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RADiO COMmunication



Journal of the Radio Society of Great Britain



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AUGUST 1987

VOLUME 63 No 8

RADIo COMmunication

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FRONT COVER

Woburn Abbey, in the grounds of which the RSGB National Mobile Rally takes place on 2 August. Photograph reproduced by kind permission of the Marquis of Tavistock

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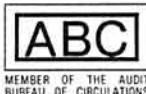
Technical articles on subjects of amateur interest are always welcome and should be sent to: The Editor, *Radio Communication*, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

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 1987

LOWE ELECTRONICS OPEN DAY, Saturday, 15th August from 10.00 am.

On the 15th of August, Lowe Electronics are holding an OPEN DAY at their head office in Matlock.

This is your opportunity to see not only the latest in equipment from KENWOOD but also visit the workshop facilities that have made LOWE ELECTRONICS the leading amateur radio company in Europe.

To make the event even more special, other well-known names in amateur radio are joining us for the day: MICROWAVE MODULES, I BEAM AERIALS, JOHN BIRKETT from Lincoln, STRUMECH, and M&B from Leeds.

Personalities in Matlock on the 15th for you to meet will be Geoff Arnold, editor of PRACTICAL WIRELESS (also representing the new SHORT WAVE MAGAZINE), Andrew Steele, English programme director from the short wave station HCJB, and Simon Spanswick and Michael Murray from EDXC (European DX council for short wave listeners).

The RSGB in the shape of Martin and Jenny Shardlow (Martin is our regional representative) will be in the entrance hall, extending a warm welcome and answering any queries you may have on the society.

SPECIAL . . . Just for the OPEN DAY, the first hundred customers to open a LOWE CARD account and make a purchase, or purchase on their existing LOWE CARD account will qualify for a FREE weekend break for two. The weekend break to be taken from a choice of over 100 hotels throughout the British Isles. (Note, purchases must be above £15.00 to qualify).

The following is also SPECIAL, but only for the open day. We have received from KENWOOD's head office in Tokyo notification of

some items of radio equipment that we thought were no longer available, classic pieces that when current sold like hot cakes, TM201A, TM401A, TR9130, TR9500, TW4000A. These items will be available at special prices. PLEASE NOTE THE FOLLOWING CAREFULLY! The shipment is not scheduled to arrive until a day or so before the OPEN DAY, we don't know the final prices, we will not be keeping a waiting list for the equipment because until it arrives we don't know exactly what we are getting. You have to come along to Matlock on the 15th, or if that is impossible, then ring after 10 on the day itself—ACCESS, BARCLAYCARD or LOWE CARD will suffice.

Talk-in on the day is in the capable hands of our local club, the TOR AMATEUR RADIO ASSOCIATION and a two metre station will be found on S22 from around 9.30 using the call sign G8LOW. There will also be an HF station on the air, its call sign being G4LOW. Even if you can't make it to Matlock, look out for both these stations as a special QSL card will be issued on the day.

The club are also organising a BRING and BUY section in the parking area behind the offices. This will be your opportunity to rent table space for an hour or so and get rid of your surplus radio bits and pieces (note, this is not a car boot sale). Further details from David, G8GIY on 0629 2817.

Finally, for the children there will be FREE rides behind a scaled-down steam traction engine.

It promises to be a great day, we look forward to seeing you on Saturday, 15th August.

TM221E & TM421E 2 metre and 70 centimetre FM mobiles 45watts 35watts



The new KENWOOD TM221E and TM421E two metre and seventy centimetre FM mobile transceivers have been specifically designed to condense maximum performance and operating convenience into a compact package. Output power is 45 watts on two metres (TM221E) and 35 watts on 70 centimetres (TM421E). Receiver sensitivity matches the output power of the set and measures an amazing 0.141µV for 12dB SINAD (across 144-146). The figures are those given by Chris Lorek in his recent TM221E review published in the July edition of HAM RADIO TODAY.

Much discussion has taken place recently

regarding 12.5 and 25 kHz spaced frequency channels on the two metre band. With the new mobiles channel spacing is not a problem. KENWOOD with their usual attention to detail have made the frequency step user selectable. The steps available are 5, 10, 12.5, 15, 20 and 25 kHz. Once programmed either microphone up/down button or the transceivers front panel knob can be used to step the transceiver across the band. Of course should it be necessary the selected step can easily be changed.

A new orange backlit liquid crystal display gives the transceiver an amazingly clear frequency readout that can be read in the

brightest of sunlight.

The transceiver has all essential operating aids. There are 14 memory channels, each of which holds frequency, whether simplex or repeater operation is required and whether or not the tone burst is on or off. Scanning can either be memory with the ability to lock out unwanted channels or band with the scan limits set by the operator. The usual priority channel facility is also included to make sure that no call is missed. As well as showing the operating frequency the display also indicates which of the facilities are being used.

TM221E...£317.30 inc VAT (carr. £7.00)

TM421E...£372.08 inc VAT (carr. £7.00)



What is an RC10?
See next page

LOWE ELECTRONICS LTD.

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Telephone 0629 2817, 2430, 4057, 4995.

send £1 for complete mail order catalogue.

RADIO COMMUNICATION August 1987

station accessories

TL922 HF amateur band linear amplifier

The TL922 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 TL922 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.



TL922 inc tubes . . . £1495.00 inc VAT, carriage £7.00

SM220 station monitor

Based on a wide frequency range oscilloscope, the SM220 station monitor features in combination with a built-in two-tone generator, a wide variety of waveform observing capabilities. The SM220 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 BS8 panoramic display and connected to one of the following transceivers (TS940, TS830, TS180, TS820 series) signal conditions in the vicinity of the receive frequency can be seen over a 40 or 200KHz range.

SM220 . . . £343.62 inc VAT, carriage £7.00
BS8 . . . £77.00 inc VAT, carriage £1.50



amateur band transceivers

TS830S HF amateur bands transceiver

Needing no description, the KENWOOD TS830S, which uses a pair of 6146B valves in the PA, is well known on the amateur bands (160 to 10 metres) for its superb signal quality. Modes of operation are USB, LSB and CW. Having variable bandwidth tuning, IF notch, IF shift and provision for various filters, its receive performance is excellent too.



TS830S . . . £1098.00 inc VAT, carriage £7.00

TS530SP HF amateur bands transceiver

An HF amateur bands (160 to 10 metres) valve transceiver without frills but providing today's amateur with all the necessary facilities for reliable worldwide communications. Modes of operation are USB, LSB and CW.



TS530SP . . . £927.51 inc VAT, carriage £7.00

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RADIO COMMUNICATION August 1987

amateur band plus general coverage transceivers

TS940S HF transceiver with general coverage receiver.

Top of the range, the TS940S 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 a separate VFO and easy keyboard frequency entry make operation and ownership of the KENWOOD TS940S a pleasure.



TS940S . . . £1995.00 inc VAT, carriage £7.00

TS930S HF transceiver with general coverage receiver

Much has been said and written about the TS930S 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 TS930S is the ideal rig for today's crowded bands.



TS930S . . . £1695.00 inc VAT, carriage £7.00

TS440S HF transceiver with general coverage receiver

A step forward in compact HF equipment, the TS440S 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.



TS440S . . . £1138.81 inc VAT, carriage £7.00

TS430S HF transceiver with general coverage receiver

A compact HF transceiver suitable for mobile or portable operation, yet having all the facilities necessary for effective radio communication. The TS430S covers the amateur bands from 160 to 10 metres and is a general coverage receiver tuning from 100 kHz to 30 MHz. Modes of operation are USB, LSB, CW, AM with FM optional.



TS430S . . . £974.23 inc VAT, carriage £7.00



send £1 for complete mail order catalogue.

the new dual band transceiver from KENWOOD, the **TW4100E**.



I am sure that you will remember the enthusiastic reviews that were written about the KENWOOD TW4000A dual band FM mobile transceiver. Its amazing sensitivity, audio quality and ergonomic perfection still endear the transceiver to many radio amateurs.

The TW4100E is a NEW dual band FM transceiver from KENWOOD. However, working on two metres and seventy centimetres, having excellent sensitivity, audio quality and ergonomic perfection is where its similarity with the TW4000A ends. Using the latest in technology, the designers of the TW4100E have achieved increased performance and, at the same time, made operation even simpler. By working through a predetermined sequence the front panel controls enable the operator to set the transceiver according to the band plan and his own preferences. Options available are shift (+, - or duplex), frequency stepping (5, 10, 12.5, 20, 25 or 50 kHz) and repeater shift (600 kHz, 1.6, 5, and 7.6 MHz). Once programmed the above parameters very much aid successful and safe operation.

With the KENWOOD TW4100E, not only do you have the normal simplex and repeater modes but cross-band duplex as well. Priority channel monitoring takes on a new meaning if the full audio can be heard whilst you are transmitting instead of the usual "bleep" and loss of signal. If you work another

amateur who has the necessary equipment to simultaneously transmit on one band and listen on the other, and many stations do have this facility, then a telephone style conversation is possible. Anyone who has not experienced this type of operating will soon come to prefer the natural conversation style of QSO that is possible.

With the KENWOOD TW4100E duplex is easy!

Driving and operating at the same time has always been a problem. With the high level of traffic on today's roads it is essential that the operator can easily control his transceiver. KENWOOD engineers have simplified the rig's operation by providing ten memories, each of which will hold information on frequency, simplex or repeater operation and whether or not the tone burst is on or off. By pushing a single button all this information is transferred to the VFO. Of course it is still held in memory for future use. You therefore have ten independent VFOs. KENWOOD's attention to detail is shown by the following additional facility. If having transferred a repeater frequency to the VFO, you move onto an adjacent simplex channel, you can, by the push of two buttons, cancel the tone burst and reset the shift from repeater to simplex. Of course, two more presses of the same buttons restore the facilities.

With the KENWOOD TW100E you have mobile operating safety!

Linear amplifiers are not needed with the KENWOOD TW4100E! Power output from the transceiver is 45 watts on two metres and 35 watts on seventy centimetres which is more than enough to cope with difficult terrain. The rig has an efficient heat sink which ensures reliable operation under the most

demanding of circumstances.

With the KENWOOD TW4100E you have reliable and effective communication!

The TW4100E has another facility that is not mentioned in its handbook. Not mentioned because unless you are a RAYNET member on an approved operation or engaged on a real emergency, to use the equipment in such a way is outside the compass of the licence as we presently know it.

The facility is that the TW4100E will act as a private crossband repeater. This means that you can park your car in a decent location and wander off into an RF black spot. Armed with a small low power handheld, you can talk back to the TW4100E which is constantly checking the two pre-set crossband frequencies. Your transmission is received and simultaneously transmitted by the TW4100E on the other band. When a station replies, the message is again simultaneously retransmitted to you. Of course you need to have another amateur in your car to oversee the operation and it must be a recognised RAYNET use. The KENWOOD TW4100E also has automatic time-out after three minutes.

The TW4100E can have DCL (digital channel link) and DCS (digital code squelch) facilities when the optional MU1 board is fitted. With DCS you could so arrange that unless the correct five figure access code data burst is received, the TW4100E ignores the transmission and doesn't retransmit it.

With the KENWOOD TW4100E, extended facilities! The TW4100E is a remarkable transceiver, a complete package for the VHF and UHF operator. See one soon at your local LOWE ELECTRONICS shop. TW4100E £766.37 inc VAT, carriage £7.00.

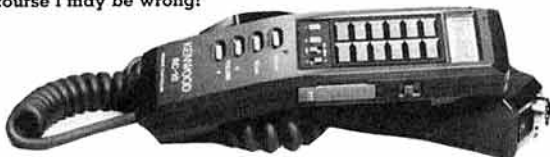
an RC10 is

Occasionally a piece of equipment comes along which catches the imagination; the RC10 remote controller/handset for the TM221E and TM421E does just that. Designed to operate with either transceivers or link both together, the RC10 looks more like a cellular radio car phone than a piece of amateur radio equipment.

In fact the RC10 not only looks like a car phone, but as a speaker and microphone are built-in, operates as would a telephone handset. Easily mounted in any car, dashboard or transmission tunnel, the RC10 controls all transceiver front panel functions with the exception of on/off and high/low power selection. The functions controlled by the RC10 are volume, squelch on/off, frequency readout, keypad frequency entry, memory selection and frequency or memory scanning. Full duplex operation is possible when both transceivers are fitted. From a security point of view it may even be possible to mount the transceivers out of sight and only have the controller on view. Since most thieves now know that a cellular phone is not a saleable item, owning an RC10 may be a wise investment!

Although I have not seen the RC10, I am of the opinion that it will do much more than I have already described. I suspect that it will be possible for the RC10, when used in conjunction with both 2 metre and 70 centimetre transceivers, to operate as a personal repeater. Parked at the top of a multi-storey car park and left unattended, I would not be surprised if you could not talk-in to the installation from another small handheld on 70 centimetres (say a TH41E) and have your transmission re-broadcast at a higher power from the good location on 2 metres. Any reply would be re-transmitted to you on 70 centimetres. Useful and ideal for staying in contact when wandering around town. Helpful also for RAYNET use.

Of course I may be wrong!



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GPV720	Dual band (144/430 MHz) base station aerial . . . £45.68 inc vat, carriage £7.00.

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IC-900 Super Multiband FM System.

This new addition to ICOM's Ham radio equipment is a multiband FM transceiver system that allows the mobile operator to customize a communications system for his favourite bands. Up to 5 optional band-units can be installed with the IC-900 for instant access to a wide range of frequencies from the 28MHz HF band to the 1240MHz UHF band. Only a small remote controller is necessary for control of all these bands. A flexible optical fibre is used between the Remote Controller and the Interface Unit. The IC-900 has independent, full duplex capability on all bands, providing simultaneous receive and transmit operation.

The function display on the Remote Controller shows two separate operating frequencies simultaneously. The IC-900 system transceiver is equipped with 10 fully programmable memory channels in each Band Unit.

The system can therefore store up to 50 different memory channels.

This revolutionary new concept in Multiband operation is available from your ICOM dealer. Also feel free to contact ICOM (UK) LTD for assistance or information. The IC-900 Multi-band system consists of a Remote Controller, Interface Unit A, Interface Unit B and a series of specially designed Band Units.

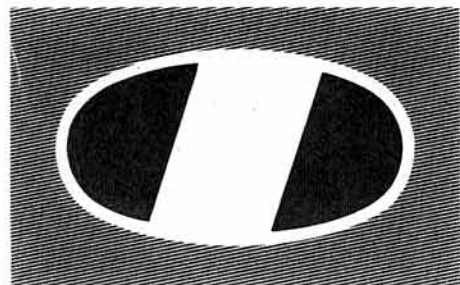
UX19	28—30MHz	10 watts
*UX59	50—54MHz	10 watts
*(No mobile operation allowed in UK)		
UX29	144—146MHz	25 watts
UX29H	144—146MHz	45 watts
UX49	430—440MHz	25 watts
UX129	1240—1300MHz	10 watts



IC-1200, 23cms FM Mobile.

To complete the range of VHF/UHF FM Mobiles this new model is now available for the 23cm Ham band, it is based on similar features to the already existing IC-28E 2m and IC-48E 70 cms mobile units. This Mini-mobile transceiver will fit easily anywhere in your vehicle or shack. Power output is 10 watts or 1 watt low. The IC-1200 is so new we do not even have a picture of it, however, the large front panel LCD readout is designed for wide angle viewing and front panel controls are straightforward to make mobile operation safe and easy. The IC-1200 is a superb example of ICOM's dedication to exploring new communication equipment.





ICOM

Communications

THE HOTTEST ITEMS THIS SUMMER



VHF/UHF FM Handportables

If you want a handheld with exceptional features quality built to last and a wide variety of interchangeable accessories, take a look at the ICOM range of FM transceivers, all ICOM handportables come with a nicad battery pack, AC wall charger, flexible antenna and wrist strap.

Micro 2E/4E

These new micro-sized 2 metre and 70 centimetre handportables give the performance and reliability you've come to expect from ICOM.

Measuring only 148 x 50 x 30 the Micro fits in your pocket as easily as a cassette tape. The Micro 2E/4E features an up/down tuning system for quick frequency adjustments, 10 programmable memories, a top panel LCD readout, up to 2.5 watts of output (optional).

IC-2E 2 metre Thumbwheel Handportable

This popular handheld from ICOM is still available. For those amateurs who require a straightforward and effective FM transceiver the IC-2E takes some beating. Frequency selection is by means of thumbwheel switches (with 5Khz up switch) simplex or duplex facility. Power output is 1.5 watts or low 150 milliwatts (2.5 watts possible with BP5A battery pack).

IC-02E/04E 2 metre and 70cm Keypad Handportable

These direct entry CPU controlled handhelds utilise a 16 button keypad allowing easy access to frequencies, memories and scan functions. Ten memories store frequency and offset, these handhelds have an LCD readout and power output is 2.5 watts or low 0.5 watt. 5 watts is possible with the IC-BP7 battery pack or external 13.8v DC.

IC-12E 23cm Handportable

Similar in design and style to the 02E/04E this 1296Mhz handheld utilises ICOM's experience in GHz technology, gained by the excellent IC-1271E base station. Power output is 1 watt from the standard BP3 nicad pack, external 13.8v DC powering is available to the top panel jack. With the growing number of repeaters on 23cm. The IC-12E makes it an ideal band for rag chew contacts.

ALSO AVAILABLE FOR ICOM HANDPORTABLES ARE A LARGE RANGE OF OPTIONAL EXTRAS INCLUDING A VARIETY OF RECHARGEABLE NICAD POWER PACKS, DRY CELL BATTERY PACKS, DESK CHARGERS, HEADSET AND BOOM MIC, LEATHERETTE CASES AND MOBILE MOUNTING BRACKETS.





ICOM



IC-751A.



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.



TOP HF

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 aerial 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.

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— Mon-Fri 09:00-13:00 and 14:00-17:30 —

This is strictly a helpline for obtaining information about or ordering ICOM equipment. We regret this service cannot be used by dealers or for repair enquiries and parts orders. Thank you

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Datapost

IC-735.



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.



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TH41E	70cms Mini Handheld	228.76 (4.00)
TR2600E	2.5W 2M Handheld with DCS	199.00 (4.00)
TR3600E	70cms Handheld with DCS	299.00 (4.00)
TS440S	NEW Amateur band transceiver	
	General coverage RX	1195.00 (7.00)
PS50	Heavy Duty PSU for TS440S	234.63 (5.00)
AT440	Auto ATU for TS440S	152.72 (3.00)
TS940S	9 Band TX General Cov RX	1995.00 (7.00)
AT940	Auto ATU for TS940S	258.23 (4.00)
TS930S	9 Band TX General Cov RX	1750.00 (7.00)
TS430S	160m-10m Transceiver	1095.00 (7.00)
AT230	Auto ATU Power Meter	220.05 (5.00)
SP230	External Speaker Unit	70.12 (5.00)
TS530SP	160m-10m Transceiver	895.00 (7.00)
TS430S	160m-10m Transceiver	995.00 (7.00)
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MC35S	First Microphone 50K ohm IMP	22.91 (1.50)
MC85	Deluxe Desk Mic with	
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MC40S	Up-Down Hand Mic 6 Pin 500 Ohm	19.07 (1.50)
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TS711E	2M Base Stations	991.29 (7.00)
HS5	Deluxe Headphones	39.57 (2.50)
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NEW

TH205E	2M Handheld Transceiver	218.00	(4.00)
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PB1	Nicad Pack 12v 800mAh	60.40	(2.00)
PB2	Nicad Pack 8.4v 500mAh	36.10	(2.00)
PB3	Nicad Pack 7.2v 800mAh	40.95	(2.00)
PB4	Nicad Pack 7.2v 1600mAh	66.64	(2.00)
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BC7	Rapid Charger	102.74	(3.00)
SC12	Case for (PB2-3)	14.58	(1.50)
SC13	Case for (PB1-4)	15.27	(1.50)
PG2V	DC Power Cable for TH205E 215E	4.16	(1.50)
PG3G	Filtered Cigar Lighter Cable for TH205E 215E	13.19	(1.50)
SMC30	Speaker Mic for TH21E 41E 2600 3600E	29.85	(2.00)
HMC1	Headset Unit with VDK for TH21E 41E 2600 3600E	34.71	(2.00)
RA2	Rubber Flexible Antenna for TR2400 2500 2600E	10.41	(1.50)
RA3	Telescope Whip Antenna for TR2400 2500 2600E	13.88	(1.50)
TR221E	2M FM Mobile Transceiver 45W	334.00	(5.00)
TR421E	70cms FM Mobile Transceiver 35W	372.00	(5.00)
TR405E	70cms Handheld Transceiver	288.00	(4.00)
TR415E	70cms Handheld with Keypad Entry	315.00	(4.00)
TR851E	70cms All Mode Transceiver	792.00	(5.00)
TR4100E	VHF UHF FM Mobile Transceiver	766.00	(5.00)

Yaesu

NC11	Charger	11.50 (1.00)
FT209RH	NW-20r H-Field CW FNB4	315.00 (—)
FT209R	70cm H-Field	319.00 (—)
MMB10	Mobile Bracket FT209 709	10.00 (1.50)
NC9C	Charger	11.50 (1.00)
PA3	Car Adapter Charger	21.85 (2.50)
FT126R	2m Base Station	999.00 (—)
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SA1226	Duplex unit for FT126R	130.00 (3.00)
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MD18R	Desk 600 8pin mic	79.00 (3.00)
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YH1	L weight Mobile H-set-Boom mic	19.99 (1.50)
YH2	L weight Mobile H-set-Boom mic	19.99 (1.50)
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SB2	PTT Switch Box 290-790	22.00 (1.50)
SB10	PTT Switch Box 270-2700	22.00 (1.50)

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FT176TG	HF Gen. Coverage trans. with optional VHF UHF 6M modules	1550.00 (—)
FTX-767-2	2m module for FT176	169.00 (3.00)
FTX-767-2(B)	70cms module for FT176	215.00 (3.00)
FTX-767-6	6m module for FT176	169.00 (3.00)
FL7000	Solid State linear with built-in auto ATU	1600.00 (—)
FT172R	Dual Band handheld transceiver 144-146MHz 430-438MHz up to 5W on each band	425.00 (3.00)
FT190RMK II	2M multimode portable mobile base	429.00 (3.00)
FT23R FNB10	2M mini handheld with LCD display 5W	249.00 (2.00)
FT23R FNB10	70cms mini handheld with LCD display 5W	269.00 (2.00)
FT190RMK II	6M multimode portable/mobile base transceiver	£399.00 (5.00)

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Two VC10 VHF converter for R2000 118-174MHz	110.76 (3.00)	
Two R5000 NEW HF general coverage receiver	895.00 (7.00)	
Two VC20 VHF converter for R5000 108-174MHz	176.32 (3.00)	
Yaesu FRG8800 HF general coverage receiver	639.00 (7.00)	
Yaesu FRG8800 VHF converter for FRG8800 118-175MHz	100.00 (3.00)	
Icom R71E HF general coverage receiver	825.00 (7.00)	
Icom RC11 remote control unit for ICR71E	62.00 (2.00)	
ICR2002 VHF/UHF scanner 25-550MHz and 800-1300MHz	487.00 (5.00)	
FRG9600 VHF/UHF scanner 25-950MHz	525.00 (5.00)	
Icom R7000 VHF/UHF scanner, all modes 75-2000MHz	957.00 (7.00)	
Icom RC12 remote control unit for R7000	62.00 (2.00)	
Yaesu FRG9600 VHF/UHF scanner	509.00 (5.00)	
60-950MHz		
Yaesu PA4C Power supply for FRG9600	21.00 (2.50)	

NEW

Regency MX4200 Portable scanner covers	328.50 (5.00)
60-89MHz, 118-136MHz,	
144-174MHz, 380-495MHz	
and 800-950MHz	
HF125 HF general coverage receiver 30kHz-30MHz (Made in Britain)	375.00 (5.00)
RS32 synthesised airband receiver 110-139.995MHz	224.05 (4.00)
RS37S Air band portable Tunable 118-136MHz	69.51 (2.50)

Icom

Icom IC505	6 metre 10W portable/base transceiver	459.00 (5.00)
IC751A	HF Transceiver	1465.00 (—)
IC735	New HF Transceiver	949.00 (—)
PS15	P.S. Unit	158.00 (4.00)
PS30	Systems p.s.u. 25A	343.85 (—)
SM6	Base microphone for 751/745	46.00 (1.00)
IC2900	2m 25W M Mode	542.00 (—)
IC02E	2m H-Field	299.00 (—)
IC04E	70cm handheld	299.00 (—)
BC25	Base Charger	70.15 (1.50)
HM9	Speaker mic	21.85 (1.50)
BP3	Std Battery Pack	29.90 (1.50)
BP4	Empty Battery Pack	9.20 (1.50)
BP5	High Power Battery Pack	60.95 (1.50)
CP1	Car Charging Lead	6.90 (1.50)
DC1	12v Adapter	17.25 (1.50)
IC48E	10W 70cms FM mobile	449.00 (3.00)
IC28E	25W FM mobile (Tiny)	359.00 (3.00)
IC29H	45W FM mobile (Tiny)	395.00 (3.00)
IC-Micro	2 min-hand portable LCD display 1W	239.00 (3.00)

NEW

IC-275E	2M Multimode Base Station inc. PSU, 25W	1039.00 (7.00)
IC-475E	70cms Multimode Base Station inc. PSU, 25W P.O.A.	1700.00 (7.00)
IC-1260	23cm FM Mobile, 10W output, style similar to 2BE	P.O.A. (4.00)
ICOM 751	HF general coverage transceiver with internal PSU and auto ATU	2400.00 (7.00)

Power Supplies

DRAE		BNDS	
4 amp	40.50 (2.00)	6 amp	75.00 (2.50)
6 amp	63.00 (2.50)	12 amp	125.00 (3.00)
12 amp	85.50 (3.00)	25 amp	185.00 (4.00)
24 amp	129.00 (4.00)	40 amp	385.00 (4.00)

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DAWA MRF50E	Heavy Duty rotator. Can have up to 4 motors	254.10 (4.00)
KR400	Med H Duty	139.00 (3.50)
KR500	6 core Elevation	149.95 (3.50)
KR400RC	5 core Elevation Duty	169.00 (3.50)
KR600RC	6 core Heavy Duty	219.00 (3.50)
KD038	lower mast clamps	17.45 (2.00)
K5065	Rotary Bearing	26.00 (2.50)
AR1002	Lightweight VHF Rotator	52.95 (3.50)

Switches

Sigma	2 way S0239	20.20 (1.00)
Sigma	2 way n Skts	22.55 (1.00)
Weiz CH20A	2 way S0239	30.75 (1.00)
Weiz CH20N	2 way n Skts	54.00 (1.00)
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Drae	3 way n Skts	19.90 (1.00)

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BY1	Squeeze Key, Black base	67.42 (2.00)
BY2	Squeeze Key, Chrome base	76.97 (2.00)
HI-MOUND MORSE KEYS		
HK708	Straight Key	21.50 (2.50)
HK702	Deluxe version of above on Marble Base	42.50 (3.00)
HK706	Straight key	23.00 (2.50)
HK707	Straight key	22.25 (2.50)
MK704	Squeeze paddle	20.00 (2.50)
MK705	Squeeze paddle on Marble Base	32.20 (3.00)

CW/RTTY/Equipment
(cont.)

NEW

RTTY-EQUIPMENT

FX-232	Packet, Amtr, RTTY, CW ASCII transceiver in one unit. Works with any computer equipped with an RS232C interface. 12V operated	269.95 (3.50)
FAX-1	NEW HF Fax receiver. Obtain weather maps, press photographs and satellite cloud cover detail on any Epson FX-80 compatible printer	279.95 (3.50)
AMT-2	12V operated	245.00 (3.00)
AMT-2-CBM64	Terminal Unit RTTY AMTOR ASCII CW	51.75 (2.50)
AMT-2-VC20	Software for the above for the Commodore 64	51.75 (2.50)
AMT-2-RBC B	Software for the above for the BBC B	44.85 (2.50)
CO660	Data Receiver for CW RTTY TOR AMTOR ASCII	264.97 (5.00)
CO670	As above but with built-in LCD display	327.77 (5.00)
NEVERYS & ACCESSORIES		
Star Master Key	Electronic Keyer	54.70 (3.00)
NEW Star	Masterkey electronics CMOS memory	95.00 (3.00)
TRX3	Keyer	13.65 (1.50)
Datong	Morse Oscillator	56.50 (2.50)
	D70 Morse Tutor	

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	9 element portable 144MHz 'N' socket	33.12
	9 element crossed 144MHz 'N' socket	57.86
	13 element portable 144MHz 'N' socket	46.00
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	19 element 435MHz 'N' socket	34.35
	19 element crossed 435MHz (old style)	39.66
	21 element 432MHz 'N' socket	44.57
	21 element 438MHz 'N' socket	44.57
1296MHz	23 element 1296MHz ATV 'N' socket	30.26
	23 element 1296MHz 'N' socket	30.26
	55 element 1296MHz 'N' socket	46.20
JAYBEAM		
MM3	NEW 'MINIMAX' HF 3 element minicore	327.75
TR3MK3	HF 3 element tribander	299.00
TR3MK3	HF 2 element tribander	202.40
TR3MK3	HF tribander rotary dipole	101.20
TR3MK3	HF vertical tribander	70.15
Dubander		
DB4-4/6	4 element Dubander beam (4 Mtrs & 6 Mtrs)	115.00
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4Y/6M	4 element folded dipole yagi with 1 1/2" boom	48.87
4 Metre Antennas		
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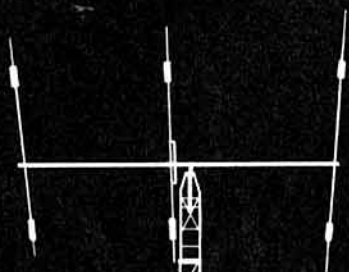
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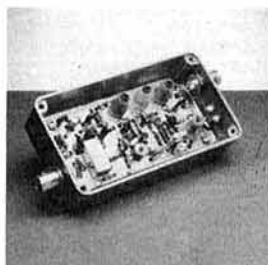
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FABULOUS SONY AIR-7

108-136MHz; 144-174MHz; 76-108MHz; + LW/MW/SW

The new Sony Air-7 is a superb new monitor with a performance and presentation that outperforms the competition. The PLL circuitry, LCD readout and 40 memories (10 on each band) make a most versatile package. Such features as priority channel, channel lockout, and delay are all included and the sensitivity puts most of the competition to shame! It also includes the broadcast bands both VHF and LW/MW and covers such things as NDB beacons as well as part of the marine band to 2194MHz. We are impressed and so will you be when you try it!



SONY 2001D

150kHz-30MHz
76-108MHz
108-136MHz
32 memories
AM/SSB/FM BROADCAST

New from Sony is the 2001D general coverage portable receiver. It gives superb performance on the short wave bands using PLL circuitry and has separate filters for SSB and AM. A novel system of synchronous exalted-carrier provides a dramatic reduction in interference when receiving AM broadcast stations. Features include LCD readout, clock, scanning, timer, RF gain control, comprehensive memories and a host of features that make it an incredible performer. It equals or betters many base station receivers we sell and the SSB performance with switchable upper and lower sideband is a joy to use.

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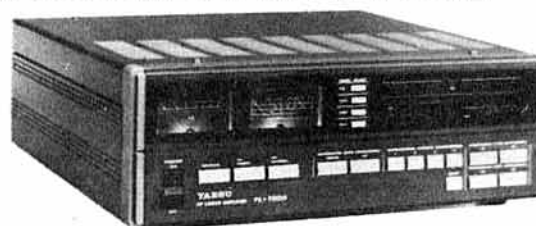
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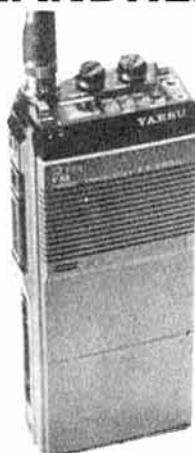
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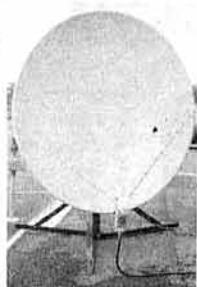
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**SMC
78F**



SMC258

GCD

GCD

SMC-HS MOBILE ANTENNAS		£	P&P
SMC6P2T/PL	Telescopic 2M PL259 fitting	6.33	0.85
SMCT144h	Telescopic 2M 1/2 wave BNC	13.50	0.85
SMC6P2T/	Telescopic 2M BNC fitting 1/2	7.94	0.85
BNC			
SMC2H/PL	Helical 2M PL259 fitting	6.33	0.85
SMC2H/BNC	Helical 2M BNC fitting	7.94	0.85
SMCHS430S	70cm 1/2 wave BNC 2.5dB	9.75	0.65
SMC2OW	2M 1/2 wave 0dB 1.6'	3.15	1.85
SMC2NE	2M 1/2 wave fold 3.0dB 4.3'	13.95	2.00
SMC2VF	2M 1/2 wave fold 3.0dB 3.5'	16.13	2.00
SMC78F	2M 1/2 wave fold 4.5dB 5.7'	23.95	2.50
SMC78B	2M 1/2 wave ball 4.5dB 5.6'	23.95	2.59
SMC78SF	2M 1/2 wave short 4.7'	22.95	2.50
SMC88F	2M 8/8 wave 5.2dB 6.5'	24.10	2.50
SMC258	70cm 2 x 1/2 fold 5.5dB 3.1'	29.37	2.00
SMC268E	70cm 2 section colinear 6dB	32.80	2.00
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HS770

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MORE RADIO AMATEURS NEEDED

One of the more delightful features of our hobby of amateur radio is that there are so many facets of it; each of us broadly enjoys the hobby of "amateur radio" but, as individuals, we tend to concentrate on one or two aspects which we regard as special. The list is enormous, as you know, and includes dxing, bouncing your signals off the moon, packet radio, QRP cw, exploring 50MHz propagation, construction or chatting to friends.

Whatever your speciality, spare a thought or two for the big picture and be prepared now to invest a little of your time for the future. "Oh dear", I hear you say, "not another plug for the sterling work of the RSGB." No, not just that, but a reminder to every single one of you members that amateur radio exists only because radio amateurs all over the world are given access to parts of the radio spectrum in which to experiment and operate. Take away those radio frequencies and amateur radio stops dead overnight. It really does.

In one way or another the Society has been chanting this litany for a long time but the message is as urgent now as ever it was. As time goes by there is more and more pressure on spectrum space, both nationally and internationally; it occurs naturally as the pace and thrust of life changes and develops. As an inevitable result, the amateur service has to spend more time and money to fight harder and harder to maintain its existing allocations, let alone to expand them.

We'd bet that the thoughts forming in your head right now go something like: "Well, that's all fair enough but what's it got to do with me? I'm just one of thousands of members and millions of amateurs worldwide; I come on the air, work a few stations and go off again. Where do I come into all this?" The answer is that we need you and everyone else to contribute to the justification of the retention of our prize assets—our amateur bands—and to devote some time to the future of the hobby.

In our rapidly-changing world every individual, not just the RSGB as a body, needs to continue to justify amateur radio in terms of public service, technical innovation, training and all-in-all a contribution to society at large. We've said all this before, but the aspect of continued growth needs to be highlighted now, before it is too late for any of us to take the appropriate action. Fewer newcomers are entering this hobby of ours, for all sorts of interesting social and sociological reasons; fewer people are taking the RAE, the average age of radio amateurs is increasing, and fewer people are going to most clubs.

This may not affect our everyday activities at the moment, but if the trend towards falling numbers continues, we're going to lose out. Every single radio amateur can make a positive contribution to growth by acting as an ambassador for amateur radio. Next time someone asks you what the funny antenna on your car does or what the diamond badge in your lapel is all about, tell them. Take it as your cue to explain the magic of amateur radio to a colleague, friend or relative. Tell them about the early days, how we pioneered short waves, how we bounce signals off the moon and have our own satellites: make it your business to show them that, as a radio amateur, you're someone rather special.

Next time you are enjoying your own special slice of the action, spare a thought to whether the band you are using will be available in 5 or 10 years' time. We don't want to sound too evangelical, but how about making a friend a friend for amateur radio today?

David Evans, G3OUF

Members' Mailbag

THE EDITOR
RADIO COMMUNICATION
LAMBDA HOUSE,
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The views expressed in published correspondence are not necessarily those of the RSGB, and readers are urged to verify independently any factual statements on which they may wish to rely as it cannot be guaranteed that such statements are correct.

REPLIES TO GW0DLW'S LETTER

Sir—I greatly enjoyed Brian Goldsmith's pungent description of life on the hf bands in your May issue. He claimed to be disappointed, yet admitted to being thrilled by contacts with new countries.

I returned to hf a year ago after being QRT for more than 30 years, and have been astonished and delighted by the many dx and European contacts which I have made. QRP operating techniques and patience seem to be as effective as ever, even with modest equipment and antenna. "Rubber stamp" formula QSOs on cw have the advantage of being easy to follow, even under difficult conditions, and the friendly exchange of "pip-pips" at the end of a contact says more than a great many words. When reception is good there is always the occasional station willing to share a chat.

The next few years should provide increasing opportunities, with improving sunspots and openings of the higher frequency bands. I hope Brian will enjoy all this using his own straightforward "secret to success" and won't really spend his aunt's money on a big linear!

Robert Charlton, G3CPC

Sir—I read with interest the letter of GW0DLW, and he has certainly aroused quite a hornet's nest as far as I am concerned. When Brian took up ham radio as a hobby did he think, as unfortunately a lot of other followers of the hobby do, that it was an extension of the telephone and that they could have their own private frequencies, and that they would not be bothered by other licence holders. There is no such thing as a "hard earned frequency" as he describes it. It is true that this feeling is quite rife. I have been retired for about 12 months or so and I have the same problem on top band. The band will be absolutely clear, and it is not unusual for another station to come very near, or even on top of you, especially around the 1,930kHz section, in the convinced belief that they have a priority to be there, but I realise that is the funny and peculiar whim of these people and I don't get all excited about it. Just put it down to modern operating. Comparing price of equipment, and the problems of operating, then I humbly suggest that Brian gets himself a telephone with a loudspeaking device. No interference, no butting in, and, with some ingenuity, incorporate some QSB and QRM, or go back to channelized 144MHz (no offence intended to the proper operators) if he suffers from QSO withdrawal symptoms.

Ham radio was once described as a hobby devoted to "self training in the art of communication"; the meaning is still there but the understanding is not. This attitude of bad operating and piling on the power also appears on cw; to get the "did did, dah, dah, did, didy" followed by silence and no call sign, that is one of my pet irritations. Or the guy on ssb who comes on with a laconic once-only call sign and expects you to pick up the "telephone" and understand his often broken English. (I am not referring always to non-G stations.) They are very often off frequency and in heavy QRM or QRN at the time. I now just ignore them. Please themselves if they work me or not, certainly I don't suffer from the QSOs. "Piling on the power" is a reminder of a QSO with a DL station some years ago, "if I can't get through then I will pile on the power until I do".

About "piling on the power", the only other comment I have about that is that it does not necessarily cause spread. A local station, recently, was only using 2W double sideband and I heard his sidebands all over the 1.8MHz band. I worked him and that was the only way

I knew he was down the band somewhere; I think he was at least 15 miles from here, so it was not a case of receiver performance or strong signal. Simple rigs can, without adequate filters, cause a lot of QRM. I have a friend who runs up to the legal amount, with a big beam and he doesn't cause trouble. I only run my rig barefoot at 100W and have no intention of going QRO (pardon the cw jargon).

I don't suppose this letter will put the world to rights, the pub is the best place for that, but I hate other people trying to do the same.

L R Beeson, G3IVB

Sir—I would like to know if GW0DLW also advocates that motor-sport enthusiasts be limited to ex-lawn mower engines for power, or that fishermen be restricted to a garden cane and a bent pin because all cannot afford a 16-valve turbo-engined rally car or a Hardy rod?

No, Mr Goldsmith, don't give me that "codswallop". Go out and improve your station; start with your antenna system, look critically at your receiver and ask yourself: "Is it good enough for today's crowded bands?" Remember it's not always related to cost. Many older receivers have a dynamic range far in excess of some modern "bells and whistle" black box. If you want to ragchew find a clear spot away from the recognized dx windows—you won't get a lot of opportunity to ragchew around 14,200kHz for instance. Incidentally, a majority do not like lists, dxers much prefer to work them under their own steam. Lists are primarily to give the weaker station a chance.

Yes, I am sorry on, it is a fact of life that if you want to work dx you have got to get yourself a better station. Please don't ask me to take down my tribander and throw away my linear because you haven't got one. It took me 14 years of work to build that station from my first homebrew transmitter (that cost me £37s 6d, in real money, for the bits). My linear is 16 years old, a long discontinued model when I acquired it. My transceiver has been out of production for seven years, and my tower was bought secondhand, for peanuts, three years ago. The concrete mixed by hand from sand and gravel, carried in buckets, six miles in the back of my 950cc motor car! It was a lot of hard work and still not finished, one day perhaps, but not yet. Wait, I nearly forgot, my garden is quite large, I suppose, measuring some 35 by 25ft. You see, I was not remembered by an old aunt either.

I do dislike the thought of consuming canine meat, but if that's your pleasure, I will see you in the "pile up". However, if your attitude is really "give me my ball back, the big lads are coming" I can only suggest you take up some other pastime, tidlywinks perhaps, although I understand that is competitive as well. So please be patient and wait until the ink is dry on your licence, plan ahead and work to improve your station—it's a lot of fun trying and generates a lot of satisfaction. Then you can look forward to years of pleasure from our hobby because of your own achievement.

Bill Ricalton, G4ADD

Sir—I agree with many of the points made by Brian Goldsmith. My experience of amateur radio is similar; I was active on 144MHz fm/ssb for just under two years and made many friends through regular contacts. I had to use indoor antennas, as I am not officially allowed to even erect an external tv antenna. Even with this limitation, I worked many Continental stations and found the hobby satisfying.

When I received my Class A licence last November, I immediately changed my 144MHz multimode rig for an FT7 hf mobile rig. This was a big mistake! I soon discovered that 10W in a bad year can lead to rapid disillusionment. I know many people successfully operate QRP, but they usually have a good external antenna system. I thought higher power might solve some of the problems, so I purchased an FT200. It was a little easier, but I soon discovered the three points Brian made.

Accept that at some time your frequency will

be stolen, but realize that it may not be deliberate; just because you can hear the interfering station, do not assume he can hear you. He may be running considerably more power than you. Also, it can sometimes help if the station you are in QSO with announces that the frequency is occupied.

You can still get the nice, cosy chats. Use 3.5MHz in the early evening. You can also get them on 14MHz, but you need to be QRO, or possess a six-element monobander at 40ft!

Forget the dx nets, as the same comments as above apply. I have not made as much use of cw as I should have done, but I agree that it is a good way (or the only way) of working some of the exotic stations.

There are many aspects to amateur radio and many challenges. To many of us, the main challenge is how to communicate with someone far away with relatively low-cost equipment and an inefficient antenna system. I cannot afford better equipment, so my personal challenge is to improve on my antenna system. It is amazing what can be achieved with a few pieces of wire.

If you want it easy, stay with 144MHz fm. I do not regret adding hf to my operating modes (I did buy another 144MHz multimode), because it prevented the technical side of my hobby becoming stagnant. The same could also be said of many others who only use 144MHz. With a Class B licence there is plenty of room for experiment on 432MHz and above.

Keith Venn, G0GFD (ex G1NWB)

Sir—I read with some interest Mr Goldsmith's letter regarding life on hf, and whilst sympathising with his dilemma would like to make the following comments.

Many G stations forget the fact that English is *not* the mother tongue of the whole wide world! Yes, it is very widely spoken and usually the first, *foreign* language a non-English person may learn, but the British radio amateur should not be so arrogant as to expect everyone to have a wonderful command of his language.

I am fortunate enough to have a reasonable command of the German language and a working knowledge of French. Not a week goes by without my having two or three hours' worth of German QSOs and it is not uncommon for a QSO to last 20 minutes. On occasions a QSO has lasted over an hour! Time and time again I am told how much the other station enjoyed a long QSO, but their knowledge of English was so basic that only a standard "rubber stamp" QSO was possible with non-German speakers.

I am certain that this problem also exists for Russians, Poles, Italians, and all "foreigners". Anybody wishing to make the jump from vhf to hf and expecting to have "nice cosy chats" ought to bear this in mind. Most of us learned some French at school but how much of a "cosy chat" could the average G have in French?

Another spin-off for a G operating in a foreign language is that he will frequently find himself on the "right end" of a pile up. Invariably when I work in German I only need to call CQ to pick up my first QSO. From then on, as I finish with one station another will call.

So spare a thought for the foreign operator. He may be having a "rubber stamp" QSO not because he wants to but because he has no other choice. I'll always remember the day I heard two stations on vhf talking about a French station they had both worked that day and they were taking great delight at criticising the standard of the Frenchman's English. Gentlemen, at least he had a go!

In conclusion, I would like to ask a totally unrelated question. Why can't those call signs appearing in the *Callbook* as "particulars withheld" be omitted from the *Callbook* altogether? People not wishing to have their telephone number printed in their local directory are just not listed. A name and address and "Number withheld at subscriber's request" would look pretty odd in the "phone book! So using the same logic why not print only

callsigns, names, and addresses of those radio amateurs who want their particulars circulated? As a result the *Callbook* would be smaller (and perhaps even cheaper!).

John S Hornsby, G0AJH

Sir—It was with some dismay that I read the letter from GW0DLW in the May *Rad Com*. On reflection, I suppose it accurately reflects the kind of culture shock faced by anyone coming from 144MHz to the hf bands.

On 144MHz there is 2MHz of band available and, under flat conditions, a range of some tens of miles. On the hf bands, discounting the WARC bands and, at this stage of the sunspot cycle, 28MHz, the total spectrum amounts to just 1.4MHz. The range, on the other hand, is hundreds, or even thousands, of miles. The potential for QRM must be tens of thousands of times greater, and we hear that even 144MHz gets crowded at peak times! For the unsuspecting vhf enthusiast coming on to hf, the comparison must be with a motorist venturing for the first time on to a busy motorway.

Calling for lower power in such a situation isn't necessarily going to help (even if it were realistic to expect those with linears to give up using them, which it isn't). Of course the bands are going to be extremely busy at evenings and weekends and, arguably, it would be selfish at such times to ragchew for long periods and monopolize scarce frequency space, just as it isn't appropriate to hog a vhf repeater at going-home time. On the other hand, there are many times when it is possible to ragchew with distant stations with modest power and with little or no QRM. The 21MHz band is frequently like that during the week, and 28MHz is wonderful when it is open. Unfortunately we have to face the fact that, right now, 14MHz will be carrying the majority of dx traffic and will get busy. What always surprises me is that, given the number of stations within range at any one time, and the limited bandwidth available, the QRM isn't worse. I believe this speaks volumes for the self-discipline of all but a few hf operators.

Incidentally, I have never understood the arguments of those who cry foul when their fellow amateurs use the maximum legally-authorized power. The distinction between a hf transceiver "barefoot", and with a linear, is fairly arbitrary and has more to do with what it is convenient for manufacturers to make and sell than with any basic scientific truth. If cash is the problem, a good secondhand transceiver with linear can cost considerably less than a brand-new all-singing all-dancing rig, and you will work much more dx with the former. As for using beams, this is actually much more social than sending power wantonly to all points of the compass, and directional antennas on hf can be squeezed into even relatively small gardens, as I have tried to show in my recent talks at the NEC and elsewhere.

My message to GW0DLW is: "Stick with it, put some effort into your station to make it as potent as possible, and start enjoying hf." On the other hand, if he wants a quiet life without the excitement of talking to people from different races, cultures and backgrounds in the far flung corners of the globe, then stick to vhf. Forced to make the choice, I know which I would choose!

D I Field, G3XTT

Sir—Having read Brian Goldsmith's letter, I can't help wondering just what he expected hf to be like, as his comments could be equally well applied to vhf from what little I've seen of it. It's a dog-eat-dog world. Period. Amateur bands are populated by real people, so you're bound to find the full gamut of human failings just as with life in general.

Fortunately, you're also bound to find the odd smatterings of the better side or human nature too. As with life in general, among all the bickering and fighting it's still possible to have a hell of a good time. It all comes down to using a bit of nous to find your own niche.

As for the guy with the ultimate megastation, he works all countries and zones without any bother... but what does he do next week?

David J Reynolds, G3ZPF

These letters represent a small sample of those we received in reply to the letter from GW0DLW. Sounds like a good debate—any

more contributions on the subject? Any offers from confirmed vhf/hf dx-chasers, for instance?

BAND PLANS

Sir—While in the USA on holiday, I visited a local amateur radio shop, which had a notice board carrying information on local clubs etc. Also attached was a notice stating that the FCC proposed to withdraw from use by amateurs the 220-222.9MHz band. This would leave 223-225MHz for amateur use only.

Checking the new band plan for UK use of these frequencies, I note that 223-225MHz is allocated to mobile radio use for both ways duplex operation. Maybe the RSGB could consider campaigning for these frequencies to relieve the congestion on 144MHz. Additionally, would it not be a good idea to get B licensees permission to operate 28MHz fm with limited power? This again would relieve 144MHz congestion and enable the use of low-cost modified cb sets in an under-used band, while keeping illegal operators out. Do any other amateurs agree?

Doug F Ash, G1BWW

Mr Ash's letter pre-dates the release of 50 and 70MHz to Class B licensees, although the obvious reply is that 430MHz is also extensively used for mobile operation. The Radio Regulations stipulate that a Morse test must be passed to operate on frequencies below 30MHz. We wouldn't think there's much chance of a 220MHz amateur band here in the UK, although you never know....

I WONDER WHY?

Sir—Many of us will have had the following experience, perhaps at Covent Garden or some similar venue; a solitary cough is followed by a veritable outburst of "shushes" which completely drown whatever is happening down there on the stage.

I thought of this—I wonder why—this morning. A rarity turned up on 14MHz and the usual dogfight developed. As I hovered on the brink wondering if it was worth dipping a tentative toe in the stormy seas, I noticed that a good half of the competitors (the polite ones) were sending (the polite ones) "QSY", while others were addressing remarks to someone called "Lid".

As Robert Owen is alleged to have said: "Everyone's queer save thee and me; and even thee's a little queer".

J J Maling, G5JL

See also the continuing debate, above, on GW0DLW's letter. Are there any practising psychoanalysts amongst our readers? We'd love to see an exploration of the unconscious mechanisms which find expression in amateur radio (or any other hobby, come to that) although we suspect it might make painful reading....

WITHHOLDING PARTICULARS

Sir—With reference to recent correspondence about RSGB *Callbook* entries and those trying to hide behind "Particulars withheld at licensees request".

Who do they think they are hiding from? Makes me laugh because there are firms who specialize in selling lists or even books of names and addresses—where do they think the perpetrators of "junk mail" get their names and addresses from? I am a postman and know that 90 per cent or more of this stuff is unsolicited. Besides, electoral rolls are freely available to the public, admittedly they only give name and town or village (except London Metropolitan area where full address is given) and this should be the minimum requirement for the *Callbook*.

And in any case, what a wonderful store of callsigns for a would-be pirate to choose from.

Ken J Randall, GD3RFH

USE OF 432MHz

Sir—432MHz is a very good band, and good conditions often go to waste through lack of activity. Often I've worked a QRP single-Yagi ssb station over a considerable distance (I only use 10W), perhaps another station or two, then... nothing. It's not that the propagation has deteriorated, just simply a lack of activity, it seems.

At present, if a 144MHz ssb operator considers the next band up, it must be all too easy for him to get the impression that there's nothing doing on 432MHz and either plump for a big 144MHz linear instead or disappear downwards towards dc. True, stations soon pop up for the big 432MHz openings, but we have to convince the potential 432MHz enthusiast that there is "life between lifts". Frequently, after calling fruitlessly on 432MHz I have called on 144MHz for 432MHz contacts—always with satisfactory and often surprising results.

Perhaps, therefore, it would be helpful to suggest a frequency in the 144MHz ssb segment as a centre of activity for 432MHz receiver-equipped amateurs to aid 432/144MHz crossbanding? With a 144MHz spot frequency, a 432MHz receiving amateur can enjoy a crossband QSO and get the feel of the band. The 432MHz band would carry at least "half a QSO"—better than unanswered CQ 432MHz. Maybe a distant 432MHz station would catch this side of the conversation and tailend—or monitor the 144MHz frequency and realize there is some 432MHz ssb activity he can beam up on.

But surely the biggest advantage of all is that the new amateur, understandably feeling the pinch after equipping himself with a 144MHz multimode, colinear and eight-element Yagi, would be encouraged to go the relatively small extra expenditure of adding a small single 432MHz Yagi and a bit more H100 at the same time, ready for the later addition, when cash allows, of a kit-built or bought converter. With something to listen for it will seem worthwhile. Crossbanding will let the 432MHz ssb "bug" bite and he/she will soon be keen on getting QRV 432MHz.

I feel that at the moment we are in the circle of low activity breeding low interest, and a suggested 144MHz crossband frequency would stimulate a lot more use of a very interesting band. As activity levels rose the frequency would probably fall into disuse. But until then I believe it would be a great help, specially out here in the sticks, where things can be very quiet on 432MHz.

What do other amateurs think?

Stuart Pillinger, G6DDJ

PS. The Monday night activity period is a lifesaver for 432MHz in the Torquay area, perhaps the 144MHz frequency could be used just on Mondays?

PLANNING PERMISSION!—MANY THANKS

Sir—May we take the opportunity of using this page to thank the RSGB and its Planning Committee for their much-valued help in obtaining planning permission for our mast and antenna. Without the support of the RSGB and vast help from Mr Kerry Lewis of the Planning Committee, we feel sure that we would never have been given the permission, which took just over one year to obtain.

Mr Lewis came to our assistance when we were refused permission by our local council, and took over all the form-filling and applications for us, as our knowledge in these matters is extremely limited.

Aldo and Dawn Corallini, G0DCW and G4YOS

"CAVEAT EMPTOR"—AGAIN!

Sir—Last summer I responded to a Member's Ad in *Rad Com*. The advertiser lived some distance from my QTH, so we agreed a price on the telephone and I sent off a cheque, which was promptly cleared. The equipment did not arrive despite further telephone calls, several letters including one by recorded delivery, and one from the secretary of the RSGB. Eight months later it seems that the chance of recovering my money or the equipment must be waning.

What lessons can one draw from this experience? My sad conclusion is that members had better be careful about purchasing items by post from Members Ads. Everyone, myself included, would be properly cautious when purchasing a major rig, but the item in question here was under £100 in value. No doubt this was a wholly exceptional occurrence but it leaves a very bad taste. You have been warned!

C T Dollery, G3GAF

A CRYSTAL CALIBRATOR UNIT

S Niewiadomski,

BEng, MSc, MIEE, CEng^{*}



Introduction

A crystal-controlled calibrator—or marker as it is sometimes called—having outputs at known frequency steps, is a useful piece of test equipment in the shack. As well as being used to set the tuning dial on receivers with analogue readout, and to give confidence that all is well with digital readout receivers, a calibrator can be used to calibrate transmitters and transceivers. Another use is in checking the stability of oscillators. Some details of these applications are given later.

