £20. Tel: 021-353-3896.

MUTEK TVVF144A 2m transverter, £169. Yaesu FV707DM scanning vfo, £80. Swinburne Electronics DR600 airband receiver, LCD readout, 5 crystal positions, and vfo. All channels are scanned, nicads, charger, £120. Tel: Rhys, 0222-394759 or 074571-2550.

YAESU FT757, mint, £590. Matching FP757 hd psu, £160. Yaesu FT1012D Mk3 WAB (used as standby rig only), immaculate, £500. FL2277Z (Yaesu 2100Z) exc condx, £590. G4VIO, QTHR. Tel: 0388-763501.

NEW TAPE, slide, synchroniser. Made by Reditronics Jersey, very professional. Mains operated. Lots of features, only £9.50 + post. G. Brown, 1 Belmont Gdns, St Helier, Jersey, CI.

ICOM 21 15-can 3w, RO-R6, S8-S10, S19-S23, xtals for S12, REV RO, nicads, mic, shoulder strap, £70 ono. GILHW, QTHR. Tel: 0202-694322 (evenings).

YAESU FT790R, 70cm multimode portable tcvr. Brand new condx and c/w all orig pkg, accs (inc nicads, Yaesu chgr) and manual. Very little use, £345. Buyer inspects and collects. G8OSA, not QTHR. Tel: 0268-755341 (Benfleet, Essex).

FDK700 EX, 25w, fm tx, £150. Yaesu FTV901R tsvtr with 2m module, £160. Boxed. Carrying case for standard 828 with 12v nicad battery pack and charger, £25. G3VYP. Tel: (Near Ludlow), 056-885-296.

OSCILLOSCOPE 15MHz dual trace, £95. Pye uhf messie £39. Ditto Duplex version hb fm messie, £35. LB fm, £25. Marconi 1064 sig/gen vhf/uhf, £75. Advance audio gen £20. Tektronix 1A4, £45. '01 £20. Some manuals. G4YVJ. Tel: (Lincs) 0507-85203.

FL2100Z HF LINEAR amplifier, brand new, never used, £570. Tono 9000E communication terminal tx/rx cw, rtty, word processor, light pen, £300. Heathkit 32' aerial tower, self supporting, dismantled, £80. G13ONZ, QTHR.

DATONG MULTIMODE FL3 filter, £90. G4NGW, QTHR. Tel: (Southend) 0772-710000.

TRIO TS830S, £725. AT230, £125. Together £810 ovno good condx, hardly used. Would consider p/ex Belcom or Sommerkamp 10m multimode, or CPC6128 computer, or vhf packet tnc. G4VYQ, QTHR. Tel: 0546-3910 (evenings).

YAESU FRG7000 hf receiver. Good condx, £185. Can deliver south east area. G6HRC. Tel: (Worthing)

0903-830434.

ADMIRALTY HANDBOOK of w/t 1939 vols 1/2. ARRL handbook 1983. "Exmon" rom for BBC computer. 18 tapes with numerous BBC computer progs. Make a sensible offer plus p&p - remember books are heavy. Don't be mean. G3KUF, QTHR. Tel: 027-581-3648.

TOKYO HY-POWER 430MHz mast head preamp, HRA7, £65. FT757GX mobile head set mic, £15. Yaesu FL2010 amplifier, 10w for FT290, etc. £50. Alpha comm printer, £15. All plus p&p. GOCAM, QTHR. Tel: 0761-415746.

TS120V, 10w, hf, £265. FT730R, 10w fm, never used mobile, new Jan '87, £175. Solatron scope, CD1400 dual beam, 15MHz, handbook, £75. Advance psu, 5v 40a, £15. Variac 0-270v out, 10a, £35. G4ZZG, not QTHR. Tel: (Mansfield) 0623-657553.

COMMODORE 3032 computer with green screen, basic 3 & 4 rom tool kit, rom word processor, rom printer, disk drive, 2 cassette decks, 100 plus items of software. Lots of manuals, condx like new, £100. Buyer collects. Tel: Rhyl 2859.

WALKER "PALACE" 6-berth luxury frame tent. Three dble bedrooms, wardrobe, kitchen area. Cotton canvas in ex condx. Some camping accessories. Ideal for camping holidays or portable expeditions £350 ono. Costello, G3YPP, 3 Northern Avenue, Henlow, Beds, SG16 6ET. Tel: 0462-815533.

FDK RX40 VHF RX, 140-170MHz, £70 ono. vgc c/w chgr and helical. Parabolic dish moulds for 1.8 and 1.3m petal type, offers? To make space. WANTED radio related software for Amiga. G6YRB. Tel: Skelmersdale 33499 (evenings/weekends).

TRIO TS700G 2m multimode base station, with VOX box, manual, £x condx £280. QUME 9/45 daisywheel printer with tractor feed. Serial interface. With full service manuals, £200. G8IYZ. Tel: (Nottingham) 0602-228103.

FT757GX11, mint, £750. FP757HD psu, £125. FC757AT auto atu, vgc, £210. Matching homebrew transverter, 50MHz and 144MHz, 20w output, professional appearance, £100. Realistic PR031 handheld fm scanner, mint, £120. ERA rtty/cw reader, £75. WANTED: FT221R. G4ILO. Tel: (Colchester) 0206-120878.

COMPUTER AND MONITOR, CBM model 3032 plus CBM 3040 twin disk drive, CMB 3022 tracker printer. All in ex condx, only £250 ono. Two transverters, 144-70 and 144-28MHz. Any offers considered. Tel: 0704-880027 (after 6 pm).

TS930S WITH AUTO ATU, £950 ono. IC271E with mutek board, £500 ono. ICPS15, 20a power supply £85. 1kw pk dummy load £45. TNC220 £80. P60 versatower £350 ono. Twin paddle Elbug, £10. Amtor rom £10. IC251E h/b £7. G3KNJ. Tel: 0923-244069.

MOSLEY MUSTANG 3-ale beam, 10-15-20m, 32' steel mast, 8-guy cables supported elements, reversible motor maglrips, direction indicator, polystyrene insulated slip rings, 80' UR67 and control cable. Offers. Buyer collects. G3HRO, QTHR. Tel: 01-460-7660.

RACK MOUNTING Hammarlund SP600. Good wkg order. Panel shabby, £70. Also Redifusion R52, offers. Both property of deceased swl. Buyer collects. Tel: Alan, (Manchester) 061-445-7274.

KENWOOD TS530S CW filter. Pristine condx, £560. Yaesu FL2100 80-10 linear, £150. Following nine months' old: Capco atu 300, £150. Altron 3-ale space saver, £125. AR40 rotator, £70. DL600, 600w dummy load, £45. Dewsbury memory keyer, h/mount key, £90. Rick, G3VEC, QTHR. Prefer ring tel: 01-405-6233 (0900-1700).