The calibrator included in this unit produces outputs at harmonics of 10kHz, 100kHz or 1MHz, depending on the setting of a front-panel-mounted switch. Harmonics extending into the vhf region are present in the output waveform.

Other useful functions can be included into a calibrator unit at relatively little extra cost. Those incorporated into this unit are first, a ttl-compatible clock output at selectable frequencies from 1MHz down to 1kHz, and, second, an accurate 1kHz pure sine wave output. This output can be used for distortion testing of amplifiers, or as a general-purpose sine-wave source. These extra facilities can be omitted if not required, without affecting the operation of the basic calibrator.

Circuit operation (Fig 1)

A 1MHz crystal-controlled oscillator is formed by IC1c and associated components. R1 biases the inputs of this gate so that it acts as a linear amplifier, sustaining the oscillation. The exact frequency of oscillation of the crystal can be trimmed by adjusting C21. The output from IC1c is buffered by IC1d which drives the CLOCK input of the 4518B dual decade counter IC2. By connecting the Q4A output to the ENABLE input, the two divide-by-ten stages of IC2 are connected in series and the overall division ratio is 100. The Q4B output of IC2 drives the CLOCK input of IC3, another 4518B, of which only one decade divider stage is used.

Six outputs from IC2 and IC3, as well as the 1MHz output from IC1d,

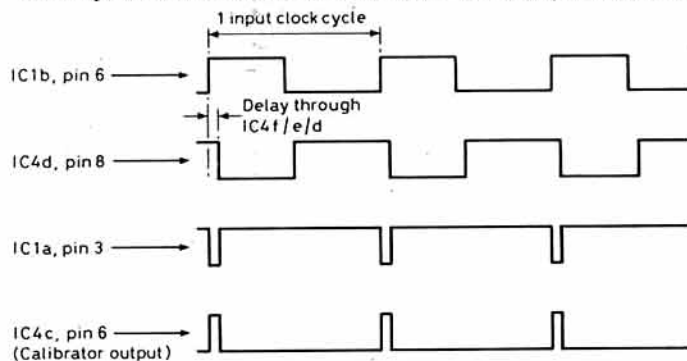


Fig 2. Timing diagram of narrow pulse generator (timing delay exaggerated)

are connected to S1. This allows any one of these signals to be selected and buffered by IC4a. The pull-down resistor R3 on the input to IC4a prevents this input from floating, with the possibility of damage, while S1 is between positions. The output of IC4a is connected to a front panel socket, SK1, and provides a ttl-compatible output at 1MHz and 500, 100, 50, 10, 5 or 1kHz depending on the setting of S1.

The 1MHz, 100 and 10kHz outputs from IC2 and IC3 are selectable by

S2 which feeds the input to IC1b. This gate drives the narrow pulse generator IC4f/e/d/IC1a. A timing diagram illustrating the operation of this circuit is shown in Fig 2. Basically, a clock signal and its delayed inverse are fed to the two-input NAND gate IC1a which produces a logic 0 following each positive edge of the original clock signal. This circuit can be thought of as a digital monostable, producing a fixed length output after being triggered by a clock edge. It is because of the speed requirement of this part of the calibrator unit that HC or HCT devices must be used for IC1 and IC4. These high-speed cmos devices produce narrow width (typically 20ns) logic 0 pulses with fast edges at the output of IC1a. The output of IC1a is inverted by IC4c which drives SK2, the calibrator output, via a dc blocking capacitor, C20.

The Q3A output of IC3, which also runs at 1kHz, is buffered by IC4b and feeds the filter driver operational amplifier stage, IC5. This Q3A output from IC3 was chosen because it has a mark:space ratio closer to 1:1 and therefore contains a smaller second harmonic content than Q4A. C7 acts as a dc blocking capacitor, and the network R4/C8/R5 attenuates the high frequencies present in the 1kHz square wave.

C12, C13, C14, C15, L1, L2 and L3 form a seven-pole Chebyshev lowpass filter. The cut-off frequency has been set to approximately 1,200Hz to prevent the possibility of higher-than-desired attenuation at 1kHz, due to component tolerances, had the theoretical cut-off been set to exactly 1kHz. The input and output impedance of the filter is 470Ω, and this is provided on the input by R11. The output is left unterminated, resulting in more passband ripple than calculated, but this is immaterial in this application. This results in a better stopband response, which is exactly what we need here.

RV1 allows the output level taken from the filter to be varied and feeds the output buffer stage, IC6. This stage provides a voltage gain of one, and has a low output impedance to drive external circuits via SK3, the 1kHz sine output. A low-noise, low-distortion device such as the TL071 specified should be used for IC6 if the purity of the output waveform is to be preserved. Actual measurements on the prototype have shown the 2kHz component to be -75dB and the 3kHz component to be -55dB with respect to the 1kHz level. A maximum output level of approximately 3.5V peak-to-peak is available, and this can be increased if desired by increasing the value of the feedback resistor R16.

IC7 produces the +5V rail for all the logic. Although IC2 and IC3, being 4000B-series devices, can operate from rails as high as 15V, the HC/HCT devices, IC1 and IC4, have an upper limit of 6V. The unit is intended to be powered via SK4 and SK5 from an external power source. However, the total current consumption at 12V is only about 10mA and so internal batteries could be used.

Building the unit

The etching pattern of the pcb is shown in Fig 3. I have deliberately not cramped the component and track spacings so that the pcb can be reproduced easily by hand using an etch-resist pen.

Fig 4 shows the positioning of the components on the pcb. IC sockets can be used to mount IC1-6; these can be very helpful during testing, allowing a suspect ic to be removed without fear of damaging it or the pcb. Since all the digital ics used are cmos devices and the operational amplifiers have jfet inputs, take the normal anti-static handling precautions and ensure that your soldering iron is earthed. The links required on the board can be made from bare wire, as their spacing means there is no danger of adjacent links shorting together.

On the prototype, X1 was soldered into the board, but a holder can be

^{*}30 Edgehill, Freshbrook, Swindon, Wilts.

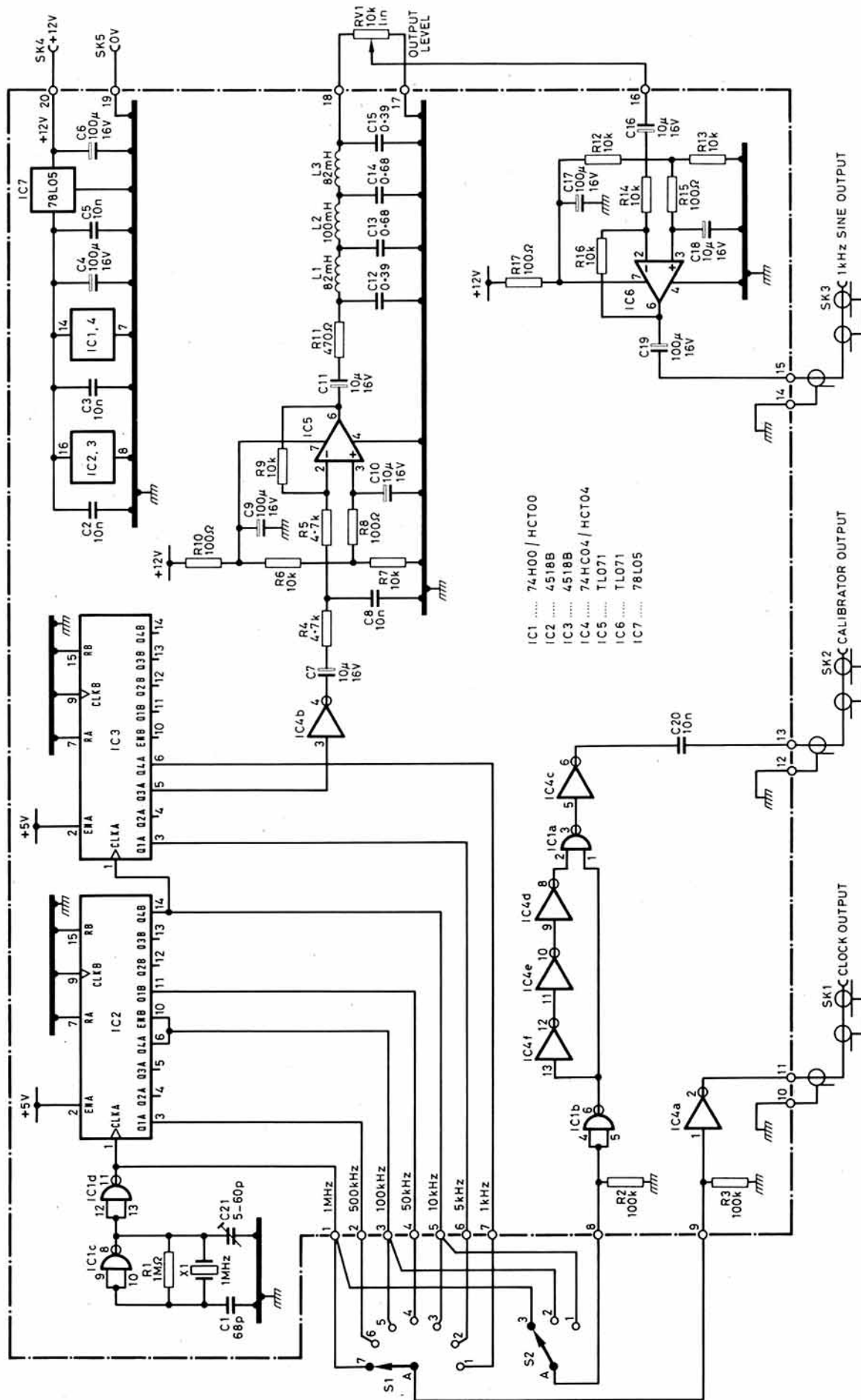


Fig 1. Calibrator unit circuit diagram. Note that pin 10 of IC3 should be connected to ground

used. If you do solder it directly, take care to complete the job as quickly as possible.

On the prototype, 1mm solder terminals were used for the 20 external connections to the board. These give a neat finish and allow connections to be soldered and unsoldered without having to remove the board from its mountings to get access to its underside.

The prototype unit was housed in an aluminium case type J9, available from Minffordd Engineering, but any suitable case which is to hand can be used. No detailed case drilling information is given here, but suggested positions of the major components is shown in Fig 5. It is best to obtain all the components which are to be mounted in the case, including the pcb, *before* drilling any holes so that the hole diameters and centres can be checked first. Unless you have a large drill available, the holes for the switches, sockets and RV1 will probably have to be finished with a round file or tapered reamer.

Output sockets other than the BNC ones specified can be used if they are more convenient for your set-up. No attempt is being made to match impedances at the outputs, so do not worry about this aspect.

There is sufficient room at the left-hand side of the pcb to mount a battery holder if desired. The prototype unit worked down to 7V, so a holder for six AA-size batteries (giving nominally 9V) could be used and would give long life if used intermittently. An on/off switch would also need to be fitted, and it could be mounted on the rear panel instead of SK4 and SK5.

Testing

Before applying power to the unit, a careful visual inspection should be made, looking for solder bridges on the pcb, checking the value and orientation of each component, and checking the wiring to the controls and sockets. If all is well the power can be switched on and the supply current measured if a milliammeter is available; this should be approximately 10mA—if it is much more than this, switch off quickly and re-check everything.

If an oscilloscope is available, the crystal oscillator can now be checked, monitoring the outputs of IC1c and IC1d; a square wave of 5V amplitude should be seen. Now move along the outputs of IC2 and IC3, verifying that the correct frequency outputs are being produced. To complete the testing of the clock generator components and wiring, monitor SK1 and check that the correct frequency output is produced for each setting of S1.

Now monitor the input of IC1b and check that 10 or 100kHz or 1MHz is present as S2 is rotated. The inputs to IC1a can be checked to see that they appear to be the inverse of each other if a dual-beam oscilloscope is to hand. Unless the oscilloscope is of high quality, the slight delay of one input with respect to the other will probably not be seen. Similarly, an oscilloscope with a relatively low bandwidth will not show much of the narrow pulses at the outputs of IC1a, IC4c and SK2.

The 1kHz sine wave circuitry can now be checked. Monitor the output of IC4b and check that a 1kHz rectangular waveform is present. Now move to the output of the filter, or the top end of RV1, and check for a sine wave. Finally, move to SK3 and check that an undistorted sine wave, whose amplitude can be varied by RV1, can be seen. The maximum amplitude here should be approximately 3.5V peak-to-peak.

Now that the unit is fully functional, C21 can be adjusted to set the oscillator to as close to 1MHz as possible. If a frequency counter of known accuracy is available, this is simple. An alternative is to use a receiver tuned to a standard frequency transmission such as MSF Rugby on 2.5MHz, 5MHz or 10MHz.

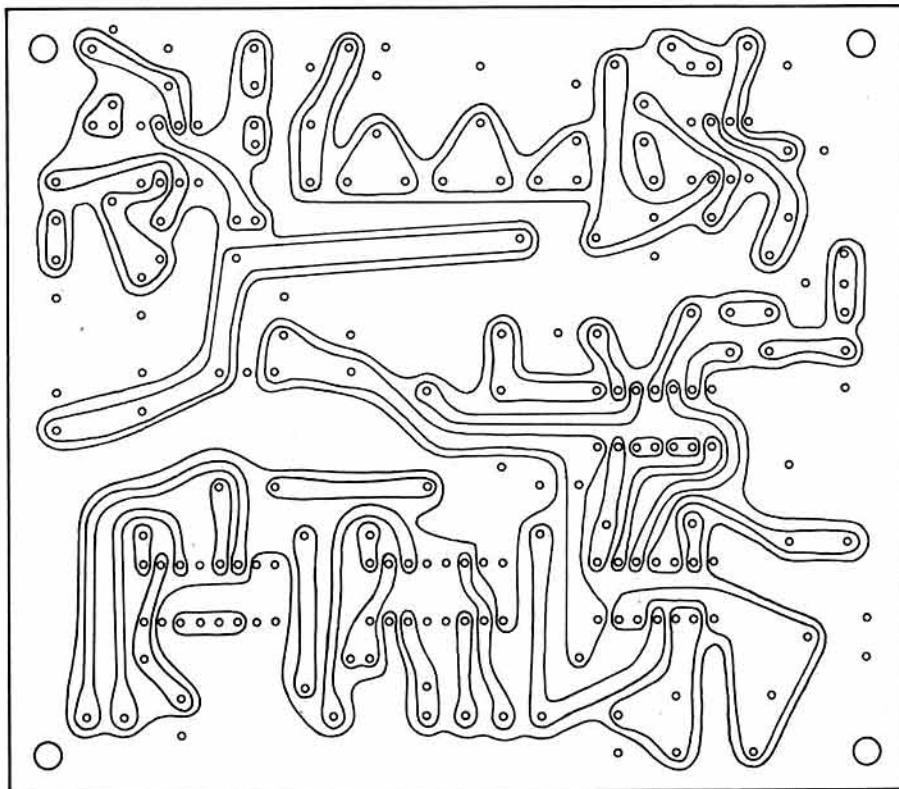


Fig 3. PCB tracking

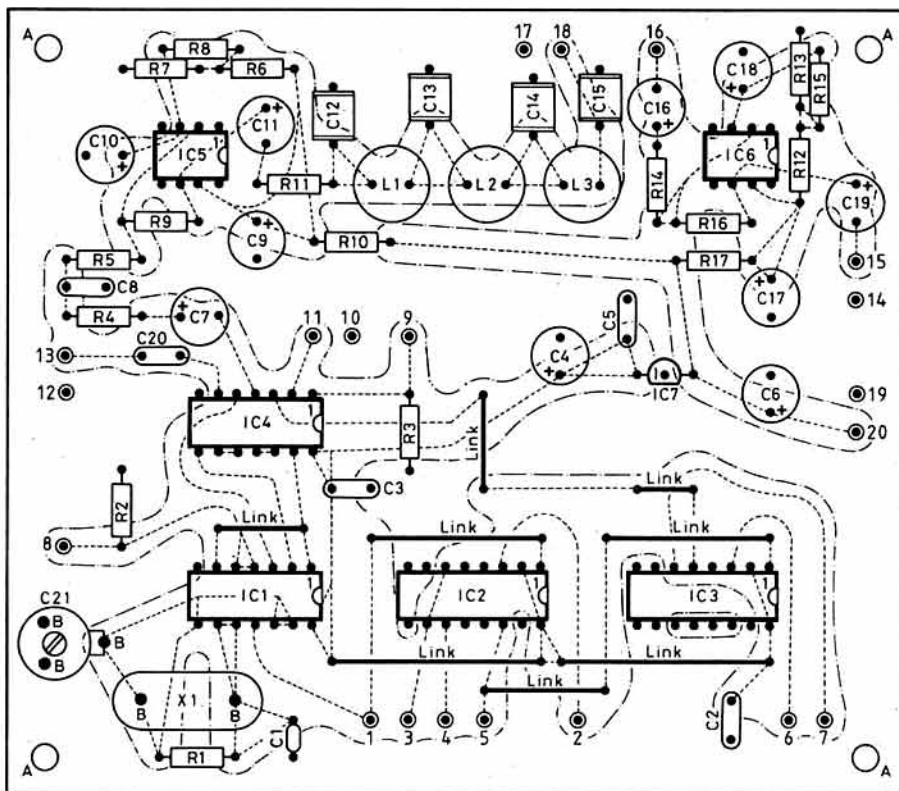
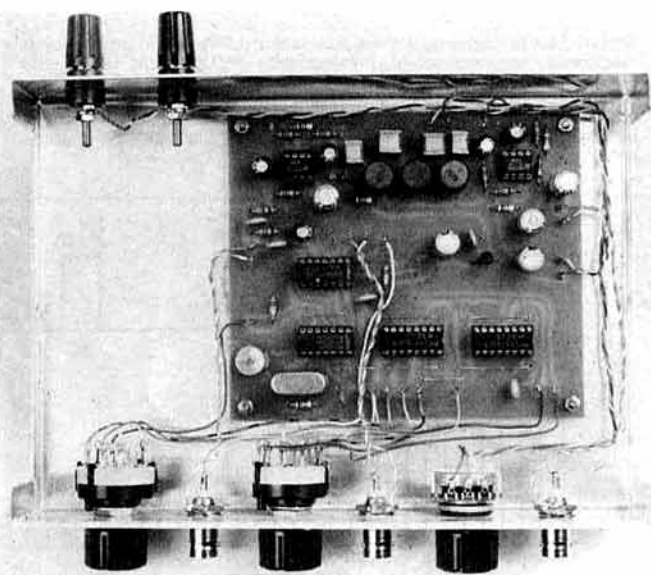


Fig 4. PCB component layout

The MSF transmissions consist of a continuous carrier, amplitude modulated with short bursts of 1kHz at 1s intervals for the 5min following each multiple of 10min. Use the S-meter on your receiver to tune in the signal accurately. Now switch the calibrator unit to 100kHz, connect it to the receiver, switch the bfo on, and adjust C21 for zero beat. This is all that is needed; the other ranges will automatically be accurately set as they are all derived from the same crystal oscillator.



Interior view of the crystal calibrator

Using the unit

Checking the dial setting of a receiver should be carried out by attaching a short length of wire to the calibrator output (SK2) and placing it close to the receiver's antenna socket. This should give sufficient coupling to enable the marker frequencies to be heard. A direct connection to the antenna socket can be made if necessary. The receiver's bfo should, of course, be turned on for the markers to produce an audio output. If the receiver is already in reasonable calibration it should be possible to use the 10kHz setting of S2 to make a fine adjustment to the receiver. The receiver's manual should be consulted on how to make this adjustment: do not be tempted to start twiddling trimmers and cores without knowing exactly what you are doing! A receiver further out of calibration might require an initial marker spacing of 100kHz or even 1MHz to locate a known initial dial setting.

As the calibrator output is switched between the 10, 100kHz and 1MHz settings, the markers will be found to get stronger. This is what would be

expected, as the width of the output pulses always remains constant, but on the 10kHz setting they contain 10 times as many discrete frequencies as on the 100kHz setting. The energy content of each frequency component would therefore be expected to be lower at the 10kHz setting. A similar argument is true for the 100kHz setting with respect to the 1MHz setting.

A newly-built receiver, completely uncalibrated, is best calibrated by initially locating a known frequency signal, such as an RSGB news broadcast on about 3,650kHz. Using the calibrator on the 100kHz setting, the receiver is then tuned lower in frequency until the 3.6MHz point is located. This is marked on the dial. The other 100kHz points within the band can then be located and marked, before the calibrator is switched to 10kHz to mark the dial at finer intervals.

When checking a transmitter, the signal from the transmitter is first tuned in on a receiver, and the dial reading at which it is heard noted. Then the 10kHz-spaced marker frequencies above and below this reading are tuned in and noted. The transmitter frequency obviously lies between these two known frequencies.

When the receiver and transmitter are combined in a transceiver, the above method cannot be used, as the receive and transmit sections cannot be used simultaneously. However, since the receive and transmit frequencies should be the same, it is only necessary to calibrate the receiver section as described above.

Since the calibrator output is crystal-controlled, and therefore, very stable, it can be used to check the stability of the oscillator(s) in, say, a receiver. This can be done by tuning the receiver to approximately 1kHz from a marker and then assessing how much the audio beat frequency changes with time, either by ear or by connecting a frequency counter to the receiver's audio output. This method has several advantages: first, the receiver can be checked without having to get access to its oscillator output which could in itself affect stability; and second, the covers of the receiver do not have to be removed, which again could affect stability due to draughts.

The clock output from SK1 is intended as a general purpose ttl, or cmos operating from 5V compatible signal source. It can be used, for example, to supply a clock to a digital circuit under development before the clock source built into the circuit itself is constructed or working. Although only seven different frequencies are selectable by S1 as built into the prototype,

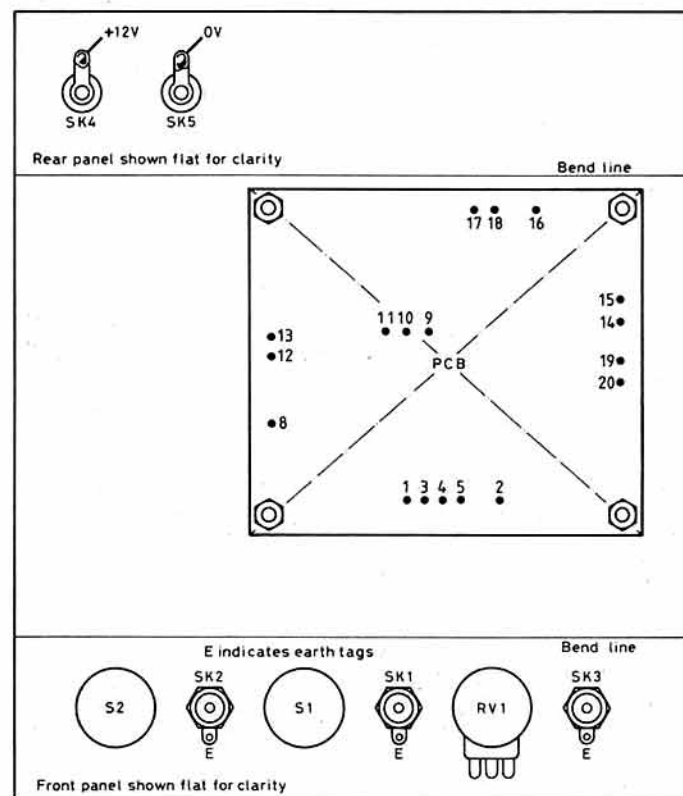


Fig 5. Component placement in case

Components list

R1	1MΩ
R2, 3	100kΩ
R4, 5	4.7kΩ
R6, 7, 9, 12, 13, 14, 16	10kΩ
R8, 10, 15, 17	100Ω
R11	470Ω
All resistors are 0.25w 5% carbon	
RV1	10kΩ linear carbon pot
C1	68pF ceramic plate
C2, 3, 5, 8, 20	10nF disc ceramic
C4, 6, 9, 17, 19	100μF 16V radial electrolytic
C7, 10, 11, 16, 18	10μF 16V radial electrolytic
C12, 15	0.39μF polyester Siemens type
C13, 14	0.68μF polyester Siemens type
C21	5-60pF foil trimmer
L1, 3	82mH Toko Type 10RB
L2	100mH Toko Type 10RB
X1	1MHz HC33U crystal
IC1	74HC00 or 74HCT00
IC2, 3	4518B
IC4	74HC04 or 74HCT04
IC5, 6	TL071
IC7	78L05
S1	Single-pole seven-way rotary (use a 12-way switch)
S2	Single-pole three-way rotary
SK1, 2, 3	Chassis-mounted BNC sockets
SK4, 5	4mm insulated terminals, red and black
Miscellaneous	
PCB (see text).	
IC sockets (two 16-pin, two 14-pin, two 8-pin) if required.	
Case (type J9, available from Minifordd Engineering, Sun Street, Ffestiniog, Gwynedd; or similar).	
Knobs for S1, S2 and RV1.	
1mm terminal pins 20 off.	
6BA screws, nuts.	
Connecting wire.	

more can be added if required. The following outputs from IC2 and IC3 have alternative frequencies available:

IC2 Q2A (pin 4).....200kHz	IC3 Q2B (pin 12).....200Hz
IC2 Q2B (pin 12).....20kHz	IC3 Q3B (pin 13).....100Hz
IC3 Q2A (pin 4).....2kHz	IC3 Q4B (pin 14).....50Hz
IC3 Q1B (pin 11).....500Hz	

Simultaneous outputs can be taken from IC2 and IC3 if required.

One application of the 1kHz sine wave output is in the testing of audio amplifiers. This output, set to a low level, is connected to the input of the amplifier under test and traced through the circuit, watching for possible distortion. If any is found then because the source is undistorted, it must be due to a fault in the circuit under test. If the output stage of the amplifier is Class B, requiring the quiescent current to be set, monitor the output with an oscilloscope while adjusting the potentiometer which controls the quiescent current. As the current is reduced, a level will be found where cross-over distortion is evident. Increase the quiescent current a little, making the distortion disappear, and you can be confident that the quiescent current is set as low as possible while keeping distortion low as well.

APPENDIX. Ideal calibrator waveform

This section gives some theoretical background to the type of waveform useful for calibration purposes. Many designers recognize that a square wave like that shown in Fig A1(a) contains many harmonics of the fundamental frequency, and so is useful as a calibrator output. The use of a 1:1 mark/space ratio waveform, however, has its drawbacks, as theoretically it contains only the odd harmonics of the fundamental frequency. Fourier analysis of a perfectly 1:1 mark/space ratio square wave gives the frequency spectrum as:

$$f(t) = k \left[\cos(\omega t) - \frac{\cos(3\omega t)}{3} + \frac{\cos(5\omega t)}{5} - \dots \right]$$

where k is a constant whose value depends on the peak voltage of the square wave. This expression uses $\cos(\omega t)$ to indicate a sine wave at the fundamental frequency, $\cos(3\omega t)$ for a sine wave at three times the fundamental, and so on. Remember that a cosine wave is just a sine wave shifted by 90° . Note that only terms such as $\cos(\omega t)$, $\cos(3\omega t)$ etc, are present, and no even harmonics are present at all. This spectrum is shown in Fig A1(b), and the gradual reduction in the amplitude of successive components can be seen.

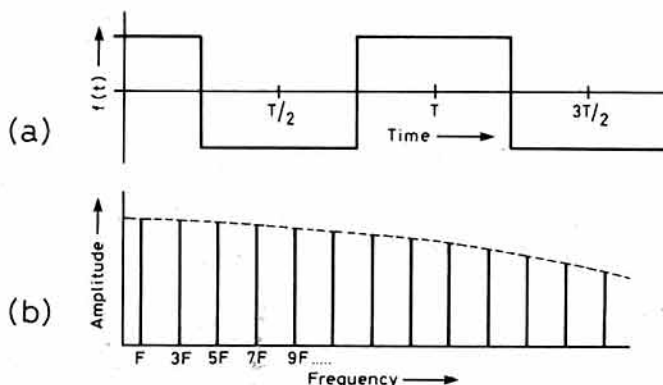


Fig A1. (a) 1:1 mark/space ratio square wave. (b) Frequency spectrum of (a) waveform

Fig A2(a) shows a waveform which does not have a 1:1 mark/space ratio, consisting of rectangular pulses of duration τ seconds and repetition time T seconds. The frequency spectrum of this waveform is more complex than the previous example and is given by:

$$f(t) = k_1 + k_2 \left[\cos(\omega t) \cdot \frac{\sin(\pi/k_3)}{\pi/k_3} + \cos(2\omega t) \cdot \frac{\sin(2\pi/k_3)}{2\pi/k_3} + \dots \right]$$

where k_1 , k_2 and k_3 are constants. A plot of this spectrum is shown in Fig A2(b). Note here, first, that all the cosine terms (of ωt , $2\omega t$, $3\omega t$ etc) are present, and second, that the amplitudes of these terms follow a $\sin x/x$ type of sequence.

One characteristic of this $\sin x/x$ sequence is that its value is zero at multiples of the frequency equal to $1/\tau$ Hz. So if the pulse duration is 100ns, the zeros will be at 10MHz, 20MHz and so on: if the pulse duration is 10ns the zeros will be at 100MHz, 200MHz and so on. If one of these zeros happens to correspond to a harmonic of the repetition frequency, that harmonic will not be present.

It can be seen that as the duration of the pulses in the waveform becomes shorter with respect to the repetition frequency, the amplitude terms become smaller more slowly, and so the frequency harmonics are more equal in amplitude. If the pulses in the waveform were infinitely thin, all the harmonics would be equal in amplitude because the first zero in the $\sin x/x$ envelope would be at infinity.

The ideal output waveform from a calibrator consists, therefore, of the narrowest possible pulses at the repetition frequency of the desired calibration spacing. How then do 1:1 mark/space ratio square wave designs manage to do their intended function, despite the arguments put forward above? The answer is that the square waves produced

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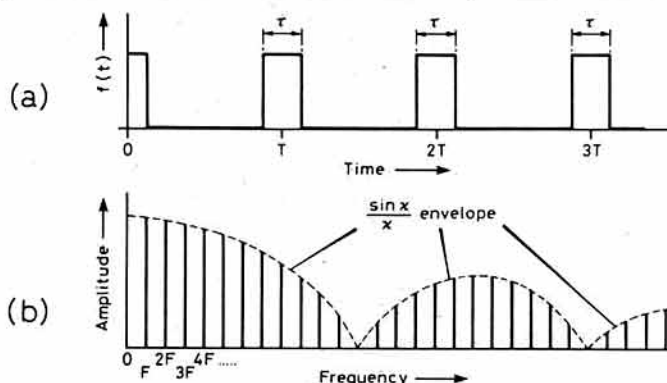


Fig A2. (a) Waveform with a non-1:1 mark/space ratio (b) Frequency spectrum of a waveform

are not of exactly 1:1 mark/space ratio, and a certain amount of differentiation must take place at the input to the receiver being calibrated. These effects generate the missing harmonics, and though they will be of much lower amplitude than the odd harmonics, they are sufficient to be detected by the receiver. \square

BOOK REVIEW

Shortwave Listening Handbook, by Harry L Helms. First edition 1987. Published by Prentice-Hall Inc, 243 + X pages (228 by 145 mm). Hard covers. Price not listed with review copy.

Until recently, entry into amateur radio often stemmed from an initial interest in listening to the many shortwave broadcasting stations that have sprung up all over the world since the pioneering days of Dr Frank Conrad of KDKA, W8XK. The "all-wave" and later "all-band" broadcast receivers usually covered only the 7 and 14MHz amateur bands, and even their limited capability of receiving amateur transmissions faded with the increasing use by amateurs of ssb rather than double-sideband a.m in the 'fifties and 'sixties. One result is that the hobby of broadcast swling has developed on parallel rather than converging lines with amateur radio. Nowadays, with some reason, many amateurs regard hf broadcasting as a not-to-be-encouraged rival seeking to take over "our" frequencies, either legally through the ITU or, as in the case of 7.0 to 7.1MHz, purloined in disregard of the ITU Radio Regulations.

Yet the swls remain the natural recruiting ground. Their dedication in seeking out the odd low-power and "tropical band" broadcast stations often needs a familiarity with hf propagation, antennas and receivers as deep as that of the hf amateur.

This new American book (the author is also an Extra Class radio amateur) is an excellent and informative introduction to shortwave radio, how it works, what you can hear, how to select and use shortwave receivers etc. It provides extensive information on the main hf "external broadcasting" organizations and their facilities. Later chapters describe the "utility" communications services (which in the UK cannot legally be deliberately monitored). Less convincing are the author's attempts to add spice to sw listening by such chapters as "Unusual, illegal and mysterious radio activity". I cannot imagine anyone getting much satisfaction, for example, in listening to the East German "numbers" transmissions, even if these are intended for their agents in the West. Again, he is surely wrong in attributing the "first" clandestine ("black") broadcasting to the 1941 Russian-based "Radio Espana Independiente". Attempts to mislead the listener as to the location (and who controls) broadcast transmitters certainly goes back to the 'thirties when, for example, an anti-Nazi transmitter was operated illegally in Czechoslovakia by the Black Front until raided by undercover German agents. Even the UK began operating "black" transmitters built by "Pop" Gambier-Parry's (G2DV) engineers for the Political Warfare Executive in 1940. ("Das wahre Deutschland" from May 1940, with Romanian, French and Italian PWE "black" programmes later that year).

Nevertheless, in most respects this is a well-written, well-researched book for those whose receivers tune frequently or occasionally to the hf broadcast bands.

Contents: 1, What is shortwave listening? (20pp), 2, Understanding the shortwave spectrum (19pp), 3, Selecting a shortwave receiver (20pp), 4, Antennas and accessories (22pp), 5, Radio propagation (17pp), 6, Major international shortwave broadcasters (28pp), 7, Domestic shortwave broadcasting (25pp), 8, Utility stations (16pp), 9, Other radio activities (21pp), 10, Unusual, illegal and mysterious radio activity (25pp), 11, The hobby of shortwave listening (15pp), Appendix 12pp, and three page index.

G3VA

A low-cost keyer using cmos logic

G M STANNETT, MBIM, G4VUX

Introduction

Where cw is concerned, good sending will courteously provide the receiving station with accurately-timed characters at a constant speed. Poor sending, however, is more difficult to read, unnecessarily slow and, sadly, quite common. Part of the reason for this may be that to pass a morse test the amount of practice required to send at test speed is minimal when compared to the time spent learning to receive at the same rate. Clearly, there is a need for a simple electronic keyer that will enable every cw operator to send "perfect" morse code to every other cw operator.

Design considerations

The rules presented to us by Samuel Morse are really very straightforward, and an electronic solution to the problem of generating cw can be found in a number of ways using logic circuitry. The use of high-speed clocked logic has been deliberately avoided to eliminate the risk of rf breakthrough. (Anyone who has ever attempted to run a morse decode program on a home computer while simultaneously trying to monitor a weak station on an accompanying receiver will almost certainly have experienced breakthrough from the micro.)

Instead, the keyer described is only actually clocked at the beginning and end of mark and space periods (see Fig 2(d)). This form of logic also has the advantage of ultra-low current consumption and, as a result, the battery life can be expected to run into years. Much consideration has been given during the design of the device to enable it to be constructed "on the kitchen table" with simple tools and without the need for any test equipment.

Circuit description

The circuit diagram is shown in Fig 1. IC1 is a dual-D type flip-flop, which forms the dot and dash memories. The cross-coupled gates (half IC2 and half IC3) form the steering circuits for reset pulses, and allow a request to send to be "stacked" while a dot or dash is being sent. IC5b/c and

surrounding components form an astable, the frequency of which is controlled by the value of RV1. IC4 is a decade counter and is used to provide the 3:1 dash-dot ratio. Finally, the transmitter is keyed by means of relay RLA.

Despite its apparent complexity, the circuit employs only a handful of ics, and in line with "kiss" technology, very little else! Detailed operation is as follows:

Production of dots. Upon closure of the dot contacts, flip-flop IC1a is SET by means of IC2a. The logic 1 level presented by the Q output (pin 13) is then passed on through IC2c to the pin 8 input of IC5a. In this condition the output of IC5a (pin 10) will fall to logic 0. This will cause three major changes;

(i) The decade counter (IC4) will be RESET by means of the logic 0 at pin 15, and all of its outputs will therefore fall to logic 0.

(ii) IC3 pins 1 and 13 will be forced to logic 0. This will disable gate IC2d and prevent any Q output from IC1b from being passed onto the remainder of the circuit until IC1a is RESET.

(iii) Pin 12 input to IC5c will be forced to logic 0, thus its output (pin 11) will rise to logic 1, and the relay will be energized by means of IC3c and TR1. All of the above takes place in just a few microseconds and appears to be instantaneous. The length of the dot will be determined by the time needed to charge C3 via R4 and RV6 (the speed control). When IC5 pin 13 is at a sufficiently high level, switching will occur and its output (pin 11) will fall to logic 0 again. This will cause the output of IC5b (pin 4) to switch to logic 1. C3 will then begin to discharge back through the R4/RV1 combination, forming the space period. Again, when the threshold is crossed IC5c output will rise to logic 1 (see Fig 2(b)), this will have the effect of clocking IC4 for the second time since RESET, and its Q2 output will rise to logic 1. This level will combine with the logic 1 level presented by IC3a (pin 11) and provide a RESET pulse to IC1a via IC6a.

In this condition the Q output of IC1a (pin 13) will fall to logic 0 and disable IC5a via IC2c. If the dot contacts are held closed, IC1a will be SET

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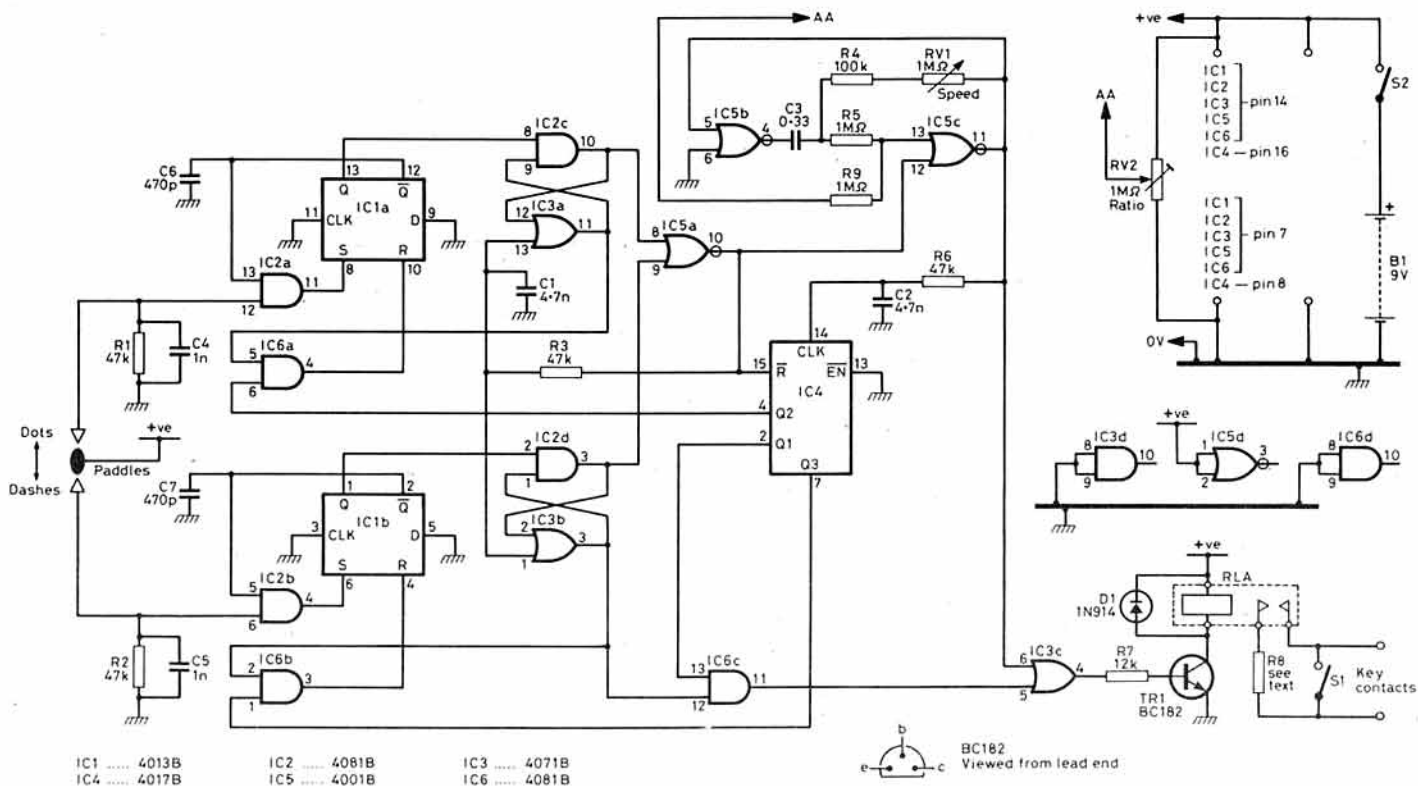


Fig 1. The circuit diagram

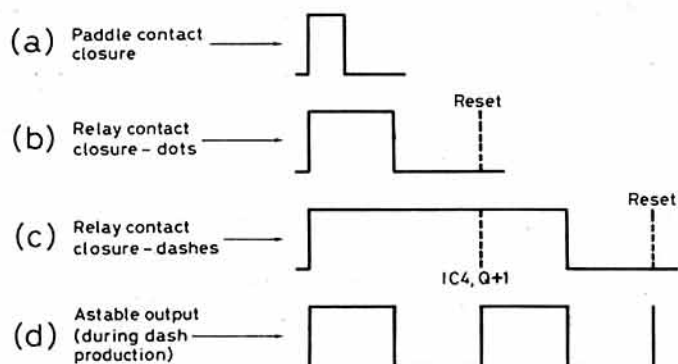


Fig 2. Timing diagram. (a) Paddle contact closure. (b) Relay contact closure during dot production. (c) Relay contact closure during dash production. (d) The astable output waveform. (IC5 pin 11)

again and another dot produced, if not, the dash memory will be "read" as the keyer awaits the next command.

Production of dashes. Upon closure of the dash contacts IC1b is SET via IC2b and the logic 1 from its Q output (pin 1) is passed onto IC5a pin 9 in a similar manner to that previously described, only this time via IC2d. In this case, however, when the output of IC5a (pin 10) falls to logic 0 and IC5c changes state, the Q1 output of IC4 (pin 2) combines with the IC3b output to energize the relay via IC6c/IC3c and TR1. The Q output of IC4 will remain at this level until the second positive-going edge is presented to the clock input (pin 14) from IC5c. This edge will also provide a logic 1 input to IC3c pin 6 and keep the relay energized for the final third of the mark period (See Fig 2(c)).

As already described, a space period will follow with the relay de-energized. Upon the next rising edge from IC5c, the decade counter, IC4, will advance one count and the Q3 output (pin 7) will rise to logic 1. This will combine with the output from IC3b and enable IC6b, creating a RESET level for IC1b, (the dash memory). As with the dot production, if the dash contacts are held closed another dash will be produced, forming a perfectly timed letter "m" and so on. Alternatively, the keyer will "read" the dot memory and, if it is not SET, await the next command.

It will be noticed that while a dash is being produced, a logic 1 will appear at the Q2 output of IC4. This will not cause the dot memory to be RESET as the output of IC3a (pin 11) is always low during dash production so that IC6a cannot be enabled.

Construction

Various prototypes have been built onto 0.1in matrix Veroboard. This can easily be obtained and will readily accommodate the ic sockets. A practical component layout is shown in Fig 4. The interconnections are made with 22swg tinned copper wire, which should be sleeved to prevent accidental short-circuits.

Modern cmos devices are protected against static damage by means of internal diodes, so that some of the old rules attached to handling are now considered over-cautious [1]. Perhaps the most sensible approach is to keep the chips in their original packaging until the rest of the circuit is complete, and plug them into the sockets as a final step.

The pinout details are shown in Fig 3; note that the packages are viewed from the top. There are some unused gates, and in line with good practice

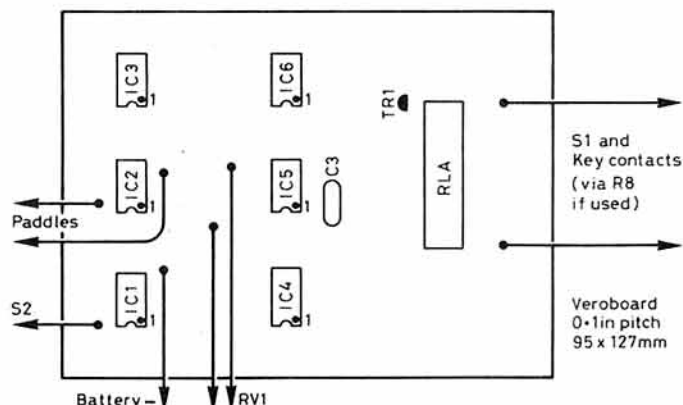


Fig 4. Layout of major components on Veroboard

Graham Stannett was born in 1952 and developed an interest in radio in the mid-'sixties while still at school. Activity centred around dx reception using homebrew equipment for some years until colleagues convinced him to sit the RAE. As a result he was first licensed in 1983 and is now a keen operator on the hf bands using cw and ssb.

He is an electronics engineer involved in the design and development of vhf/uhf communication systems, and also a part-time lecturer at a local technical college.

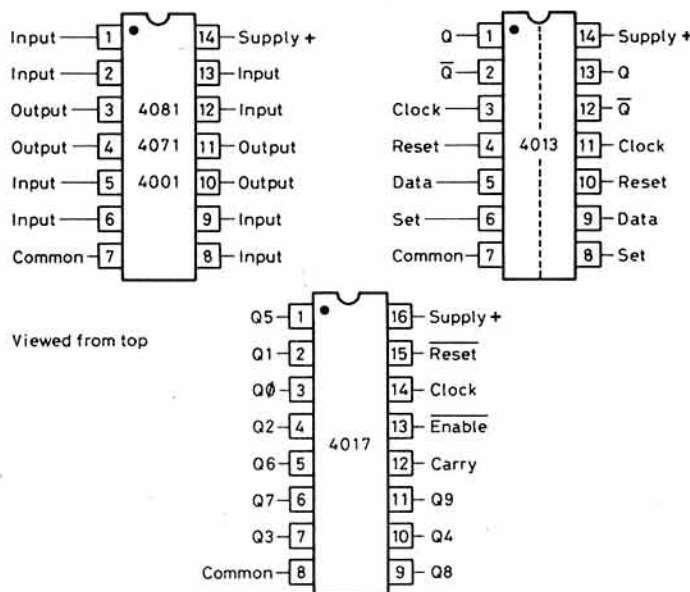


Fig 3. Pinout details of the CMOS devices. Unused pins on IC4 (4017) must not be connected to any point in the circuit, they are simply unused outputs

these should be tied to a supply line, the following arrangement will be found most satisfactory:

IC3 pins 8 and 9 linked to pin 7

IC5 pins 1 and 2 linked to pin 14

IC6 pins 8 and 9 linked to pin 7

The relay contacts are rated at 500mA, 200V dc, which will be more than adequate for most transmitters. However, a small-value series resistor (say 33Ω or so) will probably extend contact life considerably.

Components list

R1,2,3,6	47kΩ
R4	100kΩ
R5,9	1MΩ
R7	12kΩ
R8	See text
RV1	1MΩ reverse log (speed control)
RV2	1MΩ preset (ratio)
All fixed resistors	0.33W 5% carbon or metal film types
C1,2	4.7nF ceramic
C3	0.33μF polyester
C4,5	1nF ceramic
C6,7	470pF polystyrene
D1	1N914
TR1	BC182
IC1	4013B
IC2	4081B
IC3	4071B
IC4	4017B
IC5	4001B
IC6	4081B
RLA	Reed relay 6-9V (RS Stock No 348-970)
S1,2	SPST (RS Stock No 317-077)
B1	Battery 9V (Duracell MN1604)
DIL sockets	Five 14-pin, one 16-pin
Veroboard	95mm by 127mm, 0.1in pitch

Testing the circuit

If the keyer does not operate at switch on, it will almost certainly be due to constructional error(s). Steps have been taken at the design stage to ensure that there will not be any timing races or disallowed states at any point during the operation of the device.

The most likely causes of a "non-starter" are reversed polarity battery connections, ics inserted upside down, pins bent under ics during insertion and solder splashes. When using Veroboard it is important to ensure that all desired connections have been made and that in doing so no undesirable ones have been left behind; eg the unused outputs of IC4 must be isolated from the rest of the circuit.

Essentially, if the circuit fails to operate, ask yourself the question, "What am I doing wrong?"

Once the keyer is working correctly, the *RATIO* pre-set (RV2) may be adjusted to achieve a 1:1 mark/space ratio from the astable. This can be judged by ear while sending a continuous stream of dots or with the aid of an analogue multimeter as follows:

- (i) set the *SPEED* control to its mid-position;
- (ii) set the meter to an ohms range and connect it across the relay contacts;
- (iii) close the dot paddle contacts and adjust RV2 to give a reading of 50 per cent fsd on a linear (ie voltage) scale.

Operation

The keyer can be used with either a single lever key or a manipulator (squeeze paddles). In either case, the contacts only have to be closed

momentarily for satisfactory operation (see Fig 2(a)). To send the letter "N" for example: close the dash contacts, close the dot contacts at any time during the mark or space period of the dash, release both contacts, and a perfectly timed character will be sent. It must be stressed that although the keyer has single character stores it will not hold entire messages; as such, it is not regarded as being iambic.

Anyone who has never used an electronic keyer may find the whole concept rather daunting at first, but I found that with very little practice it is possible to send rhythmic cw at good speeds quite effortlessly. The temptation to send faster than you are able to receive should, as always, be avoided. (Let's keep the horse before the cart!)

The actual speed range will depend upon the exact value of C3 and some parameters of IC5, but the values given should provide a range in the order of 5 to 35wpm. by adjustment of RV1. SW1 is used to hold the key contacts closed while tuning the transmitter.

Conclusion

With the advent of the "black box" the radio amateur appears to have drifted away from homebrewing. However, it is hoped that this neat little keyer will not only help close the gap between "kitchen table construction" and modern-day technology but also encourage further development of simple outboard accessories.

Reference

- [1] *CMOS Cookbook*, Don Lancaster. Howard W Sams & Co Inc. □

A 50/144MHz DELTA LOOP

David A Reid, GJ0BZF*

WITH THE 50MHz band becoming available to UK amateurs, I realized that there would be a need for a good antenna. Of course, I could have used a simple Yagi or quad, but I thought a dual-band beam might be more appealing to the newcomers who are currently on the 144MHz band but would like to try the new band without having to put up another beam. I had never seen a dual-band 50-144MHz delta loop, so the idea to design one was born.

The main criteria for the beam are:

1. Horizontal polarization on 50MHz.
2. Unidirectional on both bands.
3. Easy construction.
4. Withstand a Scottish winter storm.
5. Simple matching network.
6. Effective radiation on both bands.
7. Must be small in physical size (so as not to upset my neighbours).

With these in mind, I set about the task. Some experiments with delta loops on the hf bands (or lf as some call 3-5MHz), and tests over the past four years with different delta loop designs on 144MHz, certainly helped in deciding the type of beam to build. The 144 and 50MHz bands are almost harmonically related, so the initial design was to have a three-wave loop on 144MHz and a full-wave loop on 50MHz. At first, the matching network was to consist of a gamma-type match, but this idea was discarded at an early stage as it was impossible to get good results on both bands without a lot of fiddling.

While looking through the *ARRL Antenna Book* [1] I discovered a type of matching network that I had never used before. So, I thought to myself,

David Reid was first licensed in 1982 as GM6JLQ, obtained GM0BZF in 1985 and, since moving to Jersey in 1986, GJ0BZF. The possessor of four G-QRP Club awards, he is now packet radio and data communications enthusiast. He is a member of the Jersey ARS, and by profession is a senior pc engineer.

"Let's try that idea, it looks simple enough". It consists of a length of 75Ω coaxial cable as an impedance matching transformer (see Fig 1).

Many trials were conducted to get the best standing-wave ratio on both bands as well as resonance. I was using a 144MHz transceiver and a Microwave Modules 50 to 144 converter and the 50MHz transmitter was a home-brew QRP valve set (a.m/cw) (see equipment list).

The beam is basically a two-element delta loop for 50MHz. The original was built to centre on 52MHz to cover the whole 50-54MHz band. (This was before the band was available for all licensees). Since the release of the band, I have built another beam centered on 50-250MHz to cover the early UK allocation (50-000-50-500MHz). This produces a resonance on 144MHz at about 145-450MHz which I feel gives very good results in the fm portion of 144MHz and all of the 50MHz band. All calculations are based on 50-250MHz. (It might be better now to centre on 51MHz—Ed)

Construction

First, cut the four vertical elements to the size required. I used 0.5m inch (12.5mm) aluminium tubing (as used by security firms for windows—see your local alarm firm); it is quite thin but very durable. I have made a lot of antennas over the years and not found anything for the elements that is easier to work with. The most difficult part of this antenna is the boom, which consists of a length of 1.5in (38mm) diameter steel mast (tv-type mast is excellent). I made a simple jig to get the holes drilled in the tubing (see Fig 2), and this ensured the accurate alignment of holes at both ends of the boom tubing.

A line is drawn down the side of the tube. (I placed it in a "Workmate" and aligned the edge of the "Workmate" with the centre of the tubing.)

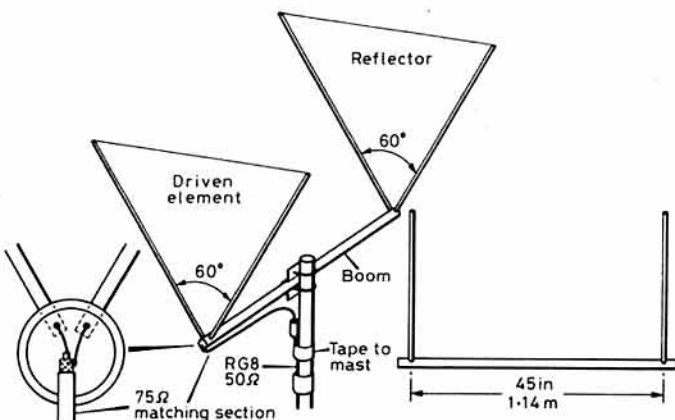


Fig 1. Matching transformer and the finished antenna

*c/o Morin, "Moorside," Maupertuis Lane, La Mare Slip, St Clement, Jersey, CI.

Equipment list

144MHz
FDK M750E: also i.f. for 50MHz.
4-el Yagi, 4-el quad, 2-el ZL Special, 144MHz dipole.
50MHz
Microwave Modules 50-144MHz convertor specially built for me.
Home-brew QRP transmitter (valve) 5W cw only.
FT690R loaned by GM4PLM.
2-el home-brew HB9CV-type 50MHz dipole.
Test equipment
Trio grid dip osc rf signal generator.
Home-brew field strength meter.
SWR bridge (good to 200MHz).

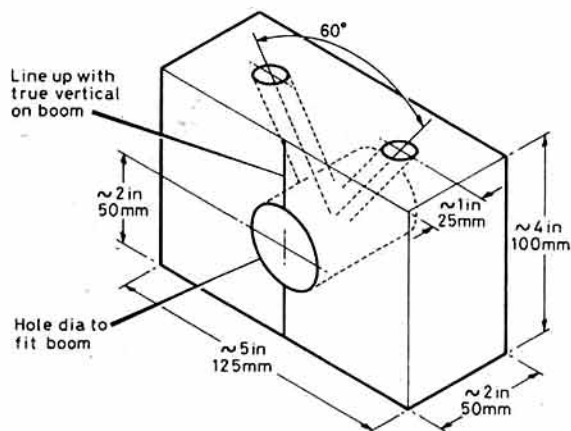


Fig 2. The simple drilling jig

This gives a true line to work to. The jig is placed on the reflector end of the boom, and the end block (after shaping) placed in the end of the tube, after which the holes are drilled. The vertical tubing can now be tried for a tight fit. Then drill the screw holes through the end block and into the vertical tubing.

Remove the elements for safety, and move the jig to the other end of the boom and repeat the process for the driven elements. Remove the jig and end block and redrill the boom tubing, about 0.25in (6.3mm) bigger. Then replace the end block and place the driven elements back into the block. Secure the block to the boom tubing with a screw through the boom and into the block so that the elements do not touch the boom. Drill the screw holes in the end block for the matching section.

Next, make the matching transformer, constructed from a length of 75Ω coaxial cable. The length is arrived at by the formula:

$$\frac{234}{f(\text{MHz})}, \text{ thus } \frac{234}{50.250} = 4.657\text{ft.}$$

Multiply this by the velocity factor of the cable (0.80 for foam and 0.66 for solid polyethylene dielectric). $4.657 \times 0.66 = 3.074\text{ft}$ ie, 3ft $\frac{7}{8}$ in (937mm) of 75Ω coaxial cable. This cable is terminated in a PL-259 (or N-type) plug on one end, and two solder tags at the other. The solder tag end is connected

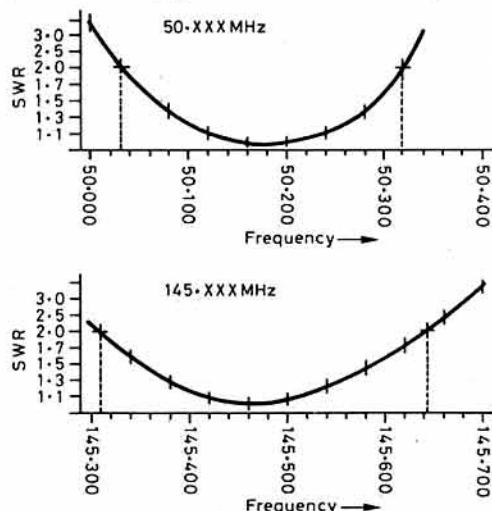


Fig 3. SWR results

Materials list

Quantity	Description
2 x 6ft 8in (2.03m)	0.5in (12.5mm) aluminium tubing for driven elements.
2 x 6ft 10in (2.08m)	0.5in (12.5mm) aluminium tubing for reflector elements.
4ft (1.22m)	1.5in (38mm) diameter steel tubing for boom.
Four	0.75in (19mm) diameter Jubilee-type clips.
14ft (4.26m)	18swg stranded copper pvc-coated wire.
One	Standard boom-to-mast type clamp.
4ft (1.22m)	75Ω (tv-type) coaxial cable.
Two	PL-259 plugs (or N-type if preferred).
One	Back-to-back female connector to suit above plug type.
Four	Solder tags.
Four	1in (25mm) screws for elements.
Four	0.5in (12.5mm) self-tapper screw for holding wire in place and for holding the end blocks in place.
6in (150mm)	1.5in (38mm) wooden rod to fit into boom for end blocks.
5in (125mm)	2 by 4in timber for jig.
Measurements were made in feet and converted to metric by multiplying by 0.3048.	

to the driven element by the screws and then covered with Araldite or similar adhesive. If a balun is desired, it should be fitted at the driven-element end, not at the free end of the matching transformer! When fitted in place on the mast, it will be found that there is enough 75Ω cable to allow the RG-8 feed cable to be permanently strapped to the mast, thereby taking all the strain and twisting out of the heavy feeder. This means that the RG-8 feeder will not be abused while rotating the antenna.

Attach the 75Ω cable to the driven element by soldering tags and screws into the end block. Now connect any length of 50Ω coaxial cable to the free end of the 75Ω cable. Using Jubilee clips, place the top wire of the driven element on top of the driven elements (once in final position, I put a small self-tapper through the clip and tubing to secure it). The reflector is then treated in the same manner, at the bottom of the reflector the two vertical elements are joined by the shorting strap. I used a "rally standard" universal boom-to-mast coupling to mount the antenna, but you can use whichever method you prefer.

Adjustments

Using a grid dip oscillator, the reflector should be tuned to 49.0MHz by adjusting the length of the shorting link at the bottom of the reflector, and by the adjustment of the top wire. The driven element should be tuned to 50.250MHz by adjusting the length of the top wire. With this configuration the beam can be held on a short section of mast in a "Workmate" or similar device and then connected to the transmitter and tweaked for the best standing-wave ratio. This is easier to set on 144MHz and an acceptable result should be arrived at on 50MHz. (See Fig 3.)

Results

I have been using the antenna on 144MHz for about two years, and it seems to compare best with my four-element Yagi at the same height. On 50MHz, the beam appears to be far superior to the two-element Yagi used previously.

Conclusions

On 144MHz, the antenna is quite efficient and exhibits a forward gain about equal to a four-element Yagi (approximately 6-8dB/dipole), and a gain of approximately 4-5dB/dipole on 50MHz. I would stress that these results are comparative, and I have not been able to make conclusive tests on the system. However, I believe that antenna gain should be taken at the location where the beam is to be used and not at an antenna testing range, so that a more realistic figure can be obtained.

My experiences with the 50/144MHz delta loop have been very good and the durability of the system has been proven. I have also built a version using bamboo garden poles which worked very well, by just running a wire around the framework.

Though it is a two-band system, the antenna provides no compromise, as most other multiband antennas do. It is easy and simple to match. It provides a way to get on 50MHz without spending a fortune and putting more metal in the sky. On 144MHz, the gain is adequate for local fm contacts, and on 50MHz the dx can be heard and worked successfully.

References

- [1]. "40-meter loop". *ARRL Antenna Book*, 14th ed, pp8-12. The Amateur Radio Relay League; 1982. Gerald Hall, K1TD.
- [2]. "The HRH delta loop beam," Harry R Habig, K8ANV. *QST*.
- [3]. *The ARRL Antenna Anthology*, Marian S Anderson, WB1FSB. The Amateur Radio Relay League; 1978.

Technical Topics

by Pat Hawker, G3VA

RECENTLY there has been a spate of items in *TT* recalling the days of simple, all-valve transmitters and receivers, and stressing the relative ease with which these could be built on the kitchen table and, when necessary, serviced in the shack. From 1935 onwards, the better receivers were capable of excellent performance on hf, particularly for cw, though often suffering from an annoyingly long period of warm-up drift. Receivers for many years used a "single-crystal" filter with phase-adjustment and less than ideal shape factors, but usually with variable selectivity that can still be highly effective on cw; and when used with a stenode-type rising af characteristic can give reasonably satisfactory ssb reception.

The old sets were, admittedly, often physically bulky and very heavy (the AR88 weighs over 100lb, the ex-Navy B-40 even more). With a separate transmitter and receiver, it is necessary to "net" the two together before calling a station, a process that takes a few seconds longer than the change-over with a transceiver. A few of us still stick to separate units, but the vast majority of the present generation of amateurs has almost certainly never operated "separates" either on hf or vhf.

Why, one can hear some readers muttering, drag up the past? Amateur communication has moved on since the days when many UK homes were still on dc mains and the most popular antenna was a Zepp! But I doubt if even such readers would want *TT* to be only about vlsi, GaAs, modfets, electronic memory, digital techniques, working cme on 10GHz or just saying which of the latest new wonders are "best buys".

For, perhaps paradoxically, readers show much more interest in simple, often seemingly antiquated techniques, but which still show promising developments, than in the latest marvels. Could it be that once an amateur has bought the ultimate in transceivers there is little you can do with it except operate and send it back for expert servicing when something goes wrong?

Amateur radio *operating* is fine and I am not decrying the black-box "appliance operator". But how much more satisfying is the hobby when accompanied by some understanding of, and interest in, the technical side of radio communication—and the proud feeling that comes from having made at least some part of the equipment, even if only an atu or wire antenna, yourself.

A simple high-performance receiver—the super-dc-gainer

The July *TT* included a discussion on the 50-year-old concept of "super-gainer" receivers: simple superhets in which the need for i.f. amplifying stages is eliminated by using a high-gain regenerative detector, as in the simple "two-valve" superhet receiver built by Malcolm Healy, G3TNO, while a schoolboy. Clearly, in the form shown, the super-gainer could not provide the performance, particularly in terms of selectivity, associated with modern communications receivers, although far from negligible as a stand-by general-coverage or beginner's receiver.

However, by a strange coincidence a letter from Dennis Unwin, G0FMT, arrived before the publication of the July issue, but after it had gone to press, outlining a most interesting variation of the super-gainer technique that retains most of the simplicity but is capable of extremely good performance. In place of the regenerative-detector plus medium-gain af amplifier of the classic "super-gainer", G0FMT substitutes the homodyne form of direct-conversion receiver with its low-gain "synchronous" (product) detector and high-gain af amplifier. He writes:

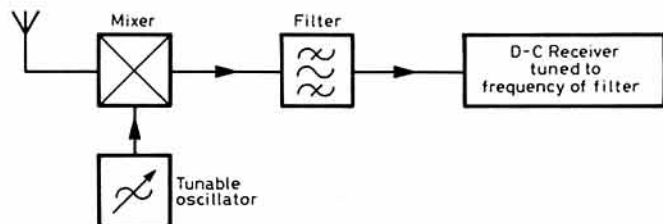


Fig 1. Outline of G0FMT's "super-dc-gainer" receiver technique combining the advantages of the superhet with the simplicity of direct-conversion receivers to provide a high-performance receiver

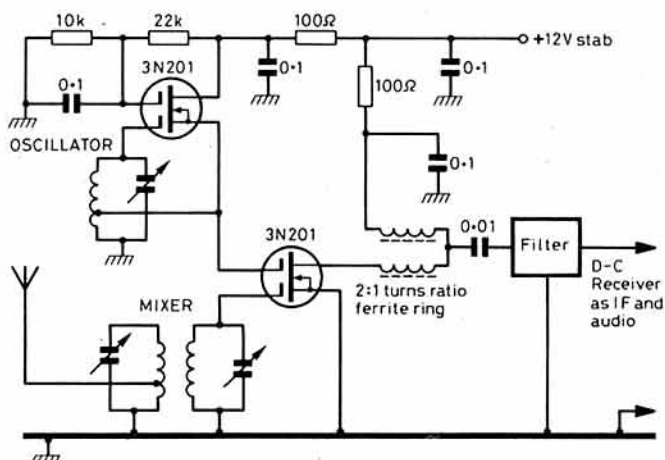


Fig 2. Circuit diagram of a suitable mosfet "front-end" for a "super-dc-gainer" receiver

"I have been following, with great interest, the comments in *TT* on the problems of home-construction of amateur equipment in this era of expensive and sophisticated 'black boxes'. I suspect that I have tendencies to 'neophobia' both in relation to amateur equipment, and in my professional world of biological instrumentation. This tendency has led me to experiment, over the last few years, with the problem of designing simple receivers which nevertheless have good performance.

"I have made direct-conversion receivers, and although they work surprisingly well, their performance does not satisfy me. What I am looking for is a simple receiver that has the performance of commercial equipment, although it may be less convenient to use. Such a receiver really has to be a superhet. However, I believe that the expertise that has developed around the direct-conversion receiver is valuable, and should be used if possible. So my idea is to use a direct-conversion receiver as the i.f. and output stages of a superhet receiver. I think of this as a kind of 'intermediate technology' approach. The arrangement is outlined in Fig 1.

"I have now built three receivers of this type and have been delighted by the performance. The approach has several advantages over the conventional superhet:

1. You don't have to build an i.f. amplifier, with its specialized components and problems of stability.
2. The alternative direct-conversion techniques are well developed, and are available in kit form.
3. The single 'block filter' does not have to be all that good. As long as the sides are reasonably steep, not much else matters, since the bandwidth will be determined by af filtering in the dc receiver section. The main function of the i.f. filter is to remove the unwanted sideband (audio image on cw).

"I have compared my latest receiver with my FT77, which is not a bad performer. I have not been able to find a signal on the FT77 that cannot be copied equally well on the home-made receiver. Fig 2 shows the simplest 'front-end' that I have been able to devise. Many professional communications engineers will, doubtless, turn up their noses at the use of a dual-gate mosfet as a mixer (just as years ago they used to at the almost universal triode-hexode valve mixer). I have used a hot-carrier diode ring mixer, but the problems of low impedance, high drive requirements and harmonic mixing inevitably demand a considerable increase in complexity over the mosfet design. Furthermore, the high input impedance of the mosfet makes it easy to provide good input selectivity, which of itself reduces the dynamic range requirements when compared with commercial receivers which nowadays usually have octave-wide input filters. Surely the essence of good design is a compromise between the many conflicting requirements, which must include the facilities available for construction. It would indeed be surprising if a design optimized for amateur home construction would suit the commercial radio market.

"It would also seem unlikely that commercial techniques would be ideal

for amateur home construction! So we should stop trying to copy equipment that is designed for a different environment and think for ourselves. The important question with regard to the mosfet mixer is 'is it good enough?'. In practice, with a selective input circuit, no rf input attenuator is required on any hf amateur band at any time of day, which is more than can be said of many of the factory-built receivers. The sensitivity of the receiver is such that the 'background noise' of all bands is audible. This suggests to me that the performance is adequate, even if another type of mixer might theoretically be better.

"One final point on receivers: the volume control of a direct-conversion receiver has to cover a large range, and with a log-law type potentiometer the control is usually a bit 'sudden'. To get over this, I use a two-gang (stereo) 25kΩ log pot with the two halves cascaded. This provides a very smooth control.

"When I was first licensed (as G8CKU), the only way of getting on to 144MHz was to build your own equipment, and I can still remember the excitement of my first QSO (with G2XV). I feel quite sorry for new licensees who have their first contacts on a black box. I suspect that many of them would like to build equipment if only the task did not seem so enormous. I think that helping them to do so is about the most important challenge in amateur radio today."

Clearly, G0FMT has left many options open to implementing this most interesting form of high-performance receiver. He does not indicate what types of i.f. filters or their centre frequencies that he has used, other than that these must be within the tuning range of the d-c receiver section. With the tuned bandpass rf input filter shown in Fig 2, a wide range of ceramic, crystal and crystal ladder filters should give a good image performance. A ceramic or home-built ladder filter using colour tv crystals could keep costs low.

This seems an excellent approach to home-construction of receivers that stand comparison with the best modern "black boxes". Surely, more will be heard of this super-dc-gainer technique!

Stable pll oscillator for mf/hf converter

Many amateurs have good amateur-bands-only receivers which may or may not include the WARC bands (10, 18 and 24MHz) but would like to extend the range to that of a general-coverage receiver of comparable performance. Austin Parker, G3AQY writes:

"Still fully operational here in my workshop is an almost 30-year-old station, including a much-cherished Racal RA17 which I shall never forget collecting, new from the factory, in 1948. In my shack, however, I have a modern solidstate transceiver, the Heathkit HW5400. I chose this because I could not be happy using equipment which I could not attempt to service myself. It functions very well indeed but has no general-coverage facility on the receive side. Many other amateurs must be in the same situation, but there has been little published on the construction of a suitable converter to receive from, say, 1 to 27MHz in bands of 1MHz tuned by the 'amateur-bands dedicated transceiver' tuning, in receive mode, from 28 to 29MHz.

"Because such a converter should preferably have frequency stability as

good as that of the transceiver into which it is to be fed, I searched for a 'constructor-friendly' phase-lock-loop (pll) circuit that would lock a vfo to the harmonics of a 1MHz crystal. Ultimately, I found one in the 1983 edition of the ARRL *Radio Amateurs Handbook* (Chapter 6.9) with additional information in the original constructional article by W1KNI in *QST* (January 1982).

"Fig 3 shows my slightly simplified version of this circuit. It was great fun to build, and with the addition of a Plessey double-balanced mixer and small power supply stage I now have an ultra-stable converter giving me the required general coverage and permitting the use of the HW5400's filters etc, including the two memories normally available for the 28MHz band.

"Components do not seem to be critical. I used a BCY71 for the oscillator transistor, TR3, a couple of junk-box 1N270 diodes for D4 and D5, and the varicap diode D3 finished up composed of two nondescript 'surplus' diodes in parallel. The meter is needed only initially, to set the bias adjustment for 0.5mA. The tuned circuit for the oscillator, L3/C2, has to comprise several coils and a two-pole switch to cover the required range.

"At first I arranged for the vco to be on the 'high side', tuning from 29 to 57MHz. Not only would this have been preferable for the usual reasons, but it was also then much easier to arrange for the vco to cover the required frequency range with the minimum number of switched coils and with small changes in amplitude. Unfortunately, I had failed to remember that the signal frequency would then decrease as the 'tuned i.f.' (ie HW5400 tuning on 28MHz) increased. This was felt to be an intolerable state of affairs when using a transceiver with a digital frequency readout! In some cases, however, it might prove an acceptable simplification."

Hazards of non-ionizing radiation

The May *TT* item "Biological effects of non-ionizing radiation" included references to a rather sensational article by Cynthia Kee (*The Observer*, 8 March, 1987, p51) in which Dr John Dennis of NRPB was quoted as saying: "We're on the dividing line between what is socially acceptable and caution. The public seem quite happy living with a risk factor of one in a thousand. We feel successful when both sides attack us equally..."

Dr Dennis, who is NRPB's Assistant Director (Physical Sciences), has asked us to make it clear that Mrs Kee quoted his remarks out of the context of several hours of discussion ranging over the whole problem of setting limits for exposure to electromagnetic fields. He is naturally unhappy with the implication that he believes the public are content to accept high levels of risk in this area. He writes:

"The actual context of my remarks to Mrs Kee was in relation to road accidents. The annual risk of a fatal road accident is about 1 in 10,000, with about 6,000 people being killed every year; over an average life-time of about 70 years the risk may be stated in a rather over-simplified fashion as about 7 in 1,000. By any standards this is a significant risk, nevertheless there is a degree of public acceptance of this risk which is not accorded to the risk of about one in a million arising from the radiation dose to the average member of the British public from the Chernobyl nuclear reactor disaster. Obviously, risk acceptance is not a simple question of numbers;

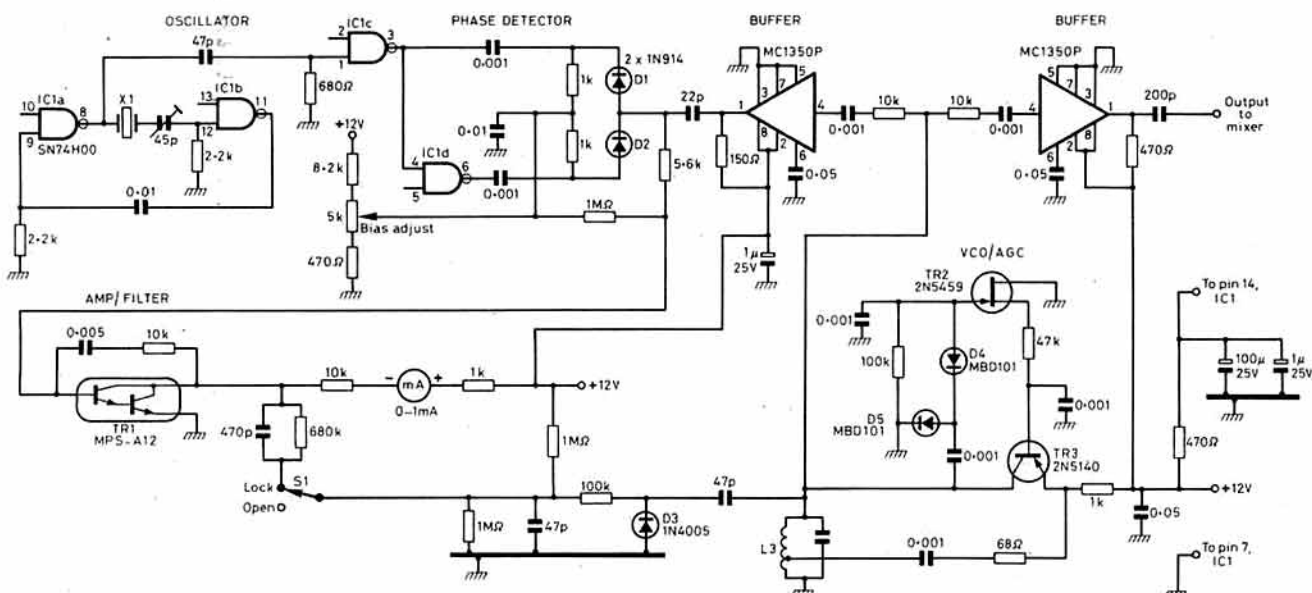


Fig 3. High-stability general-coverage pll oscillator used by G3AQY for a general-coverage converter to enable an amateur-bands-only transceiver to tune 1 to 28MHz in 27 1MHz bands. Based on an ARRL *Handbook* design originally described by W1KNI

the origin and nature of the risk and the perceived benefits or otherwise of the source also play a part in public acceptance.

"In the case of exposure to electromagnetic fields there is some rather unsatisfactory epidemiological evidence that suggests that exposures may be associated with an increased risk of leukaemia (see *TT* August and September, 1985—G3V4). Unfortunately, if this risk is real, it is impossible to quantify, and if it could be quantified I have no way of deciding what would be the level of risk from this source that the public would find acceptable. However, I suspect that there would be orders of magnitude difference between what *Rad Com* readers might accept and what would be accepted by Greenpeace. The National Radiological Protection Board has in the past regarded annual fatal risks of between 1 and 10 in a million as acceptable to the public, and between 10 and 100 in a million as acceptable at work; this is based on the observed risks which seem to exist from a variety of sources.

"I would dearly like to obtain firm evidence for the leukaemia risks from electromagnetic radiation. Appropriate animal experiments to obtain this evidence would take between 5 and 10 years to complete and cost between £500,000 and £10-million to carry out. NRPB simply does not have the resources to perform such experiments. In any case, it seems to me that those with a vested interest in the use and production of electromagnetic fields should pay for such investigations; ie, the electrical and electronic industries, the power generation and broadcasting interests, and the readers of *Rad Com*."

Audio cw bandpass filter using "kiss" approach

Leigh Harrison, VK6WA/G4CLP, writing from Padbury, Western Australia, has come up with a simple cw audio bandpass filter using the "kiss" approach: Fig 4. This filter is designed to be inserted in-line with the headphone socket of the receiver, and is used with a lightweight set of miniature headphones of the "Walkman" type providing adequate level for comfortable listening.

The filter comprises a six-pole multiple-feedback arrangement of the Butterworth type. The bandpass response is substantially flat between 570 and 1,000Hz but about 35dB down at 300Hz and at 1700Hz, and about 45dB down at 2-8kHz. It uses a single TL074 quad bifet op-amp integrated circuit and a BC548 emitter-follower headphone amplifier. Three of the op-amps form the filter while IC1d provides a $V_{cc}/2$ reference voltage, allowing a single-rail power supply to be used. Power consumption is about 60mA from a 10V supply; however, any voltage rail from 9 to 25V may be used provided that the value of R12 is adjusted to keep TR1 within its rated dissipation (625mW).

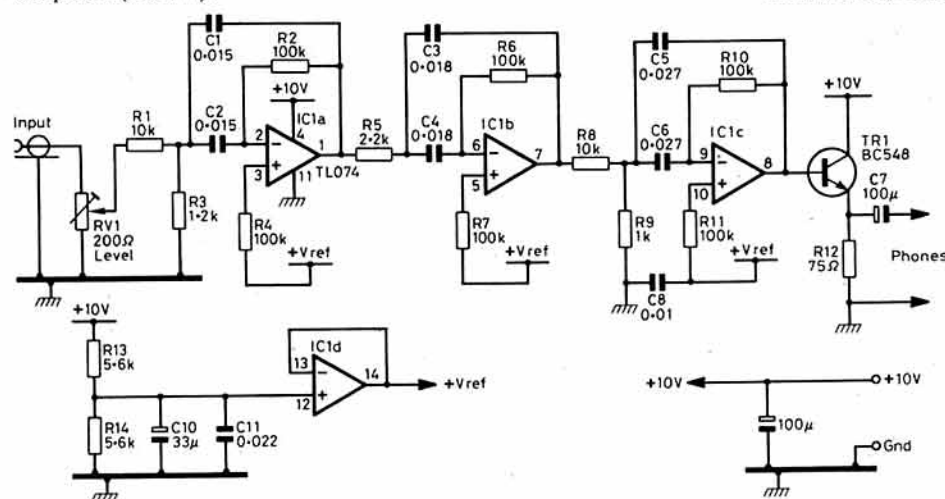


Fig 4. VK6WA's audio cw bandpass filter using an active Butterworth filter based on three sections of a TL074 quad bifet op-amp integrated circuit

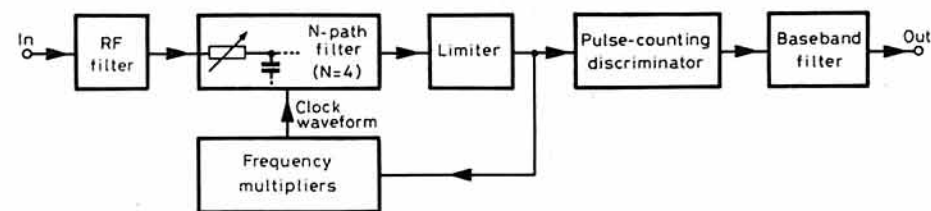


Fig 5. Outline of N-path dynamic tracking filter threshold extension demodulator as developed at Swansea in 1969-70 and seemingly basically similar in principle to the German "ICS" system noted in the June *TT*

FM threshold extension

Dr R C V Macario, GW8SRW, of the University College of Wales, noted the June *TT* item (page 407) on the "in-channel-select" (ics) fm threshold-extension unit being marketed for use with amateur vhf transceivers by H&C Elektronik Hansen of Berlin. He feels that this system is, in effect, very similar to the "tracking n-path filter" of the type developed in his laboratory at the University of College of Swansea some 17 years ago. This was described in *Electronics Letters* (5 March, 1970) as a "Method of reducing the fm threshold using a tracking n-path filter" by R C V Macario and S Patel: Fig 5. He even believes the original detector unit is still in existence somewhere and confirms the threshold extension possible with this type of dynamic tracking filter. His model used a self-synchronised filter with a typical (stationary) bandwidth of 100Hz at an i.f. centre frequency of 100kHz in conjunction with a conventional pulse-counting fm discriminator. It was capable (Fig 6) of reducing the fm threshold from an input carrier/noise ratio of about 11dB to about 6dB. The fm extension was demonstrable on both speech and music, but was limited to use of carrier frequencies (i.f.) of under about 500kHz due to the limitations of the then available switching circuit modules required for the n-path filter.

Two-element hf beams

Attention is drawn to the long, chapter-length article by Les Moxon, G6XN, "Two-element hf beams" in *Ham Radio* (May 1987, pp 8-12, 14, 17, 19, 21-2, 25-7, 29-32) introduced as follows:

"Physically small beam antennas that represent the least compromise in gain and directivity have been discussed in the literature. Large antennas, for those for whom size is no problem, have received widespread coverage... Yet the topic of medium-sized antennas—which includes the majority of amateur beams—remains an area of uncertainty, about which many have sought, without success, for more information. The quad-versus-Yagi controversy continues unabated; conflicting claims are made for what might appear to be bewildering variety of different beams; and an imperfect grasp of essentials has turned an inherently simple situation into one of needless complexity, with two-element beams deprived of their rightful status."

TT on a number of occasions has espoused G6XN's belief that it is better to have a lightweight two-element array at a good height than a heavier three-element array nearer the ground; and that the maximum theoretical gain of a two-element array (often dismissed in many texts as 3dB) rises with close-spacing to above 5dBd, only about 1dB less than what is likely to be achieved in practice with a 3-element array.

In *Ham Radio* G6XN shows that for two elements the directive pattern—and therefore the gain—depend only upon the phase shift ratio $0/0_0$ and are independent of the size, shape or spacing of elements, provided the dimensions are not excessive. This, he points out, is in flat contradiction of widely-published figures: "Those figures derived mathematically

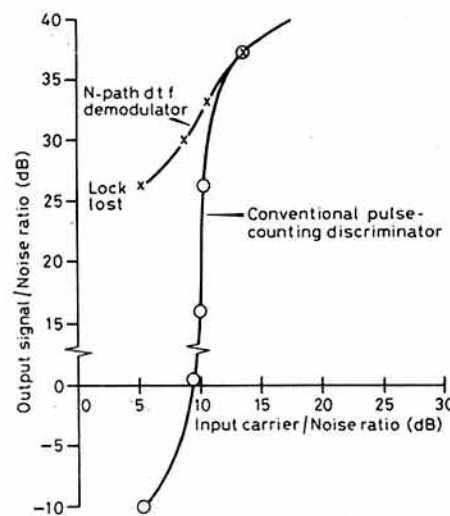


Fig 6. Performance of Dr Macario's dynamic tracking filter showing the much improved performance compared with a conventional system for carrier/noise ratios between about 6 and 11dB. Measurements with 1kHz modulating tone, modulation index of 5, rf bandwidth of 30kHz and baseband filter bandwidth of 5kHz

for parasitic arrays show gain and directivity to be critically dependent upon spacing and whether an element is tuned as a director or reflector . . . although the calculations are correct they happen to be the wrong ones! . . . normally performance is sacrificed if the elements are straight . . . this is the worst possible shape because it minimizes coupling, consequently precluding the possibility of the presence of equal currents except with very close spacing of the order of 0.05λ ."

G6XN outlines a number of designs of two-element horizontal beams with reduced length and enhanced coupling, as well as the application of enhanced coupling to conventionally-shaped beams. A number of his recommended designs should already be familiar to readers of his *HF Antennas for all locations* book and his later "Claw-type" designs, VK5HA planar loading techniques etc as described in *TT*, though with some further developments such as a form of vertical VK2ABQ array suitable for mounting on fence posts.

G6XN concludes by pointing out that his 16-page article is intended to provide guidance, rather than blueprints, for the construction of antennas tailored to suit individual needs: "The Claw designs will be useful even if the best mast available is only a garden post, and I hope that some who have decided that beams are 'not for them' will have second thoughts . . . Claw elements are particularly suitable for use as top-loaded verticals for the lower-frequency bands."

For *TT* items on some of the recent G6XN designs see *TT* August 1983, April 1984, March 1985 and January 1987.

The rhombic—Queen of antennas

In the 'thirties, E Bruce, of Bell Telephone Laboratories, described (*Proc IRE*, August 1931 and January 1935) a then novel highly-directive, long-wire hf antenna in the form of a rhombus (a squashed square): Fig 7. Terminated correctly at the far end, this high-gain antenna provides unidirectional characteristics; unterminated it works as a bidirectional array shooting both forwards and backwards. Within a few years, the rhombic antenna became firmly established for fixed point-to-point commercial and military strategic communications as well as for signals-intelligence interception. Despite limited sidelobe suppression, hf gains of about 8 to over 15dBd could be achieved with broadband characteristics that could extend over several octaves, and gave very desirable low vertical angle performance even when suspended from four relatively low masts (low in terms of professional communications). It rapidly came to dominate the hf point-to-point scene.

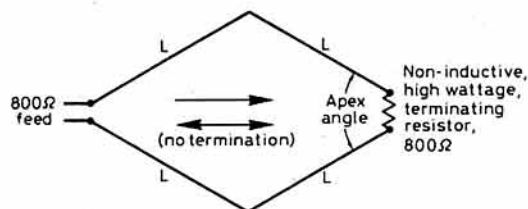


Fig 7. The classic rhombic antenna array providing a unidirectional beam when terminated or bidirectional when there is no terminating resistor. L is normally at least one-wavelength long at the lowest operating frequency

The foreword to a book *Rhombic Antenna Design* by A E Harper of BTL (published by Van Nostrand in 1941) recalled that "When there was built in 1929 at Lawrenceville, New Jersey, a radio telephone station for initiating overseas short-wave service, the most pictured feature of the new establishment was a gigantic wire fence or net, a mile long, stretched across the landscape on a row of 185ft towers. This comprised the transmitting antenna complement for the three telephone circuits to Europe.

"A year ago the nets were taken down, the towers dismantled and sold for junk. Near them had arisen a number of telephone poles carrying at odd-looking angles a few almost invisible wires . . . the most spectacular conquest of the rhombic antenna."

Unfortunately for amateur radio, there were two major drawbacks to the rhombic: it needed a lot of space and the directivity could not be easily changed. The result was that amateurs developed instead the compact rotary close-spaced Yagi and W8JK arrays despite the usually lower gain. But amateurs who have ever had access to rhombics for professional applications tend always to cherish a dream that one day they may retire into the countryside and acquire, or get permission to erect poles in, a large flat field and have envied those Australians, ARRL headquarters staff etc with space to erect hf rhombics.

Curiously, few amateurs have shown much interest in using long-wire or rhombic antennas for vhf or uhf where they can be fitted into a suburban garden or even a loft-space, and where an "antenna-farm" of several rhombics pointing in different directions is by no means out of the question.

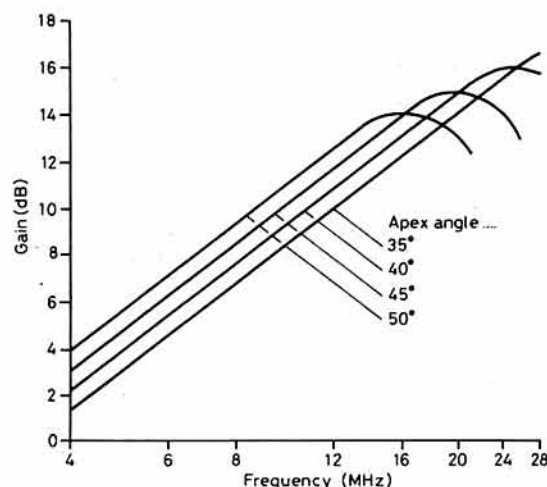


Fig 8. Calculated free-space gain for rhombic in which L is 100m for various apex angles, showing that bandwidth of the array can be used as a design parameter. Note that gain above ground is up to 6dB greater at some elevation angles

Years ago G6CJ demonstrated table-top rhombics working in the microwave region.

Joe Ellis, VK4GL (*Amateur Radio (VK)*, March 1986, pp 10-11) is fortunate enough to be a farmer with access to a rather rough field, about 300 by 140ft, sufficient for an hf rhombic. He notes that "the rhombic antenna is the ultimate in simple wire arrays, where maximum gain is required in a given direction. Many amateurs have aspired to a rhombic only to be deterred by space considerations. To be effective, this antenna needs to be big (in terms of wavelength). Apart from space the requirements are simple: some poles, lots of wire, and a good antenna tuner . . . my rhombic is near and over the tops of trees at an average height of 45ft, which is too low. Nevertheless it works superbly . . . if I could discover how to turn the farm around, I would dispense with my Yagi antennas."

With a history dating back more than 50 years, it might be supposed that there is little need for more research and development of this antenna. So it was interesting to find in the *ICAP87 IEE Conference Book No 274* (pp 79-80) a paper by A G P Boswell, of the Marconi Research Centre, on "Wideband rhombic antennas for hf" in which the design of rhombics is approached on the basis of achieving performance over a desired frequency range, using modern electromagnetic-computing design techniques. The parameters are the leg length (L) and the apex angle at the feeder/terminating ends; lesser design parameters are the wire diameter, the terminating impedance and the height above ground which affects the elevation angle of the beam.

It is noted that with single-wire rhombics, the characteristic impedance (feed and terminating) is often assumed to be 600Ω but in practice is usually about 800Ω. The paper shows that varying the apex angle results in sub-optimum gain but changes the bandwidth of the antenna. This is illustrated in Table 1. From this it can be seen that a rhombic covering 4 to 16MHz could be constructed with an apex angle of 48° and a leg length of 107m to provide a 10dB gain (4dB free-space gain) at the lowest frequency of 4MHz. With the same apex angle, an antenna with legs 20m long would be usable up to beyond 56MHz whereas if the apex angle was reduced to about 38° the bandwidth would extend to beyond 70MHz band. Conversely it should be possible to achieve 10dB gain at 50MHz on a rhombic covering the 50, 70 and 144MHz bands with legs only about 6.8m long and an apex angle of around 50°. Fig 8 from the ICAP paper shows the calculated free-space gain for a rhombic with 100m legs for various apex angles plotted against

Table 1. Bandwidth of rhombic antennas versus apex angle

Apex angle	f_{\max}/f_{\min}	L/λ for 10dB gain at f_{\min}
36°	5.3	1.82
38°	5.1	1.73
40°	4.9	1.67
42°	4.7	1.60
44°	4.5	1.53
46°	4.3	1.48
48°	4.0	1.42
50°	3.7	1.36

Note: Minimum operating frequency is arbitrarily defined as the frequency at which the free-space gain is 4dB (ie the gain over ground is up to 10dB). Maximum operating frequency is defined as the frequency of maximum gain. (Source: A G P Boswell, ICAP87)

frequency, showing how gain increases with frequency up to a fairly clearly defined maximum frequency and then falls off quite rapidly. In practice gain is further increased by 6dB by the presence of the earth plane, as for all practical antennas, to a degree depending upon earth conductivity and the required elevation angle of the main lobe. Theoretically, gain rises at 6dB/octave above an arbitrarily chosen minimum gain of 10dB over ground.

A G P Boswell notes that rhombics fail at the high frequency end of their operating range when the individual radiation patterns of the four radiating wires align themselves so closely with the directions of the wires that the azimuth radiation pattern of the antenna splits into two. This effect is more marked with the wider-angle designs, which also show rather worse sidelobe suppression at the higher frequency.

In his *HF antennas for all locations*, Les Moxon, G6XN, sets out the attractions and the drawbacks of large arrays such as rhombics, and shows that the theoretical gain of a terminated rhombic with the appropriate apex angle increases from about 5dB with legs one-wavelength long to about 12dB for 5λ legs. He also notes that "with some manipulation of ropes, terminating resistors and feed points, a rhombic can be switched to provide a choice of four directions with a good chance of being able to put a useful sidelobe in most of the other directions that may be needed." The natural level for the pair of first sidelobes is -6dB so that this can still provide a powerful dx signal.

More thoughts on up-dating Drake R4 receivers

It has long been the policy in compiling *TT* to avoid publishing too many items on modifying specific equipments unless the suggestions are of relevance also to other models. There seem to me to be a number of good reasons for this: quite often manufacturers correct problems that may be experienced on early production, so that modifications may apply only to a limited number of equipments; in some cases the modifications may themselves introduce unexpected problems; modifications normally invalidate any guarantees and reduce resale values; it takes skill and experience plus considerable courage to implement circuit changes on the densely packed pcbs of modern equipment; it would be wrong to encourage *TT* readers who may lack both experience and the test equipment needed for other than the simplest changes; nor is *TT* in a position to check out readers' modifications with the equipment manufacturers before publication.

Nevertheless, with relatively little home construction these days except in East Europe, useful technical insights can often be obtained from consideration of suggested modifications provided that they illustrate basic design principles. A good example was the various comments on up-dating the once highly-regarded but now ageing Drake R4-series of general-coverage valve receivers. Some years ago WB0JGP and K8RRH of Sherwood Engineering showed clearly that by fitting an additional high-performance cw crystal filter to an R4C the close-in dynamic range measured with signals spaced at 2kHz could be increased to 85dB, significantly better than any of the solidstate amateur receivers and transceivers then (and possibly now) available, see *TT* August and October 1984. With many modern receivers having frequency-synthesizers, it is often not even possible to make meaningful measurements of dynamic range with 2 or even 20kHz spacing due to the high phase-noise resulting in severe reciprocal mixing, oscillator noise etc.

The 1984 items were followed up last year by Dave Johnstone, G4EVS, who reported on a number of additional front-end modifications to an R4B (*TT* July 1986) and his contribution provided a good insight into the whole area of receiver performance. One of those who read G4EVS's comments with great interest was the energetic Jan-Martin Noeding, LA8AK, who has an R4C with a late serial number. He writes:

"I have for some years wondered why there should be a 10mV vfo signal in the first i.f. stage. With the aid of a spectrum analyzer connected to the pre-mixer output the reason becomes clear: see Fig 9. Two strong signals

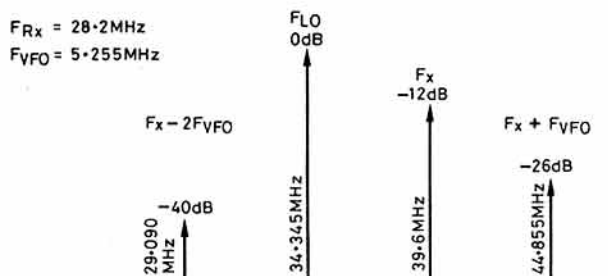


Fig 9. Spectrum from the original pre-mixer of the R4-C before modification

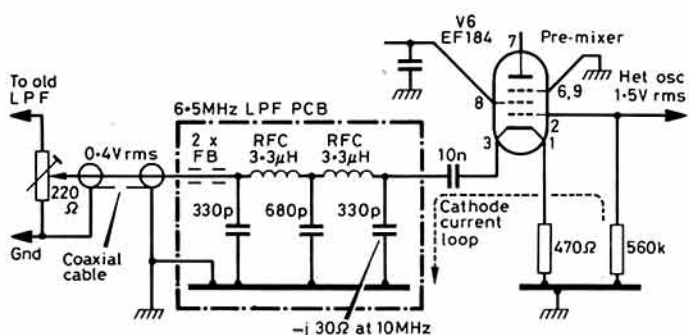


Fig 10. LA8AK's modified pre-mixer circuit for his R4-C (serial number 22073). The new lowpass filter is mounted at the side of the valve socket

are present at the mixer output, they are envelope-demodulated in the receiver's first mixer and produce the difference product which is the vfo frequency. The output from the heterodyne crystal oscillator represents all possible series resonances, in odd order; the crystal oscillator frequencies are 'pumped' from cathode of the pre-mixer to the 1pF mounted in the opposite side of the receiver and grounded via the capacitors. It is no wonder that heterodyne tones are a serious problem in this receiver.

"To avoid spreading the cathode current field through the receiver it is necessary to connect a pi-type 1pF close to the valve. This filter has the following functions:

1. It attenuates harmonics from the oscillator.
2. It isolates the heterodyne frequency signal in the cathode circuit from the rest of the receiver.
3. It provides sufficiently low earth-return impedance at the heterodyne frequency.

"The use of ferrite beads and resistance in the coaxial cable going to the old 1pF will also help to remove spurious frequency products. The addition of the extra 300pF capacitor, as noted by G4EVS, does not help very much since the cathode has a 30cm 'tuned coaxial cable' to the 1pF.

"After making these modifications, several heterodyne tones disappeared although some are still left. The use of a potentiometer to adjust the vfo level to set the correct local-oscillator level reduced the product $f_x = f_{vfo}$ by 10dB, while the other remained. I tried to use IE-500 and MC1496 as mixer with an EF184 as amplifier but the results were much worse. The only possibility for further improvement may be to correct the defects of the original compromise circuit. But the harmonic which used to fall into the 145MHz band is removed. I believe this modification is valid for R4C models with serial numbers above 22,000 and possibly those above 16,000."

Ferrite beads and rfi suppression

For many years the humble ferrite bead and its big brother the ferrite toroid have been among the most effective techniques for rfi suppression, not only for your own domestic equipment but also when tackling complaints from the neighbours since such devices can often be installed without the possible risk involved in taking a soldering iron to sort out a high-cost stereo hi-fi unit.

Jack Althouse, K6NY (Palomar Engineers, PO Box 455, Escondido, California, USA) is convinced (aren't we all!) that rfi has once again become a serious problem. He has sent along a most useful "RFI tip sheet" on "Using ferrite beads to keep rf out of tv sets, telephones, vcrs, burglar alarms and other electronic equipment". While the tip sheet relates directly to the ferrite beads marketed, together with a wide-range of toroid ferrite cores, by Palomar Engineers, much of the advice in the tip sheet is of general interest.

The attraction of the ferrite bead is that just slipping one or more on to any wires conveying unwanted rf into equipment stops or reduces the entry of rf. This can be via an antenna lead, loudspeaker cables, pick-up leads, mains cable etc, or multi-wire cables, without having to make any other modification to the equipment. To quote the tip sheet:

"Ferrite beads are made of the same materials as the toroid cores used in broadband transformers but are used at much higher frequencies. For example, ferrite Mix 43 is used for tuned circuits in the range 0.01 to 1MHz. It is efficient and losses are low. But if it is used in the 40 to 200MHz range it is lossy. So when you slip a bead of Mix 43 over a wire and there is rf in the vhf range going through the wire, it is just as though you put a resistor in the wire. But you did not have to cut the wire to insert a resistor; you just slipped a bead over the wire. If the resistance of one bead is not enough you can add more beads or add longer beads to get more resistance. The beads, unlike a resistor, do not affect the wire at low frequencies, so

Table 2. Impedance in ohms of FB-18 size ferrite beads versus frequency

Bead material	Frequency (MHz)				
	1	10	40	100	1,000
Mix 73	45	110	110	110	120
Mix 43	15	70	110	150	160
Mix 64	6	40	110	160	400

that audio, dc etc pass through the wire just as though the bead were not there. There are three bead materials in general use: Mix 73, Mix 43 and Mix 64. The impedance in ohms of size FB-18 beads versus frequency is shown in Table 2. This shows that beads of the three materials all work about the same at 40MHz, but below 40MHz Mix 73 is best. Above 40MHz Mix 64 is best. For overall performance from 1 to 1,000MHz, Mix 43 is the best choice.

"It is important to remember that the frequencies in Table 2 are those of the interfering signals to be eliminated; not the operating frequencies of the equipment being protected. For example: to protect a telephone at audio frequencies use type 43 or 73 beads to keep out 14MHz rf. When you buy beads it is necessary to specify the physical size (FB-3, FB-8 etc) and the bead material (Mix 73, Mix 43 etc) depending on the frequency of the rf interference. FB-1, FB-3 and FB-7 have 0.05in holes that will slip over bare No 18 awg wire; FB-8 has a 0.09in hole and will slip over the insulation of No 22 awg wire; FB-24 and FB-63 have 0.2in holes for larger wire or cable."

The tip sheet points out that when a multi-wire cable is passed through a bead it has the effect of suppressing rf transmission through all of the wires and is much easier than putting beads on each wire. Balanced twin-lead cable (as widely used with American tv receivers) is a special case; a bead on each of the wires would kill the tv signal as well as the unwanted rf signal, but if the whole of the twinlead goes through a single bead, the tv signal is not impeded but rfi will be suppressed. Similarly with coaxial cable: "The signal going through the cable is confined to the inside of the braid, but the outside of the braid acts just like any other wire; it can pick up unwanted rf which then reaches the tv set or video monitor; a suitable 'bead' placed over the cable suppresses the outer-braid rf without affecting the signal." For such purposes it is necessary to use a core with a large-diameter hole; the Palomar range includes toroid cores with hole diameters up to 1.4in but with some differences in the materials: Mix 77 is the best below 40MHz; Mix 43 is the best between 30 and 150MHz, but can be used from 1MHz to 1GHz; and Mix 61 is the best above 200MHz.

With toroid cores it is often possible to pass the cable more than once through the hole. It is advisable to do this as many times as possible since each turn is the equivalent of adding another toroid. Palomar also now supply "split beads" that solve the problem of putting beads or toroids over cables that have plugs that will not go through the holes. These are beads that have been cut in half, the two halves are put over the cable and then wrapped with tape to hold the two halves together. The mating edges are polished so that the two halves mate very closely, and are available with centre holes of 0.25 and 0.5in diameter and also for flat computer cable 2.5 or 3in wide. Since it is important that the two halves of a split bead fit exactly together, never attempt to use a 0.25in split bead for a cable of more than 0.25in diameter. The split beads are in the Mix 43 material.

For use in tuned circuits and wideband transformers etc, the advantages include the high permeability which means that you get a high inductance with few turns, with little leakage of the magnetic field; however, it is always important to remember that ferrites are easily saturated and should be used only in low power (receiving) applications unless you are certain that the cores will not reach saturation point.

John Greenwell, G3AEZ, draws attention to another solution to rfi that may or may not involve some form of ferrite loading. He has sent along a glossy brochure from W L Gore & Associates (UK) Ltd (Pitreevie Business Park, Dunfermline, Fife KY11 5PU; tel 0383 733380) on their range of "lowpass cables". It is claimed that these cables (single conductor, twisted pair or multi-core) and an associated range of filter assemblies will pass low-frequency signals up to a specified (-3dB) frequency (normally 5MHz for cables but selectable from 50kHz to 200MHz for the filter assemblies) but attenuate higher frequency hash and rfi with a more than 25dB/octave characteristic. The cables and filters absorb the interference rather than reflecting it back along the system. The brochure, however, gives no indication of the cost of these useful-looking products.

Tracing valve pin-outs

Frank Hughes, VE3DQB, noting the recent items about the problem of tracing valve pin-outs when no valve data books are available, writes to chide me for forgetting a useful chapter in the long-out-of-print 160pp *Radio Handbook Supplement* published by the RSGB during the second

world war at the staggering price of 2s 6d (12½p) as a companion to the *Amateur Radio Handbook* which was being used as an RAF training textbook. The supplement included a 15-page chapter "A service operator's vade mecum" by B W F Mainprize, G5MP, full of practical advice on how a signals operator could make improvised repairs in the field using substitute components "in a manner which need never enter the mind of a depot engineer".

"Surely," writes VE3DQB, "so useful a text is always within your reach and by now you will have snatched down your copy". Yes, indeed. Fortunately my copy, although now water-stained from a disastrous frozen-pipe burst that sadly reduced my library last winter, is still to hand.

VE3DQB points out that a section on page 115 headed "Enemy equipment" was intended to help the service operator presented with captured valves of unknown type to trace the base connections. For the benefit of the many readers deprived of a copy of that 1941 book, he has paraphrased and up-dated G5MP's advice as follows:

1. Locate the two or three pins with a little resistance between them; these are the heater pins. No resistance means an internal connection.
2. Apply a low voltage to the heater and slowly increase it until the heater glows cherry red. Nowadays, long odds on this being 6.3 or 12.6V.
3. A clip lead connected to a 9V battery and milliammeter in series is clipped to one of the active pins, and the other pins tried in sequence. When the meter shows current flowing, the negative side of the battery is connected to the cathode of the valve.
4. Leaving the negative connection to the cathode in place, and the positive connection to another pin, connect a second 9V battery to the cathode (positive this time) and connect the negative terminal in turn to all other pins. Those that affect the meter reading are connected to grids between the cathode and the pin connected to the meter.
5. Repeat 4 until the pins of all grids and the anode are known.
6. Scrutiny of the electrodes through the glass envelope (assuming that it is not a metal valve or a metallized coating) should identify multi-section valves, and alert the investigator to look for two cathodes etc.

Happily thumbing through the other pages of the *Supplement* with its chapters on fundamentals, radio mathematics, direction-finding, cro technique, mathematical tables and formulae etc, one is reminded of the days when even though equipment was relatively simple and understandable (and serviceable), amateurs in uniform took the acquisition of technical knowledge very seriously—and this was all years before the introduction of the compulsory RAE!

Kurt Grey, VE2UG, while far from being anti-solidstate, considers that mechanical design has become mediocre and makes servicing more difficult than it need be: "Unlike a valve, which could be simply pulled out and replaced, the removal of a transistor can be a nightmare. Very often the pcb is damaged in the process. Coils, resistors, capacitors may have to be removed just to get at the transistor. Designers seem to have been brainwashed into believing that transistors never fail. And then, when at last the new transistor is in place, power 'on' and output restored what happens? The tv monitor shows breakthrough. A \$20,000-plus spectrum analyser is needed (as Peter Chadwick, G3RZP, noted recently in *TT*) to trace and cure the parasitic spurs resulting from the minor changes in layout that came about in reinstating all the components that had to be removed to reach the transistor!"

Tips and topics

For those interested in packet radio, attention is drawn to a special issue of *Proc IEEE* (January 1987) which devotes more than 150 large pages to a series of papers on "Packet radio networks". Many stem from the current investigations into using packet radio for military mobile networks, including a paper by B H Davies and T R Davies of the UK Royal Signals & Radar Establishment: "The application of packet switching techniques to combat net radio." The guest editors regret that so many of the papers stem from efforts sponsored by military organizations, adding: "This is due to the unfortunate lack of success that we experienced in including a paper on the application of this technology to the commercial and amateur sectors." A paper on "Issues in packet radio network design" points out that much of the present work is concerned with "broadcasting" messages to mobile users over a single channel on a store and forward basis, but that some of the amateur and commercial applications "de-emphasize this capability", by which I assume is meant that most amateur packet operation is between fixed sites.

"PIN-diode rf attenuator", *TT* July p498, Fig 6(a). Please note, polarity of D3 should be the reverse of that shown: cathode joins base of the BC308. Shown correctly in layout diagram Fig 6(b). Note also transistor must be silicon pnp type and D3 a germanium type so that base is held off when D3 conducts via the 270kΩ resistor. □

NEWS BULLETIN

5070
MHz

FIRST MONTH

— The who, where and when
during June's Es openings

No apologies for leading off this Bulletin with more about 50 MHz - things on this new band have taken off in a spectacular way, and some rather exotic DX has been worked. Star turn must have been W6JKV/YVO on Aves Island, to the west of Dominica in the Caribbean, worked during a 50 MHz Es opening on 24 June - more in a moment. We hear that the HF DX brigade have been crying into their beer over that one - to work Aves on any band at all would be pretty good going, but to work it on 50 MHz....!

Basically, there were a number of 50 MHz Es openings between the UK and North America during the merry month of June - together with some 144 MHz events, just to add to the fun. You'll remember that in a late flash in last month's Bulletin we mentioned the UK-USA opening on 7 June - well, after that the story goes something like this;

Late May - Malta receives 50 MHz allocation. It's for 50-52 MHz, all 9H licensees, 10W pep max at the antenna.

28 May - G3CCH makes first 50 MHz G-9H contact, with 9H1CG.

5,6,7 June - G4IJE works 9H1BT/9H1CG, also C30DAW and CT1LN on the 6th, ZC4VHF/5B4 and CT1WW on the 7th.