FDK750E 2M MULTIMODE plus FDK PS750 matching power supply. Both boxed and in ex condx, £300 ono. G4LHV, QTHR. Tel: 0978-751328.

YAESU FT790R in orig pkg c/w nicads, rubber duck, mic, and manual. Very good condx £270. Bob, G8RSL, QTHR. Tel: Iver 651716.

TOWER, 30' IN two bolt together sections (base section 20', top section 10'). Free standing, VERY heavy duty, with built-in ladder. Fully galvanised £50. G6KND, QTHR. Tel: 0353-778828 (business), 0487-842050 (home).

SILENT KEY: TS780, 2m/70cm all mode. Datong PC1 gcc. Datong dipole AD370. Datong RFA preamp. Tokyo HRA 2m masthead preamp. MMG 144v preamp. Drae wavemeter. Matsui MR4099 receiver. MMC 144/28 converter. Maldol HS770 144/435 duplexer. Daiwa CS401. Joymatch atu. Offers. Tel: 01-423-3884.

COMPLETE HF equipment, includes FT102, FC102, FV102, SP102, £850 ono. No splits. Also MM morse talker, £80 ono. Benos LPM144 25w, 160w, £210 ono. G4YYD, QTHR. Tel: 061-764-7623.

FT480R 2M MULTIMODE, psu, £300. PF2H, PF2B, COMPMR HBFM, same channel, £120. Sinclair Dumi £20. Eddystone EC10, £50. CCTV cameras, £40 and £5. 3 midband starphones, £20. Pye bantam HBFM £35. All with data. Equipment components cheap. Tel: Bradford 617699.

CONSOLE 6'x19" £20. Racal RA17 receiver and rf tuner, £80. 100w transmitter, £25. Prestel adaptor, £75. Unused for five years. Collect or pay transport. The lot for £150. GM4HXW, QTHR. Tel: 0461-38271.

ICOM IC4E, 70cm handheld. Immac condx, boxed, £175. Bearcat 175XL scanner, also immac condx and boxed, £150. Prefer buyer inspects/collects, or post at cost. Tel: Dersingham (Norfolk) 43171 (6-9pm or weekend).

SALE DUE TO QTH MOVE: FT480R 8-ele yagi rotator, cables etc. £375. FT101 Mk2, £250. Daiwa CNW419, 500W PEP atu, £125. Daiwa PS80M psu, £40. 1kw dummy load, £30. FRG7, £125. 2 Daiwa CS201 coax switches, £10 each. 10-15-20 vertical, £15. All vgc. G4SLG, QTHR. Tel: 0522-751920.

TRIO TS830S inc mike, £700. Icom 251E (no mutek) £300. Both vgc and well looked after. Microwave modules, 28MHz IF transverters, 70MHz, £70. 144MHz £60. MMB144, 144MHz gasfet preamp, £25. All vgc. BNOS L-10-180 solid state amp £185. WPO meteor scatter more memory, £35. RF section 2x4CX250 c/w blower, £55. HV psu's 2.3kv/500ma with screen bias heaters metered, £50. 1.3kv/600ma with screen bias heaters metered, £30. 0-560v variable psu (400ma) £20. Valves, 4-125A (4 off) £10 each. Brand new, 4-250A, £15 each. ANTS J-beam LW16, new £25. Tonna 17-ele, £15 (bit tatty but works fine). All above in good condx. Collection/delivery by arrangement. Richard, G4HGI, QTHR. Tel: 0625-34823 (day), 0744-895139 (evenings - not after 9pm please).

YAESU FT708, 70cms handheld c/w case, helical, charger, speaker/mic, £130 ono. GODOP, QTHR. Tel: 0272-393157.

MARCONI TV5 marine tx/rx. Mains psu. Circa 1950. Drawings, handset, cw/am (top band cw end 80m) or collector/museum. Heath set, £30. Heath Keyer £8. B & H 8mm camera, £10. TK14 R to R recorder, £20. Sig/gen, £5. G4EUW. Tel: (Brightlingsea), 020630-3071.

FRG7700 MEMORY UNIT. Purchased new May 1987, limited use. Cash sale. Buyer collects, £375. SWSR50 twin swr meter, new unused, £20. WANTED: Top band converter 28/160 or JR310, late model with top band, ex condx, manual, circuits. G3FK, QTHR. Tel: (Ferdon) 0202-873175.

NOT GOING QRT going broke. Icom IC451E, 70cm base station low o/p/put fault, apparently not o/p/put module, £310. Icom IC260E multimode mobile rig, pwo, £285. Fourtop 70cm ATV tx, £80. Fourtop 70cm hf converter, £17. Trio TS130V hf tx used 8 hrs on transmit since new vgc, £325. Sony HVC3000 video camera, wired vhs c/w carry case, and psu £265. Akai VCX2E video camera, many features, with psu, £299. 25' ext cable for cameras, £10. 1kW Halogen lamp, £15. Rigid tripod, £10. Digital frequency counter never used, £80. Colour bar generator 50-860MHz, £45. Advance sig/gen B4A, £35. J-beam antennas, used, good condx 88-ele, £24, 48-ele £12. 6-ele quad, 2m, £10. Alinco medium duty rotator c/w lower support bracket, £45. John, G6BJQ. Tel: Hindhead 4046 or Borden 2774.

AOR2002 25-1300MHz, am/fm 20 memories, new, unwanted gift. Cost £486, offers around £425. Yaesu multimode scanner, 60-905MHz, £350. H/h air band scanner T-wheels, £85 ono. Two times 19-ele tennas, one ok, one good for spares. Tel: Robin, 01-570-4422 (9.30-5pm).

2M to 432 TRANSVERTER. Will run off 290r .5W input 10 output. Multimode RPT shift with 10W attenuator 48-ele multibeam. Just back from makers. Get on 70cm 10W, all mode for £100. Tel: Gerry, 01-890-9733 (evenings/weekends).

ICOM IC2E c/w charger, IC-DC1 voltage regulator, battery pack, rubber duck and soft case, £130 ono. Tel: 026477-3864 (evenings), or 0256-473191 Ext.355 (daytime). Ask for Mick.

TRIO 9130. Multimode, showroom condx all access. as bought, box, handbook etc. Has been used more for listening than transmitting. High power rarely used, must be bargain of the year, £350. GOMTU, QTHR. Tel: Ray, Mansfield 20001.

ICOM ICR70+FM, £450 ono. GW Morse key, £20. D70 Morse tutor, £15. ICR70 service manual, £8. Buyers collect. G8HNN, QTHR. Tel: (Worcs.) 0905-58306.

BNOS 6A POWER SUPPLY. Hardly used, £40 or exchange Datong Morse tutor. G1HXX, QTHR. Tel: Portsmouth 693968.

WIRELESS WORLD 1945-1980. Radio Ref 1966-77 (1974

missing). The Gramophone 1944-75. All mint condx. Prefer sell complete collections. No odd copies/years. Prefer buyers collect. Sensible offers? G3FFK, QTHR. Tel: 01-668-5582 to haggle anytime.

YAESU FT221 fitted muTek front end, £275. GOMAX, QTHR. Tel: 089272-2294 (evenings/weekends).

RA17L, £130. BNOS LPH/3/100, £120. IC-02E, £190 with soft case. All with books. G6XO, QTHR. Tel: 0474-783190.

HEATHKIT SB220 2kW linear, £690. Trio vfo £40 for 530/830, £50. STSHC rttu, £75. Datong FL2 audio filter, £75. IRC's 35 for £10. WANTED: TL922 or L7. OMNI or IC740. Psu's not required. Tel: (Oswestry) 0691-831111 (evenings).

DATONG FL3 audio filter, containing automatic whistle filter, operates in all modes, £90, post paid. G3RDC, QTHR. Tel: 01-455-8831.

FT101ZD YAESU 12V converter and lead. Just plugs in rear. First lucky applicant with £25 secures. SAE with cheques for unlucky ones. G4AVT, QTHR. Tel: (near Wigan) 0257-62412.

CAP-CD ELECTRONICS SPC300 atu, 1kW, 3 months' old, boxed like new, £190 ono. GARGC, QTHR. Tel: (Wakefield) 0977-519615 (day), 0924-362144 (evenings).

SPECTRUM ANALYSER - Singer ssb 50-10Hz-40MHz, vgc with manuals, £495. HP sig/gens: Rohde & Schwarz BN41004 275-2750MHz, 20mW-50W, £595. Sierra Electronic 40-200MHz, 45W max, £275. Microwave counter Syston Donner model 6057, 20Hz-18GHz, vgc, £1250. Professional 10mW helium-neon laser with power supply, ex condx, £495. Marconi FT2300B modulation meter, £325. Sony HVC3000P colour camera, as new, £325. Sony HVR320 remote control pan/tilt head with control box, £110. National fm sweep generator, 75-110MHz, £85. Hewlett Packard microwave swr meter, type 415E, £75. Philips mono TV camera model V100, die-cast case, zoom lens, brand new, £95. TV IF sweep/marker generator, 625/405, £35. Trio stereo test generator and encoder, £135. Marconi 6550A TFT microwave power meter, £125. G3PCN, 3 Eastcote View, Pinner, Middx. HA5 1AT. Tel: 01-866-3300.

TRIO R2000 RECEIVER c/w VC10 vhf unit and atu, £495 ono. Tel: (Rotherham) 0709-541277.

FT101 GOOD CONDX matching spkr, valves, 3 months' old, plus cw filter fitted, £250. Also FT290 2m multi tcvr, with MM 30W linear, all good workers, £250. GOMHGC, Bernard Roberts, Pwllheli. Tel: 0758-612206 (evenings).

WESTERN 40' CRANK UP tower, wall mounted, £300. Hy-gain 10/15m 3 ele beam, £150. Apple 2E with two disc drives, various interfaces, monitor, software and Brother daisywheel printer, £750. G3WUM. Tel: (Reading) 0734-744545.

YAESU FT101ZD hf transceiver, fan, mic, manual, vgc, £400 ono. G10FL. Tel: 0474-69225 (evenings and weekends).

QRT SALE: Icom R70, £400. Trio TR9000, £260. AOR2001 scanner, £230. Datong PCI hf converter, £70. MML144/100S 2m linear, £60. MML432/50 70cm linear and homebrew 3/10W driver, £100. Datong ASP rf processor, £60. M-modules MM2001 rttu/ascii converter, £100. Datong AD370 active antenna, £40. Mutek BBBA500 broadband preamp, £20. 70cm 19-ele crossed tonna (new) £30. Kenpro KR500 elevation rotator (nearly new) £90. Toyo T435 power meters (2-off) £25 each. Buyers to collect or pay carriage. G8PFR, QTHR. Tel: (Bradford) 0274-674396.

MARCONI CR200 vlf rx 15kHz-560kHz. Working order, some spare valves, £25. Very heavy. Buyer must collect. Two Magslip Mk11 transmitters and one Magslip receiver Mk11, £12 the lot, carriage extra. G3FMO, QTHR. Tel: (Essex) 0245-71604.

TS700 TRIO 144MHz multimode transceiver, vgc, £265. G8AAF. Tel: 04946-6558.

DX40, TX, VFO, handbook, £65. CAN52 set, tx, rx, psu, atu, £180. GOFEN, QTHR. Tel: 0908-648723 (evenings).

TR2300 GOOD CONDX, c/w charger, £95. SC160 slow scan converter complete and working, £150 ono. G4GSE, QTHR. Tel: 0322-66063.

IC251E WITH MUTEK PCB, £475. IC1271 23cm multimode with APCsu, £850. FT227RB, £125. SE600 digital 2m multimode base, £250. GKN5 colour camera, £200. 4CX250FG ex equipment £7.50. Sharp M280K wth twindisk interface, printer, offers. Tel: (day) 0703-255631, (night) 0703-766016. Richard.

NATIONAL PANASONIC 32 band rx. 0.1-30MHz am/cw/ssb plus fm broadcast digital readout. 5 months' old, surplus to requ. vgc, £200 ono. WANTED: Daiwa CN630 swr meter. G4IDF, QTHR. Tel: 0905-351568 (evenings/weekends).

HP41C PROGRAMMABLE calculator with stat pack, quadram module, time module, card reader, chemistry, high level maths, geometry solutions, manuals, spare magnetic cards, case, £165 ono. Would cost over £500 from HP. Pocket RS232C terminal keyboard, led display, £45. Acorn Archimedes IBM PC emulator software, also ISO Pascal software £69 each. Brand new and unused. Also 65C102 turbo board for BBC master double sided with 64K ram on board, £49. Analog devices s/h hydrid ultra high speed HTC 0300. Offers. G3JBT. Tel: 0784-58696.

ICOM IC551 50MHz multimode, hardly used, immaculate, £400. Tel: John, 0743-884822.

MICROWAVE MODULES 144/430 MHz TRANSVERTER with repeater shift plus 9-ele yagi and HB9CV. Will consider split. David, Borehamwood, Hertfordshire, tel: 01-207 0709 (after 7pm and weekends).