6 June - GM3WOJ works 9H1CG (QRB about 2 800 km), probably first 50 MHz GM-9H1.

6 June - GI8YDZ and EI6AS work 9H1BT, probably 50 MHz firsts from these countries.

6 June - I, YU, HG and LZ worked from UK in 144 MHz Es.

7 June - GI8YDZ works ZC4VHF/5B4 (QRB about 3 800 km).

7 June - CM4DMA/A on Maureen Alpha oil rig (JO08/AS) works UB4, UB5 on 144 MHz Es. Seven stations worked, in KO60 and KO70 squares.

10 June - New beacon CTOWW comes on air on 50.03 MHz (as per our beacon list), running 40W to a dipole.

11 June - VE1SIX beacon struck by lightning, goes off air.

11 June - 144 MHz Es opening. GJ60ZB works Italy, Greece and Yugoslavia, including mega-rare JN51 square.

14 June - G3K0X works W6JKV/P/V2A (Antigua) on 50.11 MHz at 1450. G4IJE works same station on following day at 2000.

14 June - GJ4ICD works several USA stations in 5 call area. Also hears W7, CT, EA, GI and GM.

14 June - GM4ZUK works 30+ stations in London area on 50 MHz.

15 June - lots of crossband activity. 4U1ITU works 123 G stations in some 40 minutes and hears WB4KPD and N4AVV. VP2 worked by CT1WW on direct 50 MHz during evening.

15 June - nice 144 MHz Es opening to Italy, Malta and Yugoslavia, including GI-IC8 (JO70) at about 1115.

18 June - 50 MHz opening to USA from UK in morning. 4U1ITU works crossband and HQ station GB3RS unable to crack pile-up. RSGB brings pressure at United Nations to revoke 4U1ITU licence or relocate station to Potters Bar - no, not really.

18 June - GM4DMA reports extensive 144 MHz Es opening. Between 1342 and 1456 works 33 YUs, 5 Is, 10 OEs, 5 YOs, 2 DBs, 9 HGs and 2 OKs. (over)

MORE HELP AT LOCAL LEVEL

— the RSGB reorganises
its field operations

During the time for which the Regional Representative scheme has been in existence, the amateur radio scene has radically changed. In the course of this year the Society has been looking at the effectiveness of its local organisation and how to make it more responsive to members' needs.

The role of the Regional Representative has been described as "running the local office of the Society". A Council working group which was set up to consider this most important function recommended that much more support and effort is needed, and that the Membership and Representation Committee should reorganise the system of RSGB volunteers in the field so that they fulfil the present-day requirements of the Society and its members.

Plans for the new scheme, which will be introduced on 1 January 1988, are now well under way. The President wishes to thank the Representatives of Regions 1, 3, 5, 6, 14, 15, 16, 17 and 20 and also those members who provided input. Their views were taken into consideration by the working group and the M & R Committee before the new scheme was presented to and approved by Council on 11 May.

Basically, the new scheme is designed to make the Society more accessible to its members and also to improve members' awareness of the Society's organisation. It is hoped that clubs will play a vital part in the new scheme, since only they can provide the requisite quantity of practical effort at local level.

Next month's RadCom will include a full explanation of the aims of the new local organisation, a description of the new post of RSGB Liaison Officer - which will replace the existing Area and Regional Representatives - and details of how to apply for this new post.

Other stations in central and northern G have 144 MHz Es opening to SP.

19 June - best transatlantic 50 MHz Es opening for some years. Begins late afternoon, lasts several hours, even QRP Stateside stations S9. Opening seems to extend from Florida to Nova Scotia.

24 June - 50 MHz opening to Aves Island in the Caribbean. W6JKV/P/YVO a tremendous signal between 1710 and 1830 (see 14 June) and by very sharp operating works hordes of G stations. First G station to work Aves Is was G4GLT in Leicester on 50.110 MHz CW, 559 reports exchanged at 1710 GMT, and on SSB with 56 and 55 reports at 1712.

Those were the main 50 MHz openings prior to press time, and we'd like to hear about any we've missed.

Other 50 MHz snippets. According to EA4CGN there is no legal 50 MHz activity from Spain. Lots of UK folk have worked EA1MO, and it appears that he's operating on the basis of a local informal agreement with the engineering staff of the local TV station not to cause any interference! Also, YU50MHZ has been worked on a number of occasions despite the fact that there's no been no formal release of the 50 MHz band in Yugoslavia.

CROSSBAND LADDER

Only three entries had arrived at RSGB HQ by press time - come on, where's the rest? So far the story is:

G8DKF - 9 countries

GW3WSU - 6 countries

G8PYP - 5 countries

To be included in this crossband ladder, simply note the number of countries you have worked, on the back of a postcard, together with your name and callsign, and send it to:-

David Gough, G6EFQ
News & Information Dept
..... at RSGB Headquarters.

Crossband operators might like to think about the following. When there's an opening to the States, the USA stations tend to appear on or about 50.110 MHz. It might be a good idea to avoid this frequency, and those in its immediate vicinity, when you're doing your crossband bit, and also to encourage distant stations calling "CQ crossband" on 28 MHz to avoid asking for replies around 50.110 MHz.

So - all in all, quite a month. One not-so-good item of news, however, is that the French have now started their subscription TV service "Canal Plus" in - guess where? Yes, that's right, the 50 MHz band. That by itself wouldn't be so bad but the channel they've chosen to use for most of the service is the one they call E2, which neatly straddles the UK 50 MHz amateur allocation! Quite why they couldn't go anywhere else in Band 1 is anyone's guess, but it means we've got to be incredibly careful not to cause interference to it - whether we like it or not, the French (or any other European country, come to that) have every right to deploy television in Band 1 and we just have to live with it.

We've said on many previous occasions that it's important to watch ERP on 50 MHz, but it's absolutely crucial to watch it when we beam south. If you live in the south - or, even worse, on the south coast - you MUST watch your ERP like the proverbial hawk. Please DON'T use a microwatt more power than you need if you're beaming anywhere near La Belle France. Obviously the Society is watching the situation carefully and talking to the DTI about it, but life could get rather awkward if we're not tres careful....

Incidentally, if you're considering visiting France please don't start operating on 50 MHz when you get there. There's been at least one case of a foreign national operating out of France on 50 MHz (and very badly too, we might add....) - let's not have any more.

If you're in the slightest doubt about your ERP, please re-read the item in last month's Bulletin which explained in detail how to go about working it out. If you're still not clear, or you have any queries, please don't hesitate to get in touch with Headquarters and we'll try and help.

Incidentally, if you're wondering about Aves Island it is also known as Bird Island and it's just off Dominica in the Caribbean at about 15N 63W. For DXCC purposes it counts as North America since it's in Zone 8. It's pretty rare on any band - the last time it was activated was a few months ago, by a group from a Venezuelan club using the callsign 4MOARV. There is another, smaller Aves Island off the Netherlands Antilles but so far as we know, it's never been activated.

(see "PS" column for late flash)



RSGB President Mrs Joan Heathershaw, G4CHH performed the opening ceremony for the new Flight Refuelling ARS Headquarters on Sunday 3 May. The club is 5 years old this year and has 100 members. Joan was made Honorary Member No 100. The new HQ comprises HF, VHF and UHF shacks, a workshop, coffee bar and meeting room as well as a store room for antennas and equipment. There are two towers; one fitted with a TH6 for HF and the other with antennas for 4m, 2m, 70cm and 23cm. The current project is the siting of an 18' dish for EME and satellite operation.

Left to right in the photo are:- Ashley, G0CDY (Secretary); Ron, G0GHX; Mike, G4YTA (Vice-Chairman), Joan Heathershaw, G4CHH; Gary, G1MXD; Hilary, G6KNF; John, G0API (Chairman); Brian, G4WEY; Ian, G1SMD; Rob, G6DUN; Steve, G0DQO (Treasurer); and Carle, G6NCL.

KEEPING YOUR SIX METRES CLEAN — Part 1

Last month we lamely apologised for not getting our 50 MHz transmitter filter feature into the Bulletin because of a shortage of space. This month, to make up for it, we have a simple 50 MHz filter device for you to build and there'll be another next month. Both by George Jessop, G6JP, who must have the cleanest 50 MHz transmitter in the UK!

Quarter-wave stub

First of all, there's the humble quarter-wave stub. The beauty of this is that when it's short-circuited at the remote end, it presents a short-circuit to all even harmonics of the transmitter output. In practice, this means pretty well no insertion loss and a second harmonic attenuation of at least 30 dB - it also provides a static discharge path, which should help protect the rig's front-end.

This is what you do. Beg, borrow or buy at a rally some form of coaxial "tee" connector - BNC, N, UHF, whatever you prefer and whichever matches the connectors you're already using (unless you're a masochist who positively enjoys putting coaxial connectors on cable). Next, rummage about in the junk-box for a length of about 39" of coaxial cable. It doesn't matter what type you use as long as it's of the same impedance as that used in the rest of the system, usually 50 ohms, because it's the electrical length of it that matters. Whatever the velocity factor of the actual bit of cable, you'll automatically reach the correct length when you trim the cable as outlined in a moment.

Put the appropriate plug on one end of the length of coax (the most difficult part of the operation, you'll be pleased to know). Make sure that the other end of the

cable is cut so that the inner and braid aren't shorting together. Then plug the tee connector in between the transmitter and the antenna. Don't plug the length of cable on to the "leg" of the tee just yet.

The next job is to find a strong local 50 MHz signal. If you haven't got a suitable beacon handy, or a signal generator to produce the required effect, persuade a friend to come up on the band and radiate a test transmission for you. When you've got a suitable signal organised, tune your 50 MHz rig to it and make a note of the S-meter reading. Then plug in the length of cable to the vacant socket on the tee connector. You should find that the S-meter reading reduces slightly. Take a suitable pair of cutters and snip about 1/4" at a time off the cable length whilst watching the S-meter - you should find that the signal becomes weaker with each snip. When the incoming signal reaches a minimum (which is easy to write but do be careful - don't be tempted to take one chop too many) you know that the cable's electrical length is exactly a quarter wave.

All you need to do then is to remove the outer sleeving and inner insulation for about 1/16", fold them together and join with solder. Voila! One quarter-wave stub. To prove it's working, check that the S-meter reading comes back to full strength after the outer and inner are joined and doesn't change whether or not the stub is plugged into the tee connector.

Incidentally, if you have a GDO you could also use it to resonate the stub. We prefer the "snip for maximum smoke" method, however, because it makes precise allowance for the plug and tee connector you've used.

Next month, a dual tuned-circuit 50 MHz filter.

RSGB HF CONVENTION

Arrangements for the 1987 HF Convention, to be held at the Belfry Hotel near Oxford on Sunday 27 September, are well under way.

So far, the speakers include: John Brown, G3EUR, with "Special Force Signals" (radio-communication during the 2nd World War); Peter Chadwick, G3RZP with "Measurements in the Shack"; David Yates, G3PGQ with "Aerials Illuminated" (an unique minitured demonstration of practical antenna performance); and a DX Forum, which we hope will include Einar Enderud, LALEE showing his slides of the Peter I Island DX-pedition.

Other attractions will include an RSGB Bookstall, constructors' advice booth, CW pile-up competition, "Dr DX" computerised contesting, RSGB Committee stands, car-boot sale and stands by special interest groups such as BYLARA, WAB (Worked All Britain Awards Group), G-QRP Club, UK FM Group (Southern) and others.

If there is sufficient demand, examinations for the US FCC licence will be held at the hotel on Saturday 26 September. Anyone who is interested should register with:- Gregg Lambert, G0/KK1J
27 Redcliffe Road
London SW10 9NP
tel: 01-352 2746.



16th WORLD SCOUT JAMBOREE:

The theme of the 16th World Jamboree - which will be held at Cataract Scout Camp, just south of Sydney, Australia - is "Bringing the World Together". Although representatives from over 100 countries are expected to attend, the organisers appreciate that not all those who want to attend will be able to do so. In order to 'bring the world together' in the spirit of the event, a world-wide 'Join In Jamboree' project is being promoted. Scout groups around the world will be encouraged to participate in the same sort of activities which will be going on at the camp. These will be based on traditional Aboriginal and Australian cultures. Groups will learn to make and throw boomerangs, design an Aboriginal Totem, send message sticks, play the Didgeridoo, tap sticks and Balloknook (a type of drum), and try their hand at tracking and body painting. Cooking will be another part of the activities and covers many traditional Aboriginal and Australian dishes. All of these projects and many more can be found in the "Join In Jamboree" brochure, available from the World Scout Bureau, Box 78, 1211 Geneva 4, Switzerland.

A special amateur radio station will be active at the World Jamboree from 30 December 1987 to 10 January 1988 and will be operational on the following frequencies:-

- 3740 kHz - Phone
- 7030 kHz - CW
- 7090 kHz - Phone
- 14.070 MHz - CW
- 14.290 MHz - Phone
- 21.140 MHz - CW
- 21.360 MHz - Phone
- 28.190 MHz - CW
- 28.390 MHz - Phone

SOLAR NEWS FROM DOWN UNDER:

Radio Australia now transmits regular propagation reports each day except Sundays. Solar flux, sunspot numbers, A-indices and a 24-hour forecast are given using information supplied by IPS Radio & Space Services. The reports are broadcast at 0425, 0825, 1225, 1625 and 2025 hours GMT and reception in Europe is reported to be very good at 0825 hours on a frequency of 9655 kHz.

DAM BUSTERS OPERATION A SUCCESS

Over the weekend of 16/17 May, surviving members of the original "Dam Busters" - 617 Squadron, Royal Air Force - met at Woodhall Spa in Lincolnshire to dedicate a stone memorial to their colleagues who did not survive the war. They returned to their old Officers' Mess - now the Petwood Hotel - to meet old comrades and to remember those who had died.

Sgt Ernie Knight, G4NVD, serving at RAF Waddington and RAFARS Area Representative, was asked by members of the Dam Busters' Association if he could arrange a special event GB call to mark the event. This was done after kind permission had been given by the Station Commander of RAF Waddington, Gp Capt Bonner, and Ernie's Commanding Officer, Sqn Ldr Taylor, with the support of RAFARS HQ. The manager of the Petwood Hotel gave permission for the station to operate from the snooker room, which was used by 617 Squadron during their off-duty periods, and readily agreed to provide all the facilities required.

After some initial teething troubles, GB2DB came on air at 2pm on the Saturday. The operating team of RAFARS members consisted of Ernie G4NVD, Jack G4FPB, Alec G3AZW (a member of the Dam Busters), John G3MGX, and Alvis, G4RPD from the Lincoln Short Wave Club. In support of the event, the Lincoln SWC set up a station, G5FZ/P, inside the Lancaster "Gate Guardian" at RAF Scampton, in spite of rain leaking through the fuselage.

GB2DB made a total of 454 contacts on 3680 kHz, which was the frequency used during the dams raid, and on 144 MHz FM.

Ernie would like to thank all of the stations that made contact with GB2DB over the weekend and apologise to all those who didn't quite make it. Stations displayed excellent discipline, especially when a clear frequency was called for in trying to establish contact with DA2YV located at the rebuilt Moehne Dam. Unfortunately, contact was not possible due to unfavourable conditions. Thanks also go to the 3680 Net for keeping the frequency 'warm' and allowing GB2DB instant access as soon as the station came on air.

Greetings messages were passed from George Chalmers, the wireless operator of the last Lancaster to arrive back after the raid, and Sqn Ldr Mack Hamilton, one of the Lancaster pilots. Mack was particularly pleased to hear from his old navigator.



MORSE TESTS

The following list shows the dates and locations of all the available test centres from the beginning of September to early October, 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. If you want to take a test and any of the centres shown is within striking distance, send for an application form immediately. Completed applications will be dealt with strictly on a first-come first-served basis.

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
Cleveland	Billingham	02/09/87
Cornwall	Liskeard	03/09/87
Dyfed	Carmarthen	03/09/87
Nottinghamshire	Mapperley, Nottingham	05/09/87
Lancashire	Preston Rally	06/09/87
Co. Armagh	Armagh	07/09/87
Lincolnshire	Louth	08/09/87
Central	Stirling	08/09/87
West Yorkshire	Spenn Valley ARS	10/09/87
Isle of Wight	Binstead ARS, Ryde	12/09/87
Mid Glamorgan	Rhydyfelin, Pontypridd	13/09/87
Strathclyde	SARCON 87, Irvine	13/09/87
Shropshire	Telford Rally	13/09/87
Isle of Man	Onchan, Douglas	15/09/87
Bedfordshire	Luton	17/09/87
Greater London	Wanstead, London E11	18/09/87
Norfolk	Norwich	19/09/87
Dorset	Dorchester	19/09/87
North Yorkshire	York	19/09/87
Buckinghamshire	Bletchley, Milton Keynes	20/09/87
Shropshire	Telford	21/09/87
Strathclyde	Glasgow	21/09/87
South Glamorgan	Penarth	22/09/87
Lothian	Edinburgh ARC	23/09/87
South Yorkshire	Stocksbridge, Sheffield	24/09/87
Lancashire	Fleetwood	26/09/87
Kent	Tunbridge Wells	26/09/87
Essex	Harlow Rally	27/09/87
Greater London	Croydon	28/09/87
Guernsey	Guernsey ARC, St. Martins	01/10/87
Dumfries & Galloway	Stranraer	03/10/87
Wiltshire	Swindon	03/10/87
Staffordshire	Stafford	04/10/87
Co. Durham	Great Lumley Rally	04/10/87
Derbyshire	Derby & DARS	05/10/87
Gwent	Newport ARS	05/10/87

We receive notification of new centres almost daily and the application form gives a full list of these as far ahead as January 1988, as we went to press. Currently there are around 100 centres taking advance bookings for Morse tests.

Operation ceased at 7.15pm on the Sunday and all those involved had a wonderful time. QSL cards are available for all contact and SWL reports. These will be sent via the RSGB Bureau or can be obtained direct from G3AZW (QTHR) on receipt of a reasonably-sized stamped addressed envelope.

For those readers interested in RAF special event calls, GBORAF will be active from the Lincoln Hamfest on 13 September and GB2LLS (Last Lightning Show) from the RAF Binbrook Open Day on 22 August.

Helplines

PROPAGATION PROGRAM NEEDED:

John and Margaret Corbett, G3TWS/G8TWS - members of WACRAL (World Association of Christian Radio Amateurs and Listeners) - left the UK recently to work with the Baptist Missionary Society in Zaire. They spend their time repairing and maintaining the radio equipment used by missionaries, churches and schools. As there is no reciprocal licensing agreement with Zaire, they keep in touch with fellow amateurs by letter and in a recent letter to Len, G3AGX, John has requested that we ask our members for help with a particular problem. To quote from the letter:-

"We have an HF SSB radio network linking churches, hospitals and schools along 1200 miles of the River Zaire (Congo). The distance between stations varies from 20 to 1000 miles at 100 mile intervals and the only frequencies allowed are 6997 kHz to 7305 kHz. I have access to a BBC 'B' and a 'Master' computer and have read recently of an improved 'MINIMUF' program. Therefore, if anyone has a propagation program that has been verified for MUF with a frequency range of 5 to 15 MHz within an area longitude 20 deg W to 50 deg E and latitude 28 deg N to 28 deg S, it would be of valuable assistance in making more effective our limited radio communication facilities".

If you can help with a suitable program, please contact John via Len Colley, G3AGX who is QTHR.

GOT AN HRO-MX MANUAL?:

RSGB member Waldemar Bailing, DJ2LQ, who is the proprietor of the "Amateurfunkmuseum", has an HRO-MX receiver which he thinks was built between 1940 and 1945. He's looking for a copy of the associated manual and technical information. All postal costs will be refunded. If you can help, write to him at:-

7033 Herrenberg,
Hugo-Wolfstrasse 4,
Tel: 07 032 21275

HELLO SAILORS....

Tony, G4UIF intends to apply for a Maritime Mobile licence so that he can operate from a small boat off the east coast of the British Isles. He would like to hear from

any readers with experience of -/MM or -/MA operation who can give him a few tips about any possible pitfalls. Tony is QTHR in the latest callbook.

RF AMPLIFIER UPGRADE:

Does anyone have details of mods or upgrades for the Trio R1000 RF amplifier, ie. replacement of 3SK74 with BF981? If so please contact:-

Mr A G Rivers
34 Templewood Court
New Road
Hadleigh
Essex
Mailbox 219994871

..... and he'll be eternally grateful.

PICK A CALLSIGN, ANY CALLSIGN....

The Society has recently been giving some thought to what happens when we run out of callsigns in the present series, and we'd like your help in preparing something which we can put to the DTI. Basically, there are three options. The first is to replace the G in the prefix by M. The second would be for the prefix letter G to be replaced by M and also for the role of the prefix letter and figure to be reversed. The third would be to retain the G prefix and reverse the role of the prefix letter and digit. Got that? Neither have I. Below are some examples.

In Option 1 we could, for example, use 0, 1 and 2 for Class A licences and 3-9 for Class B. For Option 2 it could be MA-ME for Class A and MF-MT for Class B. A few letters would need to be reserved for beacons, repeaters and any fiendish devices that no-one's thought of yet (anyone for the Amateur Radio Teleportation Service?) which might need licensing. For Option 3 we could use, say, GA-GG for Class A and GH-GT for Class B - we'd need to keep GB, GD, GI, GJ, GM and GU for existing callsigns, however.

Location letters for Options 2 and 3 might be - for instance;

1. England
2. Guernsey
3. Jersey
4. IOM
5. Northern Ireland
6. Scotland
7. Wales

The advantages and disadvantages of each option seem to us to be as follows. Option 1 retains the familiar format but it doesn't provide the largest number of new callsigns and doesn't leave much room for other classes of licence if they ever happen. Option 2 gives the largest number of callsigns since it makes more efficient use of the letter; the digit option is sufficient for all the UK geographical areas (GW, GM, GI etc). It also allows GB stations to have a country indicator in the callsign. However, the G prefix disappears. Option 3 gives more callsigns than Option 1 but less than Option 2 by making more efficient use of the letter. Again, there are enough digit options for all UK areas and it would allow GB stations to have a country indicator in the callsign. It also retains the G prefix. The only disadvantage we can see is the possibility of some confusion between the old and the new series.

Note - no-one who already holds a callsign will be asked or expected to change it - we're simply pondering about how ask the DTI to cater for the situation when the current series gets full up. We'd very much like to hear your views, or even an outline of any options we haven't thought up - please send them to "The Secretary (New Callsign Series)" at RSGB HQ.

It might be worth mentioning that most countries use numbers as a means of identifying geographical location. The UK has seven geographical areas, which could easily be covered by means of numbers. Systems where the location is designated by the number give a much larger number of possible callsigns. We also have a feeling that the G prefix has a very strong national identity in the UK and that members would be reluctant to see it disappear - but do let us have your views.

	Present	Option 1	Option 2	Option 3
Class A	G0AAA GMOAAA	M0AAA MMOAAA	MA1AAA MA6AAA	GA1AAA GA6AAA
Class B	G1AAA GM1AAA	M3AAA MM3AAA	MF1AAA MF6AAA	GF1AAA GF6AAA

HAM RADIO '87



The RSGB stand was staffed by a number of volunteers. Seen in the photo are Rosemary Evans, BR88188 and Nigel Roberts, G4IJF. Other helpers included Angelika Voss, GOCCI, Ron, G6LX and Pru, G4RWW.



RSGB Chief Executive/ Secretary, David Evans, G3OUF (left) is pictured on the RSGB Stand with IARU Region 1 Secretary/ RSGB Council Member, Dr John Allaway, G3FKM.

Each year there are many amateur radio rallies held in all parts of the UK and the rest of Europe but only a few of these can truly be called a Convention/Exhibition as opposed to a mobile rally. One such Convention/Exhibition took place in June at Friedrichshafen in southern Germany. This venue is the natural setting for any summer gathering being on the north shore of Lake Constance and conveniently situated near to Switzerland, Austria, Italy and France.

The annual meeting of radio amateurs in this part of Europe has been held for many decades and this year, thanks to the hospitality of the German National Society DARC and the organisers, International Bodensee-Messe, the RSGB was offered a free stand and hotel accommodation. This seemed too good an opportunity to miss, and so the long-suffering secretarial Sierra was loaded to the gunwales with RSGB books and other goodies and launched on its way south. Actually, "aquaplane" might be a better word; torrential rain affected most of Central Europe and it rained almost constantly for the three days of the event. However, despite the weather over 15,000 radio amateurs attended and many of them camped on-site - all, it seemed, with handy-talkies on the go constantly.

The venue at Friedrichshafen is a bit like a miniature version of the NEC, with the event occupying three of the nine available halls with a number of stands outside. Something like 100 trade stands took up one large hall, and another was devoted to an extensive flea market. The connecting hall housed the national society, DARC, together with a large display of historic radio equipment from the Amateurfunk Museum in Munich. As well as DARC the Austrian and Swiss national societies were represented. One of the largest stands in the main hall was that of the Deutsche Bundespost, which administers amateur radio licensing in West Germany. On this stand you could obtain an instant free reciprocal licence for D, HB0, HB9

FRIEDRICHSHAFEN



or OE valid for three weeks; the only formality was that production of your own current licence was required.

Home construction is obviously flourishing in Germany - there were lots of kits available, especially for microwave applications. For large items prices looked to be about 20% less than in the UK. The Big Three from Japan had staff on hand to answer queries. One nice touch was that the various rigs were available on tables for prospective buyers to try out without any pressure to part with the folding stuff - now wouldn't that be a nice touch at next year's NEC?!

Overall, the event had a pleasant and friendly atmosphere. Business on the RSGB stand was brisk and - perhaps more importantly - profitable and we would like to thank all the volunteers who staffed the stand for their support. Apart from the Society, a number of other UK companies flew the flag on the export side and all reported good business.

We musn't forget to mention that on the Saturday evening a large gathering took place in the Graf Zeppelin Haus, where some suitable merrymaking took place into the very small hours!

All in all, an excellent event - and you'll be pleased to know that the Society even managed to make a small profit.

The Friedrichshafen event is so popular that the Society may well consider some kind of organised package trip next year. If you are interested, please write to the Membership Services Dept at RSGB HQ, marking your envelope "Friedrichshafen". The dates for next year's event are 17-19 June inclusive.

Our thanks go to David Jardine, GOFDV of Jardine Advertising, Peter Crosland, G6JNS, the German National Society, DARC and David Evans, G3OUF for the information contained in this report.



Friedrichshafen provides a truly international meeting ground for amateur radio. Seen here (Left to Right) are: Mohammed Marhoon Al Balushi, A4XKF; Louis van de Nadort, PA0LOU, President of IARU Region 1; Carl Taddy, DL1PE, President of DARC; Joan Heathershaw, G4CHH, President of RSGB; Shoso Hera, JA1AN, President of JARL; and Nasser Al Ruwaby, AX4KG.



Arcturian Trading Co Ltd, Siskin Electronics and Cap Co Electronics Ltd, shared a stand to fly the flag. Friedrichshafen proved to be a viable way of exporting British made products.

Around the Groups

SOLENT FORTIFICATIONS AWARD:

Apologies for not having mentioned this one before - as you will see in the "GB Calls" listing on the Events Diary pages, there are several special event stations active this month from various fortifications around the Solent. Some of the stations have been active since April (see photo caption) and more are due to come on air soon.

The Solent Fortification Award is issued in five categories:-

HF (Zone 14):

Basic - 7 contacts
Silver - 10 contacts
Gold - 13 contacts

HF (outside Zone 14):

Basic - 3 contacts
Silver - 5 contacts
Gold - 7 contacts

All modes and all bands accepted. Please state CW, phone or mixed. One point per contact.

VHF (80km radius):

Basic - 7 contacts
Silver - 10 contacts
Gold - 13 contacts

VHF (400km radius):

Basic - 3 contacts
Silver - 5 contacts
Gold - 7 contacts

VHF (over 400km radius):

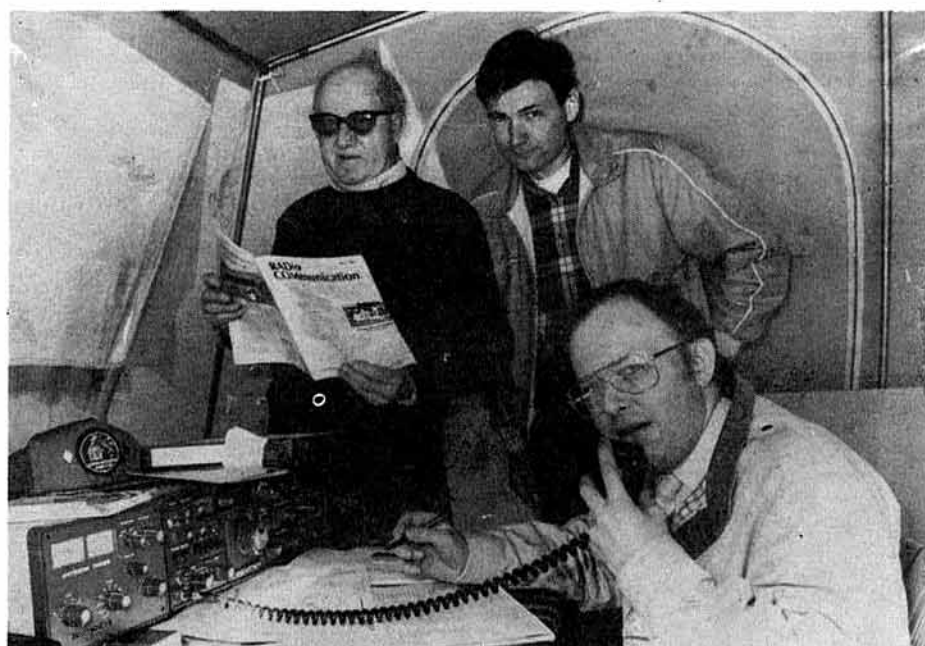
Basic - 1 contact
Silver - 2 contacts
Gold - 3 contacts

One point per contact on phone, two points per contact on CW or other mode.

Contacts made on or after 4 April 1987 are valid. Claimants should send a full list showing details of contacts made which should be certified by two other licensed amateurs. QSL cards are not required for a claim. The fee is £2.50 per award. Short wave listener reports will be welcomed.

AMSAT-UK NEWS:

Ron Broadbent, G3AAJ, of AMSAT-UK, tells us that the Russians have placed two or possibly three transponders into orbit. At press time, it was not clear exactly where they are located except to say that they are in the same orbit as the recently launched Cosmos rocket and payload - a navigational satellite transmitting in the 150 MHz band. Official and amateur



On Sunday 5 April, the first of these stations, run by the Horndean & Dist Amateur Radio Club, was active from the car-park outside Portchester Castle. About 130 contacts were made on the HF bands and about 80 on VHF. Left to right in the photo are: Edmund, GOEDM; Dave, G6KRP and at the microphone, Dan, G4RLE. (Photo courtesy of Portsmouth Evening News)

observers have tracked the navigational satellite and the RS transponders and found them to be on the same period. It is fair to assume that the transponders (RS10/RS11 until confirmed by USSR) are inside the navigational satellite.

The transponders are operational on several frequencies and are causing some problems to 21 MHz terrestrial operators who perhaps don't realise that they are transponding via a satellite.

The modes and bands are as follows:-

Mode K - 15m up/10m down
Mode T - 15m up/2m down
Mode A - 2m up/10m down
Mode KT - 15m up/10m+2m down
Mode KA - 15m+2m up/10m down

BEACON ON THE MOVE:

The 28 MHz beacon 9L1FTN - sponsored and constructed by the Cheshunt & Dist ARC in 1984 and operated by the Sierra Leone ARS - is no more. Due to national economic conditions and site problems, SLARS has decided that a new home should be found for the beacon. Alan Taylor, G3DME, the Region 1 beacon co-ordinator and Roger Frisby, G4OAA of the Cheshunt

club have discussed the problem and decided to relocate the beacon in West Africa.

At the recent Region 1 conference in the Netherlands (reported in last month's Bulletin), Alan, Cassandra Davies, 9L1YL and Ben, EL2BA agreed that the beacon should be moved to Liberia and be operated by the Liberian Amateur Radio Society. Alan is currently trying to arrange for the beacon to be returned to the Cheshunt club for modifications to bring it into the new regional beacon band of 28.190 to 28.199 MHz. When it is on its new frequency it will have to time-share with other beacons and NCDXF, who operate the 14.100 MHz time-share beacon network, have had an offer from ARRL to produce timer PCBs to their design for use in the new 21 MHz and 28 MHz beacons.

On behalf of Region 1, Alan thanks the Cheshunt club for its past and future help with beacon building, as well as all those in Sierra Leone for their efforts in keeping 9L1FTN on the air. Its demise was beyond their control.

As a final piece of news, the Sierra Leone ARS has had to abandon the use of its shack at the University following recent damage there. They now meet where they can in Freetown.

25th ANNIVERSARY:

The Loughton & District Amateur Radio Society celebrates its Silver Jubilee this year. The Society was formed on 27 April 1962 and is dedicated "to encourage and further the interests and activities in electronic applications, and to provide facilities for the pursuance of these aims". The "electronic applications" centre around amateur radio. The Loughton & DARS provides talks on radio, electronics and other associated subjects, holds film and video shows, amateur radio junk sales (which prove to be very popular) and partake in quizzes and nights on the air. Extra curricular activities are arranged and these include visits to rallies, radio stations and museums, treasure hunts, dinners and barbecues. A quarterly newsletter is produced to keep its members in touch with forthcoming events and general amateur radio news. The RSGB

extends its best wishes to the Loughton & District Amateur Radio Society and hopes that it will be as strong in the year 2012 when the Golden Anniversary will be celebrated.

WAB NEWS:

The 1987 AGM of the Worked All Britain Awards group took place at the Drayton Manor Rally on 10 May. It was attended by a record number of over 100 members. 38 trophies were presented for achievement at the higher stages of the award including the first ever Diamond Awards on 2 metres and the European Honour Roll trophy for working 3,000 WAB areas. Engraved goblets were presented to G2AFQ and G4WSB for their outstanding achievement in activating 3,000 areas. G1SMI also received the first ever trophy for activating 1,000 areas on 2 metres only.

Dave Brooks, G4IAR, the WAB Awards Manager, reported that over

2,000 awards had been issued in the previous year, nearly double the figure for the year before. Awards were issued for the first time for activity in the 430 and 1296 MHz bands, indicating an expanding interest in the Worked All Britain scheme.

A new Committee was elected as follows:-

G4HPU - President
G4IAR - Awards Manager
G4GEE - Treasurer
G4KSQ - Book Manager
...plus G0CLT, G0DVT, G3UQT,
G4UXU, G4VID, GW6JNE, G6XLL, G8XTJ.

Unfortunately, the price of the WAB Record Book and Claim Sheets has had to be increased to £6 inc p&p, but this gives the holder life membership of the group and voting rights at the AGM. There is no limit to the number of books that can be held by an individual; in fact some users prefer to have a book for each band that they operate. Each book carries an individual number and the 8000 series is about to be released.

Details of the WAB Awards Scheme can be obtained from any of the Committee members and books can be purchased from:-

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

NEWS FROM ACROSS THE POND:

'CRRL NEWS' reports that Leonid Labutin, UA3CR, will be with a group of Soviet and Canadian scientists crossing the North Pole on skis next February. The expedition will begin from Novaya Zemla in the Soviet Union and end at Cape Columbia on Ellesmere Island, Canada. Leonid advises that the expedition will use a 10W transceiver on the 80, 40 and 20 metre bands with the possibility of some equipment for operation through the OSCAR or RS satellites.

Visiting the USA or Canada this year? The 1987 ARRL Repeater Directory is available from ARRL or CRRL. It lists repeaters in the USA, Canada, the Caribbean and Central and South America.

NO PACKETS THIS MONTH:

We said last month that we'd have a four-page special feature on packet radio entitled "Don't miss the mail" in this month's Bulletin. Unfortunately we've had to hold this over for a month, mainly because of pressure on space - bear with us and don't miss the mail next month.

ASTLEY & TYDESLEY DIAMOND JUBILEE:

The Astley & Tydesley Collieries Institute club house, built by the miners themselves, was opened officially in October 1927.

The club house is the headquarters of the West Manchester Radio Club and as part of the Diamond Jubilee Celebrations, they will be running a number of special event stations from 18 hours GMT on Friday 28 August to 16 hours GMT on Monday 31 August. As well as the club call signs, G4WMC and G6FSA, the following GB calls will be active - GB60Y, GB1ATJ, GB2ATJ, GB4ATJ, GB6ATJ, and GB8ATJ. Operation will be on all bands using all modes including FAX, RTTY and Satellite. All amateurs are welcome to come along to the event

and offers of help in operating (a total of 70 hours!) will be welcomed.

Local dignitaries including the Mayor, Chief Constable and officials of the NCB, NUM and UDM, will attend the event on the Sunday.

The photograph shows the Club House and you can just about see the impressive mast and antenna array. The West Manchester Radio Club meets on Wednesday evenings at 8pm and details can be obtained from Dave, G1IOO on 0204-24104 (evenings), and just a quick reminder that the Red Rose Rally, organised by the club, takes place on Sunday the 16th of August at the Bolton Sports & Exhibition Centre (see Events Diary for more details).

Events Diary

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'.

2 AUGUST

*Rolls-Royce ARC Mobile Rally - Rolls-Royce Sports & Social Club, Barnoldswick. Easy access from A59 and A56 between Burnley and Skipton. Opens at 11am and all the usual traders. Bar & refreshments. Talk-in on S22. Details, G4ILG, tel: 0282 812288 or 0282 813271 (day).

*RSCB MOBILE RALLY - Woburn Abbey, Woburn, Bedfordshire. Usual traders, *Large RSCB Stand*, House & Gardens for family, cafeteria and shop, open spaces ideal for picnics, wildlife park nearby. Details from RSCB HQ.

9 AUGUST

*30th Derby Mobile Rally - Lower Bemrose School, St Albans Road, Derby. Usual traders, flea market & monster junk sale. Details Martin G3SZJ, tel: 0332 556875.

*Hamfest '87 & Craft Fair - Flight Refuelling Club, Merley, near Wimbourne, Dorset. Opens 10am, usual traders, bring & buy stall, craft stalls, family entertainment, refreshments. Details Ashley GOCDDY, tel: 0202 872503.

16 AUGUST

*Red Rose Rally - Bolton Sports & Exhibition Centre. *RSCB Stand*. Opens at 11am (10.30 for disabled visitors - ALL ON PAVEMENT LEVEL). Usual traders, bring & buy stall, raffle, refreshments & bar seating area. Talk-in on S22 by GB2RRA. Details Dave, G1100 tel: 0204-24104 (evenings).

30 AUGUST

*Torbay ARS Mobile Rally - STC Social Club, Brixham Road, Paignton. Opens 10am, usual traders, bring & buy stall. GB2NJA demonstration station also providing talk-in on S22. Details G3KZJ, tel: 08045 51995.

*BARTG Rally - Sandown Park Racecourse, Esher, Surrey. Opens at 10.30am. Usual traders, everything for those interested in RTTY/AMTOR/Packet communication under one roof as well as general amateur radio equipment and components. Car-boot sale, full catering. Ample car parking, talk-in on S22. Details Peter GBVXY (QTHR).

31 AUGUST

*Doncaster & Dist Raynet Rally - Bircotes Sports Centre, Waterslack Lane, Bircotes, Doncaster. Opens 11am (10.30am for disabled visitors). Usual traders, bring & buy, refreshments. Talk-in on S21 by G4YRD.

6 SEPTEMBER

*Preston ARS 20th Annual Rally - Lancaster University. Opens 11am (earlier for wheelchair disabled). Trade stands, large bring & buy, bar and restaurant. Details G3DWO, tel: 0772 53810.

*Bristol Radio Rally - Harecliffe Youth & Harecliffe Community Centres, Harecliffe Road, Harecliffe, Bristol. Opens 10am, usual traders, bring & buy stall, bar & refreshments. Talk-in on S22 by GB2BRR. Details Len G4RZY, tel: 0272 834282.

*West Kent Amateur Radio Rally - Angel Centre, Tonbridge, Kent. Opens 10.30am, usual traders, bring & buy stall, club stands, Stamp Fair. Talk-in by GBOWKS on S22, SUB and 29.500 MHz FM. Details G4KIU, tel: 0892 515678.

12 SEPTEMBER

*Ballymena Mobile Rally - Ballee High School, Ballymena. Details G14HCN.

13 SEPTEMBER

*Lincoln Hamfest - Lincolnshire Showground, Lincoln. 4 miles north of Lincoln on A15 Lincoln to Scunthorpe road. Opens at 10.30am. All usual trade stands, *RSCB Stand*, bring & buy, refreshments both inside & outside of hall, real ale bar. Lots of attraction for the whole family including raffles, flypast by WW2 Spitfire, helicopter rides (hopefully), model cars & model aircraft displays. Caravans welcome. Talk-in on 2m & 70cm. Details G8VCF, tel: 0522 25760.

*Scottish AR Convention - The Magnus Sports & Leisure Centre, Irvine, Ayrshire. Opens 10.30am. Usual traders, *RSCB Stand*. Details Bob, GHOECU on 0563-35738.

*National Amateur Radio Car Boot Sale - Old Warden Aerodrome, Biggleswade, Beds. Opens 10am, trade and private stands (over 250 last year), restaurant and cafe, The Shuttleworth Collection Aircraft and Motor Museum. Talk-in on S22 by GB4SC. Old Warden Aerodrome is well signposted from the A1. Details Wendy, tel: 0582 451057.

*Telford Mobile Rally - Telford Racquet & Fitness Centre. Arrive via M54 (junc 5) or A442

from north or south. Opens 11am (10.30am for disabled visitors). Usual traders and attractions. Lecture by MAXPAC, G3RZP/G4FNC and G3SEK. Talk-in by GB4TRG on S22 and SUB. See advertisement in this issue. Details G3UKV on Telford 55416.

20 SEPTEMBER

*Peterborough R & ES Rally - Wirrina Sports Stadium, Peterborough. Details G4PNW.

*Trafford Rally & Components Fair - Lancs CCC (Old Trafford), Talbot Road, Stretford, Manchester. Opens 10.30am (10am for disabled visitors all on ground floor) Talk-in on S22. Details G11JK, tel: 061-748 9804.

*Vange ARS Rally - Nicholas School, Leinster Road, Laidon. Opens 10am. Talk-in by GB4VMR. Details Alan G4OJN, tel: 02774-4386.

27 SEPTEMBER

*Harlow Mobile Rally - Harlow Sports Centre. Details G4KVR, tel: 0279 22365, daytime or G3UEG, tel: 0279 27788, evenings.

*RSCB HF CONVENTION - Belfry Hotel, nr Oxford. Opens 10am, comprehensive lecture programme, awards presentations, competitions, stands by special interest groups, refreshments & bar. Special B&B and Weekend rates available from the Belfry Hotel. FCC Examinations will take place at the hotel on Saturday 26 September.

4 OCTOBER

*Welsh Amateur Radio Convention - Oakdale Community Centre, Blackwood, Gwent. Details Brian G3KYA, tel: 0495 225825.

*Wakefield Mobile Rally - Details G4RCH, tel: 0532 536633.

*Great Lumley AR & ES Rally - The Community Centre, Great Lumley, Chester-le-Street, County Durham. Opens 11am, talk-in on S22. Details G4MSF, tel: 091 469 3955.

10 OCTOBER

*RSCB MIDLANDS VHF CONVENTION - Madeley Court Centre, Telford, Shropshire. Details Peter G3UBX.

11 OCTOBER

*Armagh & Dungannon District ARC Mobile Rally - Drumhill House Hotel, 2 miles from Armagh on Moy Road. Details G1OADD.

18 OCTOBER

*"ELHOEX" (Electronic Hobbies Exhibition run by Hornsea ARC) - Floral Hall, Hornsey. Opens at 11am (early entry for disabled visitors). All the usual traders, bring & buy stall, demonstrations by other local clubs. Refreshment and bar facilities. Good car parking. Located on the sea front so ideal for all the family. Potteries and Mere close by. Talk-in on S22 by G4EKT. Details Duncan, G3TLI on 04012-2588.

23/24 OCTOBER

*Leicester Amateur Radio Exhibition - Granby Halls, Leicester. *RSCB stand*, all the usual traders, large bring & buy stall, bar and refreshment facilities. Located close to Leicester BR station and city centre, large car park near by. Details Frank G4PDZ, tel: 0533 553293.

IN BRIEF - More details later.

1 NOVEMBER

*Carmarthen ARS Exhibition & Rally - Leisure Centre, Johnstown, Carmarthen. Details G3GUE, tel: 026 783 460.

7 NOVEMBER

*7th North Devon Radio Rally - Bradworthy Memorial Hall, near Holsworthy. Details G8MXI (QTHR).

7/8 NOVEMBER

*North Wales Radio Rally - Aberconwy Conference Centre, Llandudno, Gwynedd. Details Derrick Watts, tel: Colwyn Bay 530041.

15 NOVEMBER

*Bridgend Rally - Bridgend Recreation Centre, Angel Street, Bridgend. Details G1OUP, tel: 0656 723508.

22 NOVEMBER

*West Manchester RC Winter Rally - Pembroke Halls, Walkden. Details G1100, tel: 0204-24104.

6 DECEMBER

*Verulam Christmas Rally - St Albans City Hall. Details Hilary G4JKS, tel: 0727 59318.

13 DECEMBER

*Leeds & District ARS Christmas Rally - Pudsey Civic Centre, Dawson's Corner, Pudsey, nr Leeds. Details G4WYD, tel: 0274-658039.

1988

24 JANUARY

*Oldham Amateur Radio Rally - Queen Elizabeth Hall, Civic Centre, Oldham. Details Cathy, G4ZEP tel: 061-652 8617.

31 JANUARY

*26th NARSA Exhibition - Norbreck Castle Exhibition Centre, Blackpool. Details Peter G6CGF, tel: 051-630 5790.

1 MAY

*RSCB VHF CONVENTION - Sandown Park Racecourse,

Esher, Surrey. Details G3FZL. Trade - Les, G5HD tel: 040 928-342.

15/16/17 JULY

*RSCB 75th ANNIVERSARY NATIONAL CONVENTION - 2
2 National Exhibition Centre, Birmingham. Details
2 RSCB HQ. Trade - Norman, G3MVV tel: 0277-225563

28 AUGUST (Provisional)

*RSCB MOBILE RALLY - Woburn Abbey, Bedfordshire. Details RSCB HQ. Trade - Norman, G3MVV tel: 0277-225563.

25 SEPTEMBER

*RSCB HF CONVENTION - Belfry Hotel, nr Oxford. Details RSCB.

OTHER EVENTS

23 AUGUST

*Newbury & Dist ARS Radio Car Boot Sale - Acland Hall & Recreation Ground, Cold Ash, Newbury. Details G3VOW.

30 AUGUST

*Galashiels & District ARS Open Day - Focus Centre, Livingstone Place, Galashiels. Opens 11am. Trade stands, Bring & Buy, all the usual activities and family attractions. Details John G4OAHB, tel: 0896-55569.

*SMC Open Day (CHANGE OF DATE) - Chandlers Ford Industrial Est, Eastleigh, Hants. Opens 10.30am, talk-in on S22 by G4SMC. Richard Diamond (SMC), tel: 0703-255111.

8 SEPTEMBER

*Rugby Amateur Transmitting Society Auction & Barbecue - Cricket Pavilion, BTI Radio Station, Hillmorton, Rugby. Details Kevin G8TWH, tel: 0788-77986 (eve).

GB Calls

The list below shows ALL the special event stations licensed for operation during August - (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.

1 AUGUST:

GB0CST - CARDIFF SEARCHLIGHT TATTOO: Highfields Day Centre, Cardiff. Details G4OAI.

GB0WIE/GB2WIE/GB4WIE - WELSH ISLANDS EXPEDITION: Grassholm Is. WAB Sq: SM70. Details G4WJF.

GB0WIM - WIMBLEDON (RADIO SOCIETY): Barwell Est. Chessington. Details G3DW.

GB1CDE - COASTAL DEFENCE "E": Fort Purbrook, Grid: SU 678 064. Details G60TY.

GB1CXI - 111 SQUADRON (ROMAN NUMERALS): RAF Leuchars, Fife, Scotland.

GB1PRA - PURBECK RALLY AUTOJUMBLE: Ridge Farm, Wareham, Dorset. Details G1NCC.

GB2CL - CHILD LINE: Redruth, Cornwall. Details G0FKF.

GB2GJR - GRAND JUNCTION RAILWAY: Grid: SJ 708 554. Details G4GNO.

GB2LSC - LINCOLNSHIRE SCOUTS & GUIDES: Lincs Showground, Grid: SK 968 775. Details G2HHK.

GB2SYP - SOUTH YORKSHIRE POLICE: Niagara Sports Ground, Hillsborough, Sheffield. Details G4VZV.

GB2TTV/GB8TTV - THAMES TELEVISION: Sports Field, Chessington. Details G8ZWS.

GB2XO - "XO" (ORA SQUARE): Isle of Man. Details G4LXO.

GB4GD - 'GD' (ISLE OF MAN): ISLE OF MAN. Details G4VXE.

GB4RR - ROLLS ROYCE: RR Sports & Social Club, Crewe. Details G4LVR.

GB4SJE - ST JOHN ESSEX: The Public Gardens, Braintree, Essex. Details G0EMK.

GB6RE - ROYAL ENFIELD: Dunfermline RS QTH. Details G4MDDY.

GB8ACC - AUTO CAMPING CLUB: Ten Beaches Holiday Pk. Wadebridge, Cornwall. Details G6RSC.

GB8DSF - DEANE SCHOOL FAIR: Bolton. Details G6HFF.

3 AUGUST:

GB6NVC - NICOLSON VICTORIA CROSS: Millbrook, Southampton. Details G6LOB.

GB6TMB - TAPE MAGAZINE FOR THE BLIND: Boston, Lincs. Details G4VEX.

4 AUGUST:

GB0CXX - COASTAL DEFENCE "X": Golden Hill Fort, Freshwater, IOW. Details G3RJK.

GB2SMD - ST MARGAN DISPLAYS: RAF Mangan, Newquay, Cornwall. Details G3YJX.

GB4KHC - KIDDERMINSTER HARRIERS CENTENARY: Stourport-on-Severn, Worcs. Details G4SND.

5 AUGUST:

GB2EYE - EUROPEAN YEAR OF ENVIRONMENT: Haverford

Events Diary

West, Pembrokeshire. Details CWOHPQ.
GB2MRI - MARCONI RATHLIN ISLAND: Mount Grand, Rathlin Is., N.Ireland. Details G14HCN.
7 AUGUST:
GB1COA - COASTAL DEFENCE "A": HMS Dolphin, Gosport, Hants. Grid: SZ 626 993. Details G15YZ.
GB2LDS - LATTER DAY SAINTS: Bishops Frome, Herefordshire. Details G4TVA.
GB2NSR - NORFOLK SCOUT RADIO: Norfolk County Showground. Grid: TG 150 105. Details G0CLR.
GB2NTS - NATIONAL TRUST FOR SCOTLAND: Culzean Castle, Ayrshire. Details CM3MTH.
GB2SMC - ST. MAGNUS CATHEDRAL: Kirkwall, Orkney. Details CM31BU.
G4PLS - PLEASURE & LEISURE SHOW: Bicton Park, E. Budleigh, Devon. Details G4YRM.
8 AUGUST:
GB0FSH/G1FSH - FRIENDS OF STRATTON HOSPITAL: Bude, Cornwall. Details G0BBD.
GB1CDO - COASTAL DEFENCE "D": Southsea Castle, Portsmouth, Hants. Grid: SZ 643 980. Details G1UWB.
GB2IRC - IPSWICH RADIO CLUB: Christchurch Pk., Ipswich. Details G4IFF.
GB2XS - "XS" SQUARE: Rogart, Highland Region, Scotland. Details G4VWVX.
GB4DX - "DX": Near Bury St. Edmunds. Details G4BWP.
GB4EMC - ENFIELD MAYORS CHARITY: Durants Pk., Enfield. Grid: TO 352 967. Details G4KZD.
GB4LP - LOW POWER: Flight Refuelling Social Club, Merley, Dorset. Details G4XYX.
GB4USA - UNITED STATES AIRFORCE: RAF Bentwaters, Suffolk. Details G0CJX.
GB8WS - WESTTHOUGHTON SUMMER SHOW: Westthoughton Sports Centre. Details G1AEO.
9 AUGUST:
GB0CCC CARLETON COMMUNITY CENTRE CARLETON COMMUNITY CENTRE, CARLETON, PONTEFRAC. G0A0A
GB2GR - WILLI RAILWAY (STEAM-DAYS): Bronwydd Arms, Carmarthen, Dyfed. Details G0BBO.
GB2WMB - WISBECH METAL BOX: Metal Box PLC Sports Ground, Wisbech, Cambs. Details G4ODH.
GB4SS - STAFFORDSHIRE SPACE SCHEME: N. Stafford Polytechnic. Details G4TMD.
10 AUGUST:
GB0ACF/GB1ACF - ARMY CADET FORCE: Wathgill Army Camp, Catterick, Yorks. Details G4XEX.
GB2EBC - ENSWORTH BAPTIST CHURCH: Ensworth, Hants. Details G40ZX.
12 AUGUST:
GB0DFS - DERBYSHIRE FIRE SERVICE: Fire Station, Ascot Dr., Derby. Details G4LPZ.
13 AUGUST:
GB0CDE - COASTAL DEFENCE "E": Fort Purbrook. Grid: SU 678 064. Details G0DHZ.
14 AUGUST:
GB2RCC - RADIO CARAVAN CAMPING (CLUB): Broomsby Agricultural College. Grid: SK 671 161. Details G4EPN.
GB4BIF - BILLINGHAM INTERNATIONAL FOLK (FESTIVAL): Billingham Community Centre, Cleveland. Details G4CGP.
GB4IOW - ISLE OF WIGHT: The Fighting Cocks Field, nr Newchurch, IOW. Details G4RCE.
15 AUGUST:
GB0LCS - LAIRC CROFTERS SHOW: Lairg. Details G4VWVX.
GB0VJD - VICTORY JAPAN DAY: Tuffley, Gloucester. Details G3LP.
GB2OSS - OLDHAM SUMMER SHOW: Alexandra Pk., Oldham. Details G4ZEP.
GB2TS - TOLLERTON SHOW: The Showground, Tollerton, York. Details G3FTS.
GB4XN - "XN" LOCATOR SQUARE: Bodafon Mountain, Anglesey. Grid: SH 475 855. Details G4ZTR.
16 AUGUST:
GB4RAF - ROYAL AIR FORCE: RAF Sealand, Deeside, Clwyd. Details G4GCSJ.
GB6OWS - OADBY AND WIGSTON SHOW: Bushloe School, Wigston, Leicester. Details G6PFN.
17 AUGUST:
GB0CDG - COASTAL DEFENCE "C": Fort Comer, Gosport. Grid: SZ 587 989. Details G0AYZ.
20 AUGUST:
GB0ATJ/GB1ATJ/GB2ATJ/GB4ATJ/GB6ATJ/GB8ATJ - ASTLEY & TYLDESLEY (DIAMOND) JUBILEE: Astley & Tyldesley Miners Club, Meanley Road, Gin Pit Village, Astley, Gtr. Manchester. Details West Manchester RC.
GB1CDL - COASTAL DEFENCE "L": Lumps Fort. Grid: SZ 647 980. Details G6XJR.
GB60Y - 60 YEARS (ASTLEY & TYLDESLEY JUBILEE): Astley & Tyldesley Miners Club, Meanley Road, Gin Pit Village, Astley, Gtr Manchester. Details G4HZJ.
21 AUGUST:
GB0CDT - COASTAL DEFENCE "T": Fort Nelson. Grid: SU 628 069. Details G0CIA.
GB0UWC - UNITED WORLD COLLEGES: Atlantic College, St. Donat's Castle, S. Glamorgan. Details G4LFF.
GB2LLS - LAST LIGHTNING SHOW: RAF Binbrook,

Lincolnshire. Details G4NVD.
GB2PG - PAUL GODLEY: Saltcoats. Grid: NS 25 46. Details G4MDWH.
GB4SWP - SOUTH WALES POLICE: Constabulary Sports Ground, Police HQ, Warton Cross, Bridgend. Details G4WJAT.
GB5CE - CHESTERTON ENTERPRISES: Spondon, Derby. Details G30CA.
22 AUGUST:
GB2LDS - LATTER DAY SAINTS: Bishops Frome, Herefordshire. Details G4TVA.
GB4ISC - ISLAND SCOUT CAMP: Peel, IOM. Details G4OEL.
GB4LBC - LOWER BRADLEY COMMUNITY: Bradley Infant School, Bilston, W.Mids. Details G4ZAD.
GB400 - "400" ANNIVERSARY REPENTANCE TOWER: Trailtrow Hill, Hoddam, Annan. Grid: NY 155 734. Details G4TND.
23 AUGUST:
GB0SBL - SNAPE BRITISH LEGION: Recreation Ground, Snape, Suffolk. Details G0CJX.
GB1CDG - COASTAL DEFENCE "G": Fort Comer. Grid: SZ 587 989. Details G6NAK.
GB2WAT - WAT TYLER: Country Pk., Pitsea, Essex. Details G4NVT.
GB4NBS - NEWBURY BOOT SALE: Acland Hall, Cold Ash, Newbury. Details G3NVO.
GB4SSS - STAFFORDSHIRE SPACE SCHEME: County Showground, Stafford. Details G4TMD.
24 AUGUST:
GB0CDC - COASTAL DEFENCE "C": Carisbrooke Castle, nr Newport, IOW. Details G0CWK.
GB2WCC - NORTHANTS COUNTY CAMP: Scout Camp Site, Overstone, Northants. Details G4MOP.
25 AUGUST:
GB0CDB/GB1CDB - COASTAL DEFENCE "B": Fort Brockhurst, Gosport, Hants. Details G4LIK.
26 AUGUST:
GB1CDT - COASTAL DEFENCE "T": Fort Nelson site. Grid: SU 607 071. Details G8POQ.
27 AUGUST:
GB2RCC - RADIO CARAVAN CAMPING (CLUB): Alston Grange Farm, Coalville. Details G4EPN.
28 AUGUST:
GB2FI - FLAT HOLM ISLAND: Bristol Channel. Details G4OANA.
GB2MSG - MIDDELETON ST. GEORGE: Teeside Airport. Details G0BIA.
GB2TVF - TOWERSEY VILLAGE FESTIVAL: Towersey, Oxon. Details G0FCV.
GB4ATG - (BRITISH) AMATEUR TELEPRINTER GROUP: Sandown Pk. Racecourse, Esher. Details G4EAN.
GB4VSA - VICTOR SERIES AWARD: Halesowen, W.Mids. Details G4DCJ.
29 AUGUST:
GB1NTH/GB2NTH - NATIONAL TRAMWAY MUSEUM: Crich, Derby. Details G1SFR.
GB2BSI - BROWN SEA ISLAND: Brownsea Castle, Poole. Details G4WFZ.
GB2SOF - STRETTON ON FOSSE: nr Morton-in-the-Marsh, Glos. Details G0CXJ.
30 AUGUST:
GB6APS - ABBEY PARK SHOW: Abbey Pk., Leicester. Details G6PFN.
GB6SS - SANDWELL SHOW: Sandwell Valley Pk., W. Bromwich. Details G4ZAD.
31 AUGUST:
GB2EAS - EPWORTH AGRICULTURAL SHOW: Epworth, nr Doncaster. Details G4CZB.
GB4DX - "DX" LEISTON RADIO AMATEURS: Leiston Town Recreation Ground, Suffolk. Details G0CJX.
GB4WAC - WYTHALL ANNUAL CARNIVAL: Wythall, Birmingham. Details G0EYO.