SUPERB PAIR YAESU separates FR101 21-band rx digital readout, matching FL101 tx, mint condx, and little used, c/w manuals and Yaesu hand mic, £495. G2CJL. Tel: 0934-742326 (day), 0934-743636 (evenings).

70CM HANDHELD, Icom IC4E, boxed, c/w DM1 DC pack, spkr-mic, .5 wave antenna and LC3 soft case. All vgc, £180. G6DBX, QTHR. Tel: 04446-48767.

TRIO 9130 2M MULTIMODE, boxed and in mint condx. never used mobile, £365. G4WOC, QTHR. Tel: Taunton 335091 (evenings).

TRANSVERT YOUR 2M rig into a hf band tcvr with a mutek TVHF230C 10W output. Low power atu 80 + 40M dipoles and 600 ohm feeder, £275 ono. 10A psu, £25. 15MHz counter, £15, Meggar £35. Bill, G4WUS, QTHR. Tel: 0287-42596.

TRIO TV502 2M transverter £90. R1000 £190. Spectrum 2.5W 6m transmit converter, £25. Microwave modules 6m converter £12. G3G1Q, QTHR. Tel: 01-567-6389.

70CM EME. 4-QUAD loops, harness, hardware, £120. Two 2300v 0.75A £50. Amphenol coax relay, £50. HP140 scope time domain reflectometer, £220. TF995A/2 £100. FT202 £70. HP700A plotter, £70. TF1041B £100. Hatfield LE320A1 £50. Tradipor GDO £15. Coax switch, £20. Tu QRO bits. Vero rack cabinets £10. YF90F £14. YF90H600 £14. BP4119 £10. BP4128 £6. 240v 15a isolation £20. Omerty k/b £15. TTL211AS etc. 4m 10-ele £30. Aerial poles 14m FHJ450 £22. UR67 25p 4TY212S LF linear, £80. Ham Radio 1979-85. RADCOM 1969-88. Offers. Much more, ring for list. G3ZYW, not QTHR. Tel: 0703-768834.

BIRD THRULINE model 43 + 50W terminal dummy load c/w 100-250/100W, 400-1000/50W elements cost £440 new, price £280 mint condx. Icom IC02E vgc c/w case, charger, spk-mic, boom headset + 2 spare battery packs, £200. FDK multi 8000 25W 2m mobile 144-148MHz synthesised, scan £130. Standard C78 70cm 1W portable, £130. Sota 2m 100W base station amplifier, £140. Microwave modules MML432/30-L 1-3W 1/p 30W o/p £115. MM433/144 converter, £5. Mosley 15m, 3-ele monobander A315, £47. 80' CUY250 LDF4-50 equivalent inc connectors, £47. Datong rf speech clipper model RFC, £23. Oscar 430E 3x5/8 70cm mobile aerial 6.3dB, £17. Oscar 7/8 2m mobile aerial, £15. b/w monitor, £25. Circuit diagrams with most items. Buyer collects on all items or P&P extra. Brian Smith, Bridgewater, Somerset. G4ETN, not QTHR. Tel: 0278-452743.

'G'WHIP FLEXI-TEN, 80-2m inc warc, £40. SEM 160-10 tranzmach with ezitune, £80. 600MHz freq counter, £75. 3-ele TH3JNR, new, unused, £190. FU200 rotator, £38. CM9508 rotator, £50. Both with control cable. G4OBS, QTHR. Tel: 072272-752 (Wlts).

YAESU FT767GX inc 2m and 6m modules with MD1 mic, as new still under guarantee with boxes, £1350 only. Steve, CO1JJ, QTHR. Tel: (Walsall) 0922-640861.

MICROWAVE MODULES 2-10m transverter, with 7dB attenuator. Both little used, £85. Maplin 'Mapsat' vhf weather satellite receiver with matching aerial. Both new and unused, £55. Carr by arrangement. G3111. Tel: (Tysoe) 029588-543.

QRT SALE: REASONABLE offers for: Yaesu FRG7 rcvr joystick, antenna, phones. FDK multi 700EX 2m mobile tcvr, remote mike, gutter mount, antenna, swr power meter. Heathkit dip meter. Morse key. All manuals where applicable. G4PEV. Tel: (Walton) 0932-243616.

TONNA 70CM SPLITTER 29270, £20. 19-ele 70cm yagis 20919, £30 pair. 9XY 2m 20818, £20. Cushcraft ringo range ARX2B 2m, £20. GPV7 70cm, £20. S1m jim 70cm, £5. Antiference broadcast vhf 2-ele £4. TV wideband (4-bowties) £6. 4 dbie chimney brkts, £2 each. Chimney frame for 3 colinears £12. CBM 3032 (faulty) £20. 3040 £40, 3022 £15, datasette £3. Write Allan Read, G8UVM, c/o Post Release, Painswick Post Office, Gloucs. GL6 6XH.

MUTEK TVF 144A 2m transverter. Tim, G140PH, QTHR. Tel: 02477-58425 (evenings/weekends).

FT290, FT790, FT690 Mk11, TR7850, FT708R, TH41E, BNOS LP144-3-50 and LPM432-1-50 and QM70 2m linear amp all fb condx with boxes, manuals, also cordless phone and Amstrad 1512 colour and 32 meg HD. G6HKD. Tel: 0305-814196 (evenings/weekends).

STRUMECH VERSATOWER on trailer. 60' extended. Stored indoors, ex condx. Located Telford. Offers to Brian Mills. Tel: 0952-615321 (office hours), 0922-414082 (evenings).

FT290R, MOBILE MOUNT. Soft case, £235. Linc 430 70cm cw/ssb, £95. KW Viceroy Mk11 hf tx ssb/cw, £35. 2m HB9CV, £3. G0EAG, QTHR. Tel: 04027-57606 (after 6pm).

COMPLETE STATION. Heathkit SB102 tcvr (fully valved + set unused replacements). Power supply, monitorscope, v/voltmeter + HF probe, dummy load, manuals, Shure mike. Key. SEM Z-match. Edometer (wavemeter). G4MH minbeam + rotator. £400. Joystick, antenna, joymatch, £10. G3ZNX. Tel: (Devon) 03954-2300.

KR600RC ROTATOR, £120. 5-ele hf antenna TETHB35C £100. FT1012D 9-band fm mic, £485. FC902, £88. Katsumi message keyer MK1024 £150. 480R 143-148, £325 ono. QTH Detached bungalow, 4 beds, lge gdn, £72000 ono. 2m 100W amplifier USA, £100. Tel: 051-327-4280.

PYE F402 FIXED stations (3). Hb fm 30W AC240v 6-chan. 2 mint + boxed. 1 exc on 2m. Inc manuals, offers? Delivery at cost. G6GHS, not QTHR. Might swap WHY? Tel: 0249-650818 (evenings).