RAE Courses

This is a list of all RAE courses and Morse classes notified to RSCG HQ (as at press date). It is given in alphabetical order of town or area.

BIRMINGHAM

Selly Park Adult Education Centre, Pershore Road. Morse class on Wednesday evenings commencing September. Details Roy Williams on 021-475 8403.

Mirfield Centre, Yockleton Road, Lea Village, Birmingham B33. Thursday evenings commencing 3 September. Details from the centre on 021-783 5898.

BRENTFORD

Brentford School, Clifton Road, Brentford, Middx. Thursday evenings commencing 24 September. Details Brentford School Community Education Office on 01-560 6292.

BRIGHTON

Brighton College of Technology, Pelham Street, Brighton. Commencing in September. Tutor Mr P D Simmons, G3XUS. Morse class will be arranged if sufficient demand. Enrolment at Pelham Street 7/8 Sept. Details from Mr S E Miller at the college on 0273-685971.

BRISTOL

Brunei Technical College, Ashley Down, Bristol BS7 9BU. Monday evenings - Radio Amateur Theory. Tuesdays - Morse. Thursdays - Practical. All courses commence September. Enrolment 8/9 Sept at college. Tutor Phil Brouder, G3ZJH. Details tel: 0272-41241 ext 2164.

BRISTON (LONDON)

Brixton College, Ferndale Road, London SW4. Wednesday evenings commencing 23 September. Enrolment w/c 14 Sept. *External candidates accepted for examination* Details from the college on 01-737 2323.

CAMBRIDGE

Coleridge Community College, Radegund Road, Cambridge. Morse classes on Mondays. Details from the college or G3BYW.

CLACTON

Clacton Adult Education Centre. Venue for class will be Colbaynes High School, Pathfield Road, Clacton. 30-week course on Wednesday evenings commencing 23 September. Enrolment 7-18 Sept at Centre in Green Lodge, 180 Old Rd, Clacton. 15-week Morse class on Tuesdays commencing 22 September. Details from the centre on Clacton 424151 or the tutor Mr J Harris, G3LWM on Clacton 432621 (day).

CROYDON

Addington Adult Education Centre, Addington High School, Fairchildes Avenue, New Addington. 20-week course on Wednesdays 7.30-9.30pm commencing 30 September. Enrolment Saturday 19 September 9am-12.30pm. Details tel: 0689-41461.

Croydon College. RAE Monday evenings, Morse Thursday evenings both commencing September. Details Tom, G3EUU on 01-668 1725.

FAREHAM

Fareham Adult Education Centre, Wickham Road, Fareham. 28-week course on Fridays commencing 25 September. Short 12-week revision course for December exam on Mondays commencing 14 September. Details from G3CCB on Fareham 288139 or the centre on Fareham 280709.

HALESOWEN

Halesowen College, Whittington Road, Halesowen, West Midlands, B63 3NA. 30-week course on Thursday evenings 7-9pm, commencing 24 September. Enrolment 8/9 Sept at college. Details Colin Prior, G6OTT tel: 021-550 1415.

HUNTINGDON

Huntingdon College, California Road, Huntingdon, Cambs. 36-week course including Morse, Wednesday evenings commencing September. Enrolment 8/9 Sept. Details from the college on 0480-52346.

LEAMINGTON SPA

Mid-Warwickshire College of Further Education, Warwick New Road, Leamington Spa. 30-week course commencing Thursday 17 September. Enrolment 7/8 Sept. Details from the college on 0926-311711.

LIVERPOOL

Mabel Fletcher Centre, Sandown Road, Liverpool 15. Two evenings a week commencing 14 September. Enrolment 8 Sept. Details from the tutor, Mr Loughlin, at the centre on 051-733 7211 extn 37.

MANCHESTER

Pendlebury High School, Cromwell Road, Swinton. Mondays at 7.30pm commencing end of September. Details G4HYE (tutor) tel: 061-794 3706 or from Swinton Adult Ed. Centre on 061-794 5798. Also Morse classes on Tuesdays at 7.30pm commencing end of September. Details from the Centre.

North Trafford College of Further Education, Talbot Road, Stretford. Monday or Tuesday evenings or Wednesday mornings - tutor Mr J T Beaumont, G3NGD. Morse code class Tuesday evening or Wednesday afternoon. Advanced Morse on Monday evening - tutor Mr D Bradshaw G4UKK. Enrolment 2/3/4 Sept. Details from college on 061-872 3731.

Reddish Vale Evening Centre, Reddish Vale Road, Stockport, Cheshire. 25-week course on Mondays commencing September. Morse classes in 25 sessions on Thursdays commencing September. Enrolment for both on 14/15/17 Sept from 7-9pm. Details from course tutor Dave Wood, G4UJD on 0606-41511 from 12.30-1.00pm weekdays.

MARKET HARBOUROUGH

Welland Park College. Wednesday evenings commencing September. Details from G4TZY on 0858-62827 or the college on 0858-63645.

MILTON KEYNES

Milton Keynes & DARS. Morse classes in three grades. Details from Roy, G3TLE on 0908-607265.

NOTTINGHAM

Arnold & Carlton College of Further Education. Wednesdays commencing 16 September. Short course for December exam on Thursdays commencing 17 September. Morse classes Wednesdays commencing 16 September. Other classes include Construction Practice, Introduction to the RAE, After the RAE, and Foreign Languages for the Radio Amateur. Details from the college on 0602-876503. Enrolment for all courses on 7 Sept 10am-8pm and 8/9 Sept 2-8pm, or by post or by at first class.

(cont next page column 3)

Council Brief...

The third Council meeting of 1987, which took place on 21 May, gave Council an opportunity to discuss further ways of making amateur radio more popular. Council voted unanimously for the development of a "student licence" and to put the idea to the DTI for consideration. This new category of licence would permit the use of low power on selected amateur bands as a means of allowing beginners to appreciate the value of amateur radio.

In the absence of the Honorary Treasurer, Mr B O'Brien outlined further improvements being made at Headquarters in the direction of more detailed financial accounting procedures. The purchase and nominal ledgers were being computerised; this would enable monthly accounts to be produced quickly. It had also been agreed to make monthly accounts available, instead of three-monthly as at present. A deficit was still expected at the end of the 1986-7 financial year.

The Secretary spoke about new budget arrangements in which each department at Headquarters would have its own budget. The Secretary said that he had wanted to implement this system for some years but it was only now that the requisite staffing skills had become available to enable such arrangements to be made.

As a means of introducing people to amateur radio and improving book sales, Council felt that the production of a new "Handbook" now required high priority.

In discussing workloads at Headquarters, Council noted that a few individuals were bombarding staff with detailed questions about the Society and amateur radio. Such questions occupied a large amount of staff time and meant that more valuable work could not be undertaken without the incurring of considerable delay. Council felt that one particular non-member was wasting time and involving the Society in legal costs. Such costs also detracted from the monies available for spending on improvements and facilities required by the membership as a whole.

The Secretary reported on;

a) a continuing EMC case involving a possible licence variation by the DTI. In acknowledging the valuable work being put into this case, Council wished to see publicity given to this matter at the appropriate time.

b) proxy voting - the Society's solicitors had advised that it was necessary to change the Articles of Association if the form of proxy vote was to be changed. In the same context the Society had received legal advice to the effect that a non-member holder of a proxy vote did not have the right to speak at an RSGB AGM or EGM.

c) staffing levels in the Membership Services Department. Council confirmed that two additional staff should be appointed to this important department to provide better service to members.

d) the recent IARU conference in the Netherlands. A paper from Mr T Hughes, G3GVV, the leader of the RSGB delegation, was introduced. It was noted that a complete report would appear in Radio Communication (see last month - Ed).

e) the reappointment of Morse examiners, the proposed lottery to raise money for the 75th Anniversary, the 50/70 MHz bands and the introduction of direct debit for subscriptions.

Council agreed that the chairman of the EMC Committee should liaise with RIS staff on day-to-day matters if it would be useful in specific cases. The normal liaison channels were to be used for all matters involving RSGB policies.

Council accepted with thanks the offer of a trophy from the Verulam ARS for use in the ROPOCO 1 contest.

Following the resignation of Peter Miles, G3KDB, as Awards Manager, Council appointed Mr S Emlyn-Jones, G4BKG, to fill the resulting vacancy. Council noted with great thanks the work of Mr Miles over many years.

A discussion took place concerning the various options open to the Society for the revitalisation of the "Intruder Watch" facility. Input had been received from several sources including Dr J Gannaway, the Secretary, the IARU Committee and the Presidential Advisory Group, which had been chaired by David Pratt, G4DMP. As a result, Council agreed to appoint Mr Colin Thomas, G3PSM, as Intruder Watch manager for the period until 1 June 1988. New IW reporting schemes had been designed but it was recognised that progress in this difficult area was bound to be slow and did not always reflect the effort and dedication put in by volunteers in this area.

Council discussed the function of a new committee to replace the existing Membership & Representation Committee, to be known as the Membership Liaison Committee. This new body would work more closely with locally-based RSGB volunteers to ensure the smooth running of the Society at local level. The various improvements which were considered desirable were still being considered by the Presidential Advisory Group and the M & R Committee.

Other matters discussed during the meeting included the following; the G6ZR memorial and other contest trophies, the disqualification of a member from RSGB contests for a period of two years, the agreement in principle to the establishment of a "DXpedition fund", site access for portable operators, arrangements for the 75th anniversary and a UK satellite tracking facility.

Council noted;

a) a letter from the DTI acknowledging the role of radio amateurs in the Zeebrugge ferry disaster

b) a letter from the DTI thanking the Society for the opportunity to participate in the Society's National Convention

c) a letter from Louis Varney, G5RV, expressing gratitude for the continuing good work of the Society.

EXPULSION FROM THE RSGB:

On 21 May 1987, a special meeting of Council was convened to consider the expulsion from the Society of Mr H Crawford, G4VAN. The motion before Council was that:-

"Mr H Crawford, G4VAN, of 150 Troon Avenue, East Kilbride be forthwith expelled from the Society and that his name be removed from the Register of Members on the grounds that he had been guilty of such conduct as shall render it undesirable in the interests of the Society that he should continue to be a Corporate Member of the Society in that:-

On or about the 16th day of June 1986 at the Court of the Sheriffdom of Lothian and Borders at Edinburgh he was convicted of fraud on a plea of guilty, and subsequently fined a sum of £250. The charge and conviction arose because Crawford fraudulently sat the Radio Amateurs Examination at Leith Nautical College posing as, and in place of, David Boyd, who was awarded a pass certificate as a result".

After a discussion on the motion, 14 of the 15 Council Members present voted in favour of expulsion, with 1 abstention. G4VAN was expelled from the Society with immediate effect.

(cont from previous page)

PORTSMOUTH

Adult Education Centre, Drayton Road, North End, Portsmouth. Course now in its 42nd year will commence in September on Tuesdays and Thursdays. Details from Leon Newnham, G6NZ on Portsmouth 819968.

RHONDDA

Rhondda College of Further Education, Llwynpia, Tonypandy, Mid Glamorgan CF40 2TQ. 30-week course, probably Monday evenings commencing September. Enrolment 7 Sept, early application advisable. Details from college on 0443-432187.

RUGELEY (STAFFS)

Rugeley Evening Institute. 33-week course on Thursday evenings commencing 24 September. Enrolment 7/8 Sept 7-9pm. Details John Teece, G4DBR, QTHR.

STEVENAGE

Stevenage & DARS HQ. Commences Tuesday 6 October 7.30pm. Details tel: Stevenage 724991 or Prestel Mailbox 219994795.

WIGAN

Wigan College of Technology, Parsons Walk, Wigan. 7pm on Wednesday evenings starting in September. Morse code class also planned if sufficient numbers. Details from Roy Hesford, G4UAE at the college.

PS

GB2RS - LONDON AREA

Details of the London area GB2RS news broadcast were omitted from the latest callbook.

The transmission time is 10am local time on 145.525 MHz FM.

The SSB transmission from London at 10.30am on 144.250 MHz has been suspended.

Next month - "Don't Miss the Mail" and another 50 MHz filter, plus some news about the new licence proposals.

--- LATE FLASH ---

Just as we were about to go to press, we received confirmation that the Norwegian PTT has allocated 50-52MHz to all its amateurs. Power limit is 25W to an antenna of not more than 6dB gain and not more than 20m above ground. More next month.

★ **DON'T FORGET** ★
The closing date for JOTA Special Event applications is
FRIDAY, 11th SEPTEMBER
NO APPLICATIONS CAN BE ACCEPTED AFTER THAT DATE

NEWS & VIEWS

HF

John Allaway, G3FKM*

REMEMBER the problems last year concerning the extension of the USA Novice and Technician privileges to include 28·2–28·3MHz and thereby creating the possibility of severely QRMing the International Beacon Project beacons (See *HF, Rad Com* March 1987). At the time ARRL promised to draw the attention of its Novice and Technician class members to the dangers of this happening, and I am delighted to be able to quote the following from May *QST*:

"Special note about 10m beacons. What happened to Novice cw operation from 28·20 to 28·30MHz? At least 60 beacons are still operating here, in accordance with an earlier band plan (roughly speaking there's at least one beacon every 2·5kHz or so throughout this range). In time—and in accordance with good spectrum management!—all of these beacons will move into the 28,190–28,225kHz segment. Until then, ARRL recommends that you avoid operating in the 28·20–28·30MHz segment to keep from interfering with the beacon network."

A diagram of the ARRL band plan from 28·1 to 28·5MHz accompanies this and shows a gap for the beacon band. Full marks—and thanks to ARRL.

Ken Francom, G3OCA, says that he is willing to build up, over a period of time, a QSL manager "centre" on the lines of a small version of that run so successfully by W2CTN. He would particularly like to offer his services to stations in the Far East and Pacific areas. Anyone who would like to take up Ken's kind offer should write to him at 1 Chesterton Rd, Spondon, Derby, DE2 7EN.

Apologies to some regular correspondents because my final copy had to be sent in rather earlier than expected due to a last-minute change of plans which meant that I was not at home after 6 June. All scores for tables and other contributions will be held over until next month.

DX news

Stations in **Sierra Leone** are using 29L prefixes to celebrate their country's 29 years of independence. However, is this legal?—prefixes in the "2" series are allocated to the UK!

ARRL has recently announced a number of decisions on the validity of QSLs for DXCC. The 28 June—1 July 1985 and 26 March—1 April 1986 QSLs of DL7FT/SV/A are now accepted, as are cards from T50DX.

According to *DX News Sheet*, DJ0LC wrote to *DX-NL* from Wuhan saying that there is no amateur activity from there because there is no club station. However, the secretary of the radio club in Peking is believed to have said that if he had had his own station with him there would have been no problem in getting operating permission. BY5RA seems to like operating near 21,027kHz around 0700, and there is a new **Chinese** station on the air—this is BY8NC in Nanchang.

Graham Smith, 9V1WL, left **Singapore** in June to return to the UK where he will probably become G3SNO from Bucks or Herts. He suggests that QSLs are still sent to him via SARTS QSL Bureau which will forward them. During his two-year stay he worked the UK on all bands 1·8 to 21MHz (including 18MHz but excluding 10MHz) and he was hoping to work a G on 28MHz before leaving.

VK2BCH has written to say that he was due to be on the air from the **Cook Is** from mid-May. QSLs should be sent direct to his home address with return postage, and no cards will be sent via the bureaux. ZK1CT is a permanent resident on **Aitutaki** and at the time this is being written, ZK1DD was being worked regularly around 0800 on 14MHz. Both these operators do not like "pile-up" type operations and tend to go away if pressed too hard. ZK2PK is believed to be a priest who has no linear and only a wire antenna tied to a coconut tree—he has been worked in the UK on 14MHz ssb.

Tom Hutton, GW0HUT, is in Cairo and has been trying to get a licence.

* 10 Knightlow Road, Birmingham B17 8QB

However, the answer has been that no reciprocal licences are issued to foreign nationals at present.

Maltese stations are now allowed to use the 18 and 24MHz bands on a secondary basis. They also have 50MHz.

Jesus, CO2DC, is currently working in the Ministry of Telecommunications in **Guinea-Bissau**. He intends to train some new amateurs, and there is already a club station with the callsign J52UAC. ZD9CK is running 50W to a dipole and frequents 14,176kHz around 1900. G6LOT and his wife G6LOS, are now in **The Gambia** where they have an FT101 and a tri-band beam, BBC computer and Amtor terminal. When licensed they will be looking specially for UK contacts. According to *DX News Sheet*, FR5AI is hoping to visit **Europa Is** during September. FT0WA, on **Crozet Is**, is very often on 14,236kHz at 1200, and at weekends on the same frequency as early as 0500. According to the *Lynx DX Bulletin* he is very active between 0400 and 0600 in the 14,200–14,225kHz area, and again around 1530 between 14,110 and 14,140kHz. FT8XD is now active on rtty around 14,085kHz.

N6YM/KH2 will remain on **Guam** for another year or so. He is on all bands 1·8 to 28MHz but mostly on 7 and 14MHz on both cw and ssb. He joins in the W7PHO Family Hour on 14,226kHz quite often. FK0AT is due to leave **New Caledonia**, and asks anyone who needs a QSL for any of his S Pacific operations (FK25AT, C21NI, YJ8MC, YJ0KMS, FK0AT/FW etc) to apply direct enclosing \$1 per operation. He says that no cards sent via the bureau or via N7RO will be answered. N7RO himself apologises—he has over 700 QSLs which he cannot answer.

Amir, 4X4TT, should have left for a one-year dx tour last month. He was going to JA, BV, DU, HS, XX9, VS6, VK and ZL islands, and various mid-Pacific islands, and hopefully should be on the air from some.

Another potential visitor to the Pacific area is OH1RY, who is rumoured to be planning a visit to C2, T30, ZK1, ZK2, KH8 and 3D, probably during October and November. This time he may concentrate on the lower frequency bands.

WB5ZQU/KH3 will remain on **Johnston Is** for some time. He has been worked on 14MHz ssb around 0630, and is believed to be looking for contacts with Kettering (his wife's home town). *DX-NL* reports that A35PP keeps a schedule with KF5E every Saturday at 2300 on 21,230kHz.

HL9HP is making a list of all previous holders of HL9 calls because there are many unclaimed QSLs at the HL9 bureau. Anyone having information on call signs, date of operation and current addresses is asked to please pass this along to him at: H Hutchinson, D-46, 271st CAC, APO San Francisco, CA 96271-0148, USA.

Lynx DX Bulletin reports a likely September visit by a group including F6EXV, DJ8NK, WA2MOE, WORLX, K9AJ and a Japanese operator, to **Palmyra Is** and **Kingman Reef**. This will be an all-band cw and ssb affair using linears and beams.

"AP9P" was still active on 14MHz cw at the time of writing and asking for QSLs via WA3HUP—who has never heard of him! Another fairly obvious pirate is "YA0DX" who asks for cards to Box 1, Kabul.

According to JH1ROJ, XU1SS makes a point of looking for Europe at 1300 on Tuesdays, Thursdays, Saturdays and Sundays in the 21,220–21,230kHz area. 9N1MC seems to have been fairly active from **Nepal**, mostly between 0900 and 1300 on 14,200, 21,200 and 28,600kHz. The "9N1MC" on cw was a pirate.

Nearer home, JX9CAA's favourite frequencies have been listed in *DX News Sheet*. These are 3,799, 7,070, 14,220, 21,220 and 28,500kHz for ssb, and 20kHz above lower band limits on cw.

Several stations supposed to be in **Iran** were active at the time of writing. EP2HZ and EP2DL have been worked on 14MHz, and QSLs from the latter have been received in the USA.

Contests

LZ DX Contest

0000 to 2400 6 September
3,510–3,560, 7,000–7,040, 14,000–14,060, 21,000–21,080 and 28,010–28,200kHz cw only. Single-operator single- and multi-band and clubs (multi-op) as well as listener sections. Exchange RST and ITU zone (UK is 27). QSOs with LZ count six points, with other Europeans one point and with others three. Stations may be worked once per band and the multiplier is the sum of ITU zones worked on each band. Listeners earn three points by logging both call signs and exchanges and one for both call signs and one number. Submit separate log sheets for each band, and include a summary sheet showing zones worked on each band and the usual signed declaration. Post within 30 days to: Central Radio Club, PO Box 830, Sofia 1000, Bulgaria.

Scandinavian Activity Contest

1500 19 September–1800 20 September (cw)
1500 26 September–1800 27 September (ssb)
Work Scandinavia on 3·5 to 28MHz. 3,560–3,600, 3,650–3,700, 14,060–14,125 and 14,300–14,350kHz must be kept clear of contest traffic. Single-operator all-bands and all-bands QRP, multi-operator single-transmitter and listener sections. Exchange RS/T plus serial number starting from 001. The same

station may be worked on each band. Each Scandinavian QSO counts one point and the multiplier is the number of different Scandinavian prefixes worked on different bands added together. Scandinavian stations have prefixes beginning LA/LB/LG/LJ, JW, JX, OF, OG, OH, OI, OHO, OHOM, OX, OY, OZ, SJ, SK, SL, SM and TF. The multipliers are the worked call-number areas on every band in each Scandinavian country. Entrants with more than 200 QSOs must include a "dupe" sheet. Mail entries before 30 October to SRAL Contest manager OH4NCR, Erkki Korhonen, Box 44, SF-57131, Savonlinna, Finland. Photocopies of full rules are available from G3FKM.

SEANET DX Contest

15 and 16 August (ssb section)

The object is to contact stations within the SEANET area, and the same station may be worked on each band. Single-operator, single- and all-band and multi-operator all-band classes. Exchange RS plus serial QSO number (from 001). QSOs with stations in the SEANET areas DU, HS, YB, 9M2, 9M6, 9M8, 9V and Y8 count 20 points on 1-8MHz, 10 points on 3-5 and 7MHz, and four points on the other bands. With stations in other SEANET areas, ten, five and two respectively. (These are: A35, A51, AP, BV, BY, C21, FK, FR, FW, HL, H44, JA, JD1, KA, KC6, KH2-3-4-5-6-7-8-9-0, KX6, P29, S2, S79, T2, T3, VK, VQ9, VS6, VU, XU, XV, XW, XX9, XZ, YB, YJ, ZK, ZL, 3B6-7-8-9, 3D2, 457, 5W1, 8Q7, 9N and I29.) The multiplier is three for each SEANET country worked. Entries must be received no later than 20 October 1987 by the Cebu Amateur Radio League, PO Box 304, Cebu City, Philippines 6401. Mark "Att SEANET Contest".

All Asia DX Contest

0000 22 August—2400 23 August (cw section)

Rules for this contest were given in the June column.

European DX Contest

1200 8 August—2400 9 August (cw)

1200 12 September—2400 13 September (ssb)

1200 14 November—2400 15 November (rtty)

3-5 to 28MHz. Single-operator—all bands or high band (14, 21 and 28MHz only), multi-operator single-transmitter and listener sections. Only 30h of the 36h are permitted for single-operator stations. The 6h rest period may be taken in up to three parts and must be marked in the log. Europeans work non-Europeans and exchange RS/T plus serial number from 001 (this is different on rtty). The multiplier for Europeans is the number of non-European DXCC countries worked on each band. Non-Europeans use the WAE countries list. Quick band changes to work multipliers are allowed, but no return to the original band may be made for 5min and this must be shown in the log.

10MHz COUNTRIES TABLE

	All-time	1987
G3PJT	96	60
G4YWG	62	41
G4VDX	71	37
G4UZN	87	31
G4OBK	55	30

28MHz COUNTRIES TABLE

G4JBR	—97	G4NXG/M	—12
G4VPM	—56	GM4CHX	—10
G3XQU	—55	GW4TEJ	—8
G4MUW	—48	G0FYD	—2
G4XAH	—44	G4OBK	—1
G4RWP	—39		

Multipliers are multiplied by four on 3-5MHz, three on 7MHz, and by two on 14, 21 and 28MHz. Additional points may be claimed for "QTC" traffic.

NB. This year's rules contain major changes, and serious entrants are advised to obtain a copy of the official rules—this may be obtained from G3FKM (sase please). (It is recommended that official DARC log sheets are used, and these can be obtained from WAEDC Manager, WAEDXC Committee, Postbox 1328, D-8950 Kaufbeuren, FR Germany, to whom a large envelope and some irls should be sent.)

In the 1986 cw section of this contest, G3FXB scored 1,150,077 points; G3MXJ 745,340; G3ESF 53,920; G6QQ 9,996; GM3CFS 7,488; G4BWO 6,700; and GM8SQ 2,898. Congratulations to G3FXB who was third European. The only UK entry in the phone section was G4FKG who scored 880 points in the multi-operator category.

Results of the 1986 CQ WW WPX CW Contest appeared in May CQ Magazine. UK scores were as follows:

SINGLE-OPERATOR			
Callsign	Band	Points	Points
G3FXB	All	2,816,198	452,250
G4UOL	"	390,852	5,650
GW6TM	"	328,770	390,720
GW4RHW	"	269,000	293,888
GW3OKA	"	205,821	221,949
G4OKN	"	164,269	88,985
G4LRS	"	121,968	121,380
			5,776

MULTI-OPERATOR, SINGLE-TRANSMITTER			
GB2MM—3,641,560 points			
QRP SECTION			
Callsign	Band	Points	Points
G3KDB	All	132,821	3,185
G4ZFE	14MHz	15,664	1,320
			29,568

Special congratulations to G0D0N4ZC who was leading European on 21MHz.

HF F-layer propagation predictions for August 1987

The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band, ie $\phi = 0000$, $\phi = 0200$, $\phi = 0400$ 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								
MOSCOW21.	...11221243.	..1445545882	425544445798	86432223578	+4.....24+
MALTA22.	...2221155.	..456545894	634655556799	98743223589	+4.....25+
GIBRALTAR1.	...1.....24.	...44332782	411565555798	976643333589	+53.....25+
ICELAND2222452.	...21345555687	756454333467		+52.....34
** ASIA								
OSAKA111.....	..133221.1.	..121112252	.....251	.....2.
HONGKONG112121.	..133334521	1.....1113574	.....263	.....3.
BANGKOK1232121.	..1224334541	2.....1113576	.....266	.....33
SINGAPORE1232121.	..123433431.	2.....1113561	.....365	.....34
NEW DELHI111.12.	..1232234.	311.....1113576	51.....367	2.....34
TEHERAN11211252.	..22332475.	5331.....113588	741.....367	5.....35
COLOMBO112112.	..223324.	21.....1113475	51.....367	2.....35
BAHRAIN11221351.	..233335741	1.3322345785	7431.....113588	841.....367
CYPRUS22322365.	..455545872	314664567897	87411.....12478	+4.....45
ADEN1122244.	..333446611	21232345756	8541.....13589	52.....35
** OCEANIA								
SUVA/L1.....	..21221.33.	..1422111531	.....2.....21.	.....
SUVA/L1.....	..1.....32	..1151.....241	.....2.....21.	.....
WELLINGTON/S1.....	..22.....4.	..242111.52	.....2.....22.	.....
WELLINGTON/L1.....	..11.....14	2224.....43	.....2.....12.	.....
SYDNEY/S111.....	..1442.....1	..1331112323	.....1.....251	.....2.
SYDNEY/L2.....	..21131.....44	2.....111.....44	.....1.....51	.....2.
PERTH234.....	..23542.....	3111211133.	.....2.....362	.....33
HONOLULU1.....	..112.....1421	..23221.23.	.....221.....	.....
** AFRICA								
SEYCHELLES1123241.	..232234572.	..13.....113574	541.....367	52.....35
MAURITIUS1123344.	..232334571	2.31.....113587	721.....267	52.....35
NAIROBI1123357.	..33345681.	5.42.....13587	853.....267	+5.....35
HARARE11234674.	..23345787.	2.1532345794	71531.....12588	8651.....267
CAPETOWN223431.	..2435554.	..55334573.	1.521112571	6622.....266
LAGOS2134685.	..14245787.	2.552235793	76252.....2588	8852.....267
ASCENSION Is2111486.	..43235881	1.....54224796	6.....31.....1488	86.....257
DAKAR2112377.	..43334881	21.253223696	873431.....378	8862.....157
LAS PALMAS22111561	..44433783	31.376556898	874654334589	997421111368
** S. AMERICA								
Sth SHETLAND1232.	..34552.	.....1335761	2.....1112566	7541.....236
FALKLAND Is112267.	..34577.	.....2335672	2111.....112357	7752.....126
R DE JANEIRO1121561	..3333683	31.....433577	873.....111258	8861.....27
BUENOS AIRES111.141	..221354	41.....21332246	86323111.14	78621.....2
LIMA1121253	..4.....3321236	8622221.....14	68621.....1	3+3.....
BOGOTA2221364	41.....4321257	8632221.....26	88621.....3	5+3.....
** N. AMERICA								
BARBADOS111143	4.....2321235	7521.21.....3	58521.....1	2+3.....
JAMAICA111143	4.....3322256	752.121.....25	68521.....2	3+3.....
BERMUDA111122	3.....2222235	641.....211.24	4752.....1	53.....
NEW YORK111122	2.....222123	4311.....11.1	2652.....1	33.....
MEXICO111.22	2.....2222245	641.....211.24	47521.....1	42.....
MONTREAL1.....	1.....12112	322.....11.1	1452.....	+2.....
DENVER1.....	1.....12111	222.....12.	352.....	+2.....
LOS ANGELES1.....	1.....11111	212311112111	2521.....	+2.....
VANCOUVER1.....	1.....11111111	1.2421112211	.....22.....	.....
FAIRBANKS

The provisional mean sunspot number for May 1987 issued by the Sunspot Index Data Centre, Brussels, was 30.6. The maximum daily sunspot number was 64 on 17 May, and the minimum was 10 on 31 May. The predicted smoothed sunspot numbers for August, September, October and November 1987, are respectively: (classical method), 24, 25, 26 and 27; (SIDC adjusted values) 25, 27, 28, 30, 31 and 32.

QTH CORNER

BV0AE via JA1UT, 4-20-2, Nishi-Gotanda, Shinagawa, Tokyo 141, Japan.
C21A Ed de Jong, Box 17, Nauru.
C30LEF via KV4AM, H Mc Birney, 1428 Northern Way, Winter Springs, Fla, 32708, USA.
H44DL Box 6, Honiara, Solomon Is.
H44JA Masashi Shiotuki, 12994-2, Higashikago Makurazaki-City, Kagoshima 898, Japan.
INEXDA (new) PO Box 241345, Charlotte, NC, 28224, USA.
NP4TB/KP5 WD5BJT, 437 Avenue K, Marrero, La, 70072, USA.
WD5BJT/KP5 via OH0NA, Kee Eriksson, SF-22430 Saltvik, Finland.
OH0MA 80 Nadder Park Rd, St. Thomas, Exeter, EX1 1NX.
OH0/G4EDG Penworth, Tokers Green Lane, Tokers Green, Reading, Berks RG4 9EB.
OH0/G4JVG 41 Veronica Crescent, Kircaldy, Fife KY1 2LH.
OH0/GM3YOR via home QTH.
OH0/SM5AOD R Crosby, PO Box 344, Forster, NSW 2428, Australia.
VK2BCH YU1RL, Radivoje Lazarec, Sima Milosevic 16, 11000 Belgrade, Yugoslavia.
VK2BCH PO Box 483, Freetown, Sierra Leone.
9L3PS via SARTS, PO Box 2728, Maxwell Rd, Singapore 9047.
9V1WL

Howdy Days

1400 Wednesday 9 September to 0200 11 September
 Open only to lady operators. Copies of rules from G3FKM (sase please).

Results of the 1986 SAC Contests have now been received. In the cw section (single-operator) UK scores were as follows: **GW3HCL** 39,720 points; **G5LP** 35,148; **G4ELZ** 27,878; **GM4SID** 27,560; **G3ESF** 22,695; **G4ODV** 16,632; **GM3CFS** 15,438; **G4OKN** 14,705; **G3SIX** 8,610; **G4ZFE** 6,604; **GM8SQ** 3,800; **GM3MHG** 3,528; **G4OBB** 3,015; and **G4XTM** 308. In the phone section (single-operator) **G4CHP** scored 21,660 points, **GM4WEW** 11,778; **G3ICG** 8,906; **G4YEK** 8,806; **G3SIX** 5,785; **GM3CFS** 4,959; **G4TXM** 4,756; **G4VMM** 2,370; **G3NT** 2,025; and **GJ0/DJ2YE** 49. In the multi-operator section **G3SRT/P** scored 27,702 points and **G6OI** 15,573. In the swl section **RS32525** came third with 22,927 points.

Awards

The PPPY1 Certificate

This is being issued by Brazil's oldest cw group, the Pica Pau Carioca, to encourage knowledge of the IARU World Locator. It is available to licensed amateurs and listeners who can produce evidence of working or hearing stations in the states of Espirito Santo (PP1) and Rio de Janeiro (PY1) employing the QTH exchange involving the new locator system. Participants must exchange locator information either printed or rubber stamped on their QSLs. Only valid cw, simplex, station-to-station contacts on any band (but in the designated band segments) made on or after 1 January 1986 count. On hf the certificate is awarded for an initial series of 50 sub-squares spread in at least two squares, followed by four series of 15 sub-squares each and one additional square each, minimum. Send details of stations worked, date, band, locator, and own QSL card, plus five ircs to PPC Certificados, PO Box 18003, CEP 20720, Rio de Janeiro, RJ, Brazil. Listener requirements are the same. The PY1AFA Trophy will be given to the participant who has the highest number of squares and sub-squares by 31 December 1988.

Band reports

As mentioned at the beginning of this month's column, the data of despatch of material for August issue to the editor had to be 6 June due to a sudden decision to be away from home for a spell. This will have caught out many of the regulars—to whom abject apologies. It was possible to contact one or two, and thanks go to the following for their co-operation: **G5JL**, **G3GVV**, **G3LPS**, **G3PJT**, **G3YRM**, **GW4KGR**, and **G4s JBR**, **LRS**, **MUW**, **NXG/M** and **VPM**.

As usual, stations listed in italics were using cw.

3-5MHz **0200** **YV1MX**, **0500** **P7TAQ**, **ZF2KI**, **7MHz** **0000** **EA8BLC**, **UA0AKQ**, **VP2VCW**, **VP8BNO**, **VU2TEC**, **ZS5BK**, **4K1A**, **6Y5JH**, **9M2AX**, **0200** **ZD8CW**, **0300** **VP2VCW**, **0400** **V31A**, **VP2VM**, **W7**, **ZL1-ZL4**, **7Z5EG**, **0500** **CE5MGQ**, **KH6AFS**, **XE2PK**, **YN3EO**, **5A0A**, **0600** **VK2-VK3**, **W6-W7**, **2100** **OYDF7JC**, **ZS2NC**, **2200** **UZ1PWA**, **2300** **FGI/W2QMI**, **FS**, **UN9MWAJUMOT**, **UM8NAC**, **VU2DX**.

10MHz **0400** **HK3RQ**, **W5 (N M)**, **VK2-4**, **0500** **WA5FFK/HR5**, **N7INX**, **VK2-VK3**, **W1-W0**, **ZL2L-ZL3**, **0600** **HK1IOE**, **WA7NCL**, **1500** **FE6IXF/TK**, **VK2AMB**, **1900** **UA0AG**, **VK5FE**, **2100** **FGI/W2QMI/FS**, **PZ1DV**, **2200** **VK2-3**, **ZD8CW**.

14MHz **0000** **W6-W7**, **0600** **KH6**, **VE6-VE7**, **5A0A**, **0700** **AH6EK**, **F05s ET**, **JP**, **KL7**, **VE6ARH**, **0800** **F05IW**, **5X5BG**, **1100** **FGI/W2QMI/FS**, **T32BC**, **1300** **DX9HT**, **Y11BGD**, **9K2KW**, **1400** **ZF2KY**, **9M6AE**, **1500** **EP2DL**, **TZ6MG**, **V85RM**, **9M2DF**, **1700** **A92C**, **H25SA**, **HL1IE**, **5A0A**, **1800** **H21AB**, **JA**, **VP8BKK**, **8Q7CH**, **1900** **TA3C**, **YB0ZE**, **2200** **OX3GH**, **PJ9EE**, **2300** **FGI/W2QMI/FS**, **G6ZY/VP2M**, **18MHz** **0800** **VK6AKG**, **21MHz** **0800** **A71BJ**, **Z21AV**, **ZD8RP**, **5A0A**, **8J4IT**, **0900** **FR5AL**, **1000** **H44AL**, **JA**, **VK**, **YB**, **9V1WP**, **1100** **OD5RF**, **4X500Q**, **1200** **JA**, **YB**, **1300** **Z2EM**, **OYDF7JC**, **SU1ER**, **YCOPHM**, **3D6CW**, **1500** **5A0A**, **575NU**, **1600** **JY5AZ**, **SU1FN**, **TL8DC**, **TZ6MG**, **VP8BKK**, **1700** **A22FN**, **TZ6FC**, **1800** **PJ2KI**, **5A0A**, **5Z4ET**, **9Q5NW**, **2000** **CE**, **9Y4TL**, **2100** **VP2EZ**, **2200** **KG4TM**, **VP9LL**, **ZD8CB**, **ZF2KI/9**, **5Z4BP**, **2300** **8R1RPN**, **28MHz** **0800** **ZB2EO**, **4X4ZZW**, **1300** **J28DN**, **1400** **T77M**, **TJ1DL**, **TU2QZ**, **5L7T**, **1500** **PY5V**, **1600** **EA6VE**, **TZ6FC**, **1700** **3G2Z**, **575NU**, **6W1KI**, **6W7OG**, **1800** **CN8LG**, **TA3C**, **1900** **K1CKD**, **S79CW**, **TA1E**, **TR8AHO**, **TU2QT**, **ZL4AP**, **5A0A**, **575NU**, **2000** **CE4JLK**, **EA9IB**, **K2ARO**, **PY**, **V2AA**, **8P6OV**, **2100** **CX4HS**, **NP4Z**, **ZP5CF**, **2200** **EA9RY**.

Thanks also to the following for information: **DX News Sheet** (G4DYO), **The Ex-G Radio Club Bulletin** (G13OEN/W6), **Long Skip** (VE3IPR), **Lynx DX Group Bulletin** (EA2JGO), **DX Family Newsletter** (JH1KRC), **DX'press** (PA3CXC), **CQ Magazine** (W1WY), **DXNL** (DL3RK), and the **Long Island DX Bulletin** (W2IYX).

Closing date for receipt of material for **October** issue is **19 August**. □

VHF/UHF

Ken Willis, G8VR*

WITHIN A FEW DAYS of the general release of 50 MHz, conditions went wild on the band with major openings to the USA and Caribbean, giving scores of UK stations their first taste of real dx. East Coast USA stations could at times be copied at S7 on an indoor dipole at this QTH, the extraordinary propagation embracing very large areas of both the USA and Europe. Coming right on deadline, it was impossible to include details in this issue, so next month an attempt will be made to summarise the various events, not just those which occurred on 50 MHz but also on 144 MHz which also enjoyed some excellent conditions.

Some unusual vhf propagation

Last month's report of early 50MHz sporadic-E, written before the general release of the band to both Class A and B licensees, might well have been seen as an indication of what the band could provide by way of summertime dx working, but few could have foreseen the events which soon were to follow and cause such great excitement, not to mention a possible reappraisal of our views on propagation in this part of the spectrum.

By the date of general release of the band, 1 June, the crossband frequency 28,885kHz was already very busy on most days, offering European crossband contacts 50/28 to any takers. It was a revelation to hear how many European operators, themselves denied 50MHz privileges (and in some cases even having to seek permission just to listen on the band) had invested time and money in establishing 50MHz receiving systems, with the result that newcomers to the band were offered an early thrill of dx working. Stations able to generate a mere few hundred milliwatts into an indoor dipole were able to make dx contacts across Europe; the band sometimes being open for hours on end. It seems likely that from April to September, maybe longer, crossband operation will be possible on many days in each month.

On 6 June, 9HICG appeared on 50MHz to be worked two-way by many UK stations, and the good news emerged that Maltese amateurs had been granted 50MHz facilities on a 24h day basis, with a permitted power of 10W and no antenna restrictions.

On the following day, with vhf tv pictures being received here from all over Europe and the USSR from early in the day, it appeared that things might get exciting later. They most certainly did. With several experienced and well-equipped stations working and listening on the band, at 1340gmt EI6AS heard VE1YX on 28,885kHz, calling DJ2LF and attempting a crossband contact. DJ2LF was unable to hear the Canadian station on 50MHz, but EI6AS could, on cw on 50-095MHz with a report at 569. EI6AS then tuned up the band to find and work K1TOL (1345gmt), W400 (1405) and WA10UB (1417), all on cw. Meanwhile, much further to the east, Paul, G4IJE (Sheering), had just received a telephone call from GM4DXX warning him that something was afoot. At 1422 G4IJE heard weak cw from K1TOL, but could not raise him. However, 3 min later he worked WA10UB in FN43 sending 559 and receiving 579. At the time of going to press it is not known how many others managed to work into the USA, but the time of day, path length and strength of signals give much cause for thought. A remarkable achievement, or was it something we shall take for granted now that we have such band occupancy on 50MHz in the UK?

This was not all that the day had in store, for G18YDZ made contact, early on 7 June, with the expedition station ZC4VHF/5B4 on Mount Troodos, Cyprus, (KM64KW) for what is believed the first G1-ZC4 contact on 50MHz. Later in the day G4IJE worked the ZC4 at 1600gmt on cw and again on ssb at 1647. John Mathews, G3WZT, worked the same station at 1614 on cw, and during the next week several more stations were to work Cyprus, and 70MHz tests were in progress over the same path.

All week, good sporadic-E conditions prevailed on 50MHz, but it was on 14 June that even greater surprises were in store. At 1457gmt, G3KOX (Hatfield) worked W6JKV/V2A (Antigua), followed at 1516gmt by N4HSM/V2A; contacts which by any standards were remarkable and require much analysis to determine the mechanism involved. Caribbean contacts in the middle of a summer's afternoon at the low point of the solar cycle! We can now see in perspective the significance of OH1ZAA's recent visit to Grand Cayman with 50MHz gear. If only he had delayed his trip by a few weeks. At least he has left some equipment and enthusiasm behind

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on the island for our future benefit. Later the same afternoon, G4IJE copied snatches of USA call signs, mostly on cw; for example, at 1634, K4? EL98? (50·114MHz); at 1641, W6JKV/V2A calling or being called; and at 1711, KB5PX? EL49? ssb (50·146MHz) with a single very short burst up to S9.

As far as is known, these contacts were made with a beam heading according to the great circle path between stations. If you work any really long dx, do make a point of trying to determine the best beam heading so that the path can be better evaluated. It may not always correspond with the great circle route.

The excitement continued on 15 June. During an evening of much 50/28MHz crossband activity, when ZC4VHF/5B4 and 4U1ITU were on the band, Paul, G4IJE, worked W6JKV/V2A on cw at 2003gmt. Later, around 2315gmt, there was a major opening to the USA which lasted until about 0015 on 16 June, during which many first-time W-G 50MHz contacts were made. G4IJE's log indicates the scope and direction of the opening. At 2328 he worked WA4VCC in S Carolina (EM94), plus his xyl KB4CSE, both on ssb. At 2332 N4AVV in N Carolina (FM04) was contacted, followed at 2343 by WD4KPD (FM15) who was using only 100W to a five-element Yagi, small by USA standards. Several other USA call signs were heard, among them W4CKD and N4VA (FM25). One USA station was overheard saying that he had worked eight British stations in the event. Paul reported signals as generally quite weak, with heavy QSB, "in and out all the time", but with CT4KQ also being on the band, it must at times have sounded more like 14MHz! As we go to press, I quote from a letter from 9H1BT, who says: "It was very enjoyable to meet so many friends on this new fantastic vhf band". Fantastic seems to be a good description, let's hope the fun continues.

Sporadic-E on 144MHz

The conditions which lead to the events on 50MHz also produced some excellent propagation on 144MHz. The first sporadic-E opening on this band seems to have occurred on 28 May during the late afternoon. It started with signals coming from 9H1 and Italy but, as so often happens, swung round to a more east-west direction when Yugoslav, USSR and Polish stations were worked. In this event, GW4FRX (Powys) had a contact with RA3LE (KO64) over a distance of some 2,300km. The opening appeared to favour most of the UK at one time or another over a 2h period. G4RUW (Newbury), who is virtually at sea-level and runs only 10W to a nine-element Tonna, managed UP1BWR for a new square and country, and heard lots more.

The evening of 6 June provided another short opening, this time mainly to Italy, at the quite late hour of 2030. On 7 June, Italian stations were again in evidence from about 1130 to 1300gmt. G3WZT worked 15 of them, but a much rarer one for John was SV8JE (KMO8BD). There was a second event later in the day, starting around 1800 and lasting about half an hour. Most of the action was from Yugoslavia, though some Hungarians and Bulgarians were worked (G4ASR 18 YUs, 3 LZ, 1 HG), but there were also several UB5 stations much enjoyed by G4SWX, G4RKY and many others. The best one heard at G8VR was UB2GA giving his locator as KN77AB (RH71g), which is a QRB of 2,395km. The UB2G prefix is interesting, the QTH being in the Crimea area.

There is evidence of much more sophistication these days in monitoring for Es, so that one notices many more stations actually waiting for it to break, resulting in some horrendous pile-ups where the weak are trampled underfoot. It's far better to move off a few kilohertz and make a few calls of your own. This can greatly enhance your chances of making some fine contacts if you are not one of the stations blessed with multiple Yagis and a high erp.

Repeater news

Since the home team seems to have gone quiet this month, here is some news from the USSR. In the publication *Radio* (No 3/1987) an article from the pen of Leonid, UA3CR, is entitled "Experiment in Progress". It describes a repeater, which Dexter Anderson, W4KM, who translates the text, says is the first USSR terrestrial repeater in the amateur service to come to his notice. It apparently commenced operation in February this year from a high building at Moscow State University, sponsored by *Pravda* and the subject of a special licence from the USSR equivalent of our DTI.

The antenna, a vertically-polarized half-wave dipole, is some 150m above ground, giving a radio horizon of more than 50km. Transmission is on 145·600MHz with a power of 10W and deviation 3 to 5kHz. Reception is 600kHz down on 145·000MHz. The article goes on to say that "when operation exceeds 3min, the transmitter sends its call sign UA3KP and locator KO85PQ". Though only the receiving antenna is specified, there is clearly another for transmitting, since the text refers to the "two antennas being situated on opposite sides of a central tower block, the screening

effects of the building being used to some advantage". Some idea of the capabilities of the system can be judged from the fact that it can be accessed at distances up to 10km using transmitters with 100 to 500mW output.

KO85 is quite distant, even for weak signal types, so it is unlikely that much will be heard from this machine in the UK, but I felt I should pass on that high-tech bit about using a building to minimize receiver desensitizing to the more technically-minded repeater group members in case they hadn't thought of it themselves.

Meteor scatter

The popular Perseids shower is due this month, peaking around 12 August. It is a daylight shower, and, as the accompanying computer print-out (Fig 1) shows, the radiant remains above the horizon throughout the 24 hours. Fig 1 shows the probability of reflections occurring, on a scale of ten (maximum), zero (minimum), but all this tells us is that if meteors are present, this is an indication that they will be travelling in a direction suitable for producing reflections which will assist propagation along the compass directions shown. All of this is based on the geometry of the path between stations, and the predictions do not guarantee that meteors will be there in the required numbers at the times shown, though the Perseids usually can be relied upon to provide good reflections. In Fig 1, some gaps will be obvious, notably along the NE/SW direction from midnight until about 0800gmt, and again from 2200 to midnight later the same day.

PERSEIDS			MAX. AUG. 12		ZHR 80	RADIANT AT RA 45. DEC 59		
HRS	AZ	EL	N/S	NE/SW	E/W	SE/NW		
00	46	45	XXXXXX		XXXXXX	XXXXXXXXXX		
01	51	52	XXXXXXXX	X	XXXXXX	XXXXXXXXXX		
02	54	59	XXXXXXXX	X	XXXXXX	XXXXXXXXXX		
03	55	67	XXXXXX	X	XXXXXX	XXXXXX		
04	51	75	XXXX	X	XXX	XXXX		
05	29	81	XX	X	XXX	XXX		
06	337	81	X	XXX	XXX	XXX		
07	311	76	XXXX	XXXXX	XXX	XXXX		
08	305	68	XXXXXX	XXXXXXXXXX	XXXX	X		
09	305	60	XXXXXX	XXXXXXXXXX	XXXXX	X		
10	309	53	XXXXXXXXXX	XXXXXXXXXX	XXXXXX			
11	313	46	XXXXXXXXXX	XXXXXXXXXX	XXXXXX			
12	319	39	XXXXXX	XXXXXXXXXX	XXXXXX	X		
13	325	33	XXXXX	XXXXXXXXXX	XXXXXX	XX		
14	332	28	XXXX	XXXXXXXXXX	XXXXXX	XX		
15	340	25	XXX	XXXXXX	XXXXXX	XXX		
16	347	22	XX	XXXXXX	XXXXXX	XXXX		
17	356	20	X	XXXXX	XXXXXX	XXXX		
18	4	20		XXXX	XXXXXX	XXXX		
19	12	22	X	XXXX	XXXXXX	XXXX		
20	20	24	XXX	XXX	XXXXXX	XXXXXX		
21	27	28	XXXX	XXX	XXXXXX	XXXXXX		
22	34	33	XXXXX	XX	XXXXXX	XXXXXX		
23	41	39	XXXXXX	X	XXXXXX	XXXXXX		
24	46	45	XXXXXX		XXXXXX	XXXXXX		

Fig 1. Perseids print-out

UPSILON PEGASIDS			MAX. AUG. 12		ZHR 10	RADIANT AT RA 350. DEC 19		
HRS	AZ	EL	N/S	NE/SW	E/W	SE/NW		
00	134	51	XXXXXX	XXXXXXXXXX	XXXXXX			
01	156	56	XXXX	XXXXXXXXXX	XXXXXX	XXX		
02	182	58		XXXXXX	XXXXXXXXXX	XXXXXX		
03	208	55	XXXX	XXX	XXXXXX	XXXXXXXXXX		
04	229	49	XXXXXX	X	XXXXXX	XXXXXXXXXX		
05	246	41	XXXXXXXXXX	XXXX	XXXX	XXXXXXXXXX		
06	260	32	XXXXXXXXXX	XXXXX	XX	XXXXXX		
07	272	23	XXXXXX	XXXXX		XXXXXX		
08	283	14	XXXXX	XXXX	X	XX		
09	295	5	XX	XX	X	X		
10	306	-3						
11	319	-10						
12	332	-16						
13	347	-19						
14	2	-20						
15	17	-18						
16	31	-14						
17	44	-9						
18	57	-1						
19	68	7	XX	X	X	XX		
20	79	16	XXXXX	XXX	X	XXXX		
21	91	25	XXXXXXXXXX	XXXXXX		XXXX		
22	103	35	XXXXXXXXXX	XXXXXX	XX	XXXX		
23	118	43	XXXXXXXXXX	XXXXXXXXXX	XXXX	XXX		
24	135	51	XXXXXX	XXXXXXXXXX	XXXXXX			

Fig 2. Upsilon Pegasus print-out

It is interesting, however, that a minor shower, the Upsilon Pegasus, is scheduled to peak more or less at the same time as the Perseids, and the right ascension and declination of this shower give rise to the second print-out (Fig 2). If this is studied closely, it will be seen that although the radiant of this shower lies below the horizon for some hours during the middle of the day, meteors from it may be well-placed to fill in some of the "holes" in the Perseids mentioned above. So, with the help of minor showers, plus the presence of sporadic meteors, one can make skeds for almost any time of the day with a reasonable certainty of hearing some reflections.