80M HOWES MODULES 5 units. Only rx few wires attached. All var caps mounted. Screened enclosures in main case. Mini coax, cable, switches, knobs inc. Parts cost £120, accept £70 for collection. Illness prevents completion. G8KI, Surrey. Tel: 093-23-47331.

LADDER FILTERS 8.913MHz or 9.063MHz with circuit. Covers 80m and 40m with one vfo. Eight HC18-U crystals (two for usb and lsb). Can be soldered into 0.1" veroboard, £5 inc p&p. G4H4Q, QTHR.

ICOM 751A hf transceiver fitted CR64. High stability filter and RC10 remote controller, with Icom AT500 automatic antenna tuner unit, used receive only, 8 months' old, mint condx, cost £2080, offers around £1500. Trio 440S built in atu, fitted 1.8KHz narrow ssb filter, used receive only 6 months' old, cost £1340, offers around £1000. Tono theta 5000E, rty/ambor/asci/morse, terminal unit, built in 5" vdu, with keyboard, 2 hrs used receive only, mint, £750 ono. Trio 9130 2m multi mode with mobile bracket, mic, boxed, vge £350. FRG9600 Withers Mk3 scanning receiver, 100KHz-950MHz. Mint £400 ono. Dressler ARAS00 active antenna for scanner 14dB gain. Cost £139. Boxed unused, £90. BNOS linear 2m amplifier, 144-10-180 unused, £275. Datong ANF mint, £50. Hamgar pmx tuner, mains-battery, unused, £60. YH48 mic with keypad, £15. Minolta 7000 af camera f1.7 lens, with 2800af flash, used once. Cost £440, sell £300. No dealers. G6SFD, QTHR. Tel: (Dronfield) 0246-413413 (evenings/weekends).

COLLINS KWM1 TCVR, collectors item, superb condx complete and working, £300. Psu £100. Extra crystals and spare set of valves inc pair matched 6146A's, £100. SM3 mic £80. Bob Ralph, G4KSG, QTHR. Tel: (Birmingham) 021-743-7979.

MSX WORK PROCESSOR software, cartridge or cassette eg msx-text, tasword, kuma for msx computer. SALE: Boxed Texas TI99/4A 16k computer, tech man, books. Hardly used, unwanted gift, £35 (p&p ex). Tel: Ray, 0254-831605 (Lancs) after 7pm.

BARGAIN SALE. SEM transmatch £90. Wetz swr/pwr meter (2 range) SP220 £50. Wetz 500W dummy load, CT530 £25. All mint. G4GHC, QTHR. Tel: 0803-37050.

YAESU FT708R, £165. FT208R, £155. Both hardly used and ex condx. Free spk/mic to first buyer. Also, serial/parallel printer, home use only, £30. Buyer collects or pays p&p. G6IHG, QTHR Burgess Hill, Sussex. Tel: 04446-43505.

FT790 70CM MULTIMODE, vge boxed, c/w mike, flexi-whip, £270 cash. Sale inc homebrew linear. G1RVE, QTHR. Tel: (East Sussex) 07914-88145. Buyer collects.

SHACK CLEARANCE - Marconi 100 valve double diversity receiver, HR11 circa 1970 with manual: laboratory Spectrum analyser: AVO electronic test set; for full details and other equipment send lge s&e to G3JMK, No4 Over Hall Drive, Winsford, Cheshire, CW7 1EY.

REDIFON R800 TALLBOY minicomputer with hard disk, two vdu's, Centronics printer and manuals. Offers over £250. Proceeds to RAIBC. Buyer collects from London. G4YLT, QTHR. Tel: 0245-321171.

TR7200G 10W FM CRYSTALLED R07, S11, 12, 16 20-23. Exc mobile rig, £70. Chris, G4KXN, not QTHR. Tel: 0865-890461 (evenings).

FT290R MK1, 2.0 A/H nicads, strap, case, charger, boxed, manual, good condx. Kit built linear to suit, 20W, with preamp, £270. Will split. WANTED: 10m fm rig, around £40. G8GNT. Tel: (Walsall) 0922-413958.

DRAE MORSE TUTOR £20. Commodore computer, 3032, double disk drive, 3040. Computer incorporates monitor, manuals, diagrams, etc. £150. Telequip-ment scope, 43R (dual trace). Working needs looking at £20. Pierson KE93 (American) mobile receiver (hf) with powerpack, £20. Tel: 0373-812158.

TR10 TS780 DUAL BANDER 2m/70cm, £690. Collection/delivery by arrangement. G6TPQ, QTHR. Tel: 061-633-3895.

ICOM IC751 HF TX/RX, 250Hz cw filters £995 ono. Kenwood TL922 hf 2kW linear amp inc spare pair 3-500z valves, £875 ono. TAU SPC3000 3kW roller coaster atu £175 ono. Phillips CD304 CD player £149 ono. Olympus OM2N 50mm/f1.8 £130 ono. Vivitar (OM) 75-205mm zoom £45 ono. G4WVX, QTHR. Tel: Bruce, 06286-64415.

ICOM IC271E 2M BASE, fitted with muTek front end. Mint condx £575 ono, or will consider swap with Yaesu FT230R. (With cash adjustment). G4UHM, not QTHR. Tel: 0245-468149 (after 7pm or weekends). Essex.

SHACK CLEARANCE, Yaesu FTONE, FT757, FC707, FC700. Trio TS711E. Pye pocketfone P5004, mobile chgr, R3, S20, S18, S16, PF2 S20 S18 S8 fitted. All open to offers or px scanners AR2002, 9600, WHY? G4UAP, QTHR. Tel: (Stamford) 0780-53089 (after 7pm).

TRANSVERTERS, microwave modules MMT42/28S, £100, MMT144/28 £80. Icom IC245E 2m mobile multimode, £160. AR40 rotator £50. G3ZSS, not QTHR. Tel: 0932-63552 (evenings).

YAESU FT201 TRANSCEIVER hf, £250. Yaesu YD844A microphone, £15. KDK 2m FM2016A/E transceiver £100. Maldi 2m/70cm dualband antenna cw HS770 duplexer, £37. G4L10, QTHR. Tel: 0705-373320.

ARAK 5/8 COLINEAR model SUS2850 5-6dB gain c/w pole clamps, £15. 50' coax fitted female 'N' connector both ends marked 'S02V'. Ex Icom AH7000 discone. Unused, £15. G3RDC, QTHR. Tel: 01-455-8831.

ICOM IC202S ssb/cw 2m portable, £100 ono, vgc c/w case, manual, 5 xtals, accessories. Boxed. G3Z0I, QTHR. Tel: (Reading) 0734-332777.

FT726R, 2/70/SAT mint, boxed, with all manuals, £850. Prefer buyer collects but will despatch at cost. MML432/50 still under warranty, £100. Maplin TU1000 rty terminal unit, aligned, working, with circuit, £30. G1VCY, QTHR. Tel: (Essex) 0268-753508.

WANTED . . .

IC202S + 8877 or 4CX1000A + base, also 40' telescopic, tilt over mast and 60' LDF550 + connectors and propeller pitch motor. Conrad, G6ZTU, QTHR. Tel: 0226-791196.

"THE MORSE TALKER" (MMSI) required for RAE student. Could possibly collect Yorks/Lancs, or you post. Colin, tel: (Keighley, Yorks) 0535-273891.

ENTHUSIASM WANTED? ORP tcvr kit required, micron, Omega, DS880 etc. Unfinished or faulty welcomed, but must be complete. Condition immaterial, my soldering is even worse! Terry, G4YSO, QTHR, or 'phone daughter on 0865-341166 and I will return your call.

YAESU FC102 ATU. Must be as new, boxed with all info and unmarked. Top price paid for right one. Could exchange + cash, 6 mths' old Trio AT230 atu or sell £165. G4WRLP, QTHR. Tel: 0286-3567 (eves).

HIGH IMPEDANCE Microphone suitable for valve transmitter. Components/information to construct G2DAF Mk3 transmitter. Manual/circuit diagram for Solatron solarscope CD514 'scope. Julian, G3XWL, QTHR. Tel: 0622-891239.

HANDBOOK OR SERVICE sheet to buy or borrow for Trio TS700S. Martin Rowland, G4YUA, QTHR. Tel: 0993-71688.

GENERAL COVERAGE receiver required. Must be in

first class condition. Please ring Lymington 73294 (near Bournemouth).

CIRCUIT DIAGRAMS or handbook for: Standard radio, receiver unit 3-LRU-132A, your price paid. 027YV, Finn Hoffmann, Elkaervej 5, Laven, 8600 Silkeborg, Denmark.

TWO VALVES type DCC90 - new or good secondhand, and a reasonable offer for my ex-min CDU150 D/B scope, working but not in calibration. Will consider exchange for good S/B 10MHz example. G4EAB, QTHR. Tel: (Wolverhampton) 090-722-2349.

EDDYSTONE 6-pin baseboard coilholders. Eddystone A11 World Two receiver. Any pre-war shortwave receivers, Peto Scott, BTS, Premiere, WHY? Also pre-war shortwave components, literature, kit built receivers. G4HZL, QTHR. Tel: 0703-268705 (evenings/weekends), 0962-822401 (day).

CLEAR OUT YOUR LOFT! Philips 580A 1935 vintage mains radio. Wanted in any condition even cabinet or chassis only. Pure nostalgia for old timer. Not a collector but will pay your price. Contact Roy, G0EWC, QTHR. Tel: Bristol 776891.

DRAKE 'C' LINE R4C, T4C, etc. L7 linear, MN2700 or MN4438 or MN4432A, 7077 mic. WHY? Will part exchange TS940S with built-in atu. G4H1B, 29 Ryde Vale Road, London SW12 9JU.

TOWER 3-SECTION BOX LATTICE tilt over 33' max, 10m with winch. G1WUH. Tel: Ken, 01-595-1480.

HP435 OR 436 POWER METER less head, or with u/s head. Faulty unit OK. Can offer cash or complete working HP432A + 478A in exchange. FOR SALE: HP1815A TR/sampler plug-in for HP180 series scopes. John, G8BXH. Tel: 01-428-0974.

EARLY WIRELESS & XTAL sets wanted; particularly WW1 equipment or parts, early valves, horn speakers, old radio books, magazines, catalogues, pre-war television. Keen collector pays well for anything associated with early wireless. James, G4ERU. 5 Luther Road, Winton, Bournemouth. Tel: 0202-510400.

DRAKE L7 LINEAR amp and psu, Drake MN2700 atu, top price paid. Urgently required. Tel: 0602-609345 (anytime).

HP106, HP107, HP117 + handbooks, in good condx. G3FOQ. Mr Delaney, Halls Lane, Norton, Suffolk, IP31 3LG. Tel: 0359-30336 (after 8 pm).

FT707 and FC707 atu, together or separately. G0FR0, QTHR. Tel: (Abingdon) 0235-832871.

MAINS TRANSFORMER for valve linear; at least 500v at 1 amp, or two 250w isolation transformers. G4DTC, QTHR. Tel: 0883-43838.

CODAR T28 or similar transistor, top band receiver. Tel: 01-486-4376.

SCANNING RECEIVER WANTED for general coverage vhf and uhf. Anything considered, faulty or working, for middle aged widow turned swl. Must be cheap!! c/o Derek, GWOFR. Tel: 0633-856237.

YAESU FC102 ATU, must be in mint condx, unmarked, boxed, with all info, late model only. Will pay £150 for right one. May exch. Trio AT230 atu, 7 months' old, as new, or sell £160. G4WRLP, QTHR. Tel: 0286-3567 (evenings).

SAVE A PANDA. Mains transformer for Panda cub, Elstone MT9 or equivalent. Complete transmitter if mains transformer OK. Please help! G8DPE, QTHR. Tel: (Wigan) 0942-38844 (after 6pm).

EDDYSTONE BAND-spread condenser and slow motion dial catalogue 1043. Also Eddystone Brown, three hole mounting, British 5 and 7 pin valve holders. May have alternates for exchange. G4IMT, QTHR. Tel: Bath 891254.

YAESU POWER amplifiers FL2010, and FL7010 for Jim, G4LWY, QTHR. Tel: 0925-76-2485.

KW2000, 2000A or 'B'. Almost any condx OK. Contact Martin, tel: 01-773-2983 (evenings).

FT225RD WITH mutek front end. Wanted for Rugby Amateur Transmitting Society Club Station. Cash waiting for right beast. Can collect. John, G4EPA. Tel: 0788-822750.

WARTIME SUITCASE TYPE radios. A Mk3 (B2 minor), Mk123, or any other clandestine and resistance type radios, inc. modern for collection. Any condx welcome. Manuals and access. are of interest G4OF0, QTHR. Tel: 01-949-2317.

STUDIO AND BROADCAST equipment for hospital radio use. Mixers, carts, grams, mics and jackfields, etc., surplus or s/h but must be of professional quality. Martin, G4VZ0, QTHR. Tel: 0384-271963 (evenings) or 0384-287477 (daytime).

TELESCOPIC TILTOWER tower, versatower, etc. at a reasonable price. Can collect, post not important. Also FC102 atu wanted. RS48536. Tel: (Peterborough) 0733-310371.

SHURE 526T MIC. Must be in mint condx. Marc, C13YDH. Tel: Belfast 795783.