With 50MHz now generally available, some quite spectacular bursts should be recorded on this band during the Perseids, so those not familiar

with the procedures might look them up before the action starts. The overall period of Perseids activity is between 20 July and 23 August, though the real advantages of the shower will probably be confined to the period 11 to 13 August. Operators on 50MHz using dipoles or simple beams should find these antennas good for working over distances such as G-GM, G-GI, G-EI etc, since the polar diagram will allow better access to the meteors useful for such paths. Beams with greater directivity may lack the vertical component of radiation which is needed for short-path working on meteor scatter. Back-scatter can also be used over these shorter distances, of course, often with great effect. Bursts at these frequencies are usually long enough for ssb contacts to be made, so the high-speed cw more commonly used on 144MHz is less important.

Beacon notes

Dubus reports that a beacon signing EA3XS should now be active and be QRV at least until October with the primary purpose of providing an indicator for fai propagation. Its frequency is given as 144.1525MHz which seems a strange one, and it is set to beam at the fai scatter-point above DG (JN36) square. Power is 2.5W to a 10-element Yagi.

A group of amateurs in EA5 has established a beacon operating on 144.932MHz from ZZ 69j (IM 99) which is near Valencia. Its beam heading is 35-40 degrees towards central Europe. Beacons for 50 and 432MHz are planned by this group.

Following his trip to Grand Cayman to operate 50MHz, Jan, OH1ZAA plans to retain his call (ZF2KZ) and reciprocal licence so that it can be used for a beacon to be located in George Town, Grand Cayman Island, BWI. Roger, ZF1RC has agreed to become beacon-keeper, and Jan says that the rig he has built for an OH 50MHz beacon may well find its way to Cayman since he is not too hopeful that any 50MHz allocation will be forthcoming in his country.

At least one of the Cyprus vhf beacons was understood to be taken to the mountain site for the June tests reported in earlier issues, and a copy of a newsletter published by the BEMRS Social Club Radio Group in Cyprus confirms that this organization has indeed taken over the responsibility for the beacons which they intend to keep going in future.

Expeditions

First a reminder of those expeditions during August which were detailed in earlier issues of *VHF/UHF*. LA6HL should be in Iceland and then Greenland from 16 July to 6 August. The combined Newbury/BBC Ariel groups will be operating in all the major vhf/uhf bands from locations in Eire up to 10 August. See the May issue for details of these. GW4VXX plans to be in IO78 (XS) from 8 to 22 August using both 144 and 432MHz, while another large group, Derbyshire Hills, will be in Eire from 2 to 14 August, both these being detailed in the July issue.

A new one for the diary is the Ballymena Radio Club, GI3FFF, special event station operating from Rathlin Island from 5 to 9 August, callsign GB2MRI, which is scheduled to be QRV round the clock "on all bands" so Jonathan, GI1XIB informs us. If my geography is correct, this lies in IO65 (WP) square. Lastly, Ted, G3DCC is heading north and hopes to be active during the 144MHz Trophy (5/6 September) from IO85, but will in fact be there until 9 September with gear for both 144 and 432MHz. The site is about 1,000ft asl, so weather permitting, he could be on between 1,000 and 1,700 daily. Callsign will presumably be GM3DCC/P.

News from G5UM

Our hard-working vhf awards manager, Jack Hum, G5UM, who seldom receives the publicity he deserves for all the work he does on behalf of RSGB members, has asked me to mention one or two points. First, he reminds us that in these days of super vhf dx, the countries and counties awards are still there to be claimed, and anyone sending him an sae QTHR will receive full details. Next, a current claim form for the Monday Night 432MHz activity award is also available, again on receipt of an sae, and Jack says that it may not be generally recognized that this is an award, not a contest. In connection with 70MHz awards, Jack has made a recommendation to the VHF Committee, which has been accepted, to set the top limit for countries to be claimed on 70MHz to eight (it was ten) since, as Jack says, "there aren't 10 that can be worked on 70MHz". Ending with a plug for his own part of the country, Jack says that Friday night is 50MHz night in the east Midlands, when stations from North Derbyshire to South Leicestershire (and points in between) may be heard on 50.4MHz between 7.30 and 8pm. Jack has always had a soft spot for working on frequencies not far removed from 50MHz, and was to be heard in that part of the spectrum long before most of today's operators were yet a gleam in their parents' eyes, and he still exudes the same enthusiasm today as he did all those years ago.

On the awards front, Jack notified three 200 square/30 country awards on 144MHz to G4RGK, G4XEN and G4RNL, bringing to nine the number



"The feeder loss on 50MHz was not as much as I thought, so when they checked my erp..."

(No joke! There are good reasons for the existing power levels — Ed)

of certificates in this category issued to date. G4TIF achieved a senior 70MHz award which automatically brought him a coveted Supreme award (No 69) while 144MHz seniors went to G4XEN, G8RRA, G1EHJ and G6CSY/P. A 432MHz senior was awarded to G4XEN and G1EHJ. Don't forget, says Jack, that Monday night is cw activity night on 144MHz, and he is amazed at how many people are completely ignorant of it.

From here and there

Colin Fox, G3HII, spent some time in Switzerland and operated on 144MHz, but found that unless one spoke fluent French and/or German, contacts were hard to come by. He was able to access several repeaters, both locally and in France, despite having only 1.5W. The reciprocal licence was easy to obtain, taking about two weeks to come through. He sent a photocopy of his current UK licence, plus the DTI receipt indicating that he was fully paid up. The cost of the HB9 licence was approximately £15 plus some postage fees.

Andy, 5B4DN, was scheduled to leave Cyprus in July, and should soon be heard here on the vhf bands as G3ZYP from Suffolk, so we shall then have the benefit of someone with first-hand information on the Cyprus scene. When he wrote, summer vhf conditions in Cyprus were providing good propagation into 4X4, OD and SU, prefixes which tend to send little shivers up and down the spines of avid vhf dx operators. G3VYF worked 4X4IX a few years ago on 144MHz, so who knows what may happen in the future as some of the more remote stations become better equipped and more experienced at spotting openings of various types.

Our thanks to Peter John, DL7YS (Berlin), who sent information on 50/70MHz to more than 20 stations in seven European countries, each receiving some 80 pages dealing with converters, transverters, antennas, band plans, propagation etc. As he says: "It was a hard and very expensive copy-session but hopefully it will help to improve the crossband activity in Europe". It certainly did, Peter, as anyone who listens on 28.885kHz will confirm. He was due to move QTH in May to a flat where he hopes to be able to put up antennas, but did not expect to be QRV during the June or July "Es hot seasons". Let's hope someone will see fit to publish those 80 pages, since they could be the basis of a very useful hand-out for newcomers to the "longer vhf wavelengths".

David Palmer, G1DHQ, QTHR, sent the results of the Derby & DARS 144MHz contest which took place last March, and which was mentioned in this feature. Winner of the full legal power section was G4CRA/P, while the low-power section was won by G4RLF/P. David will provide the full list of results to anyone who sends him an sae.

Mick, G4PRJ, and his wife G8XCY (Eastbourne), have recently celebrated the arrival of their first junior operator which they find keeps them busy on matters other than radio, but an unexpected problem was a bad case of rfi in the baby alarm which Mick has frantically been trying to cure!

Angie, who was licensed as G1XEO only last February (see the June issue), wasn't far out in her aim of becoming a Class A operator by April. In May she was issued with G0HGA after passing her morse test and has celebrated by raising the antenna from 9 to 12ft in an area where apparently they measure these things with a micrometer to ensure that local planning regulations are observed.

DATA COMMS

Ian Wade, G3NRW*

Let me tell you a story . . .

A little while ago I needed a simple packet tnc monitor program, to display messages on the screen of a Sirius (Victor 9000) computer and to save the message text on disc for future reference. The objective was to get something working as quickly as possible, just to verify a few details that I was interested in at the time.

The Sirius is a somewhat slow machine by today's standards, but seemed more than adequate for the task in hand. The program, written in Microsoft compiled Basic and running under MS-DOS, simply had to communicate with one of the serial ports connected to the packet tnc. Incoming characters from the tnc were to be displayed on the screen, and saved in a character string. Whenever a carriage return was received, the complete string was to be written to the disc as a line of text.

Nothing could be simpler. Stripped of the frills, the heart of the program looked something like this:

```
100 L$ = ""
110 IF (PEEK(2) AND 1) = 0 THEN 110
120 C% = PEEK(0)
130 C$ = CHR$(C%)
140 PRINT C$;
150 IF C% = 13 THEN GOTO 200
160 L$ = L$ + C$
170 GOTO 110
200 PRINT L$, L$
210 GOTO 100
```

Clear the current line
Wait for the serial input flag
Get the character code
Convert it to character string
Display character on screen
Test for carriage-return
Append character to end of line
Get the next character
CR received. Write line to disc
Start a new line

Because the serial port does not run under interrupt, it is necessary to test its status in a tight loop (line 110). Obviously, most of the time is spent in this loop, waiting for a character to come along from the tnc. But when a character does eventually appear, it is essential to execute the rest of the program as quickly as possible, and to get back to the main loop at line 110 before the next character arrives.

The first run

With the serial link speed set to 1,200bps, the program was fired into action. A few commands were sent to the tnc, and within seconds the screen was full of text. The incoming characters were indeed being displayed on the screen, and later examination showed that they were being saved on disc as expected. It was looking good.

But just a moment. Closer examination showed that *most* of the characters were displayed and saved, but not all. At apparently random intervals, a block of about 20 consecutive characters was missing, both on the screen and in the disc file. Aha, I thought, maybe the disc write was taking longer than expected, so that the program couldn't get back to line 110 soon enough, and hence missed some characters.

Slow down

Nothing to worry about. Just drop the line speed to 300bps, and the problem should go away. But it didn't. The number of dropped characters was certainly less, but some were still missing. And it was still a random dropout, not occurring regularly on every line.

Looking closer at the program, I realized that I should really have had some form of handshake with the tnc, to tell the tnc to stop sending characters when the disc write was in progress. So a few extra lines were added, to send XOFF (control-S) to the tnc immediately before the disc PRINT statement on line 200, and XON (control-Q) immediately afterwards.

No difference. The characters were still being dropped as before. I even hitched up a BBC in parallel with the Sirius, to monitor the traffic on the line and to check that XOFF and XON were really working. Sure enough, they worked fine; the trusty Beeb captured every character without a single dropout.

Forget the disc

By now I was getting a little annoyed. I then remembered that because the data to be written to disc is buffered up by MS-DOS, the actual disc write operation only occurs when the buffer becomes full; ie not necessarily on

every disc PRINT command. So was this why some lines were complete, but others had pieces missing?

To prove the point, I removed the XOFF/XON statements, and also the disc PRINT statement at line 200. Now, the program only had to display characters on the screen, with no disc activity. But this made no difference at all. Characters were still being dropped. I couldn't believe it! Disc delays had nothing to do with the problem.

Back to Basic(s)

The program was put on ice for a day or two, but in experimenting later with another Basic program I noticed something a little odd: The complete program was as follows:

```
300 PRINT "The quick brown packet fox jumps over the lazy rtyy dog"
310 GOTO 300
```

Now you can't get any simpler than that! The odd thing, though, was that as the text repeated line after line, scrolling up the screen, there was a momentary flash every second or so. The screen went blank for a fraction of a second, then continued to display the text.

Eureka! A quick look at the Sirius *Technical Reference Manual* reminded me that the MS-DOS BIOS uses a block of ram for the screen image, and the area of ram actually displayed at any time is determined by the ram pointers set up in the crt controller chip. When scrolling occurs, all that the BIOS does is change these pointers. But eventually the end of the ram buffer will be reached, and everything has to be reset to point to the beginning of the buffer again. Could this reset process be causing the screen to flash, and could the valuable time needed to do this be the real reason why the tnc program wasn't working?

Beat the BIOS

Back to the tnc program. The screen PRINT statement (line 140) was removed, and the disc PRINT statement was restored at line 200. So now the program was (hopefully) writing the text to disc, although I couldn't actually see it on the screen. With mounting excitement I ran a few tests, then examined the disc file. Not one single character was dropped. The *disc* PRINT was working fine; it was the *screen* PRINT routine in the BIOS which was the culprit.

The next hour or so was spent in writing and debugging a new subroutine to replace the screen PRINT statement; this new subroutine poked the screen ram directly, completely bypassing the BIOS. The end was in sight.

Testing was then resumed, and sure enough, the "20 missing characters" syndrome finally disappeared. So it really was a BIOS problem. Trouble was, I now had a "10 missing characters" syndrome! That is, blocks of around 10 characters were now being dropped, both on the screen and in the disc file.

Time to collect the garbage

It was at this juncture that I was ready to start tearing my hair out (but those of you who know me personally will testify that I can ill-afford to do much more of that!). In desperation I tried everything I could think of to minimize the execution time of the program. Almost every statement was changed and experimented with, until eventually the only one remaining unaltered was the string append statement on line 160: L\$ = L\$ + C\$. No point in doing anything with that.

Then eventually the light dawned. Perhaps, after all, line 160 was not as innocuous as it seemed. Appending a character C\$ on to the end of a string L\$ can be very time consuming when the memory allocated to the string isn't big enough. When this happens, the string library routines have to go through a tortuous memory re-structuring process (called "garbage collection") to make room for the new character to be appended. Could this be what was taking up all the time?

In a word: yes. On removing line 160 from the program, I was able to see every character on the screen for the very first time, with not one single character missed, even at 2,400bps! Not much got written to the disc, of course, but at last I had found the true culprit.

The final solution

Further experimentation with string handling followed, such as assigning a 256-byte dummy string to L\$ at the beginning of the program, to force the string memory to be allocated before entering the main loop at line 100. But neither this nor other similar ruses worked, and in the end I was forced to use an integer array instead of a string to store the characters. Not very elegant, but here at last, after many hours of toil and frustration, was a program that did what I wanted. The only consolation was that I learnt a lot on the way.

And they say that computers are here to help mankind!

End of story

RADIO COMMUNICATION August 1987

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COMPUTING

John Morris, GM4ANB*

Greyline predictions

May's program for predicting the dates when the sunrise/sunset greyline would pass through a particular dx location aroused a lot of interest. From my mail it would appear to have been successfully adapted to a wide variety of computers. If you are having trouble getting it going, the following notes may help.

Line 280 seems to have caused the most confusion. The construct "IF RF THEN . . ." is not a typographical error, but perfectly valid Basic. It means exactly the same as "IF RF <> 0 THEN . . .". In most dialects of Basic any expression can appear after an IF, and will be taken as "true" if it is non-zero.

The exact syntax of IF . . . THEN . . . ELSE varies from one computer to another. I will try to avoid them in future. Commodore users will have to add a ":" before the ELSE.

I am indebted to G4BYP for pointing out a more subtle problem on the Commodore 128. The program uses variable EL, but this is a reserved fileword in CBM Basic 7.0. The fix is to replace EL with EE in lines 10, 150, 190 and 200. On all CBM computers replace "PI" with the "π" sign, throughout.

Some computers, including the Spectrum, do not have IF . . . THEN . . . ELSE at all. (Look, I said I'm sorry, and I really will avoid them in the future.) In this case line 280 needs to be completely re-written. The following is suitable:

```
280 LET TM=(RA+TH-HE): IF RF THEN LET TM=(RA-TH-HE)
```

Finally, a note on using the program. Latitudes should be entered as positive for north, negative for south. Longitudes are positive for east, negative for west. In both of the examples given in May the latitude was south of the equator.

Calculating distances the IARU way

One of the resolutions passed at the IARU Region 1 Conference in April was that when calculating distances for vhf/uhf/microwave IARU contests using spherical geometry, a conversion factor of 111.2km/degree should be used. This is equivalent to saying that the radius of the earth should be taken as 6,371.291km.

This means that in future all contest scoring programs should give the same answer. Until now, programs have used a variety of earth radius values, with anything from 6,360 to 6,380km having appeared. There were two reasons for the previous lack of consistency. The first was that the earth is not really a perfect sphere: we just pretend it is to make the calculations easy. The second was that various measurements of the size of the earth have come up with different answers—it's a bit big to get a tape measure round.

The exact figure used for the radius of the earth in contest scoring does not really matter. What is important is that everybody should use the same one. I have always used 6,367km in the past, as it is a nice round figure that corresponds to the internationally agreed nautical mile. However, I am quite happy to change to the IARU recommended value, in the knowledge that every one else should be doing the same, and so all our contest scores will be calculated on the same basis.

All my programs have now been modified to use 111.2km/degree. With the September IARU VHF Contest coming up next month, now is a good time to check that your contest scorer also uses the right value.

If possible, look through the program for either an earth radius value (around 6,370) or a km/degree value (around 111.2). If you find the first, change it to 6,371.291. If you find the second, make sure it is exactly 111.2.

To check if your program is correct, try using it to find the distance between two locators separated in latitude by 10 fields (such as IE91AA and IO91AA). Ideally the distance should come out as exactly 11,120km. If it comes within 1km then it should be close enough.

If you are writing a new scorer, the subroutine shown in Program 1 can be used. It calculates distances using the IARU method. The latitude and longitude of the first station should be in N1 and E1, and those of the second station in N2 and E2. All values must be in radians. It returns the distance in dx and the corresponding RSGB radial ring score in pt.

Note that the IARU figure is only intended for contest use, and not for dx records, where much more accurate distance calculations are used.

Program 1

```
1000 CC = COS(E1-E2)*COS(N1)*COS(N2) + SIN(N1)*SIN(N2)
1010 IF ABS(CC)=1 THEN CA=PI/2 * (1-SGN(CC)): GOTO 1030
1020 CA=PI/2 - ATN(CC/SQR(1-CC*CC))
1030 DX=111.2 * 180/PI * CA
1040 PT=INT(ABS(DX-1)/50) * 2 + 1
1050 RETURN
```

Passive reflectors

Contacts are frequently made using passive reflectors such as the moon, passing aircraft, or gasometers, especially on the higher frequency bands. In idle moments it can be amusing to speculate about what else could be used to reflect signals. Would a silvered kite flying a few hundred feet up help me get over the hill at the bottom of my garden?

Putting some numbers on the ideas is very simple, as shown in Program 2. It gives the path loss for a signal travelling between two stations via a reflecting object. It assumes that both of the stations are line of sight to the reflector. It also assumes that the reflector will re-radiate equally in all directions. In general this is not true, but it gives a starting point.

The path loss is only one component of the system budget. To see if the path is workable you must include the antenna gains, transmitter power, receiver sensitivity, and so on—but that is a topic for another time. In rough figures, a path loss of less than 230dB on 144MHz or 240dB on 432MHz should be workable by reasonably well equipped stations.

Program 2

```
10 INPUT "Frequency (MHz)"; F
20 INPUT "Tx to reflector DX (km)"; D1
30 INPUT "Rx to reflector DX (km)"; D2
40 INPUT "Reflector diameter (m)"; OD
50 INPUT "Reflectivity (%)"; RF
60 PL = PI*16*D1*D2*1E6/OD*F/300
70 PL = 10*LOG(PL*PL*100/RF)/LOG(10)
80 PRINT "Path loss "; PL; " dB"
```

Oddbits

Following recent letters in *Rad Com* bemoaning the lack of technical software for the Amstrad CPC series, Nigel Pritchard, G8AYM, has compiled a list, from those contacting him, of who has what and who wants what. Although he does not want to become a sort of club co-ordinator, G8AYM does have several programs, and will copy them to anybody who sends him a formatted disc plus adequate postage etc. For himself, G8AYM is looking for slow-scan, packet, and "anything interesting, preferably without typing in long listings!"

G2TA suggests the following method for tuning the Beeb audio generator given as Program 2 in *Computing* October 1986. Temporarily modify the program by adding:

```
125 INPUT "Enter offset"; K
135 GOTO 125
```

Then change "293" in line 130 to "K". Run the program and try various offset values, listening for a beat frequency with a known oscillator. Once a good zero beat is achieved, delete lines 125 and 135, and replace the K in line 130 by the experimentally derived value.

A computer QSL card received from G4MUW is not flashy, but it does the job and rates very highly for convenience and economy. G4MUW noted that although the use of a pre-printed background card would give a good effect, it would not actually be cheaper than getting complete QSLs printed. A computer printed callsign, on the other hand, is difficult to produce in an attractive format, and perhaps a little too easy to imitate. G4MUW's solution is to use a pre-printed sticker for his callsign, and a computer printed label for the QSO details. The stickers were produced by Able-Label, who advertise in the small ads of the national press most weekends, and there are other firms which can do a similar job.

"Hambit '87", the Second International Congress on Ham Computing, will be held in Florence on Sunday 22 November 1987 under the sponsorship of ARI, the Italian amateur radio society. It will be part of "Exposer '87", one of the leading information technology exhibitions in Italy. According to the press release, the aim of the congress is to provide a general view of advances in the field, both practically and in research environments. It is being organized along the lines of a professional conference, with papers being submitted in advance. From the release, it appears that the emphasis will be very much on the IBM pc and its clones.

For more information on submitting a paper or attending the congress, send a self-addressed envelope and ircs to: Carlo L Ciapetti, I5CLC, Via Trieste 36, 50139 Florence, Italy. The deadline for submitting papers is 31 August.

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SATELLITES

Bob Phillips, G4IQQ*

Oscar 10

Much to the surprise of many observers, Oscar 10 emerged from its prolonged period of eclipse in better shape than had been expected. The actual re-start of operations was delayed until 15 May, with strong advice from the spacecraft controllers that operators should treat the bird very cautiously. In particular, care was needed to ensure that no fming was caused to the beacon or passband signals. This effect is an indication that the battery voltage is reaching a perilously low level. In addition to the general caution mentioned above, a complete ban has been put on constant envelope signals such as rtty, sstv and fax.

As the on-board computer is no longer operational, it is not possible to control the attitude of the spacecraft with respect to the earth. As a consequence there is likely to be considerable mispointing of the spacecraft antennas and probably considerable spin modulation on all downlink signals. At the time of writing, the operating schedule for the Mode B transponder provided an ON period between MA30 and 220. As can be seen from the visibility chart for the month of August, the ON period coincides quite well with the times when the satellite can be seen from the UK. In fact, notwithstanding the performance of the satellite, the current orbital conditions are the best they have been for a long while. One drawback for those operators without elevation control is that on many days the satellite will be above 30° for much of the time and for two periods in the month the elevation will rise to 60°. Under these conditions it may be possible to gain access with an omni-directional antenna, depending, of course, on how other operators are limiting their power.

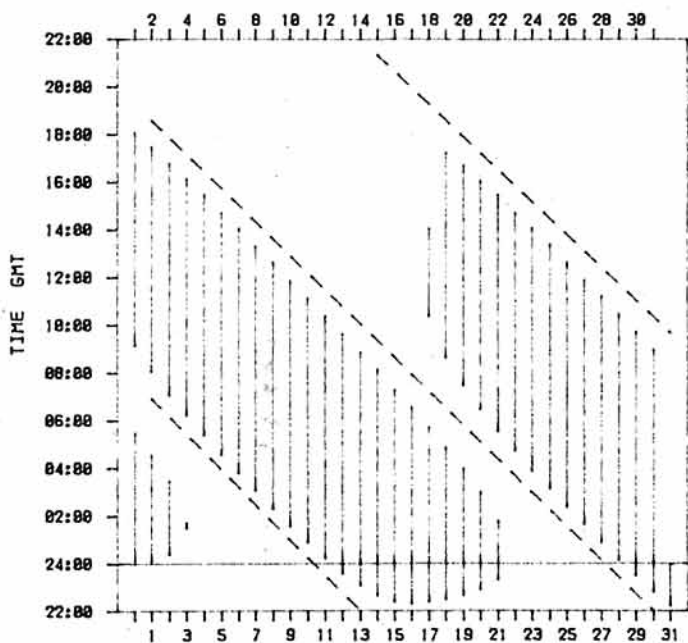


Fig 1 OSCAR 10 VISIBILITY (London area) - AUGUST 1987

— satellite in view — — — — — perigee (MA=0)

Uosat

Operation of Uosat Oscar 9 has been interrupted for several months due to earlier problems, and subsequent difficulty in reloading the software for the on-board computer. There is no major problem, it's just a matter of perseverance.

There has been a great deal of activity on Uosat Oscar 11, ranging from gravity gradient stabilization experiments to use of the Digital Communications Experiment to provide store and forward message

facilities for the increasing number of amateurs using packet radio transmission techniques. To relay a message through the satellite it is necessary to access the packet station at the University of Surrey, GB3UP. The help option will provide the necessary information to originate and receive messages.

A further rewrite of the software for the satellite's diary is underway and is likely to lead to easier operation of the spacecraft.

Phase 3D

Even before the launch of Phase 3C, plans are underway for its successor. It is rumored that the satellite, which could be launched in the 1990-1 timeframe, will be substantially more powerful than both 3B or 3C. A 250W p.e.p. mode JL transponder is planned and a further attempt at a Molniya type orbit will be made.

Fuji Oscar 12

This satellite begins its second year in orbit on 8 August, and operating difficulties continue. The mailbox was declared operational in early May and should provide AX.25 access when the mode JD transponder is active. The callsign for the satellite is 8J1JAS, and the on-board memory can store up to 50 messages before the earlier ones begin to get overwritten.

As a reminder, uplink frequencies are 145.85/87/89/91MHz and the downlink is 435.910MHz. Initial operation will not provide any message security, and anyone will be able to access and read any message in the buffer.

The difficulties experienced by JARL are a clear indication of the increasing complexity of amateur satellites which more and more rely on the adequate performance of the on-board computers and the ability to write appropriate software for the successful operation of the satellite.

Other news

The launch manifest for the Ariane vehicle was released in early June and indicates that the next launch (V19) is due during this month. This puts the launch of the Phase 3C satellite on the first Ariane 4 rocket back to January 1988 if the V20 and V21 launches go according to plan.

There is a possibility that amateur operation from the Russian MIR space station may take place in the future. No details are yet available of the bands to be used or the modes of operation, but it is likely that fm would be used due to the high values of doppler shift experienced with the low orbit of the space station.

The University of Surrey is still looking for reports from operators who listen to the satellite's various transmissions. The information received is useful in the planning of future activities as well as giving an appreciation of the extent of use of the satellite. □

MICROWAVES

Mike Dixon, G3PFR*

Microwave feedback—historical

Certain recommendations were made at the IARU VHF Managers' Working Group in Vienna on 8-9 March, 1986. They were approved by the Executive Council of IARU Region 1 at their Oslo meeting of 18-20 April, 1986. These recommendations set proposed standards for digital transmissions and also defined provisional band plans for the amateur microwave bands from 1.3 to 47GHz inclusive.

These band plans were then passed up to the Region 1 Triennial Conference in the Netherlands (12-17 April 1987) for consideration and endorsement by Committee B, the vhf/uhf/microwave committee. On the recommendation of this committee, the proposals and plans would be implemented throughout Region 1, with feedback into the other regions. Since all the proposals interact with UK national plans, it seems to be appropriate to review them briefly here, even though some are not strictly microwave.

Microwave feedback—digital transmissions

This is likely to be an area of considerable growth in the microwave bands: not only direct digital transmissions, but also "indirect"; ie those where a microwave band is used for links or a networking medium for other bands.

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The proposed standards are as follows:

- (a) Modulation methods—fm/fsk (where allowed in band plans)
—fsk/psk: at speeds below 300Bd, fsk preferred, shift 200Hz
Shifts for fsk and fm/afsk: at 1,200bps—1kHz
(1,200 and 2,200Hz, Bell 202)
below 1,200 bps—200Hz.
Mark is always the higher frequency

- (b) Coding: Baudot; 45, 45, 50, 100bps preferred
Ascii; 110bps preferred

- (c) Protocol: Packet—AX.25 (ARRL)
AmTOR—as adopted by HF Group

- (d) 144MHz band: 144.625 to 144.675MHz

Note: no "formal" digipeater networks on this band. Discussion of the width of the beacon band (144.845 to 144.990MHz) took place and will be reviewed at the 1990 conference in Spain.

- (e) 432MHz band: 430.600 to 430.800MHz
432.625 to 433.675MHz
438.025 to 438.175MHz

The allocations agreed for digital transmissions, although vhf/uhf only at the moment, are given to show that the lowest frequency band where such modes are recognized for formal digipeating networks is the current 432MHz band. While experiments on 144MHz were not discouraged, the setting up of formal networks was not approved, although there would be opportunity to review the situation at the forthcoming VHF Working Group's meetings. It appears that a strongly argued case for 144MHz access points into packet networks on other bands may have resulted in acceptance of the need for such access points on this band, the actual usage to be determined by each national society. "Crossband" repeaters with inputs on 144MHz would, however, cut across a previous Region 1 recommendation against such devices. So the situation remains fluid.

Microwave feedback—band plans

Band planning was quite definitive; even though some frequencies are not available in some member countries, a certain amount of flexibility has been introduced by recognizing these differences and allowing "sub-regional", ie national, band plans to exist within the general outline plans.

The band plans were fully described in *Rad Com* July 1987, which should be referred to for the purposes of this brief review. That for 1.3GHz is "firm" while those for 2.3 to 47GHz are still provisional and will only be made firm when there is complete knowledge of the various Region 1 allocations.

Acceptance of common narrowband (dx and beacon bands) segments, each 2MHz wide, is an important feature of the plans and will, we hope, not only lead to co-ordinated international activity but also to a determination in the longer term to secure these frequencies as primary allocations throughout the region. Importantly, it has recognized and established the need for such sub-bands, one of RSGB's principal aims at the conference.

Operating news and views

The well-known 1.3GHz beacon GB3BPO is no more!. In May it was rebuilt using G4DDK's 1.152MHz source, featured in this column earlier, and an updated version of G4FRE's keyer which, incidentally, is now available as a pcb from Dave, on request. The beacon has reappeared on its old frequency with the callsign GB3MHL, so as to be in-line with the other beacon on that site, GB3MHX (indicating "L" band and "X" bands, respectively).

Mark Hughes, GM4ISM (Larkhall, Lanarks), wrote to say that he is now QRV from home on 10GHz, wideband, with a good takeoff up, down and across the Clyde valley. He is also QRV/P on 5.7GHz, NB, and 10GHz, both WB and NB, with a 4ft dish available. He would welcome skeds for contacts using either band. As his job takes him to good sites all over Scotland and Northern Ireland—he is an antenna engineer—he may also be able to offer skeds from some quite exotic sites and would be pleased if anyone interested will contact him directly (QTHR or tel 0698 886504).

The "operating ladder" mentioned a couple of months ago, started on 1 January, now has some entries and stands as follows (ranked this month on best dx):

Posn	Callsign	Best dx(km)	No worked	Multiplied score
1	G3NKL/P	160km	5	800
2	G3PHO/P	94km	9	846
3	G0BTA/P	90km	7	630
24GHz				
1	G3NKL/P	38km	2	76

For the latest tables, see *Microwave Newsletter*.

The latest awards notified by Jack Hum, G5UM (awards manager), were the following:

- 1.3GHz G3XDY (Ipswich) 60 Squares (No 2)—No 1 held by G4KIY
G8CHW (Watford) 15 Squares (39)
G8CHW FMD (74)
GM4YPZ (Angus) 15 Squares (38)
GM4YPZ Distance award (115)
G0CZD (Telford) 5 Squares (18), first G0 + 3 to achieve
2.3GHz G8CHW Distance award (18)
G1DOX (Barrow-in-Furness) 10 Squares (7), first G1 to achieve
10GHz G4IHZ/P (Barnsley) Distance award (82), first this year!

G8CHW's contact for the 2.3GHz Distance award was gained for a contact, using 0.5W, with DF5DN/P during last October's big opening and I expect Jack to be kept busy soon, as at least two other operators have now received cards from this spell of good conditions which will enable them to make several claims! G4IHZ's 150km+ contact was from Saddleworth Moor, near Holmfirth, to GW3MWN/P on Snowdon, using very simple gear (Solfan in-line mixer) including a 100MHz i.f. strip which was "an old transistor radio bought for 5p in a club junk sale"! It just shows what can be done, given that the conditions and path characteristics are good.

Just in time comes confirmation that the Derbyshire Hills Contest Group (G4FRE, G4VVZ, G4XUM, G4YUZ and G8ROU) will again be QRV in EI over the period 2 to 14 August. Fixed operation is planned for 70, 144, 432 and 1,296MHz from the old VN (IO53) square and possible portable operation from UN and UO (IO43, IO44), the main objective being to catch the Perseids meteor shower. However, G4FRE will be taking gear for other microwave bands and he should be contacted for possible skeds—via Dave, G8ROU, QTHR, tel 0629 732620. The success of microwave operation will depend greatly on conditions, of course. □

SWL

Bob Treacher, BRS32525*

Sporadic-E

Writing this in early June, there had already been evidence of some sporadic-E. At 144MHz, David Whitaker, BRS25429, referred to an opening to LA on the afternoon of 23 May, and one on 28 May in which he heard SP8NCJ at 1726. Other dx worked by stations in the north of England included SP8AOV (LL53d), UP1BWR (MO27g), RA3LE (QO) and UC2AAB (NN). It appears that this time, conditions favoured the north.

At the same times, I was getting my first taste of sporadic-E at 50MHz. On 23 May EA1MO (IN71PP) was 56 at 1133. His signals were heard again, but this time 59 + 20dB, at 1558 on 25 May. On 28 May, a superb short-skip Es opening to GM occurred. Five GMs in IO77 and 86 were heard between 1730 and 1800 before I had to QRT with the event in full swing.

VHF QSLs

David Whitaker had cards from FC1HKS (AH) on 144MHz and LX2GB/P (JN29) on 432MHz. By far the best returns noted this month are from Michel Monteil, F11ATZ. He has had these goodies: YU1PSF (KN04), I2FAK (JN45), IC8EGJ (JN70), G1HHH (!), HB9S/P (JN36) and ISOQDV (JM49).

HF news

Plenty of news this month from listeners who had been enjoying the upsurge in conditions. Is it possible that we have at last gone past the sunspot minimum? Even if we have, the peak will not be until 1990-1, so we have some way to go before we can hear ZLs on 28MHz consistently.

Colin Watson, BRS46598, had heard many W6s and W7s on 14MHz, plus South American stations on 21MHz. Malcolm Harrington, BRS20249, had concentrated on the lower bands and had heard 5T5NU on 3.5MHz and TU2QU/3X and 8R1RBF on 7MHz. However, one foray on to 14MHz netted VR6TC, VR6YL and two KH6s. Brad Bradbury, BRS1066, had monitored 28MHz, where his yearly score had risen from 3 to 27 in the space of one weekend. Other good dx included BY6A, CE0ZIG, FG/W2QM/FS, N0APT/HH2 all on cw. Michel Monteil, F11ATZ, also looked on 28MHz and had been rewarded with 6W6AB, TZ6FIC and TA3C. Robert Small, BRS8841, reported good openings to JA on 21MHz, with the band open

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1987 Countries Tables

HF UPDATES						LF UPDATES					
Station	DXCC	28	21	14	Total	Station	DXCC	7	3-5	1-8	Total
BRS8841	204	32	122	188	342	BRS25429	?	146	143	69	358
BRS25429	?	48	116	172	336	BRS8841	172	137	136	51	324
ORS45992	?	39	107	95	241	BRS32525	160	134	120	47	301
BRS1066	132	27	74	120	221	BRS52543	139	106	119	66	291
F11ATZ	71	27	49	27	100	BRS1066	104	92	59	49	200
G1XEO	73	7	21	66	94	BRS20249	61	45	39	8	92
BRS20249	69	5	24	59	88	ORS45992	7	38	21	1	60
BRS32525	44	44	0	0	44	G1XEO	35	28	12	0	40

late to Central and South America. The Pacific had provided consistently good openings on 14MHz, and Robert listed KH6AQ, WB6IPT/KL7 (Aleutian Is), FO5JP, VP9BP/KH6 and WB4KMV/KH3. The 21MHz band had produced three new countries in the shape of CP8XA, HI7KB and HS0B. On 10MHz, UO5WT, UQ2PM and EA7AIN represented three new countries.

On the hf QSL front, lots of activity to report too. David Whitaker had caught up with some of his QSLing and had been pleased with his 3Y card. VK9NS had sent cards for VK9YS and VK0GC (both on 3.5MHz to put the total at 245 confirmed on the band). Y11BGD on 3.5MHz was also new, as were VK9LM on 7MHz and V31CV and LA7Q on 1.8MHz. Michel Monteil mentioned CE0FCM/CE0Z, ZD7JAM, 7Q7LW and ZSISARL. Robert Small finally got a card from AH9AC after a long wait, and added two more cards from BY, in the shape of BY4RB and BY7HL. Other interesting returns included C56/DK7PE, T19W, H24LP and WA9YHW/HR6.

Cray Valley Contest

Further to the earlier news that this event is to be re-established, I am advised by G4DFI that the event is to be split into ssb and cw events. The ssb leg will be on 19/20 September, with the cw leg on 26/27 September. The full rules are available from G4DFI, QTHR.

HF Challenge 1986 results

Both legs were fortunate to experience good conditions. Looking through all the logs, it is surprising to see the many dx stations audible in Europe. Once again our friends in ON enjoyed the weekends, with ONL383 coming home first in both legs with mammoth scores.

There were a few comments about the rules, so I shall look at them for

the 1987 events, but the idea of the challenge is to improve listening and logging techniques. Any change to lessen the amount of information to be logged will not therefore be looked at favourably, neither will any changes which allow stations only heard calling CQ. Contests must have a degree of difficulty, otherwise they are not true contests!

In the ssb leg, 7 and 1.8MHz appeared to provide the best of the surprises, but 28MHz was open with VK, YB0, VU, J28 and 7Q7 among the more interesting stations logged. K4YT/4D9 was located in DU, while P36P was in 5B4. The 1.8MHz band for those who missed some sleep, provided VE8DX, TA, VP2M, HH, CP, VP2E, PJ2 and 4X4. All in all, conditions were quite fair.

During the cw leg some very good dx was heard. All four logs showed that the bands were in good shape; 7MHz was particularly good, with BY, FH8, HC8, HS0, VQ9, VS6, YB0 and 9N1. On 1.8MHz JAs were audible in G-land around 2130, several Russian Republics 599 as early as 1400, and some W2s before sunset. The 28MHz band came to life with FH8, VK, VS6, ZC4, 5H3, 5T5 and 9J2 in several logs.

Both legs had 59(9)+ signals on 14MHz from 0500 to 2130, and most entrants spent much time here picking up a total of over 160 countries during the 96h of the two challenges.

Thanks to those who supported the events, including those who sent useful check logs for the ssb leg, and the hope that conditions are even better for the 1987 challenges with even more entries.

SSB											
	Station	Countries	Points	Score		Station	Countries	Points	Score		
1	ONL383	440	1,153	507,720	7	BRS88639	213	483	102,879		
2	ONL5810	343	913	313,159	8	ONL4333	146	302	44,092		
3	RS87156	303	808	244,824	9	BRS88825	120	234	28,080		
4	BRS8841	294	811	238,434	10	BRS87799	91	226	20,566		
5	RS87865	230	552	126,960	11	BRS31976*	98	164	16,072		
6	BRS28198	211	566	119,426							
*21MHz only											
Check logs: BRSs 25429, 32525, 62088, 88969.											
CW											
	Station	Countries	Points	Score		Station	Countries	Points	Score		
1	ONL383	433	1301	563,333	3	BRS52868*	63	137	8,768		
2	BRS8841	211	625	131,875	4	BRS31976†	36	157	5,642		
*21MHz only, †1.8MHz only											

*21MHz only
Check logs: BRSs 25429, 32525, 62088, 88969.

*21MHz only †1.8MHz only

Finale

News, views and scores for the tables should reach me no later than 10 August, with late copy by 18 August.

OBITUARIES

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

Mr R S Ashley, G2HII

Mr Ashley died on 14 May 1987. He joined the RSGB in 1937, and in the early days and for some time after the war he designed and built much of his equipment.

Mr R E Axford, G4LHV

Ralph Axford died on 5 May 1987 aged 57. He was a vice-president and past-chairman of the Medway ARTS, and was first licensed as G8STQ. A member of the RSGB and the RAFARS, he was a familiar face at amateur radio rallies in his capacity as one of the principals of Scarab Systems.

Mr J Charlesworth, ZL1BOO (ex-G3IJC)

Jess Charlesworth died in New Zealand on 24 March 1987 aged 76. He was a founder member of the old "Northern Mobile Rally" in the late 'fifties.

Mr A S Clacy, G6CY

Stewart died on 16 April 1987, aged 79. He was a member of the RSGB from the mid-twenties and of RAOTA. When he lived in Hove he was secretary of the local radio society. During the war he served in the RSS, and afterwards lived in Chalfont St Giles until retiring to Thurlstone.

Mr E Dowdeswell, G4AR

Eric Dowdeswell, who died on 2 February 1987, was a regular columnist in *PW* for many years, and was also well known as the holder of the call sign ST2AR. For a brief period in the late 'sixties, he was secretary/general manager of the RSGB.

Mr D Duff, VK2EO

Dave Duff died on 28 December 1986. He was a life-member and past-president of the Wireless Institute of Australia, NSW Division, and a leading cw operator with many friends in the UK.

Mr C S Frost, G3XX

Mr Frost died on 8 May 1987 aged 89. His lifelong interest in radio led him through spark, coherers, crystal sets and bright emitters to his amateur licence obtained in 1938. During the war he was a member of the RSS, listening to and logging transmissions from occupied Europe. His favourite band was 28MHz.

Mr J Ron Griffiths, G2AQH

Ron Griffiths died on 14 April 1987 aged 86. He was an ardent cw enthusiast, having started his wireless/radio interest before the first world war, and although G2AQH was his current call he had held other AA calls prior to the issue of 2AQH in the late 'thirties. He was an original member of the Derby Wireless Club 1911 and number 12 in Derby & DARS.

Mr S Haddon, G3OQJ

Stan Haddon died on 11 May 1987 aged 63. A "white stick" operator, in recent years he was also severely disabled. He was a member of the Northampton Shortwave Club and of the G-QRP Club, and could be heard on the vhf and uhf bands daily.

Mr T F Herdson, G6ZN

Tom Herdson died on 6 April 1987. He had been a member of the RSGB since 1936. During the war he was in the Royal Signals attached to M16 at Bletchley. He was an active contender in the postwar years and won several trophies.

Mr S W Law, G3PAZ

Sid Law died on 12 October 1986 aged 78. He was licensed in June 1961 and until his retirement was a technical writer for Decca Radar. He was a keen and active supporter of the Purley Radio Club, South London Mobile Club and Surrey Radio

Contact Club. It is through his Raynet activities that he will be chiefly remembered. As a member of the Raynet Committee for over 10 years, he served as publicity officer for much of that time and as contributor of the Raynet column in this magazine.

Mr N Mattock, G2DFG

Norman Mattock died on 29 May 1987, aged 68. He was licensed pre-war, was a keen home-brewer, and was active until shortly before his death.

Mr K E Salmon, G2AKM

Ken Salmon died on 7 April 1987. He was a VI during the war, and had been an active member of the Guildford & DRS, and later the Chichester & DARS.

Also:

Mr A K Aitkenhead, GM4SLA, on 10 April 1987
Mr J H B Bolland, G4PMI
Mr I Bracegirdle, RS54183, on 19 April 1987
Mr G F Bradshaw, G3MHK, on 2 March 1987
Mr W F Chapman, G6XGE, on 25 February 1987
Mr D F Free, G1LEV, in November 1986
Mr S E Freeman, RS44733, in July 1986
Mr C Lancaster, G3KL, in January 1987
Mr J B Masters, RS35855, on 16 April 1987
Mr G J Owen, RS26407, on 20 April 1987
Mr D Tenant, G4KCA, on 12 March 1987
Mr C F Turner, G4AG, on 31 March 1987
Mr D V Walters, G3MXO
Mr D H Webster, GM4KVM, on 25 March 1987
Mr P J Whiddett, G6YVQ, on 24 March 1987
Mr T V Williams, RS2837

APOLOGY

In the obituary list published in the June issue, the name of Mr N Burton, BRS11494, was accidentally included. We are pleased to report that he is still very much alive in Australia, and we offer our sincere apologies to any of his friends who were distressed by this regrettable error.

Contest News

7MHz Contest 1987 results

This year's event produced a very slight increase in the number of logs received overall, with the UK winners in both sections returning very high scores. The standard of log keeping was generally good although as seems the case every year several entrants will find their scores have been drastically reduced due to duplicate contacts. The adjudicator feels strongly that not enough time or effort is taken with the preparation of the entry as entrants happily spend hours of actual operating during the contest and then lose in some cases several hundreds of points through carelessness in cross checking, scoring and preparing their logs for adjudication. This happens across the whole of the entries and is not confined to the lower scored positions. Several entrants have trouble in distinguishing between 5 and 15 point QSOs and also a lot of logs have to be rescored because of difficulty in recognizing new countries. The USSR block of countries seem to pose particular problems. This year it was found necessary to disqualify two entrants for exceeding the number of permitted unmarked duplicates.

The final score of the winner of the UK SSB Section was over twice that of the runner-up, and perhaps more surprising, the score of the ssb winner was more than that of the winner of the cw event. The winners and runners-up in both sections all used beam antennas.

Summary of multipliers worked by leading stations

GW3YDX: CT, CE, CO, CP, DL, EI, EA, EA6, EA9, F, HA, HB, HC, HH, HI, HK, HKO, HL, HP, I, IS, J, J7, JA, KP4, LA, LU, LX, LZ, OA, OE, OH, OK, ON, OZ, PA, PJ2, PY, PZ, SM, SP, SV1, TA, TK, TR, TU, TZ, UA, UA2, UA9, UB, UC, UD, UI, UL, UM, UO, UP, UQ, UR, VE1, VE2, VE3, VK2, VK6, VP9, VU, W1, W2, W3, W4, W5, W8, W9, WO, XE, Y, YB, YN, YO, YS, YU, YV, ZF, ZL1, ZL2, ZL3, ZL4, ZS, 4X, 5N, 9H, 9Y, (94 countries).
G3FVB: CT3, DL, EA, EA6, EI, F, FO, HA, HB, I, JA, LA, LZ, OE, OH, OK, ON, OZ, PA, PJ2, PY, SM, SP, TI, UA, UA9, UB, UC, UD, UF, UI, UJ, UL, UP, UQ, UR, VE1, VE2, VE3, VK2, VK3, VK4, VK5, VK6, VK9, VO, VP2M, VP8, VS6, VU, W1, W2, W3, W4, W5, W6, W7, W8, W9, WO, XE, Y, YO, YU, ZL1, ZL2, ZL3, ZL4, ZP, ZS, 4X, 6Y5, 9V1, (73 countries).

Details of scores of the leading stations

	QSOs	15pt QSOs	5pt QSOs	Multiplier	Score
GW3YDX	824	288	536	94	646,814
G4CNY	500	138	362	79	304,229
G3NLY	525	90	435	77	267,190
G3FVB	742	461	281	73	606,046
G4CNY	677	401	276	68	502,520
G4BUO	525	284	241	72	392,796

Please note that the above table does not take into account points deducted during adjudication, although the score column has the corrected totals.

VS6UO was active during the cw portion and sent a list of stations who were called repeatedly but no QSO was forthcoming: G4OBK, G3TBK, GM3YOR, GW3WVG, G3NKS, G3JUG, G5MY, G3LPS, G3DYY, G3JKS, G3SWH and G3GAF; however, Bill did manage contacts with 12 G stations.

G3KDB

UK CW TRANSMITTING								
Posn	Callsign	Score	Posn	Callsign	Score	Posn	Callsign	Score
1	G3FVB	606,046	17	G3BBR	76,067	33	G4HZV	28,128
2	G4CNY	502,520	18	G3VYI	75,194	34	G4PKU	22,446
3	G4BUO	392,976	19	G5MY	72,320	35	G4UZN	20,155
4	G4WQW	332,588	20	G3DLU	50,061	36	G3LIK	19,544
5	G3UFY	282,534	21	G3ESF	48,282	37	G4LZB	19,285
6	G4ODV	267,344	22	G3SWH	47,690	38	G4EBK	17,950
7	G3YEC	202,014	23	G3APN	47,400	39	G4GLC	16,445
8	G3MIR	190,808	24	G4MSID	44,555	40	G3AWR	16,100
9	G3TBK	160,608	25	G4BWP	37,164	41	G3JJZ	9,315
10	G2OT	148,314	26	G3KDB	35,150	42	G3JKY	8,550
11	G3JKS	135,184	27	G0EHO	34,353	43	G4BXN	8,400
12	G3HJG	116,424	28	G0FYD	33,693	44	G0BVZ	6,006
13	G3NKS	97,525	29	GM3CFS	32,178	45	G3GMM	4,656
14	G4OBK	90,240	30	G3DGT	31,668	46	GW4KJV	2,310
15	G4UOL	88,020	31	G3DCZ	30,624	47	G3ILO	1,100
16	G4WYG	83,184	32	G3SIX	29,410	48	G3SXW	1,035

UK SSB TRANSMITTING								
Posn	Callsign	Points	Posn	Callsign	Points			
1	GW3YDX	646,814	9	G2OT	71,534	17	G4YEK	7,314
2	G4CNY	304,229	10	G4MET	45,255	18	G4BWP	4,000
3	G3NLY	267,190	11	G3FNM	39,006	19	G3KNS	3,060
4	G4WUJL	225,148	12	G4YTV	20,070	20	G0DAY	2,686
5	G4AMT	167,769	13	G3UHU	17,394	21	G3SJK	2,325
6	G4WQW	127,680	14	G4PPR	12,504	22	G4GG	1,890
7	G4ODV	75,984	15	G4WYG	10,978			
8	G3TBK	75,726	16	G4NXG/M	7,498			

UK SSB RECEIVING								
Posn	Callsign	Points	Posn	Callsign	Points	Posn	Callsign	Points
1	BRS 32525	63,045	4	BRS 28198	13,080	6	BRS 31879	6,875
2	BRS 87156	42,975	5	BRS 87865	12,760	7	BRS 88825	6,820
3	BRS 25425	39,060						

EUROPE CW TRANSMITTING					
Posn	Callsign	Points	Posn	Callsign	Points
1	UB5WE	9,674	14	UA4HNP	4,750
2	UA1DZ	8,580	15	UB5PCO	4,580
3	YU2QS	8,442	16	SP2AVE	4,560
4	LZ1KWF	8,268	17	SM5IMO	4,550
5	YU1BEF	7,397	18	OH6RC	4,430
6	LZ2TU	7,319	19	DJ0KE	4,400
7	UB4FWC	6,708	20	HA1VE	4,140
8	DL3NCI	6,643	21	OZ1DPW	4,100
9	UP3BA	6,019	22	UB5NO	4,068
10	OZ3ON	5,940	23	Y03CO	3,980
11	OH1AF	5,445	24	OE9G3TXF	3,850
12	UB5QMA	5,390	25	DL2OM	3,839
13	SMOCCE	5,368	26	HB9ARF	3,780
27	YU2LIX	3,680	27	HB9DX	3,520
28	DL1TH	3,460	28	OK1FCA	3,450
29	YU7SF	3,400	29	HB9AGH	3,250
30	UP2PCI	3,240	30	DL7ALM	3,168
31	HA1TC	3,030	31	SP1PEA	3,105
32	SP2FJ	2,980	32	SP2CTW	2,830
33	SP9CTW	2,830			

Posn	Callsign	Points	Posn	Callsign	Points	Posn	Callsign	Points
40	DF2UU	2,790	62	OK100Z	1,768	84	OK1FIM	790
41	G6ZY/EA6	2,760	63	OK3CDO	1,764	85	OZ80W	765
42	OK3THM	2,730	64	4N7A	1,757	86	Y02ADQ	720
44	SP6AUJ	2,630	65	UA3AOF	1,755	87	OK3KSO	630
45	OK3CEL	2,630	66	HA0HG	1,710	88	OK3ZWX	560
46	LA0DY	2,510	67	HB9COL	1,652	89	Y37ZE	550
47	Y78UL	2,484	68	RC2AP	1,589	90	YU1LM	545
48	UA3TBO	2,464	69	Y62NN	1,584	91	DL100	540
49	Y51YJ	2,457	70	YU5JA	1,561	92	PA0VLA	420
50	DL120	2,385	71	SM5AOG	1,421	93	SP9AKD	404
51	SM3DXC	2,322	72	UR20D	1,316	94	Y58WA	400
52	OH7DI	2,256	73	EA2CR	1,260	95	OH3LZ	372
53	Y47ZG	2,205	75	UB5ECE	1,246	96	Y21EA	330
54	Y23GD	2,151	76	LZ1VA	1,208	97	OK2BFX	300
55	UA6BPM	2,124	77	OH7NW	1,160	98	UT5LF	270
56	HA1SL	2,040	78	YU7KM	945	99	SM0RSM	200
57	OK1XW	1,984	79	UZ4YWW	915	100	UT5HP	192
58	UP2BPJ	1,935	80	OK2PAW	900	101	Y08MF	106
59	OH1OW	1,920	81	DF3QN	896	102	UP2AV	90
60	ON6TJ	1,845	82	YU5FU	870	103	DL7YS	60
61	YU7BCL	1,818	83	UO2GEC	798	104	Y240L/A	5

LZ1KTU, Y02BP: Disqualified, excessive duplicates.