WIND UP 30-40' MAST. G4WYF, QTHR (Blackpool). Tel: 0253-56811 (after 6 pm).

SONY 2001D RECEIVER. SONY 2001D receiver. Tel: (Nottingham) 0602-301674.

DISK DRIVE for MSX computer with accessories. SM220 Trio station monitor. SW200A Trio swr/power meter for hf bands. HC10 digital world clock. Pair 572B/T160 valves. SP820 Trio speaker. Howard, G0H2H. Tel: 0394-460-474.

ICOM IC202 or similar type of ssb and cw 2m tcvr. Home built equipment accepted if in full working order. Larry, G0HTR, QTHR. Tel: (Tamworth) 0827-898024 (anytime).

KW E-ZEE match atu. Please write. G0DIC, Dick Fixter, 18 Linley Drive, Boston, Lincs. stating condx and price.

EXTERNAL VFO for Trio TR7200G, good condx. G4VEF, QTHR. Tel: 0270-663453.

TR751E 2M MULTIMODE. Mutek masthead amp. Amplifier valve type or homebrew 2m. E13CGG, QTHR. Tel: 066-41373.

ICOM FILTER, FL53A or FL52A or p/ex for FL63. Also required, Lowe AP12 airband receiver. Call Ted, G4MLZK on 0292-41737 NOT QTHR.

LONELY DRAKE R4C seeks mate T4X or /C etc. TR4C tcvr considered. 1296 antennas 23/55 elements or similar. 70cm amplifier one or two 4CX250 WHY? Bird thru line with 1kw 70cm element. Richard, G4HGI. Tel: 0625-34823 (day), 0744-895139 (evenings - not after 9pm please).

DRAKE MN2700 also L7, CS7, SP75, CW75, 1800Hz filter. Cash paid. Will collect any distance; will consider complete systems. G4JBH, QTHR. Tel: 0935-624225.

EDDYSTONE 940: Will pay reasonable price for receiver in good condx, preferably from SE England so that I can collect. G8AMJ, QTHR. Tel: 0603-738440 (evenings).

0603-738440 (evenings).

YAESU FTV901R with 70cm, 2m and 6m transverter units. FV101DM or FV901DM vfo's. FL2100Z linear. FP700 psu. FTV700 transverter. G4AJE. Tel: (Cams) 0354-740441.

MARCONI WAVEMETERS: 1026/1,2,3 & 4. Any condx, also ICOM 202. FOR SALE: 9cm, 13cm, 23cm cavities Sandown Park, May 1st. G3VVB. Tel: 072684-2368. QTHR.

YAESU FL101 with or without matching FR101. Preferably pristine (for display station). Also 2m/6m fm boards for FR101S. Also fully equipped FR101S/D/DO etc. Also pristine FT101 any mark. All to good home. Tel: 0789-841285.

G2DAF or G3PDM type rx designs need not be working, but mostly complete. G4RVU, QTHR. Tel: 0332-72259.

TEMPO 2004A 70CM LINEAR. Tel: 021-458-1941.

2182KHz MARINE WATCHKEEPING receiver wanted. Single fixed frequency type, normally muted until distress channel active. Any unit considered, details to BRS88004, Felixstowe, Suffolk. Tel: 0394-272096.

PLEASE - CIRCUIT DIAGRAM and service data for Taylor model 31A oscilloscope. Plug-in units for Telonic SM2000 sweeper. GW2HCJ, QTHR. Tel: 0766-7706370.

YAESU FC700 ATU, or similar. Argonaut tcvr. Also vertical hf antenna. Trio/Yaesu, similar, tcvr recent model. G2CYN. Tel: 01-935-7119 (days).

100W+ 2M LINEAR wanted. Valve or transistor, homebrew or commercial. G8PCA, QTHR. Tel: (Chelmsford) 0245-76106.

R1116 and R1082, up to £150 offered for either of these ex-RAF receivers. Dick, G6DIK. Tel: 0227-764000 Ext 3245 (daytime).

AS LIGHT AS POSSIBLE tcvr. For hf/p backpacking cw/ssb multiband, or 80m. Prefer minimum 40W. Consider poor condx, damaged, dropped, scratched, but must be cheap as may attempt to lighten further! Write G4YSS, QTHR please or tel: 0723-863137 (evenings/weekends).

COMMODORE 500/600/700 programmers reference guide. Will stat copy and return with usual

reimbursement. Any information re programming would be welcome, and paid for. Double or single disk drive 3030/4040 or similar. IEEE/488 cables. Epson LX100 printer. G4IZW. Tel: 0228-20786.

YAESU FT1012D MK3 with fm facility and any accessories. Must be in ex wkg condx and c/w manual. Best offer secures up to £450 cash. Contact Phil, G6DBO, QTHR. Tel: 0784-56169 (evenings) 093276-2065 (daytime).

12v SOLID STATE aircraft vhf tx/rx (such as Narco COM11A) and/or any navigation receivers. G6MBV, not QTHR. Tel: 0706-216564.

70cm MODULE FOR FTV901R. G3MZX, QTHR. Tel: Mario, 0671-2190 (daytime), 2268 (evenings).

ELECTRONIQUE 1.6MHz IF transformers for G2DAF (valve) receiver. Also Hallcrafters small valve transmitter and S73 rcvr. Any condition if complete and unmodified. HRO. Nine coil packs mint, £65. R1196, £35. Geoff Fowle, RS90218. Tel: (Broadstairs) 0202-698142.

B2 ANCILLERIES: spares box, key, power leads, phones. Also steel container for psu and spares box to complete rebuild. Also wanted 121 or 122 set and original user handbook for 128 set. Letters only. Maj Kemp, 4 Armd Wksp, BFPO 41.

WORKSHOP MANUAL FOR FDK multi 750XX. G3OVL, QTHR.

KW2000A MECHANICAL FILTER type MK455-10CK. Please write Brierley, c/o 46 Ardgowan Road, London, SE6 1UU.

CIRCUIT OR SERVICE manual for Diablo Mk1 printer as used in Rank Xerox 800 word processor. Borrow for copy or buy. Brian Hodgson, G3YKB, QTHR. Tel: (Dunstable) 0525-221665.

WANTED FOR COLLINS TCS tx mains psu, or the 16-pin socket psu connector, type Cannon SK23C. Tel: 0255-435700.

OLYMPIC L/B AM RF unit AT27605. Sony C9 infra-red remote control. Opus discovery '1' disc drive for Spectrum. G8JTJ. Tel: (Devon) 0626-68187 (evenings).

POWER TRANSFORMER for WW2 AR88 receiver. Advertiser will pay transportation. Tel: (Stevenage) 0438-353636 (any time).

CONTEST NEWS - CONTINUED FROM PAGE 218

Low Power Contest 1988 rules

Please note: Changes to rules 3, 5, 8 and 11 have been made in order to encourage QRP activity.

1. The general rules for RSGB HF Contests, as published in "Contest News", *Rad Com* January 1988, will apply.

2. Date and time. 0700-1100gmt, Sunday 17 April 1988.

3. Sections. (a) 10W rf output maximum. (b) 3W output maximum. RSGB members resident in the British Isles. Single-operator stations only.

4. Frequencies. 3.510-3.560kHz and 7.010-7.040kHz. (IARU Region 1 contest-preferred segments). CW only.

5. Exchange. RST and serial number starting at 001, plus output power (eg 579001 3W).

6. Scoring. 15 points for each completed contact with another QRP station. Five points for all other contacts. Points may be claimed for contacts made with stations on both bands and outside the UK.

7. Documentation. Standard RSGB hf contest log sheets (HFC1 Rev79) should be used. Duplicates must be clearly marked without claim for points. Unmarked duplicates will be penalised at the rate of 10 times number of points claimed plus the claimed score. Logs containing more than five unmarked duplicates, for which points have been claimed, would normally result in disqualification. Each entry must be accompanied by a cover sheet (HFC2 Rev80) or a standard RSGB declaration signed by the operator responsible for the entry.

8. Equipment. The transmitter or onboard power amplifier state should not be capable of rf power output in excess of 15W.

9. Address for entries. Logs should be sent to: "HF Contests Committee", c/o Mrs H Claytons-Smith, G4JKS, 115 Marshalswick Lane, St Albans, Herts AL1 4UU.

10. Date for entries. Logs must be post marked not later than 15 days after the end of the contest.

11. Awards. The 1930 Committee Cup will be awarded to the leading station in section (b). Certificates of merit will be sent to the first three stations in each section and to the highest placed entrant using a completely homemade station.

IARU/RSGB 432MHz-24GHz Contest results - erratum

The VHF Contest Committee apologises for an error which appeared in the results published in *Rad Com*, January, page 64.

In the 432MHz Single Operator table, the callsign in position 3 should have been G6YLW, not G6YLS. Apologies to both callsign holders.

432MHz-24GHz Contest rules

1400-1400gmt, 7/8 May 1988

The general rules published in "Contest News", *Rad Com* January 1988, will apply. There will be two sections, Section S for single-operator stations using the same callsign on all bands, and Section M for multi-operator stations which may operate all bands concurrently using different callsigns. Scoring will be by the radial ring system on 432MHz and 1.3GHz, and at 1pt/km on all other bands. Half points may be claimed for crossband contacts. Individual band and overall tables will be published.

All entries and check logs to: VHF Contests Committee, c/o A J Collett, G4NBS, 10 Quince Road, The Limes, Hardwick, Cambridge CB3 7XJ.

432MHz Trophy and SWL Contest rules

0900-1700gmt 29 May 1988

The general rules published in "Contest News", *Rad Com* January 1988, will apply. There will be three sections, Section F for single-operator fixed stations, Section O for other stations and Section L for listeners. The 1951 Council Cup will be awarded to the station with the highest overall score in the contest.

All entries and check logs to: VHF Contests Committee, c/o T Melvin, GM8MJV, 2 Dudley Avenue South, Edinburgh EH6 4HH.

432MHz FM Contest rules

0800-1200gmt 12 June 1988

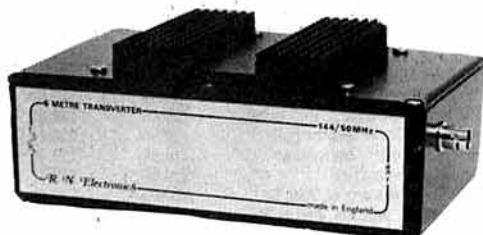
This contest is under review due to lack of support in 1987. If you wish this event to continue, please be active and send in an entry.

The UK band plan should be adhered to, so recommended working frequencies are in the ranges 432.5-432.8MHz and 433.4-433.575MHz. The general rules published in "Contest News", *Rad Com* January 1988, will apply. There will be two sections, Section F for single-operator fixed stations, and Section O for other stations. Entrants may transmit only F3E (FM) and contact only other stations using this mode. County multipliers will be used (general rule 14).

All entries and check logs to: VHF Contests Committee, c/o D J Robinson, G4FRE, 15 Ferry Lane, Cavendish Park, Felixstowe, Suffolk IP11 8UR.

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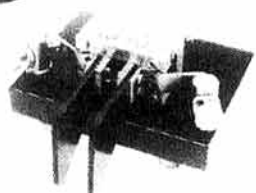
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CTX40, CTX80 QRP CW Transmitters for 40 and 80M	£13.40	£19.40
MTX20 10W CW TX for 20M	£21.90	£27.70
CVF20, CVF40, CVF80 VFOs for above transmitters	£9.90	£15.90
HC220, HC280 2M to HF transverters, 10W output	£52.50	£83.50
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73 from Dave G4KQH,
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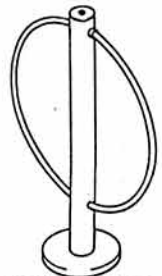
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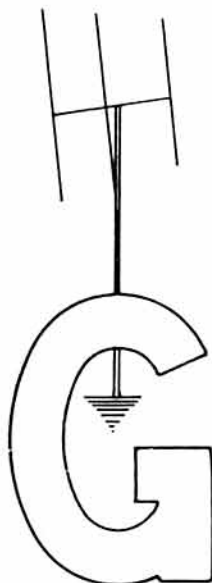
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PASSPORT TO WORLD BAND RADIO

If you are interested in listening to the shortwave spectrum outside the amateur bands then the 1988 edition of *Passport To World Band Radio* is for you. This book lists all the shortwave broadcast stations in the world by frequency from Korea on 2,300kHz to Norway on 25,730kHz. For each entry is given the transmitter site, time of transmissions, transmitter power, target area, language of broadcasts and much more useful information. All this is shown together in graphical form for easy reference. No more searching through pages of lists to find the information you need.

This book is not just a guide to broadcast stations, however. In addition there are brief reviews of no less than 60 different shortwave broadcast receivers, and full-length reviews of 14 recent models. Useful tips are also given on what to look for when purchasing a shortwave receiver. There are also 12 feature articles covering a wide range of shortwave broadcast listening and a useful glossary of terms used throughout the book.

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400 pages; paperback; 1988; £16.25 to RSGB members by post

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Uncle Bill and his merry men are moaning because we imported the TS-680S long before they did.

Incidentally, I notice that even they admit not knowing about the RZ1 scanning receiver and we have had it in stock for weeks!!!

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