EUROPE SSB TRANSMITTING									
Posn	Callsign	Points	Posn	Callsign	Points	Posn	Callsign	Points	
1	UB5WE	26,860	35	SP9MAX	738	68	YU2CAH	320	
2	UO2GAG	12,631	36	OK3CUM	721	69	UA2EC	315	
3	DL8JS	10,010	37	EI7CC	720	70	Y67UL	294	
4	OH2VB	8,879	38	IK1BHL	686	71	OK1FIM	280	
5	YU2OU	7,319	39	{ Y37ZE	665	72	EA5CKL	290	
6	Y77KF	5,499		{ Y36UE			{ YU1RA		
7	DF2UU	4,950	41	Y06AJ	660	73	{ Y320G	275	
8	UB5QMA	4,632	42	ON8WN	650	75	UB5KW	250	
9	IK2GWH	4,455	43	Y52ZF	648	76	{ HB9BRM	240	
10	UR20D	4,400	44	Y52XF	637		{ UA4CO		
11	F9KP	4,310	45	UP3BH	590	78	OK2ABU	232	
12	SM7FHJ	4,070		{ EA2CR		79	{ HA5ABC		
13	HA8XX	3,300	46	{ I4CSP	575		{ UC2BA	225	
14	Y47PN	3,168		{ HA6NI		81	UO5OV	220	
15	SP5PSL	2,700	49	UR2DJ	570	82	Y54NL	200	
16	Y22EK	2,580	50	{ EA3ELM	540	83	{ UA4CZ	192	
17	IK2AED	2,504		{ YU7SF			{ Y36TG		
18	UA3TEP	2,233	52	Y57OG	510	85	Y42VB	182	
19	IC2AIU	1,840	53	UA3ZU	500	86	OK2KVI	180	
20	HNBJ	1,820	54	{ HA8KAX	490	87	{ HA5KDB	160	
21	OZ10VJ	1,620		{ Y66YF		88	Y51XO	140	
22	UO2GIP	1,600	56	HA8KVB	475	89	{ HA5NP	45	
23	DL2SBF	1,540		{ RA3RK			{ OK2KPS		
24	FE6DRP	1,470	57	SM2LWU	450	91	OZ3FYN	40	
25	LZ1KVV	1,400	59	HA5MY	438	92	HA5MM	30	
26	OH2BUU	1,246	60	HA8RJ	400	93	UR1RYO	20	
27	Y43EO	1,200	61	UB5AEO	378	94	HA5KLF	5	
28	Y62SM	1,071	62	Y24JJ	375				
29	YU1HFG	1,050	63	F01HWB	352				
30	IV3YYK	1,043		{ OH7NW					
31	HB9DJ	1,036		{ SP9CTW	350				
32	RC2AP	1,000	64	{ UA3TN					
33	OK1KZ	900		{ YU7BW					

REST OF WORLD CW TRANSMITTING					
Posn	Callsign	Points	Posn	Callsign	Points
1	N2KW	26,940	10	UA9CBR	4,400
2	UA9FGO	12,210	11	UA9SGW	3,960
3	UJ8JA	9,750	12	UF6FAL	3,780
4	UA9FAL	9,180	13	UA9XR	3,240
5	UD6DKW	8,820	14	VE3FGU	2,300
6	UA9SGN	7,740	15	CT3DJ	2,170
7	RA9SUV	6,480	16	VO1AW	1,350
8	K1ZZ	6,165	17	UW9AO	1,125
9	UA9FGJ	4,410	18	UI8AJ	1,075
			19	UV9WN	1,025
			20	K5MK	1,020
			21	VK2DJA	880
			22	WU4O	600
			23	VK4XA	490
			24	VK4XW	480
			25	VE3KK	255
			26	VU2UR	120
			27	JH6TYD	105

REST OF WORLD SSB TRANSMITTING									
Posn	Callsign	Points	Posn	Callsign	Points	Posn	Callsign	Points	
1	UA9CI	34,230	6	VO1SA	2,250	11	H1BLC	675	
2	UA9CSS	15,750	7	RA9SUV	1,260	12	HK5JVF	345	
3	VE3CDX	15,300	8	RL7AC	975	13	J1H1DH	300	
4	VE30ZB	13,500	9	UA9AJM	825	14	UM8MU	120	
5	UA9CE	2,520	10	UV9WN	775	15	WK4F	60	

OVERSEAS CW RECEIVING					
Posn	Callsign	Points	Posn	Callsign	Points
1	LZ1-M-333	3,290	3	UC2-006-156	2,700
2	UB5-075-145	2,900	4	LZ2-P-118	2,184
			5	VU2-0020	120

1987 70MHz Cumulative Contest results

This year's 70MHz cumulatives confirmed the continued interest in the band. There was an increase in entries and activity compared with last year's event, with 122 call signs (3 EI, 111 G, 4 GM, 1 GU, 3 GW) appearing in this year's logs.

Conditions were described as poor, with the usual amount of a deep QSB prevalent on the band. GM0FRT was heard if not actually worked by the majority of entrants, despite being well away from the centre of activity. The ability to work one of its three operators would appear to be a requisite to be highly placed in the results table.

The timing of the event was universally liked, judging by the lack of adverse comments in the logs. Five complaints were received about the adverse signal quality of one station, but as this station did not enter the contest no action could be taken.

Comments from this year's logs included: "G4RFR was always a consistent signal; sometimes we could only hear it (699km) and GM4HAM (141km) calling on the band."—GM0FRT, "Amazing how many stations are

59 with no antenna connected"—G4NBS, and "Better results now antenna progressing"—G4SUI (one of four entrants to change antennas during the event with good effect).
G4FRE

Posn	Callsign	Points	QSOs	Loc	Sessions	Best dx	Km	Pwr/EI
1	G4RFR	970	122	90AS	2.3,4	GM0FRT	699	140/24
2	G4BVY/P	863	125	82LB	1,2,5	GM0FRT	559	160/76
3	G3UKV	712	122	82RR	1,3,4	GM0FRT	482	90/4
4	G4MGR	674	98	83KH	1,3,4	GM0FRT	421	130/4
5	G4HGI	664	102	83PL	1,3,4	GM0FRT	400	100/4
6	G4VXE/P	635	119	81XW	1,2,5	GM0FRT	570	100/8
7	E19FK/P	625	51	63WC	2,4,5	G3EDD	444	100/5
8	G4ASR	620	93	81MX	3,4,5	GM0FRT	567	100/6
9	G3UAX/P	608	116	91GI	1,2,3	E19FK/P	372	100/6
10	G4NBS	502	88	02AF	1,2,3	E19FK/P	429	100/4
11	GM0FRT	459	25	87WB	1,2,4	G4RFR	699	70/7
12	G4RDX/P	409	92	93BD	1,3,4	E19FK/P	283	10/5
13	G4CIZ	349	61	91KF	2,3,4	G4MGR	199	70/4
14	G4SUI	314	46	93ER	2,4,5	G4RFR	330	100/4
15	G4AFJ	278	76	92HO	2,3,4	E19FK/P	324	60/7
16	G4MUT	260	56	91NK	1,2,3	G4HGI	259	10/4
17	G4FOH	246	43	92XI	3,4,5	E19FK/P	419	35/5
18	G3UEY	235	57	82XC	1,2,4	GM4HAM	432	4/4
19	G0BPU	224	28	02OB	3,4,5	G4MGR	339	40/5
20	GW4HBK	193	39	81KP	2,3,4	G4ZTR	283	60/3
21	GM4HAM	186	19	85JW	3,4,5	G4RFR	580	40/8
22	G5UM	182	42	92MP	1,2,4	E19FK/P	352	15/3
23	G3BPM	176	34	80OW	1,2,4	E19FK/P	310	50/4
24	G3VKM	159	17	02TM	1,2,4	G4BVY/P	321	60/3
25	G0ENR	108	28	82XC	1,3,-	G4RDT	163	25/4
26	G4FMC	85	23	92DM	3,4,5	G4RFR	195	4/3
27	GM3TAL	28	6	86GA	3,4,5	E19FK/P	366	50/4
28	G2DHV	8	8	01BK	1,2,4	G3LXP	44	20/3

Pwr/EI = ssb P.E.P output/total number of antenna elements.
Checklogs received with thanks from G4ZTR, G4FRE, G4MWO, G4BVY.

CW Cumulative Contests (1-8/3-5/7MHz) results

The 12 sessions of this event held in January were well supported with over 300 logs submitted for adjudication. Conditions for inter-UK working were generally good during all the sessions and this proved useful to those entrants who took part in the 7MHz section of the contest. The two sessions on 17 and 24 January produced some of the best scores ever recorded in this series of annual contests. Conversely, the 7MHz session on the 11 January and the 3-5MHz session on the 24 January were considered to be poor by most entrants.

The certificate winners in the transmitting section are G4WQN (1-8MHz), G5LP (3-5MHz), GM3YOR (7MHz). There was a close contest for the best three-band performance between G4WQN and GM3YOR with only a few points between them after checking. The HFCC decided that both should receive a certificate of merit for their efforts. There were several entries in the old-timer section and also in the first-timer category. After deliberation, the committee decided to award these certificates to GM3UM and to G3WYV.

The committee were disappointed with the support from the swl fraternity as only one log was received for checking. This came from a regular entrant to RSGB contests, Don Piccirillo, RS52868, who submitted a superb set of logs covering every session on the three bands. There were a number of check logs and the thanks of the adjudicator go to all those who troubled to submit these as they were a help in the checking process.

Many entrants commented on the enjoyable nature of this event and said how they liked the timings and the format. Several asked if more of these short sharp events could be organized and compared the friendly operating standards with those experienced in the larger international events. There were several suggestions about the timings of the 7MHz sessions to overcome the skip problems. One proposal was to keep all these sessions to a Saturday and start at 0800 or 0900, but keeping the 3-5MHz timings to a 1000 start, but always on Sundays. Another, suggested that a Saturday afternoon session on 7MHz with a 1300 start might produce more UK contacts and might be better supported. The possibility that was suggested by several entrants in the comments last year of withdrawing the 7MHz sessions completely was opposed most strongly and everyone seems to want them to continue. Finally, the committee apologise to those entrants who have been awaiting the results. This delay resulted from changes in the committee membership earlier in the year and the need to re-schedule the adjudication procedures. We are sorry about this, but there was little that could be done to speed up the adjudication process.

G4RWV

		1-8MHz				Total
Posn	Callsign	5 Jan	13 Jan	21 Jan	29 Jan	best 3
1	G4WQN	183	189	210	CK	582
2	GM3YOR	CK	183	201	159	543
3	GM4SID	165	156	180	—	501
4	G4OGB	CK	168	153	165	486
5	G3SWH	150	159	150	CK	459
6	G3LET	CK	144	156	156	456
7	GM3RAO	126	141	162	CK	429
8	G3BBR	126	132	138	—	396
9	G3YEC	120	—	132	144	396
10	G4WYV	120	CK	129	144	393
11	G3BPM	—	123	111	117	351
12	G3YLC	CK	102	126	105	333
13	G4ENA	60	—	138	123	321
14	G3MCX	108	CK	93	111	312
15	G4ICP	81	CK	108	99	288
16	GM3UM	93	CK	87	87	267
17	G3AWR	96	81	84	CK	261
18	G3BFP	57	63	135	—	255
19	G3TBK	105	144	—	—	249
20	G2HLU	81	69	60	—	210
21	G4UZN	93	111	—	—	204
22	G4BUO	—	51	57	90	198
23	G4NFX	66	69	60	—	195
24	G4OGB	—	177	—	CK	177
25	G3OLB	—	—	—	171	171
26	G3BCC	57	42	CK	48	147

Checklogs: G3LIK, G3WP, G3WYK, G0DYX, G6LX.

		3-5MHz				Total
Posn	Callsign	4 Jan	10 Jan	18 Jan	24 Jan	best 3
1	G5LP	240	255	237	—	729
2	G3TBU	219	234	222	—	675
3	G3JJG	243	219	207	CK	669
4	G4WQN	237	249	180	CK	666
5	G3WYK	216	222	216	CK	654
6	G4GLL	216	231	198	CK	645
7	G3SWH	210	213	216	CK	639
8	G4ARI	—	240	222	177	639
9	G3YDV	222	228	CK	186	636
10	G4VXE	201	222	213	—	636
11	GM3YOR	—	203	240	180	633
12	G3LET	213	—	201	120	624
13	G3YEC	198	228	186	CK	612
14	G4UZN	210	198	189	CK	597
15	G3OLU	CK	210	186	180	576
16	G0CDB	198	183	192	—	573
17	G4OTV	186	174	153	—	513
18	G4BUO	162	252	96	—	510
19	G4SUP	156	180	174	—	510
20	G2HLU	180	—	180	147	507
21	G4WYV	159	189	153	CK	501
22	G3BBR	138	177	180	—	492
23	G3BPM	—	153	153	126	432
24	GM3VEY	CK	162	126	123	411
25	G4XPE	CK	153	126	123	402
26	G3AWR	123	141	129	CK	393
27	G4LZB	—	93	165	135	393
28	GM3UM	126	108	138	CK	372
29	G3MCX	123	CK	129	117	369
30	G3BCC	96	117	150	CK	363
31	G3SB	108	126	120	CK	354
32	G3HQH	165	—	168	—	333
33	G4HZV	150	—	99	81	330
34	G4ECI	165	156	—	—	321
35	G0DYX	—	141	63	54	258
36	G4PRU	—	—	123	132	255
37	GW4KVV	—	54	90	87	231
38	G4NFX	—	105	—	96	201
39	G3OLB	—	—	—	102	102

Checklogs: G3SGQ, G3SYA, G4XTM, G6LX.

		7MHz				Total
Posn	Callsign	3 Jan	11 Jan	17 Jan	25 Jan	best 3
1	GM3YOR	195	CK	222	189	606
2	GM3VEY	189	CK	210	168	567
3	GM4SID	174	CK	207	180	561
4	G3YEC	177	—	177	207	561
5	G4WQN	—	129	186	222	537
6	G3LET	150	CK	168	204	522
7	G3SWH	144	CK	129	177	450
8	G4OGB	153	—	120	162	435
9	G3YDV	156	—	120	144	420
10	G2HLU	132	—	105	126	363
11	G4PKU	126	CK	36	159	321
12	G4WYV	132	—	81	87	300
13	G3AWR	96	CK	93	108	297
14	G3OLU	126	39	129	—	294
15	G4OTV	147	9	—	123	279
16	G4ARI	132	—	—	141	273
17	G3BPM	—	51	93	117	261
18	G3SB	105	CK	51	87	243
19	GM3UM	—	57	78	90	225
20	G4LZB	—	36	81	93	210
21	G4XPE	99	—	48	63	210
22	G4NFX	81	—	45	54	180
23	G3MCX	60	CK	33	78	171
24	G5LP	159	—	—	—	159
25	G3BCC	69	CK	48	30	147
26	G3OLB	—	—	—	54	54

Checklogs: G3WYK, G4ECI, G4XTM, G0DYX, OI3AL (OH3GZ), PA3CAL.

April 70MHz/144MHz Contest results

The idea of this contest was to combine the old 70MHz and 144MHz contests, which were traditionally held in early spring, in the hope of encouraging more stations to operate on 70MHz as well as 144MHz. In the event it was not well supported, attracting far fewer 144MHz stations and significantly fewer 70MHz stations than the old contests. Yet most stations who commented found the combination enjoyable and thought that it should be continued. It appears that many stations are not thinking in terms of contests this early in the year, and many remarked that it should have been held in May. Poor weather on the Saturday may also have discouraged /P stations. Your comments on the future of the event will be welcome.

Conditions on both bands were unspectacular, and most entrants commented on the lack of activity on 144MHz. G4BVY/P (IO70PP) is claiming a new tropospheric record on 70MHz for its contact with GM0FRT/P (IO87WB) (733km) which it claims beats the previous record by 50yds! Such is the progress of amateur radio.

A few stations did not like the multiplier scoring system, believing that it put them at a disadvantage. This was a surprise, as most contest operators seem to enjoy it. Confusion was rife, however, as about 25 per cent of the entries failed to carry out rule 14 correctly, which caused considerable difficulty in adjudication. These were penalized by the deduction of 10 per cent of the claimed score. If any stations are still unsure of this rule, they are welcome to contact G4JLG who will try to explain.

Logging standards were quite good in general, but the loss of a single contact claimed as a multiplier can make a big difference to the claimed score, especially on 70MHz. This must be an incentive to take care in exchanging information.

Congratulations and certificates go to the winners and runners-up in the overall multi- and single-operator sections, the winner of the overall listener section; and the band leaders and runners-up in the 70 and 144MHz single- and multi-operator sections of the 70 and 144MHz bands.

Thanks also to everyone who took part and gave this new contest a try.

G4JLG

OVERALL RESULTS: MULTI-OPERATOR SECTION

Posn	Group	Score	70MHz	Score	144MHz	Score
1	Sheppey W C G	1,821	G4BVP/P	821	G8TFI/P	1,000
2	Flight Ref & Clockwork	1,635	G4RFR/P	1,000	G1KMI/P	635
3	Hillbillies	1,464	G4THB/P	494	G4APA/P	970
4	Harwell ARS	791	G4HLX/P	341	G3PIA/P	450
5	Victory CG	612	—	—	G8LNC/P	612
6	Chesham Scroungers	539	—	—	G1RDX/P	539
7	Colchester RA VHFCCG	530	G4TZM/P	286	G4CRA/P	244
8	Five Bells	498	G4SIV	143	G8ZHP	355
9	South Manchester RC	432	—	—	G8SMR/P	432
10	Edinburgh & D RC	402	GM4HAM/P	169	GM4RZW/P	233
11	Caversham CC	400	G4CCC/P	178	G0CCC/P	222
12	Rugby ATS	322	G4APD	156	G3BFX	166
13	Home Comforts CG	166	G4KVI/A	62	G0DNJ	104

OVERALL RESULTS: SINGLE OPERATOR SECTION

Posn	Callsign	Score	70MHz	Score	144MHz	Score
1	G4ASR	1,653	—	—	—	653
2	G0CLP/P	1,000	—	—	—	1,000
3	G4NBS	881	658	—	—	223
4	G4JICD	876	—	—	—	876
5	G3XBY	614	119	—	—	495
6	G4AFJ	565	565	—	—	—
7	GW8HEZ	244	—	—	—	244
8	G8ORG/P	100	—	—	—	100
9	G0CYD	60	60	—	—	—
10	GW4ALG	58	56	—	—	2
11	GM0GMD	43	—	—	—	43
12	GM3TAL	39	39	—	—	39
13	G6HXU	32	—	—	—	32
14	G4ZNM	23	—	—	—	23
15	G8ZRE	14	—	—	—	14

OVERALL RESULTS: LISTENER SECTION

Posn	Station	Score	70MHz	Score	144MHz	Score
1	BRS32525	2,000	1,000	—	—	1,000
2	BRS28198	1,492	722	—	—	770

70MHz MULTI-OPERATOR SECTION

Posn	Callsign	Points	Mult	QSOs	Loc	Pwr	Best dx	Km
1	G4RFR/P	29,436	44	74	80AQ	+22	GM0FRT	718
2	G4BVP/P	23,522	38	54	70PP	+22	GM0FRT	733
3	G4THB/P	14,544	32	47	94RJ	+20	GJ3YHU	584
4	G4HLX/P	10,045	35	55	91FN	+19	GM0FRT	612
5	G4TZM/P	7,192	29	37	01NW	+18	GM4HAM/P	452
6	G4CCC/P	5,225	29	42	91IH	+10	GM4HAM/P	428
7	GM4HAM/P	4,986	18	25	84EV	+16	G4BVP/P	477
8	G4APD	4,606	25	45	92JI	+18	GM4HAM/P	324
9	G4SIV	4,202	22	29	92TR	+17	GJ3YHU	407
10	G4KVI/A	1,824	19	31	91RP	+16	G4THB/P	305

70MHz SINGLE-OPERATOR SECTION

Posn	Callsign	Points	Mult	QSOs	Loc	Pwr	Best dx	Km
1	G4ASR	9,696	32	47	81MX	+19	GM0FRT	567
2	G3UAX/P	8,750	35	51	91GI	+18	GM0FRT	636
3	G4NBS	6,380	29	36	02AF	+20	GM4HAM/P	382
4	G4CIZ	6,293	29	35	91KI	+19	GM4HAM/P	468
5	G4AFJ	5,481	29	34	92HO	—	GM3TAL	403
6	G4ZTR/A	4,462	23	28	01NT	+19	G4BVP/P	425
7	G3XBY	1,152	16	16	92DG	+20	GM4HAM/P	317
8	G3BPM	1,050	14	16	80OW	+17	G4TZM/P	280
9	G0CYD	580	11	16	81PL	+20	G4NBS	206
10	GW4ALG	546	14	13	70PP	+10	G4BVP/P	178
11	GM3TAL	375	5	6	86GA	+15	G4RFR/P	610
12	G2DHY	51	3	7	01BK	+14	G4ASR	223

70MHz LISTENER SECTION

Posn	Station	Points	Mult	QSOs	Loc	Best dx	Km
1	32525	1,022	15	20	01AL	G4RFR/P	293
2	28198	738	9	13	00HX	G4BVP/P	370

Checklogs from GM0FRT and GW4ZAP/P acknowledged with thanks.

144MHz MULTI-OPERATOR SECTION

Posn	Callsign	Points	Mult	QSOs	Loc	Pwr	Best dx	Km
1	G8TFI/P	674,688	97	577	70PP	+26	GM6TKS	854
2	G4APA/P	654,450	93	643	94RJ	+26	DF8VO	763
3	G1KMI/P	428,695	83	504	80AQ	+26	GD3DAN/P	803
4	G8LNC/P	413,019	81	622	90MX	+26	DB5ZA	830
5	GW6APZ/P	391,932	76	601	81LQ	+26	DF9QT	801
6	G1RDX/P	363,870	78	681	91TW	+26	DL2BAY	637
7	G3PIA/P	303,202	79	539	91FN	+26	GM6TKS	799
8	G8SMR/P	291,454	86	524	93BF	+24	DF9QT	717
9	G8ZHP	239,913	69	419	92TR	+26	DJ2JA	672
10	G4UHF/P	230,619	81	487	91LT	+23	DF9QT	662
11	G4CRA/P	192,596	68	376	01NW	+22	DJ9EV	655
12	GM4RZW/P	156,968	56	284	84EV	+21	G1DWQ	562
13	G0CCC/P	149,785	67	410	91IH	+26	GM3TSL	656
14	G1KAR/P	149,188	52	380	00DR	+24	DJ9EV	665
15	G3FKF/P	136,358	58	366	81XA	+23	GD3DAN/P	663
16	G3BXF	111,825	71	331	92JI	+25	E15FK	502
17	G0DNJ	70,437	53	302	91RP	+24	DF8KV	530
18	G14KIS/P	55,695	47	103	74AU	+20	G4WHZ	578
19	G3SFG/P	49,491	47	309	91UR	+20	DF9QT	612

144MHz SINGLE-OPERATOR SECTION

Posn	Callsign	Points	Mult	QSOs	Loc	Pwr	Best dx	Km
1	G0CLP/P	248,250	75	401	84IG	+18	DG2JA	698
2	G4JICD	217,620	62	315	89WF	+25	E1ADAV	738
3	G4ASR	162,208	74	272	81MX	+26	DF8KV	698
4	G0CDA/P	142,497	71	360	93AD	+13	LX2GB/P	649
5	G3XBY	123,062	74	245	92DG	+25	DB8KJ	581
6	G1GEY	71,276	52	169	94FW	+25	GJ41CD	635
7	GW8HEZ	60,588	51	207	81JK	+20	PA3CNX	571
8	G4NBS	55,390	58	170	02AF	+22	G14KIS/P	492
9	G4PIQ	51,920	50	182	01MU	+18	GM8BDX	487
10	G8ORG/P	24,932	46	125	83VC	+10	F61FR/P	452

Posn	Callsign	Points	Mult	QSOs	Loc	Pwr	Best dx	Km
11	G6HLL	17,999	41	101	83RE	+10	GJ4ICD	441
12	G1DWQ	16,568	38	90	90AT	+13	GM4RZW/P	467
13	G1LPU	15,884	38	105	82XR	+10	GJ4ICD	388
14	G1SPU	13,889	45	90	82PQ	+17	GM6COX	351
15	G4YCA	13,212	36	122	83AE	+14	GJ4ICD	440
16	GM0GMD	10,634	26	29	86AE	+10	G8TFI/P	618
17	G6HXU	7,968	32	58	83RF	+14	GJ4ICD	445
18	G1PEF	8,000	32	40	81XI	+12	GM4RZW/P	407
19	G6MXL	6,102	27	36	80XR	+13	G4APA/P	419
20	G4ZNM	5,832	27	38	00BS	+22	G4APA/P	405
21	G4RYV	5,351	29	35	91OI	+10	G1GEY	401
22	G8ZRE	3,436	23	27	83NE	+20	GJ4ICD	443
23	G1AMX	2,730	15	19	95FB	+12	G8TFI/P	535
24	GW4ALG	540	10	10	81PP	+20	G4APA/P	338
25	GM4UYZ	528	12	11	85MX	+15	G4UHF/P	479

144MHz LISTENER SECTION

Posn	Station	Points	Mult	QSOs	Loc	Best dx	Km
1	32525	9,044	34	56	01AL	DK9FVH	525
2	28198	6,968	26	48	00HX	G4APA/P	375

Checklogs from G1XEO, G1SMD, G1GVA, G1DWI/P, G8TXH, G0AFH, G3BPM, G6LKB and PE1EWR acknowledged with thanks.

432MHz Fixed and AFS Contest results

The inclusion of an affiliated societies element increased the number of entries to this contest by about a quarter. Although this is a welcome increase, the number of societies taking part was small compared with the December 144MHz event. Your comments on whether the AFS element should be continued next year would be welcomed.

Conditions were perhaps slightly above normal during the first two or three hours, favouring stations in the north, but many found propagation flat, and QSB was a problem noted by many. A welcome entry was received from EI5FK, who provided good dx for some entrants. A fair number of PA stations appeared in the logs, along with ON, DL and F callsigns, plus LX2GB.

Comments in the logs indicated that there were few problems with bad-quality signals, and that the general standard of operating was good. Activity seemed to fall off rapidly in the last three hours of the contest.

Congratulations go to all the zonal certificate winners, as indicated by the asterisks in the tables.

G3XDY

SINGLE-OPERATOR SECTION

Posn	Callsign	Points	QSOs	Loc	Zone	Pwr(dBW)	Ant
1	G3NNG*	898	148	91EP	D	+25	21Y
2	G3JKN	767	145	91UM	—	+21	4 x 21Y
3	G6OYL*	746	108	93JK	A	+17	2 x 17Y
5	G1DOX*	746	97	84JC	A	+20	21Y
6	G6XVV	701	97	93JK	A	+19	21Y
7	G8HKM*	637	103	01FT	C	+17	21Y
8	G4DEZ	624	102	01IN	—	+17	18PB
9	G4NBS*	622	104	02AF	B	+20	21Y
10	G1KDF	596	81	93NN	—	+20	21Y
11	G8IAT	489	91	91TV	A	+20	2 x 21Y
12	G4JLG	487	77	93TM	B	+20	88MBM
13	G4XEN	452	86	92JE	A	+17	24Y
14	G1NOD	380	72	92PE	—	+10	2 x 21Y
15	G8ZHF	337	61	01GU	—	+17	15Y
16	G4VHF	324	62	92QB	B	+21	19Y
17	G0DAZ	320	64	82VF	B	+17	4 x 17Y
18	G3COJ	300	68	91FO	D	+20	21Y
19	G4DFI	290	73	01BL	C	+19	19Y
20	G4FOH	289	60	92NR	B	+17	18Y
21	G8ZQB	288	55	92XI	—	+8	21Y
22	G3NAQ	278	68	92JN	—	+17	19Y
23	G4JTT	276	69	91HL	D	+16	21Y
24	G1HRW	253	59	92SD	B	+17	21Y
25	G1HRT	213	56	01EH	—	+16	19Y
26	G1VTR	205	43	03JD	—	+15	48MBM
27	G0EHV	201	35	02KI	—	+17	17Y
28	G4NTY	176	22	94FW	A	+17	48MBM
29	E15FK	176	39	83TM	A	+10	18PB
30	G1BWW	160	12	51RV	—	+17	21Y
31	G3TQF	156	43	92TA	B	+17	19Y
32	G3UM	151	38	92JP	B	+25	18PB
33	G3WQG	139	49	92MP	—	+10	14Y
34	G16AT*	126	39	91PO	D	+7	48MBM
35	G0GLB	116	12	74BN	F	+17	21Y
36	G1PO	110	33	91IO	D	+10	21Y
37	G8JAY	102	33	91OH	D	+17	8XY
38	G4JPO	97	23	91WV	D	+17	19Y
39	G8CWI	94	25	92MP	B	+10	10Y
40	G8RYV	89	30	91OC	D	+8	48MBM
41	G4GGV	71	34	91PM	D	+10	51P
42	G0DTJ	70	23	91PM	D	+10	19Y
43	G1MOG	64	23	83SR	A	+17	48MBM
44	G4WCJ	54	22	91TN	C	+10	68MBM
45	G6MXL	48	11	90AR	D	+10	21Y
46	G8JXV	45	11	80XR	D	+15	48MBM
47	G0GCI	43	21	91VE	C	+20	2CL
		29	11	91OF	C	+16	19Y

MULTI-OPERATOR SECTION

AFFILIATED SOCIETIES OVERALL TABLE

Posn	Society	Callsigns	Zone	Score
1	Sheppey Western CG*	G0FRE, G4GFX, G0DAZ	B	2,710
2	Derbyshire Hills CG*	G4ZAP, G6OYL, G6XVV	A	2,395
3	Harwell ARS*	G3NNG, G3NAQ, G0GLB	D	1,284
4	Warrington CG	G8XVJ	A	985
5	Five Bells	G4SIV	B	959
6	Flight Refuelling ARS	G4RFR	D	929
7	Bedford & District ARC	G4VHF, G4JTV, G4FOH	B	865
8	Sutton & Cheam RS*	G3WHK, G3CDK, G6MKC	C	756
9	South Lakeland ARS	G1DOX	A	746
10	South Manchester RC	G4JLG, G4NTY	A	663
11	Ariel Radio Group	G3COJ, G8BBC	C	571
12	Leicester RS "A"	G4JDI, G3TQF, G4JPO	B	534
13	N Wakefield RC	G4NOK	—	519
14	Maidenhead DARC "A"	G3WQG, G0CWI, G8RYW	D	286
15	N Kent RS	G4CW	—	243
16	Cork RC	E15FK	—	160
17	Leicester RS "B"	G5UM	B	139
18	Farnborough & DRS	G1IPO, G0GCI	D	131
19	Poole RAS	G4WCJ, G6MXL	D	93
20	Maidenhead & DARC "B"	G4GGV	D	70

March 144/432MHz Contest results

Why is it that for the majority of contest weekends the sun never shines? This weekend was the worst for a few years, with stations not being able to access portable sites, or once getting there being unable to get back down! The cold and snow took its toll on equipment icing-up or freezing, and the commonly occurring comments that sum it up were, "appalling", "cold" and "flat".

It was disappointing to see some well-equipped 144MHz stations with obvious capabilities for 432MHz only putting in a token entry on that band (maybe they will do better next year). There were a few comments on the format and data of this contest which will be taken into consideration when setting the rules for next year.

Congratulations to the winners, runners-up, and the portable stations (for braving the weather). Certificates will be awarded to winners and runners-up in each section.

GM8MJV

SINGLE-OPERATOR SECTION (OVERALL)

Posn	Callsign	Points	144MHz	432MHz
1	G6XVV	1,609	3	2
2	G3XBY	1,152	2	4
3	G8HHI	1,106	14	1
4	G0CLP/P	1,064	1	17
5	G4DFI	722	4	8
6	G6CSY/P	714	5	5
7	G4NBS	621	6	3
8	G4ULS	428	11	9
9	G4MUT	422	9	10
10	G4FOH	379	—	6
11	G4ZNM	303	16	11
12	G4VXE	297	7	16
13	G6HXU	256	10	15
14	G6XRX	230	8	19
15	GM4WLL	191	12	18
16	G6MXL	176	15	14
17	G4YCA	114	13	20
18	G3ILO	68	17	21

Disqualified: G8YGD, RS31976 (Single-band 144MHz). Checklogs: G4SSD, G4GFX, G8XTV, G2DHW, G1XEO.

MULTI-OPERATOR SECTION (OVERALL)

Posn	Group	Points	144MHz	432MHz
1	Flowerpot Men CG	1,590	1	2
2	Flight Refuelling ARS	1,453	11	1
3	Havering DARC	1,051	4	5
4	Clockwork CG	1,030	9	3
5	Colchester VHF CG	950	5	7
6	Victory CG	929	2	27
7	North Bucks CG	895	7	6
8	Five Bells	840	12	4
9	Warrington CG	832	8	8
10	Hastings Electronic RC	766	3	21
11	South Belfast VHF CG	726	10	9
12	Southdown ARS	646	6	18
13	North Wakefield RC	499	12	12
14	11th Hour CG	497	16	10
15	Univ of Surrey EARS	458	15	11
16	Crowborough RS	429	14	13
17	Aberdeen VHF Group	193	17	21
18	Dave & Don	192	20	14
19	Glasgow CG	185	18	15
20	G1RDX	145	21	17
21	The Ridgesiders	138	23	16
22	G4KVI	135	19	20
23	Abingdon CG	83	24	23
24	Him & Me	82	26	19
25	Edinburgh DARC	80	22	26
26	East Lancs ARC	65	25	23
27	Cheshunt DARC	50	27	25

144MHz SINGLE-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Pwr	Ant	Best dx	Km
1	G0CLP/P	2,539	315	84KD	80	8	F6GOE/P	709
2	G3XBY	1,668	261	92DG	300	2x17	DL2YDN	725
3	G6XVV	1,633	215	93JK	70	19	DK8ZB/P	831
4	G4DFI	1,021	102	01BL	200	9	DK0BN/P	564
5	G6CSY/P	749	99	01BH	50	9	G1JUS	553
6	G4NBS	729	101	02AF	160	9	DLOVN/P	584
7	G4VXE	583	109	81WV	400	13	GM0FRT	574
8	G6XRX	568	141	01CO	400	17	DA1UM	515
9	G4MUT	487	104	91NK	85	9	FF6KIM/P	599
10	G6HXU	436	81	83RF	30	6	FF1MKJ	550
11	G4ULS	416	88	82TI	—	9	ON4ADC	494
12	GM4WLL	394	50	75UU	60	8	G4NBS	603
13	G4YCA	276	99	83NE	25	8	F6TNB	450
14	G8HHI	269	52	91OH	80	16	DA1UM	586
15	G6MXL	230	24	80XR	20	8	G1GEY	468
16	G4ZNM	199	25	00BS	160	6	DF0CQ/P	482
17	G3ILO	164	18	81VQ	150	9	GM0FRT	597

432MHz SINGLE-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Pwr	Ant	Best dx	Km
1	G8HHI	644	103	910H	400	2x21	PI4EME	510
2	G6XVV	622	70	93JK	60	21	DF0MWW/P	752
3	G4NBS	374	56	02AF	100	21	DJ9DL	502
4	G3XBY	319	55	92DG	100	2x21	DL2KBB	563
5	G6CSY/P	270	21	01BH	50	19	GI6ATZ/P	539
6	G4FOH	244	36	92XI	5	21	DJ5GR	460
7	G4BVY	214	26	82TD	75	21	PA2HJS	598
8	G4DFI	206	42	01BL	90	19	DL9DL	480
9	G4ULS	170	40	82TI	—	19	DL2KBB	609
10	G4MUT	148	34	91NK	50	88	PA0EZ	427
11	G4ZNM	145	25	00BS	100	48	DL2KBB	420
12	G5UM	69	21	92MP	10	14	G4VBG/A	235
13	G8JXV/P	64	28	91VG	10	2	G6IBD/P	209
14	G6MXL	55	7	80XR	30	48	G6XVV	306
15	G6HXU	54	8	83RF	5	19	G0FRR/P	290
16	G4VXE	43	19	81WV	10	13	G6XVV	182
17	G0CLP/P	41	7	84KD	10	9	G0FRR/P	397
18	GM4WLL	23	7	75UU	10	10	G1KDF	271
19	G6XRX	4	6	01CO	1	21	G3NAT/P	40
20	G4YCA	3	3	83NE	1	RD	—	—
21	G3ILO	2	2	81VQ	1	9	G4WMB	47

144MHz MULTI-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Pwr	Ant	Best dx	Km
1	G4UEM/P	6,922	633	03AD	400	2x17	DK8ZB/P	742
2	G8LNC/P	6,410	674	90MX	400	4x19	HB9RCJ	734
3	G8HHI/A	5,123	508	00HU	400	17	DL8HCZ	713
4	G4HRC/A	4,988	587	01DM	400	2x16	DL8PC/A	629
5	G4CRA/P	4,748	462	01NW	180	2x19	E15FK	663
6	G1KAR/P	4,127	436	00DR	250	2x16	DH5NAH	716
7	G4NUT	4,117	519	91OW	400	17	DL8HAW	748
8	GW4CDA/P	4,105	470	82KW	400	19	DL8GP	809
9	G1KMI/P	3,525	377	80AQ	—	19	PI4GN	780
10	G14TAP/P	3,436	276	74CO	250	16	F1MKJ	813
11	G4RFR/P	3,134	430	90AP	400	4x14	GM0FRT	712
12	G8ZHP	2,864	260	92TR	400	2x16	DL0HNP	797
13	G4NOK/P	2,560	357	93FM	150	2x16	DL8GP	752
14	G0CRW/P	2,200	383	01BB	200	19	GM8COX	641
15	G1DR/L/P	2,193	380	91XG	100	14	GM0FRT	657
16	G4AVV/P	2,154	375	91XG	150	19	DL8PC/A	650
17	GM0FRT	1,158	76	87WB	400	13	F6TNB	825
18	GM0GCG/P	747	89	75OR	400	8/8	G6HHI/P	650
19	G4KVI	720	203	91QO	400	12	GM0GCG/P	584
20	G1GEY	656	77	94FW	300	9	FF6TNB/P	593
21	G1RDX	587	159	91RQ	80	16	DF0CQ/P	522
22	GM4HAM/P	533	57	85UP	100	2x17	FF6TNB/P	685
23	G8EBT	453	138	91QO	25	16	DK0BN/P	631
24	G4UHF/P	442	100	91JR	400	12	DF0CQ/P	567
25	G3NTJ/P	319	100	83SS	30	16	G8LNC/P	326
26	G6DZK/P	298	103	91PP	25	9	PI4AMF	425
27	G4ECT/A	283	106	91XQ	150	19	—	—

432MHz MULTI-OPERATOR

Posn	Callsign	Points	QSOs	Loc	Pwr	Ant	Best dx	Km
1	G0FRR/P	2,250	231	90AP	400	4x24	DJ9RX	798
2	G6IBD/P	1,327	143	03AD	300	4x19	OZ1KLU	660
3	G4KZY/P	1,173	117	80AQ	400	2x21	F6HYE/P	860
4	G4SIV	958	116	92TR	400	4x21	HB9AMH/P	855
5	G4HRC/A	745	135	01DM	400	4x21	DK0JK/P	594
6	G4BJM/A	676	141	91OW	400	4x21	DF9ZP	673
7	G4TZW/P	595	88	01NW	100	4x17	DK1DQ	458
8	GW3CKR/P	538	88	82KW	400	21	DJ5GR	680
9	G16ATZ/P	517	51	74CO	50	2x17	PE0MAR/P	718
10	G3NAT/P	419	115	91XG	200	88	GI6ATZ/P	535
11	G8AHK/P	318	100	91XG	30	88	PA0GUS/P	428
12	G0CCZ/P	290	55	93FM	100	2x21	PA0FLY	461
13	G0GLM/P	249	54	01BB	20	44	PA0GUS/P	432
14	G4VBG/A	219	27	94FW	100	2x17	G0FRR/P	479
15	GM0GAS/P	174	22	75OR	60	8/8	G4NOC	571
16	G6PXB/A	164	61	91QO	50	48	PA0EZ	416
17	G1WPF/P	135	39	91RQ	30	10	DL2KBB	473
18	G3WQK/P	112	20	00DR	10	17	PA0GUS/P	444
19	G1ARL/P	88	42	91PP	10	44	G4KZY/P	134
20	G0DNJ/A	69	34	91QO	10	21	G6YEK	242
21	G1HHH/P	59	15	00HU	350	21	G4KZY/P	323
22	GM4CAN/P	59	7	87WB	5	2x21	G4RFR	713
23	G3NTJ/P	42	19	83SS	10	48	G16ATZ/P	236
24	G4PSU/A	42	12	91JR	—	19	G4BVY	184
25	G6CRC/A	20	8	91XQ	15	48	G0FRR/P	132
26	GM1VQT/P	7	1	85UP	10	21	GM4CAN/A	158
27	G8NEH/P	6	2	90MX	1	8/8	G0FRR/P	79

SWL SECTION

Band	Station	Points	QSO	Loc	Ant	Best dx	Km
144MHz	BRS28198	327	64	00HX	8/8	DK0BN/P	510
432MHz	BRS28198	34	10	00HX	48el	G4KZY/P	320

432MHz CW Contest results

As in the previous year, this contest was held under below-average propagation conditions. Contestant reactions can be summarised as "dreadful", "flat", "poorly supported", "every year less stations QRV" etc.

The number of entries was well down on 1986, and very disappointing considering six out of this year's nine participants also supported the 1986 event. No Continental stations were worked, and best distances averaged just above 300km. Congratulations and a certificate to the winner.

All participants are thanked for the standard of logkeeping.

G8HHI

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
1	GW4MGR/P	291	37	IO83JA	G4MDZ	368
2	G4THB/P	217	35	IO93AF	GM4TX	342
3	G0CDA/A	212	30	IO83RJ	G4MDZ	360
4	G4BVY	137	24	IO82TD	G4YGV/P	315
5	G4ZTR	127	19	JO01LV	G4KUX	354
6	G0BIX	89	17	JO01GI	GW4MGR/P	315
7	G5UM	81	20	IO92MP	G4YGV/P	253
8	G4YGV/P	77	9	IO94FW	G4BVY	315
9	G4RGK	64	14	IO91ON	G0CDA/A	235

Ropoco 1 1987 Contest results

The first ten places this year illustrate the small margin for error in recording the postcodes which leaves no room for guessing. Comments from the logs adequately express the overall opinions of participants. "A great contest, just long enough". "Definitely the most entertaining contest I have ever entered". "RSGB short, sharp contests are the tops". In answer to many queries, points are not lost for copying correctly any postcode sent. They are lost for inaccuracies and lack of or incorrect times (error over 30min!). Again thank all of you for submitting logs and the comments included. G3HCT

Posn	Callsign	Points	Posn	Callsign	Points
1	G4BWP	830	36	G4EBK	460
2	G0FDX	810		G3JJZ	460
3	G4WQN	800	38	G4KWI	450
4	G5LP	780		G4YYR	450
	G3SXW	770	40	GM3RAO	430
5	G3KAF	770		G3AWR	410
	G3LET	770	41	G4JHO	410
8	G3OLB	750	43	G3DPX	380
9	G0EOW	740	44	G3KJZ	340
10	G3NKS	730		G3YLC	320
11	G4BUO	690		GM3UM	320
12	G3PDL	670	48	G4KTI	320
	G3HOH	660		G4PUR	320
	G3WVG	660		G3GMS	310
13	G3SWH	660	49	G3KNU	310
	G4DJX	660		G3DOT	300
17	G4ARI	650	51	G4XPE	300
	G3JKS	640		G3VNG	280
18	G4ELZ	640	53	G4WZV	280
	G5BM	600		G4ZME	280
20	G4SND	600	56	G0BBL	270
22	G2HLU	590		GW4KVJ	270
23	G4IUZ	560	58	G3MCX	240
	G4OGB	560	59	G4NFX	210
25	G4UOL	550	60	G3COR	200
	G3VYI	550	61	G3GMM	150
27	G4IFB	540	62	G4FJZ	120
	G4OAY	540	63	G4PTE	110
29	G3JYP	530			
30	G3LHJ	500			
	G3MA	500			
	G4UMS	490			
32	G3WRR	490			
	G3OLU	490			
	G4WYG	490			

Checklogs: G3BPM, G3KAY, G5LR, G3XNG, G4HZF, G4HZV.

Contests Calendar

RSGB HF CONTESTS

2 Aug	3.5MHz Hopscotch (Rules in June issue)
2 Aug	DF Qualifying, Salisbury (Rules in July issue)
17 Aug	DF Qualifying, Colchester/Chelmsford (Details in August issue)
30 Aug	Ropoco 2 (Rules in August issue)
5, 6 Sept	SSB FD (Rules in June issue)
6 Sept	DF Qualifying, Slade (Details in August issue)
20 Sept	DF National Final, Mid-Thames
Sept-Oct	28MHz CW Cumulative (Rules in July issue)
11 Oct	21/28MHz SSB (Rules in May issue)
18 Oct	21MHz CW (Rules in June issue)
24 Oct	DF Treble Night, Mid-Thames
Nov-Dec	28MHz Phone Cumulative (Rules in July issue)
14, 15 Nov	2nd 1.8MHz

RSGB VHF CONTESTS

8 Aug	144MHz Low Power & SWL (Rules in June issue)
9 Aug	432MHz Low Power & SWL (Rules in June issue)
23 Aug	1.3/2.3GHz (Rules in June issue)
5, 6 Sept	144MHz Trophy & SWL (Rules in June issue)
5, 6 Sept	IARU Region 1 VHF & SWL (Rules in June issue)
13 Sept	10GHz Cumulative (Rules in April issue)
20 Sept	70MHz Trophy & SWL (Rules in August issue)
3, 4 Oct	IARU UHF/SHF & SWL (Rules in June issue)
3, 4 Oct	432-24GHz & SWL (Rules in August issue)
8 Oct	432MHz Cumulative (Rules in August issue)
16 Oct	1.3/2.3GHz Cumulative (Rules in August issue)
24 Oct	432MHz Cumulative (Rules in August issue)
25 Oct	70MHz Fixed (Rules in August issue)
1 Nov	1.3/2.3GHz Cumulative (Rules in August issue)
7, 8 Nov	144MHz CW (Rules in August issue)
9 Nov	432MHz Cumulative (Rules in August issue)
17 Nov	1.3/2.3GHz Cumulative (Rules in August issue)
25 Nov	432MHz Cumulative (Rules in August issue)
3 Dec	1.3/2.3GHz Cumulative (Rules in August issue)
6 Dec	144MHz Fixed & AFS
11 Dec	432MHz Cumulative (Rules in August issue)
13 Dec	70MHz CW
19 Dec	1.3/2.3GHz Cumulative (Rules in August issue)

OTHER CONTESTS

1 Aug	YL/OM Summer SSB Sprint (Rules in July HF)
1, 2 Aug	YO DX Phone
8, 9 Aug	European DX CW (Rules in August HF)
15, 16 Aug	Remembrance Day CW/Phone
15, 16 Aug	Seantet DX SSB (Rules in August HF)
22, 23 Aug	All Asia DX (Rules in August HF)
6 Sept	LZ DX (Rules in August HF)
9, 11 Sept	Howdy Days (Rules in August HF)
12, 13 Sept	European DX SSB (Rules in August HF)
19, 20 Sept	Scandinavian Activity CW (Rules in August HF)
26, 27 Sept	Scandinavian Activity SSB (Rules in August HF)
14, 15 Nov	European DX RTTY (Rules in August HF)

Ropoco 2 1987 rules

- The general rules for RSGB hf contests, published in the "Operating Guide" supplement, *Rad Com* January 1987, will apply.
- Date and time.** 0800-1000gmt, Sunday 30 August 1987.
- Sections.** Single-operator entries only. All entrants must be paid-up members of the RSGB resident in the British Isles holding a class A licence.
- Band and mode.** CW in the 3.5MHz band only. Entrants are requested to confine their operations to 3.520-3.570kHz.
- Exchange.** Send RST, plus—for the first contact, entrant's own postal code; for the second and subsequent contacts, the postal code received in the previous contact. Contacts with European stations will not count.
- Scoring.** Ten points per contact.
- Documentation.** Entrants are requested to use RSGB hf contest log sheets (HFC1) and the cover sheet (HFC2) which must include a signed declaration stating that the rules and spirit of the contest were observed. Column 5 should be headed "Postcode received" and used for this purpose.
- Name and address for logs.** Logs should be sent to A K Gray, G4DJX, 12 Marston Close, Dagenham, Essex RM10 7LL.
- Date for entries.** Logs to be postmarked not later than Monday 14 September 1987.
- Awards.** Certificates of merit will be awarded to the first, second and third placed entrants. The Edwin Hodson G3XTJ Memorial Trophy will be awarded to the entrant with the highest checked score and most accurate log. This trophy will be awarded only once in 10 years to the same station. Previous winners, GW3YDX, G3SXW.

Oxford DF Qualifying Event results

The thick early morning fog on 26 April 1987 did not prevent the transmitter crews from reaching their respective hides in plenty of time to set up shop. In fact the sun appeared soon after to presage another hot day and, for some, perhaps too hot!

The annual problem the first qualifying round suffers in respect of sufficient and suitable cover was with us once again, and the ploy of distance and "funny" antennas had to be resorted to. On the other hand an easy first round does allow confidence to be built up.

Station A, G5LO/P, was about a mile south of Upper Heyford aerodrome and located between the railway line and the Oxford canal. Over half a mile of very fine wire was used for the antenna connected at its centre to the transmitter which was buried beneath the bulldozed debris of an old wood.

Station B, G3UJO/P, was on the tip of a large island between two branches of the River Thames south of Abingdon where it was possible to be on the wrong side of the river twice, and so it proved!

Of the 20 competitors taking part only three failed to find both transmitters. The tea, recriminations and tall tales happened at "The Rock of Gibraltar" where we were all pleased to welcome Eric, G6AGE.

It is to be noted that the time between the second, third and fourth competitors was measured in seconds and this order was agreed by them in spite of the frenetic activity at the time! An enjoyable, if masochistic, afternoon was appreciated by all who took part and perhaps augurs well for this season.

Posn	Name	Club	Time of arrival	
			Stn A	Stn B
1	A Simmons	Mid-Thames	1423	1527
2	T Gage	Mid-Thames	1429	1528.05
3	P Labalestier	Colchester	1424	1528.10
4	P Lisle	Mid-Thames	1425	1528.15
5	B Bristow	Mid-Thames	1443	1547
6	R Brooks	Chelmsford	1426	1549
7	C Plummer	Mid-Thames	1442	1551
8	M Hawkins	Chelmsford	1423	1552
9	W Pechey	Mid-Thames	1443	1554
10	G Foster	Stratford	1444	1555
11	N Woodley	Mid-Thames	1508	1601
12	C Merry	Dartford Heath	1607	1509
13	D Holland	S. Manchester	1609	1447
14	A Judd	Mid-Thames	1610	1509
15	A Malbon	RSGB	1424	1616
16	D Newman	Northampton	1522	1627
17	I Bulson	Colchester	1628	1510
18	R Kelly	RSGB	1522	—
19	B Poole	Mid-Thames	1528	—
20	G Whenham	Coventry	—	1603

With T Gage organizing the National Final, A Simmons and P Labalestier qualify for the National Final in September

Coventry DF Qualifying Event—results

Twenty teams assembled one mile south of Lutterworth for the start of the Coventry Qualifying event. Two good signals were heard at the start and with no competitor requiring assistance all teams were able to leave at 1.30pm.

Station A, G4CFG/P, was located in a ditch running parallel to a bridge way adjacent to a sand pit, approximately 10 miles north of the start. Most competitors decided to try to locate this transmitter first, perhaps trying to avoid the congestion around Coventry due to the celebrations of City winning the FA Cup. Owing to the event being fairly early in the year, the undergrowth was not particularly thick and teams did not have much trouble locating the station, especially after the first few teams had been in.

Station B, G3TFA/P, was located next to a sub station just north of Coventry at the junction of the Coventry and Oxford canals, approximately 11 miles west of the start. The antenna wire ran between the sub station and one of the canal banks and gave the competitors plenty to think about. Once again the first few competitors destroyed most of the undergrowth, leading the way for other teams. However, one competitor finding himself the wrong side of the canal did brave the murky water to wade to the correct side—a sure sign of desperation to qualify for the Final. Unfortunately he just missed out but gave the organizers plenty of satisfaction.

Afterwards a total of 45 sat down for tea at the Coventry ARS HQ where G4KZU thanked competitors for turning out in terrible weather. Brian (the professional) Bristow gave his account of how he managed to win by placing Spurs' supporter stickers on all the other cars to slow them down around Coventry! Georgina Holland won the ladies prize for the second year running and told Brian what he could do with the first prize!

Posn	Name	Club	Time of arrival	Stn A	Stn B
1	B Bristow	Mid-Thames	1425	1425	1532
2	I Butson	Colchester	1442	1442	1540
3	M Hawkins	Chelmsford	1439	1439	1548
4	P Clark	Chelmsford	1438	1438	1549
5	C Plummer	Mid-Thames	1432	1432	1553
6	A Simmons	Mid-Thames	1433	1433	1601
7	G Boyce	Mid-Thames	1433	1433	1601.30
8	D Foster	Stratford	1439	1439	1602
9	D Newman	Northampton	1440	1440	1602.30
10	A Judd	Mid-Thames	1439	1439	1605
11	C Merry	Dartford Heath	1450	1450	1605.30
12	P Lisle	Mid-Thames	1437	1437	1606
13	C Wells	S Manchester	1448	1448	1610
14	D Yorke	S Manchester	1610.30	1610.30	1518
15	M Bennett	Coventry	1518	1518	1623
16	D Holland	S Manchester	1537	1537	1627
17	C Metcalf	Mid-Thames	1628	1628	1605
18	K Chan	S Manchester	1628	1628	1605

I Butson and M Hawkins qualify for the National Final
Two teams failed to find either transmitter

DF Qualifying Event Chelmsford/Colchester

Date: 16 August 1987

Map: OS Sheet 168 1:50,000 series, Colchester and the Blackwater

Assembly: 1300bst for start at 1320bst

Location: Fordham Heath ngr945264

Competitors requiring tea should notify Mr I Butson, 60 Churnwood Road, Parsons Heath, Colchester, Essex CO4 3EY. Tel 0206 860724 (home) 0206 892380 (office) by 9 August 1987.

DF Qualifying Event—Slade

Date: 6 September 1987

Map: OS Sheet 139 1:50,000 series, Birmingham

Assembly: 1300bst for start at 1320bst

Location: Beacon Hill car park ngr986757

Competitors requiring tea should notify Mr J Drakeley, 186 Conway Road, Fordbridge, Birmingham B37 5LD. Tel 021-770 3474 (home) not later than 30 August 1987.

50MHz Fixed Station Contest rules

0900-1300gmt 18 October 1987

Following the expansion of facilities on 50MHz, an additional contest has been added to the calendar to encourage activity on the band. Further events with other formats will take place in 1988. It is hoped to have a new trophy available for 50MHz, and if this is confirmed it will be awarded to the overall winner of this event.

The general rules published in the "Operating Guide" supplement, *Rad Com* January 1987, will apply. Only fixed stations as defined in general rule 5 may enter, and the address given for correspondence on the cover sheet must be the address that the station was operated from. There will be two sections, section S for single-operator, and section M for multi-operator stations. QTH information must be exchanged in accordance with general rule 13.

All entries and check logs to: VHF Contests Committee, c/o D J C Bushell, G4WAD, Tanglewood, Bridge Street, Lower Moor, Pershore, Worcs.

70MHz Trophy & SWL Contest rules

0900-1600gmt 20 September 1987

The general rules published in the "Operating Guide" supplement, *Rad Com* January 1987, will apply. There will be three sections, section F for fixed stations, section O for other stations, and section L for listeners. QTH information must be exchanged in accordance with general rule 13.

The station with the highest overall score will receive the VHF Manager's Trophy.

All entries and check logs to: VHF Contests Committee, c/o A J Collett, G4NBS, 10 Quince Road, The Limes, Hardwick, Cambridge CB3 7XJ.

1-3/2-3GHz Cumulative Contest rules

1930-2200gmt 16 October 1987

2030-2300gmt 1, 17 November; 3, 19 December 1987

The general rules published in the "Operating Guide" supplement, *Rad Com* January 1987, will apply. There will be two sections, section F for fixed stations, and section O for other stations. An overall table (Rule 10) will be published. The adjudicator will normalize the scores in each session to that of the leading station in that session, and each entrant's three best scores will then be combined to determine the overall placing. This will mean that scores in a session with exceptionally good conditions will not outweigh scores in other sessions held under normal conditions. Entrants should therefore send logs for every session for which they are active.

All entries and check logs to: VHF Contests Committee, c/o J Pilags, G8HHI, 43 Bartons Drive, Yateley, Camberley, Surrey GU17 7DW.

70MHz Fixed Contest rules

1000-1500gmt 25 October 1987

The general rules published in the "Operating Guide" supplement, *Rad Com* January 1987, will apply. Only fixed stations as defined in general rule 5 may enter, and the address given for correspondence on the cover sheet must be the address that the station was operated from. There will be two sections, section S for single-operator, and section M for multi-operator stations. A multiplier system will be used in this contest in accordance with general rule 14.

All entries and check logs to: VHF Contests Committee, c/o C J Easton, G8TFI, Highlands, Townsend, Nympsfield, Glos.

144MHz CW & Marconi Memorial Contest rules

There will be two sub-sections in this contest:

Sub-section 1: 1400-1400gmt 7/8 November 1987

Sub-section 2: 0800-1400gmt 8 November 1987

The general rules published in the "Operating Guide" supplement, *Rad Com* January 1987, will apply. There will be two sections, section S for single-operator stations, and section M for multi-operator stations. Scoring will be at 1 point/km to allow logs to be forwarded for the Marconi Memorial contest.

All entries and check logs to: VHF Contests Committee, c/o G M C Stone, G3FZL, 11 Liphook Crescent, Forest Hill, London SE23 3BN.

432MHz-24GHz & SWL Contest rules

1400-1400gmt 3/4 October 1987

The general rules published in the "Operating Guide" supplement, *Rad Com* January 1987, will apply. There will be three sections, section S for single-operator stations, section M for multi-operator stations, and section L for swls. Individual band tables and an overall table will be published. Scoring will be at 1 point/km. Entries will be forwarded for the concurrent IARU contest.

All entries and check logs to: VHF Contests Committee, c/o T Melvin, G8MJV, 2 Dudley Avenue South, Edinburgh, Scotland, EH6 4PJ.

432MHz Cumulative Contest rules

1930-2200gmt 8, 24 October 1987

2030-2300gmt 9, 25 November, 11 December 1987

The general rules published in the "Operating Guide" supplement, *Rad Com* January 1987, will apply. There will be two sections, section F for fixed stations, and section O for other stations. The adjudicator will normalize the scores in each session to that of the leading station in that session, and each entrant's three best scores will then be combined to determine the overall placing. This will mean that scores in a session with exceptionally good conditions will not outweigh scores in other sessions held under normal conditions. Entrants should therefore send logs for every session for which they are active.

All entries and check logs to: VHF Contests Committee, c/o D J Robinson, G4FRE, 15 Ferry Lane, Cavendish Park, Felixstowe, Suffolk IP11 8UR.

Club News

The following is the latest information received by RRs from the RSGB affiliated societies, clubs and groups in time for inclusion in this issue. Basic unchanged information on other affiliated organisations will be published again in July 1987.

RSGB affiliated organizations are requested to report all programmes and new items to their regional representatives regularly. Information for inclusion in the **October** issue should reach them by **10 August**, and for the **November** issue by **14 September**.

Club programmes are given in order of date, subject, time and place of meeting. All call signs of club secretaries and other contacts are QTHR (correct in the current *RSGB Call Book*) unless otherwise stated.

Most clubs welcome visitors and would be pleased to hear from potential new members.

REGION 1—RR B Donn, G3XSN, 7 Thurne Way, Liverpool L25 4SQ.
Tel 051-722 3644.

Barnoldswick (Rolls Royce ARC, G3RR)—2 Aug (Club rally, doors open 11am), 5 (Talk by G8VVE). 8pm. Rolls-Royce Sports & Social Club, Barnoldswick. Sec G4ILF, tel 0282 812288.

Bury (BRS, G3BRS)—12 Aug (VHF Foxhunt). 8pm. Mosses Community Centre, Cecil St, Bury. Details G1VQE.

Chester (C&DARS, G3GIZ, G8GIZ)—4 Aug (Committee meeting), 25 (Pre SSB Field Day meeting), 1 Sep (Committee meeting). 8pm. Chester RUFC, Hare La, Vicars Cross, Chester. Details G6IFA, tel Chester 336639.

Leyland (Central Lancs ARC)—3 Aug (Foxhunt, details G3SYA), 17 (Morse quiz, G1PKE), 8pm. The Priory Club, Broadfield Drive, Leyland. Details G4ZYN, tel 0257 452287.

Liverpool (L&DARS, G3AHD, G8WCL)—4 Aug (Minute Waltz), 11 ("The solar system", G6XB), 18 ("Club's history research", G4CVZ) 25 (Isle of Man preparations), 1 Sep (Junk sale). 8pm. The

Churchill Conservative Club, Church Rd, Wavertree, Liverpool. Sec Lynn, tel 051-728 8811.

Manchester (South MRC G3VFA, G3UHF)—7 Aug ("The great egg race part 6", G2AKR), 14 (DF event, 8.15 start), 21 (Mystery lecture, G8TTY), 28 ("Building a vhf station in a Land Rover"), 4 Sep (Lecture). 8pm. Sale Moor Community Centre, Norris Rd, Sale. Details G2AKR.

Penrith (Eden Valley RS)—20 Aug (Foxhunt, G4JHV), 7.30pm. The Crown Hotel, Eamont Bridge. Sec G4FUI, tel Penrith 66728.

Tarporley (Mid-Cheshire ARS)—10 Aug (Committee meeting), 7.30pm. The Cotebrook Village Hall, Cotebrook, nr Tarporley. Details G1SIB, tel 0928 88153.

Thornton Cleveleys (TCARS)—3 Aug ("Amateur tv", G4YVQ), 10 ("TRF receiver—a useful simplicity", Alan Radmore), 17 (Computers), 24 (Auction), 31 (Closed), 2 Sep (Visit to Blackpool Airport), 7.45pm. 1st Norbreck Scout HQ, Carr Rd, Bispham, Blackpool. Club net Sundays 11am, G4ATH on 1-865MHz. Details G4BFH, tel 0253 853554.

Warrington (WARC, G4CDA, G6WRC)—4 Aug (Film: "Junction transistors"), 11 (Quiz), 18 (Open forum), 25 ("The myths of ics" G4JYP), 1 Sep (Junk sale). 8pm. Grappenhall Community Centre, Bell House La, Warrington. Details G0BCN, tel 0925 814005.

Wyre (WARS)—5 Aug (Visit to Hutton Police, 7pm), 12 (Social night), 26 ("Satellites", G1JCW), 8pm. Breck Squash Club, Breck Rd, Poulton. Sec G4UHL, tel 0253 854745.

My apologies to Wyre ARS and Central Lancs ARC for having to cancel my visits. I hope we can arrange some new dates. Thank you to South Manchester RC for the welcome on my visit. Congratulations to Bolton ARC on their first rally which I enjoyed very much. **RR1**

REGION 2—RR P R Sheppard, G4EJP, 9 Elvington Crescent, Leconfield, Beverley, N Humberside HU17 7LX. Tel 0401 50397.

Goole (GR&ES, G0GLE)—7 Aug (Natter night), 14 (Broadcast radio talk), 21 (Mini df), 28 (Social evening). 8pm. The Pavilion West Park. Details G0GLZ, tel 0405 69968.

Halifax (H&DARS, G2UG)—18 Aug ("How Photocopies work", G4SDX). Running Man ph. Details G0DLM, tel 0422 202306.

Halifax (Northern Heights ARS G4NOK)—5 Aug (Report by repeater group), 19 ("Satellite tv reception", G8HUA). Bradshaw Tavern, Halifax. Details G3UI, tel 0422 60574.

Keighley (KARS RS84851)—11 Aug (Informal), 25 (Visit to Mintex). Victoria Hotel. Details G1IGH, tel 0274 496222.

Maltby (MARS G4SKM)—7 Aug (Activity night), 28 (Club activity weekend at Spitewinter). Hellaby Community Hall. Details G1PQW, tel 0709 814135.

Sheffield (SARC)—2 Aug (Trip to Woburn Rally), Firth Park Pavilion, Sheffield. Details G8ZHG, tel 0742 395287.

Todmorden (T&DRS, G4WYT)—3 Aug (Natter night), 17 ("10 fm", G4YDI). Queen Hotel. Details G1GZB, tel 0706 817572.

Wakefield (North Wakefield ARC G4NOK)—6 Aug ("AC circuits"), 13 (On the air), 20 ("Video recorders", G3VID), 27 (Monthly meeting). White Horse ph, Wakefield. Details G4RCH, tel 0532 536633.

Wakefield (W&DRS, G3WRS)—4 Aug (Car treasure hunt). Ossett Community Centre. Details G4VRY, tel 0532 820198.

York (YRCA, G4YRC)—11 Aug (Summer df hunt), 7.30pm. Ashcroft Hotel, York. Details G3WQM, tel 0904 793672.

Thanks to the Goole and Maltby clubs for their hospitality. Will northern groups please avoid

144-260MHz when Raynet operations are in progress. **RR2**

REGION 3—RR G Ross, G8MWR, 81 Ringwood Highway, Coventry CV2 2GT. Tel 0203 616941.

Birmingham (Mirfield ARC)—12 Aug (Natter night), 3 Sep (New RAE class). Activities every night. 7pm. Mirfield Centre, Lea Village, Birmingham. Sec Ms K Field, tel 021-783 5898.

Coventry (CARS)—21 Aug (Treasure hunt and barbecue). 8pm. Scout HQ, 121 St Nicholas St, Radford, Coventry. Sec G3UOL, tel 414684.

Halesowen (Midlands ES&SC, G4MEB)—11 Aug ("Pulse code modulation", G6UDX). 8pm. MEB Social Club, Mucklow Hill, Halesowen. Sec G4RWH, tel 021-747 8784.

Rugby (RATS)—11 Aug (DF competition). 7.30pm. Cricket Pavilion, B entrance, Rugby radio station. Sec G8TWH.

Sandwell (SARC)—1 Aug (Barbecue night). Wednesday, morse classes. 7.30pm. Broadway, Oldbury, Warley. Sec G4UMY, tel 021-422 1554.

Telford (T&DARS)—5 Aug (Committee meeting, night on the air, and constructors evening). 8pm. Dawley Bank Community Centre, Dawley, Telford. Sec G0CZD, tel 0952 770568.

Warwick (Mid WARS)—11 Aug (Fox hunt and barbecue), 25 (ATV demo). 8pm. St John Ambulance HQ, 61 Emscote Rd, Warwick. Sec G6VHL.

Wythall (WARC)—4 Aug (Committee meeting), 25 (Night on the air). 7.30pm. Community Centre, Silver St, Wythall. Sec G0EYO, tel 021-430 7267.



Midland Amateur Radio Society president, Stewart Laing, G8ODT, presenting an illuminated scroll to Tom Douglas, G3BA, in recognition of 50 years' service to amateur radio. (Photo: Tim, G0GPZ)

REGION 4—RR M Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey DE3 2BJ. Tel Derby 0332 556875.

Alfreton (A&DARC)—10 Aug ("The metrewaves then and now", G5UM), 29-31 (GB0NTM and GB1NTM exhibition station at National Tramways Museum, Crich). 8pm. ECP Sports and Social Club, Carnfield Hill, Alfreton. Sec G1SFR, tel Alfreton 835874.

Derby (DADARS)—5 Aug (Rally preparation), 9 (30th Derby Mobile Rally at Lower Bemrose School, Derby. Opens 10am), 12 (tba), 19 (Cheese and wine evening), 26 (tba), 2 Sep (Junk sale). 7.30pm. 119 Green La, Derby. Sec G3KQF, tel Derby 772361.

Lincoln (LSWC)—5, 19 Aug (Committee meeting/activity night), 12 (tba), 26 (Construction contest). 7.45pm. City Engineers Club, Waterside south, Lincoln. Sec G4STO, tel Gainsborough 788356.

Thanks to both Alfreton and Mansfield clubs for their hospitality during my recent visits. **RR4**

Region 5—RR J S Allen, G3DOT, 77 Rosslyn Crescent, Luton LU3 2AT. Tel 0582 508515 or at work on 0582 21151 ext 314.

Dunstable (DDRC)—4 Aug (Radio contact with twin town, Wolfsburg, Germany), 7 (Talk, tba), 22 (Summer barbecue). 8pm. Chews House, High St, South Dunstable. Sec G0COQ, tel 0582 508259.

Northampton (NRC)—16 Aug (Tulip Rally and barbecue). 8pm. Kingsthorpe Community Centre, Northampton. Sec G8EUX, tel 0327 51716.

Shefford (S&DARS)—Club closed during Aug by informal meetings held at the White Horse ph. Thursdays, 8pm. Sec G4PSO, tel Hitchin 57946.

REGION 6—RR N P Taylor, G4HLX, 87 Hunters Field, Stanford in the Vale, Faringdon, Oxon SN7 8ND. Tel 03677 503.

Aylesbury (A Vale RS)—19 (Natter night). 8pm. Hardwick Village Hall, three miles north of Aylesbury. Sec G6SIB.

Harwell (HARS)—18 Aug (Natter night), 7.30pm. Harwell Lab Social Club. Sec G6LNU, tel Wantage 68453.

High Wycombe (Chiltern ARC)—12 Aug (/P informal event), 26 (tba). 8pm. Sir William Ramsay School, Rose Ave, Hazelmere. Details G4XVP, tel 0494 35275.

Maidenhead (M&DARS)—6 Aug ("Raynet", G4PGZ), 18 (informal). 7.30pm. Red Cross Hall, The Crescent, Maidenhead. Sec G8RYW.

Newbury (N&DARS)—13 Aug (DF hunt, 7.30pm. Newbury Technical College), 23 (Car boot sale, 10am-5pm, Acland Hall & Recreation Ground, Cold Ash, Newbury). Sec G3VOW, tel Newbury 43048.

Oxford (O&DARS)—12 Aug (Natter night), 26 (tba). 7.45pm. Oxford Civil Service Sports Association Club, Govt Buildings, Marston Rd, Oxford. Sec G4PUU, tel Oxford 52859.

Reading (R&DARC)—4 Aug (Meet the RSGB, with the President, Chief Executive, Zonal rep and regional rep). 8pm. Kennet Room, Reading Civic Centre. 18 (September contest and horse trial discussion). 1 Sep (Junk sale). 8pm. Clubroom, White Horse ph, Emmer Green, Reading. Details G4YFB.

Slough (Burnham Beeches RC)—3 Aug (Fox hunt), 17 ("A new approach to sound mixing", G4XDU). 8pm. Haymill Community Centre, 112 Burnham Lane, Slough. Details G6EIL, tel Maidenhead 25720.

I hope many members who live in the Reading area will be able to come to the meeting at the Civic Centre on 4 August (see above) and I look forward to meeting you there. Also, I should like to thank all those clubs who have made me feel most welcome during my visits in my first year as your regional rep. **RR6**

REGION 7—RR R Sykes, G3NFV, 16 The Ridgeway, Fetcham, Leatherhead, Surrey KT22 9AZ. Tel 0372 372587.

Ashford (Echelford ARS)—10 Aug ("Wireless from the beginning", G3CBU), 27 (tba). 8pm. The Hall, St Martins Court, Kingston Crescent, Ashford, Middx. Sec G4VAZ, tel Sunbury 783823.

Cray Valley (CVRS)—6, 20 Aug (Natter night). 8pm. Progress Hall, Admiral Seymour Road, Eltham SE9. Details G3TAA.

Croydon (SRCC)—3 Aug (Social evening). 8pm. TS Terra Nova, 34 The Waldrons, South Croydon, Surrey. Sec G8IYS, tel 01-657 0454.

Crystal Palace (CP&DRS)—15 Aug (Test equip-

G4SJM R.A.D.A.R.S

RIPON & DISTRICT AMATEUR RADIO SOCIETY



Steve Fisher, G6YXO (L), winner of the Ripon & DARS raffle is presented with his prize, a Yaesu 144MHz transceiver, by club president Dave Graydon, G1EDE. Photo: Simon Calgie



To keep the memory of the late Eric Dowdeswell, G4AR, alive, his son and daughter have donated his TS530S transceiver to the Wimbledon & DARS, where it will take pride of place wherever the club station operates. Seen here are G3PVA, president of the W & DARS accepting the transceiver from Susan and Michael Dowdeswell

ment review and on the air). 8pm. All Saints Parish Room, Upper Norwood, SE19. Sec G3FZL, tel 01-699 6940.

Dorking (D&DRS)—11 Aug (Informal at the Falkland Arms), 25 (Informal at the Anchor, Pyrford). Sec G3AEZ, tel 0306 77236.

Farnham (VHF Group)—10 Aug (1.3GHz evening), 24 (Natter night), 14 Sep (Computer night). 8pm. Farnham Central Club, South Street, Farnham, Surrey. Details G4EPX.

Kingston (KDARS)—19 Aug (Natter night). 8pm. Alfriston, 3 Berrylands Road, Surbiton. Details G3IMK, tel 01-397 6924.

Redhill (RATS)—18 Aug (Members evening). 8pm. Constitutional and Conservative Club, Warwick Road, Redhill. Sec G8JXV.

Sutton and Cheam (S&CRS)—21 Aug ("The Worthing 1.3GHz video repeater", video tape). 8pm. Downs Lawn Tennis Club, Holland Avenue, Cheam. Sec G4FKA, tel Epsom 21349.

Thames Valley (TVARTS)—4 Aug (Construction contest). 8pm. Thames Ditton Library, Watts Road, Giggs Hill, Thames Ditton. Sec G3ENI.

Wimbledon (W&DRS)—1-9 Aug (Annual camp, Chessington), 14 ("The RSGB", RR7), 28 (General activity). 8pm. St Andrews Church Hall, Herbert Road, Wimbledon SW19. Sec G3DWW, tel 01-540 2180.

REGION 8—RR M Elliot, G4VEC, 20 Haysel, Sittingbourne, Kent, ME10 4QE.
Tel 0795 70132.

Burgess Hill (Mid-Sussex ARS)—8 Aug (144MHz low power contest), 9 (432MHz low power contest). Shack closed 13, 20, 27 Aug. 3 Sep (Informal). 7.45pm. Marlé Place, Leylands Road, Burgess Hill. Sec G0GMC, tel 07918 2937.

Chichester (CARC)—4, 18 (Informal). 7.30pm. North Lodge Bar, County Hall, Chichester. Sec G4EHG, tel Chichester 789587.

Dartford (DDFC)—2 Aug (Qualifying event), 4 (Evening hunt, 7.30pm, Dartford Heath), 16 (Qualifying event). Pre-hunt meetings, after 9pm. Horse & Groom ph, Leyton Cross, Dartford Heath. Details G8DYF, tel Greenhithe 844467.

Dover (SE Kent YMCA ARC)—5 Aug (1.8MHz fox hunt), 12 (Summer night out), 19 ("Meeting the folly", G3ROO), 26 ("The folly on the air", G3ROO), 2 Sep (Natter night). Dover YMCA, Godwynhurst, Leyburne Road, Dover. Details John Dobson, Flat 3, 145 Sargate St, Dover, CT17 9BZ.

Eastbourne (Southdown ARS)—3 Aug ("Microwave Modules", G4EFO), 7.30pm. Chaseley Home, Southcliff, Bolsover Rd, Eastbourne. Also, Tuesdays and Fridays each week at Hailsham Leisure Centre, Vicarage Lane, Hailsham. Sec G1UTH, tel Crowborough 63061.

Gillingham (Bredhurst R&TS)—6 Aug ("The return of Louis Varney", G5RV), 13, 27 (Construction and natter night), 20 ("Crystals", G4LQI), 3 Sep ("Howes your construction?" Dave and Chris Howes with the latest in kits). 7.30pm. Parkwood Community Centre, Parkwood Green, Wigmore, Gillingham. Details G0AMZ, tel Medway 376991.

Gillingham (MARTS)—7 Aug (Junk sale), 14 (Quiz, round 2), 21 (Natter night), 28 ("The prison

service", G4HJE). 7.30pm. Matthews Riding School, Lower Rainham, Rd, Gillingham. Sec G1MSS, tel 0474 814874.

Hastings (HERC)—19 Aug (Weather satellite, propagation study). 7.30pm. West Hill Community Centre, Croft Road, Hastings. Details G4NVQ, tel Hastings 420608.

Horsham (HARC)—6 Aug ("HF loop antennas", G3WYN). 8pm. Guide Hall, Denne Road, Horsham. Sec G4UDU, tel Hassocks 5517.

Maidstone (MYMCAARS)—7, 14, 21, 28 (Natter night with RAE, cw and antenna working). 8pm. YMCA Sportscentre, Melrose Close, Maidstone. Details G0BUW, tel 0622 30544.

Margate (Radio Club of Thanet)—23 or 30 Aug (Family day). 8pm. 7.30pm. Grosvenor Club, Grosvenor Place, Margate. Sec G1HWG, tel 0843 42480.

Worthing (W&DARC)—5 Aug (Ragchew and workshop evening), 12 (tba), 19 (Barbecue at QTH of G4XXF), 26 (tba). 7.30pm. Lancing Parish Hall, South Street, Lancing. Details G4SWH, WADARC, PO Box 599, Worthing, BN14 7TT.

Many thanks for the courtesy extended to me during my recent visits to Horsham ARC, Radio Club of Thanet and Medway ARS. RR8

REGION 10—D H Phillips, GW4KQ, 17 Pentre Gardens, Grange Town, Cardiff CF1 7QJ.
Tel 0222 35648.

Barry (Barry College of Further Education RS GW4BRS, GW6BRC, GW3VKL)—27 Aug (Final preparations for Flatholme 87 expedition), 29-31 (Listen out for GB2FI on all bands from 1.8MHz to 2.3GHz. Skeds may be arranged by contacting GW1CJB. Sec GW4NBY, 0656 62867.

Cardiff (CRSGBG GW5BI)—10 Aug ("Clandestine radio on the Burma/Siam railway", G3BA). Sec GW0CUM, tel 04463 3212.

Powys (PARC GW4HVN)—20 Aug (Social event). Sec GW4DWX, tel 0938 2068.

Rhondda (RARS, GW2FOF)—6 Aug (Natter night), 20 (Night on the air). Sec GW4BUZ, tel 0443 432542. Enrolment for the amateur radio course, starting in Sep at Rhondda College is now taking place. Phone the college on 0443 432187 for details.

Swansea (SARS)—20 Aug (Final preparations for ssb field day). 7.30pm. Room 303, Applied Sciences Bldg, University College of Swansea. Details GW0BBO, tel 0792 818100.

I need more details from club secretaries regarding future events. Only three clubs have been in contact with me this month. RR10

REGION 11—RR B H Green, GW2FLZ, 1 Clwyd Court, Tan-y-Bryn Road, Colwyn Bay, Clwyd LL28 4AH. Tel 0492 49288.

Caernarfon (Arfon Repeater Group GB3AR, GB3AN)—Sec GW3PIO, tel 0248 714571. New affiliated society.

Colwyn Bay (Conwy Valley ARC GW6TM)—13 Aug (Talk by G3XSN), 10 Sep (Junk sale). 8pm. Green Lawns Hotel, Bay View Rd, Colwyn Bay.

Sec GW4KGI, tel 0745 823674. An extremely interesting talk was recently given to the club by GW3MZY about the world's largest spark transmitter with a power of 200kW situated in the past near Caernarfon and designed by Guglielmo Marconi, Sir W Preece and D Hughes.

Deeside (Alyn & DARS)—18, 25 Aug (QRP construction and demo, G4NRO), 5, 6 Sep (144MHz contest). 8pm. Shotton Social Club, Shotton Lane, Deeside. Sec GW1ILZ.

Porthmadog (P & DARS)—20 Aug (Foxhunt, start at the Ffestiniog Railway Station), 17 Sep (Meeting). 8pm. Harbour Cafe, Ffestiniog Railway, Porthmadog. Sec GW1EGQ, tel 0766 2684.

Welsh Language Group—Every Wednesday at 1115gmt on 3.750MHz. Join the net for various discussions in Welsh. Net controller GW2HFR.

REGION 17—RR T Emery, G3KWU, Wilverley, Old Lyndhurst Road, Cadnam, Southampton SO4 2NL.
Tel 0703 812435.

Basingstoke (BARC)—3 Aug (Natter night). 7.30pm. Forest Ring Community Centre, Sycamore Way, Basingstoke. Sec G1OQV, tel 0256 59644.

Blackmore Vale (BVARs)—11 Aug (Project competition judged by Tony Mailer), 25 (Project night). 7.45pm. The Bell and Crown, Zeals (on the A303). Sec G4YXX, tel 0963 32389.

Bournemouth (BARS)—7 Aug (RSGB evening with the President, G4CHH, and General Manager, G3OUF). 7.30pm. 21 (Open evening). 8pm. Kinross Community Centre, Kinross, Bournemouth. Sec G4DJG, tel 0202 526793.

Farnborough (F&DARS)—12 Aug ("Coherent cw", G3XVR) 26 ("Propagation", G3LTP). 8pm. Railway Enthusiasts Club, Access Road, off Hawley Lane, Farnborough. Details: M C Graffius, The Paddock, Diamond Ridge, Camberley, Surrey, GU15 4LB.

Isle of Wight ARS—7 Aug ("Integrated circuits and their role in amateur radio"), 14 (Question time) 21 ("Computers and computing", G1UGT), 28 ("Measurements with basic equipment"). Results of recent agm: Chairman G3PZB, Treasurer, G8MBU. 8pm. Unity Hall, Wootton Bridge. Sec G4RGE, 0983 872620.

Liphook (Three Counties ARC)—5 Aug (On air night), 19 ("Satellite tv", G6FTY). 8pm. The Railway Hotel, Liphook. Sec G0BTU, tel Petersfield 66489.

New Forest Repeater Group (GB3NF)—For information or to join the group and help support the repeater, please contact G6DLJ, tel 0703 847754.

Portsmouth Hill Repeater Group (GB3PH)—For information or to join the group and help support the repeater, please contact Mr A L G Price, tel 0329 281852.

Salisbury (SRES)—2 Aug (RSGB df qualifying event). Tuesdays 7.30pm. Grosvenor House Centre, Churchfields Road, Salisbury. Sec G4LDR, tel 0980 22809.

Southampton (SARS)—5 Aug (Foxhunt from Sainsbury's car park, Lordshill). Sec G4VKB, tel 0703 737892.

South Dorset (SDRS)—4 Aug (Computer night). 7.30pm. Results of recent agm: Chairman G4VBY, Treasurer G3EAT. The Pennsylvania, Castle, Portland, Dorset. Please note new meeting place. Sec G0FIT, tel Dorchester 67596.

South Dorset Repeater Group (GB3SD and GB3DP)—For information or to join the group and help support the repeaters, please contact G3VFF.

Trowbridge (T&DARC)—5 Aug (Picnic at the White Horse), 19 (Natter night). 8pm. Territorial Army Centre, Blythsea Road, Trowbridge. Sec G0GRI, tel 0380 830383.

UK FM Southern Repeater Holding Group (GB3SN)—For information or to join the group and help support the repeater, please contact Mrs Jan Steele, tel Fleet 613311.

Wimborne (FRARS)—9 Aug ("Hamfest '87"). Flight Refuelling Social Club, Merley, Wimborne. Sec G0CDY.

REGION 19—RR R J C Broadbent, G3AAJ, 94 Herongate Rd, Wanstead Park, London E12 5EQ.
Tel 01-998 6741.

Cheshunt (C&DARC G4MGC)—5, 19 Aug (Natter night), 12 ("Indoor antennas"), 26 (Portable on Baas Hill Common), 2 Sep (Natter night). 8pm. Church Rooms, Church Lane, Wormley, Herts. Secs G4VMR and G4VSL, tel 0920 84250 (evenings). Morse classes held. Club net on 144MHz 2000h.

Chiswick (ABCARC)—18 Aug ("EMC filters").



After 25 years as secretary of the Ayr ARG, Ron Harkness, GM3THI, recently retired from the post on moving QTH. He is seen here receiving a shack clock from GM3KGJ, on behalf of all the club members. L to r: GM4CUB, new secretary; GM3KGJ, the club's oldest member; GM3THI; GM4WVF, chairman. Photo: GM4PPT

7.30pm. Chiswick Town Hall, High Rd, Chiswick, W4. Sec G3GEH, tel 01-992 3778.

Edgware (E&DRS)—27 Aug (Informal and field day briefing). 8pm. Community Centre, 145 Orange Hill Rd, Burnt Oak, Edgware. Sec G4IUZ, tel Hatfield 65707. Club net on 1,978kHz at 2200h bst.

St Albans (Verulam ARC)—11 Aug (Informal), 25 (Bring and buy sale). RAFA HQ, St Albans. Details G4JKS, tel St Albans 59318.

Stevenage (S&DARC)—2 Aug (Picnic at Woburn Rally). Please note there will be no club meetings in Aug. 7.30pm. Sitec Ltd, Ridgemonk Park, Telford Ave, Stevenage. Details G3OVT, or G6EDA, tel Stevenage 724991.

Welwyn and Hatfield (WHARC)—3 Aug (EMC). 8pm. Morse classes on Thursdays. Nets on Monday, 8pm, on 145.375MHz. Details G4WLG, tel 0707 335162.

REGION 20—RR C R Hollister, 34 Battersby Way, Henbury, Bristol BS10 7SU. Tel 0272 508451.

Area representatives

E A Perkins, G3MA.....Gloucester.
A C Denning, G4JHB.....S E Somerset.
A W J Capel, G4ROX.....Bristol.

J Thorn, G3PQE.....Portishead & Nailsea.
Bath (B&DARC)—5 Aug (tba). 19 (Radio quiz, Michael Smith). 8pm. Alternate Wednesdays, Englishcombe Inn, Englishcombe La, Bath. Details G6EII, tel Bath 318128.

Bristol (BARC)—Tuesdays, 7.30pm. The YMCA, Park Rd, Kingswood, Bristol. Details G4YOC, tel Bath 318128.

Bristol (BRSGBG)—24 Aug (Elaine Howard of *Practical Wireless*), 30 (Mobile picnic at Ashton Court). 7.30pm, last Monday of the month. Small Lecture Theatre, Queens Bldg, University of Bristol, University Walk, Clifton, Bristol. Details G4SQQ, tel 0272 508451.

Bristol (HTVRC)—Details c/o 470 Bath Rd, Bristol BS4 3HG.

Bristol (North Bristol ARC)—Fridays, 7.30pm. Self Help Enterprise, 7 Braemar Cres, Northville, Bristol. Details G4YQQ, tel 0272 690404.

Bristol (South Bristol ARC)—5 Aug (Teach-in "Driving the club rig", GB4RZY), 12 (Preparations for the third Bristol Rally, G4SQQ), 19 (28MHz activity evening), 26 (Morse key rally, G4YZR). 7.30pm. Whitchurch Folk House, East Dundry Rd, Bristol. Details G4RZLY, tel 0272 834282.

Bristol (Shirehampton ARC)—Fridays, 7.30pm. Twyford House, Lower High St, Shirehampton, Bristol BS11 0DE. Details G4GTD, tel 0272 770504.

Bristol (University of Bristol ARS)—Term time net on S5 most evenings. Details G6TGN, c/o Students Union, University of Bristol, Queens Rd, Clifton, Bristol BS8 1LN.

Bristol (23cms FM TV Repeater Group GB3ZZ)—Details G4ZQF, tel 0272 699947.

Bristol (432MHz Repeater Group GB3BS, GB3BP)—Details G4MCQ.

Cheltenham (CARA)—7 Aug (Possible visit to BBC Wood Norton, to be confirmed), 21 (Natter night). 7.30pm. Stanton Room, Charlton Kings Library, Cheltenham, Glos. Details G4VXE, tel 0242 36723.

Cheltenham (Government Communications HQ ARC)—Details c/o GCHQ, Priors Rd, Cheltenham, Glos GL5 5AJ.

Cheltenham (Smiths Industries RS)—Alternate Thursdays, 8pm. S&S Cub Office, Evesham Rd, Bishops Cleeve, Cheltenham, Glos GL52 4SF. Details G8UJG, tel Bishops Cleeve 2175 or 3333.

Cirencester (C&DARC)—Alternate Thursdays, 8pm. Phoenix Centre, Beeches Rd, Cirencester. Details G0AXD, tel 0285 5015.

Gloucester (GARS)—August (Summer picnic to coincide with low power vhf contest). Meetings Wednesdays, 7.30pm. St John Ambulance HQ, Heathville Rd, Gloucester. Details G6AWT, tel 0452 504515.

Mendip Repeater Group—GB3WR 144MHz repeater, GB3UB and GB3VS 432MHz repeaters and GB3UT 1.3GHz tv repeater. Details c/o 191 Charlton Park, Midsomer Norton, Bath BA3 4BR.

Portishead (Gordano ARG)—27 Aug ("County hunting", GW3CDH). 8pm. The Ship, Redcliffe Bay, Portishead. Details G6ETL, tel Nailsea 855316.

RAIBC—Area representative G0CEF, tel 0272 856045.

Sedgemoor (S&DARS)—Third Wednesday of the month, 7.30pm. Bridgwater Sea Cadets HQ, The Docks, Bridgwater. Details c/o Nether Cotts, Gurney St, Cannington, Bridgwater TA5 2HW.

Street (S&DARS)—First Thursday of the month, 7.30pm. Toc H Hut, Brutach Tce, Street. Details G4SCD, tel 0458 45145. Club net 10pm Wednesdays on 145.350MHz.

Stroud (SARS)—Alternate Wednesdays, Nelson School, Stratford Rd, Stroud. Details G0DZM, tel 045 3832773.

Stroud (S&DARS)—Tuesdays, 7.30pm. Scout HQ, Parliament St, Bisley Rd, Stroud. Details G3TEV.

Taunton (T&DARS)—First and third Friday of the month, 7.30pm. The Basement, County Hall, The Crescent, Taunton. Details G0FMF, tel 0823 51526.

Thornbury (T&DARC)—Details G8AZT, tel Thornbury 416381.

Weston-super-Mare (WSMARS)—10 Aug (Talk by G4KMB), 24 (Constructors night), 7.30pm. The Bristol Hotel, Locking Rd, Weston-super-Mare. Details G1DJW, tel 0934 514429.

Yeovil (Y&DARC)—6 Aug ("A peak reading rf voltmeter", G3MYM), 13 ("Polar diagrams", G3MYM), 20 ("QRP transmitter output filters", G3MYM), 27 (Natter night), 3 Sep ("Negative resistance oscillators", G3MYM). 7.30pm. The Recreation Centre, Chilton Grove, Yeovil. Details G1MNM, tel 0935 79804.

Yeovil (432MHz Repeater Group GB3YS)—Details G6AGL.

Many apologies for the lack of Region 20 news last month, this was due to postal problems. Congratulations to the Bristol FM TV Group, for their splendid work in building the now operational 1.3GHz tv repeater, GB3ZZ. RR20



The social event of the year for the Paddington College ARS was the wedding of Lynn (G1ULH) and Fred (G4RJS) Butchart on 23 May 1987. Richard Irving, G1UCR, and David Peace, G4KKM, provided the guard of honour. Photo: G1UCT

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 R820 RX, all pre WRAC hf amateur bands plus 49, 31, 25, 16m broadcast bands, am filter, ex condx, superb rx, £350 for quick sale, no offers. GW6DD8, QTHR, tel: 0248 810227.

HITACHI 9" b/w monitor, £30; also Taxan high res colour monitor with RGB card, suit Apple IIE, £75, buyer collect. G6XD, QTHR, tel: 06267 2611.

AR88D, gd condx, £45 ono, prefer buyer inspects and collects. G4MEZ, tel: Newport Pagnell 611810 anytime.

NAG VALVE LINEAR 250W, can be heard/seen in use, £250 ono; Regency MX3000 scanner with disccone antenna, £175 ono; 70cm masthead preamp, £50 ono; 15m LDF250 with N types, £12 ono; Jaybeam D15/23 23cm Yagi, £20 ono. Julian Tether, G6LOH tel: 0295 768152.

FT726R 2m+70cm+sat, board, gd condx, £900 ono. Paul, GWOHC8, Cardiff, tel: 0222 482481 after 6.30pm.

YAESU FTV700 50MHz tvtr, 9months old, £200; beam A0620/2E 6m/10m/15m/20m, one spoke damaged, £60; 110W rotator FU200, £25 OR £250 the lot. G4YQM, QTHR Northumberland, tel: 081 082 266.

FT700 WITH FM FC700 matching atu, YM35 hand/mic, £400 ono; CP5 five-band hf vertical, £70 ono. WANTED: AT730 KW107 or 109. G0ESZ, QTHR Ashford, tel: 0233 29685.

TRIO TS510 hf tvtr with PS510 psu and remote VF050 Good low-cost system for the new amateur, £195, buyer collects. Ken, CM3YBQ, QTHR, tel: 0592 265789 evenings and w/ends.

KENWOOD R1000 gen/cov rx, vgc, has am wide and narrow, usb, lsb and cw, instr manual, £150 ono; Heathkit HR-1680 gen/cov rx and spkr, ssb/cw, manual and circuit diags, £90 ono. Tel: 01-698 7305 after 6pm.

SHACK CLEARANCE: components, ICs, relays, meters, spkrs, much more, no junk, £30 the lot; dummy loads: 15W £4, 50W £10; swr meter £12; rf sig/gen £20; leather case for AV07/8, £15; RadCom handbook new, £8. G4LVP, QTHR, tel: Hitchin 58728.

TR2600E C/W SOFT CASE, r/d and whip ants, base ch/ps, spkr/mic, nicads, £240 ono; IC271E fitted muTek board, desk/mic, £550 ono; TNC220 ROM driver and lead for BBC-B, £140. All boxed with manuals. G3KNJ, QTHR, tel: Watford 44069.

CUSHCRAFT AV3 triband vertical antenna 10/15/20 in ex condx, £30, no offers. G3AVJ, QTHR, tel: 051 489 3325.

ICOM 745 plus ps, Heath SB200 amp, TenTec 229 atu, A3 tribander with 40m attachment, 400RC rotator, prefer to sell as package for best reasonable offer. Alan Brennglass, 41 Tavistock Square, London, WC1H 9EX or tel: 01-387 1507.

TRIO TS820 with added digital readout equal to TS820S; modified with Lowe kit to operate on 10MHz ex order, c/w owners manual and service manual, £450. Will deliver 50miles. G3RDC, QTHR, tel: 01-455 8831.

G30G0 SSB TCVR PROJECT: receive section built and wkg, all pcbs, some parts for remainder, plus all info, £45; micrometers 1" and 2", £12 ea; set of taps and dies plus spares (BA sizes), £20. G4LVP, QTHR, tel: Hitchin 58728.

MARCONI LCR BRIDGE, £35; rtty at&e T-unit type fsy psu scope bfo/afc units, £45 lot; rtty at&e

distortion scopes tx&rx 5B/6B, £45pr; Fax Mufax rx No 900 with paper, £59; tx No 901, £49, all with manuals. G8BMQ, Southampton, tel: 0703 848444

KENWOOD TS430S gen/cov rx and hf tvtr fitted with fm board, c/w mic box, £600; Heathkit oscilloscope model 10.17, gmo, £25 with manual. G0DUF, QTHR, Oxon, tel: 0491 612279.

DATONG MORSE TUTOR, £30; Yaesu FRG7700 with memory FRT7700 and FRV7700, £300; View word processor and spreadsheet unused for Electron, the two for £18. Len, G0HMT, tel: Stevenage 356595.

DL7YC 4Cx250 single valve linear amp and low tension psu 70cm, £275 ono; K2R1W twin valve amp for 70cm, £210 ono. Mark, G4XOL, QTHR, tel: Newton-le-Willows, Merseyside, 5829.

TRIO TS530S cw filter mic as new, handbook, box, £565 ono; Telrex h/phones, £10; 7360 bal.mod valve new, £10; TS530S, prefer buyer collect. G4DLW, QTHR, tel: Helsby 5221.

W&D 70cm synth tx/rx 7 boards completed and tested £115; 23cm corner reflector unused, £25; GDX2 disccone, £25; rx 328R spy-type 2.5-30MHz am/ssb/cw xtal cal, BFO, audio to phones, 9/12V dc, £65. All post pd. G8ESK, QTHR, tel: 0274 497438.

TS940S WITH VOICE SYNTHESIZER, £1,500 ono; shack clearance (late G30QJ); TS700 multimode, £175; FDK Palm4 70cm, £100; plus lots of other equip. Lists sac. G3JBU, QTHR, tel: 0604 401800 OR 0604 718007.

ICOM R70 hf rx inc fm board, manuals and diags, all boxed, excellent radio, new tvtr forces reluctant sale. Price reflects urgency, £350, no offers. G4WOP, QTHR Medway, tel: 0634 571537.

CROTECH 3131.15MHz, dual trace and component tester oscilloscope, as new, £200 ono. Tel: 0227 375168.

REALISTIC DX200 rx gen/cov, ex condx, £65 ono; also Kenwood KR250 rotator controller, offers? Yamaha MR10 drum machine, £20. WANTED: Any good make digital display gen/cov rx, around £200. Graham, BR588051, tel: 0772 813250 6pm-7.30pm.

NATIONAL HRO rxs in various condxs from pristine to grotty, offers? WANTED: Copy of manual for Dynamic mutual conductance tube tester type 1-177, expenses pd. Tel: St Albans 39333.

KW E-ZEE MATCH ATU, £40. G4HPF, tel: 0463 241211.

TRIUMPH MODEL 1632 sig/gen 100kHz-120MHz, £45; Ferguson vhs video rdr, £130; variable capacitors suitable for linear amplifiers, valves 813, NEWTT21, QOV03-20A, Admiralty handbook of wireless telegraphy 1931. G400W, QTHR Hinckley, tel: 0455 612091 after 7pm.

FT707 100W hf trx, FP700 matching psu extension spkr/mic, 250Hz cw filter, ex condx, hardly used, never used mobile, all in orig boxes, £380 ono. G0CIU, QTHR, tel: 0903 43018.

YAESU FT290R HANDHELD with MH-12 spkr/mic NC-9C chgr, £200. WANTED: FTV901 tvtr with 2m fitted. Colin, G0DNO, NOT QTHR, tel: 051-678 6052.

SHACK CLEARANCE: Racal Manpack gen/cov tvtr, £300; Yaesu 726R 2/70 hf satellite £1,100; Trio TW4000A dual-bander, £325; Trio TH41 spare nicad chgr dc unit spkr/mic, £185; PS430 20A psu, £100; SP430 spkr, £20; Einstein computer, lots software, £100; SWR 200 with hf/uhf/vhf sensing heads, £80; triple S/B mobile antenna 70cm with diplexer £35; Oscar beam 2/70 £25; AR250 rotator, £45; dualband 2/70 diamond ant, £50; SPV720, £30. Tel: Romford 763640

PLUSTRON TVR5D, the best commercial tvdrrx available with BI tunable PA, £65; FT200, manual valves, £200; Dessler 2m masthead PA with psu, condx as new, cost £120 will accept £65 (0.50BNF) Richard Hill, Cardiff, tel: 0222 20717.

R155 IN GOOD WKG COND, offers? High Fidelity amplifier 15W. Ken, G0HJA, tel: 0403 52023.

YAESU FT290R c/w nicads chgr case, gd condx, £230. G1JCC, QTHR, tel: 0582 451057.

TEN-TEC OMNI D WITH MATCHING PSU spkr, all filters fitted, £400 plus carr. G4BVI, QTHR Ipswich, tel: 0473 688770.

TOWER, 60ft BX1, motorized winch, Ham-M, Moseley Classic CL33 wide-spaced 3-ele beam, dismantled ready for delivery, which could be arranged; Anglian 2kW pep Pentode amplifier, 1kW dissipation spare valve Swan-350 tvtr, offers? Worcester/South Birmingham area. G3LBS, tel: 052786 393 OR 0836-506 357 (24hr).

THE ULTIMATE VHF STN: Icom IC271E muTek, £625 inc psu; also Adonis AM-303C plus Datong rf speech processor suit IC271, £40; Welz SP15m wattmeter with pep, £30; Termaline 150W dummy load, £40; hb 10/100W 2m linear with psu, £55; Thandar freq counter, £30; HK704 key, £5; Fluke 77 dig/analogue meter, £40; Yaesu FSP1 spkr, £7; 6-ele quad plus rotator, needs slight attn, £40; TH21E mint, £130; DC21 psu, £15. All plus postage. G4UFG, QTHR, tel: 061-633 7892 after 6pm.

ONE TRIO R600 rx in gd condx, £200. Wood, tel: Clochan 378.

FRG9600 Mk2 60-950MHz, rwc mod, Datong PC1 cvtr 50kHz-30MHz to 144MHz, Welz SP10X swr meter. Offers invited for above. G4BRNK, NOT QTHR Swansea area, tel: 0639 730 237.

DURST C35 ENLARGER, Jobo enlarger timer, dial thermometer, developing, drum, twizers, developing trays, jugs, orange safelight, easel 10x8. All as new, only used twice, boxed, £160. Dave, G4WVP, QTHR, tel: Holyhead 2197.

70cm HANDHELDS, pr Tokyo Micro 7, new condx c/w manual, pouches, rubber ducks, 10 xtals, £120 the pr (xtals worth £95); 4Cx250Bs ex equip wkg, £5 ea plus post. G0EHT, QTHR, tel: 0989 85320.

DRAKE TR7 full cover tvtr SPS7 pwr unit, manuals extender boards, desk and hand/mic, ex condx, £950 ono, call and test. G4SKS, tel: 0723 367658.

NRD 515 all-wave rx 100kHz to 30MHz, with matching spkr, ex condx, little used, £750. Securicor delivery extra. Surrey area. Tel: 0483 275461.

KW204 KW202 CW SPKR, ex condx, daily use until recent replacement by Corsair, £200 the pr. G3AZW, QTHR, tel: 02214 2655.

FT726 HF UNIT, 6m, 2m, sat, cw filter, £950. G3NOH QTHR, tel: 01-997 4756.

JAPAN RADIO COMPANY NRDS15 hf communications rx with additional 96-chann NDH518 memory unit, NCM515 remote controller with memories and NVA515 spkr, exceptional equip in ex condx, £945 complete. For full details contact G4CXE, QTHR, tel: 0298 78861 after 5pm.

ICOM 255E MOBILE, £135; Icom 215 portable with nicads, £75; Belcom liner2 ssb, £40; all 2m gear, ono. G4KVV, QTHR, tel: 0556 67261.

HEATHKIT SB102 tvtr, swr bridge, psu/spkr/mic, £200; SB200 linear amp, £300; FT107 WARC kit, £20; Hokushin 70cm mobile ant, £15; EK150 keyer, unused £100; 70MHz Westminster psu, £35; 14AV0 80m coil, £40; Crabtree 80A safety breaker, £25. Tel: 0639 820356.

TRIO 9000 MULTIMODE 2m, c/w mobile mount, £300; MML144/50-S, £60. G6NMK, QTHR, tel: 0366 388713 evenings.

MICRO-P 80-col 100cps dot matrix printer CBM64 i/face, as new, £95; dozen rolls friction feed teleprinter grade A paper, £12; RSCG handbook paperback 5th edition, unmarked £6; Icom IC-HP1 headphones £5, carr extra. G4BGE, QTHR, tel: 0344 421502.

2xGLB PACKET TNCs, manuals, one vhf other modified

for hf, BBC software, £70ea; Heathkit digital multimeter IM102, £25. The following were wkg when stored in garage 12mths ago, now sold as scrap value: Wang mini-archiver with vdu, 280 cpu, disk drive, fan, keyboard, £45; Xerox fax 400 +1 box of paper, £15; old Tektronix scope 524AD, very heavy, £15; 2x1T3330 ASC11 telex machines, one with keyboard, both RS232 compatible with BBC and GLB TNCs, £20 and £15; tape reader & punch with vdu and keyboard, £25; Redifon dual rttty terminal with tuning aid 4m, pwr supply, heavy, £20. All items to be collected; old Creed 7 rttty with silencing cover, £5; IIT vdu and keyboard, £15. John, Orpington, tel: 0689 37955.

YAESU FT208 KEYPAD handheld c/w spkr/mic, chgr unit, psu enables unit to be used as a base stn, hi/lo pwr, memories scanning etc. A nice wkg 2m setup, £140. Ken, GIGPC, QTHR Harlow, tel: 0279 26647.

FT901DM AT200 SP830 7-band am/fm ssb cw/fsk Curtis keyer, all vgc, £500 ono. GMDWH, QTHR, tel: 0294 72803.

TR10 TS130S WITH PS30, AT230, VFO120, MC60, SP230, hf stn, £650. WILL NOT SPLIT. Mosley TA32JR 2-ele tribander, £80 ono. Keith, GOCVB, QTHR, tel: 0623 758329.

KW2000B HF TCVR c/w mic, psu/spkr, h/book, circuits, spares etc, vgc, £195. G14OUN, QTHR, tel: 0504 84529.

FT208R, £165; FT708R, £175; NC7 chgr, £25; sp/mic, £12; spare nicads, £10; manuals, c/cases, the lot for £345. Would prefer not to split, could deliver 50m radius. G8VHG, QTHR, Hull, Humberside, tel: 0482 855436.

ICOM IC745 TCVR +fm, Daiwa CNW 419 500W atu, Yaesu FP707 psu 427H swr pwr meter rms & pep, Trio LPF 100W d/load, all boxed in ex condx, £850. NO SPLIT To include Securicor. GWA9LP, QTHR, tel: 0286 5322 evenings.

HONDA E150U PORTABLE ac 240V, 1PH, 1500VA gen, condx as new, used six hours only. Will deliver London area, £130 ono. Vickery, G3CLK, tel: 0322 528555.

FT790 NICADS, little used, £300; ECH730 amplifier 1W to 10W, £25; IC2E, £90; Pye Olympic fm, £15; Pye Motophone am, £10; Southampton, tel: 0703 81344.

DUE TO UPDATING, I am selling my TS820S, dc cvtr, cw filter and 10MHz band fitted by Lowes. All in perfect order, orig pkg case, manual etc, £475. No offers. G4VKA, QTHR Lichfield, tel: 0543 252646.

PK232+ Mod 100 32k, £460, no tv required, FT77 100W narrow cw filter, £480; Zmatch, £70; BNOS 25A £120; freq counter, 5-digit, £25; GDO, £40; RS232 Spectrum+microdrive+12 carts, £50, brass key, £12. All mint, buyer inspects. Chris, Worthing, tel: 0903 506289.

ICOM IC271E 2m base full muTek front-end 25W 32 memories, 2 vfos, immac, £600; KDK 2m fm mobile 1/15W o/p, memories, scan 144-148, £140. GOCXT, QTHR Derbyshire, tel: 0298 79481.

40ft CRANK-UP 4-section aluminium tower c/w head unit, h/duty winch and cables, buyer collects, £190; med/duty rotator, £50, 11-ele Cushcraft 2m beam, £30; Reace FS1-5 2m swr bridge, £14. G0BVD, QTHR, tel: 0905 356096.

KENWOOD MC60 500/50k mic boxed, £40; glass fibre mast 17ft 45mm diameter new £25; TA31 trap dipole 10/15/20 unused £30; Jaybeam 5-ele 2m Yagi £10; Eimac 4Cx250R new £30; 4Cx150 with holder £10; 6146B new £5. All plus carr. G3ACB, tel: 0323 897145.

FT480 MULTIMODE, user manual, mobile brkt, £250 ono. G3M2V, tel: 0242 43558.

TR10 TS430S LINE complete in mint condx, incl fm board, cw, ssb and am filters AT250 automatic atu PS430 dc pwr supply SP430 spkr, £1,095; muTek TVV144a 2m tvtr, £175. Tim, G4YBU, NOT QTHR, tel: 01-393 9691.

FT290R MOBILE MOUNT, chgr, nicads, carrying case, £270; 30W linear with preamp ideal FT290R, £40; muTek TVV144a 2m 10W tvtr, £175; ssb products TV144-432 2m to 70cm CRP tvtr, £60. Tim, G4YBU, NOT QTHR, tel: 01-393 9691.

HEATHKIT HW9 four bands built accessory pack kit, will deliver London or near, £170. G0CEU, tel: 01-801 1415 7pm-9pm Mon to Fri.

TS711E VERY LITTLE USED, 144MHz tx/rx in gd condx, £775 ovno. G1DK1, QTHR, tel: 0902 755935 evenings.

STANDARD C7800 70cm 10W 10MHz fm mobile, internal DJ7VY preamp, ext spkr, £140 ono. G3SMU, QTHR, tel: 0407 720017.

50MHz LINEAR AMP, A200, 50W o/p for 8W i/p, 25W o/p for 3W i/p, £55; one also for 70MHz, Icom IC720A hf tcvr, fm fitted, gen/cov rx, vgc, £495. G3WCS, QTHR, tel: 0606 891913.

STANDARD C58 2m PORTABLE c/w all extras, £300; also Yaesu TR7010 2m ssb/cw, £75. Pair 4Cx250 valves c/w bases and chimneys, brand new. Offers? Shure 444 base/mic, fair £20. Exch possible, WHY? G1XQR, tel: Wallingford, Oxon 36720 evenings.

HEATHKIT RA-1, £15; SOTA 2m 100W linear, £70; YK-88C 500Hz filter, brand new, unused, £35; Lafayette HE-30, needs attn, £15; BBC-B with sideways ROM board and DFS, £275; Weller mains soldering iron, 60W, £15. All carr extra. G4PDO, QTHR, tel: 0242 42336.

FT7B AND FP12 in pristine condx, no mods, full 10m coverage, with mobile mount, boxed, manuals and info, £350 ovno. Possibly Yaesu's best mobile rig definitely an excellent receive with pre-select. G0CAJ, QTHR, tel: 01-450 0801.

FT726R WITH 6m, 2m 70cm modules, sat unit, mint condx, c/w orig pkg and manuals, £900. G4LJR, QTHR tel: 0403 64275.

TVTRS, MICROWAVE MODULES MMT432/285, £110; MMT144/28, £85; modular electronics 432/28, £90; Icom IC245E 2m multimode, £200; Kenwood TR8400 70cm fm with PS10 base stn psu, £250. G3ZSS, NOT QTHR, tel: 0932 63552 evenings.

YAESU FT290R, 1yr old, nicads, chgr, case with new Revco 5/8 mobile and mgmount. All as new, £250 OR exch with cash as reqd for FT221 or Trio TS700. G1S10, QTHR Chessington, tel: 01-391 0450.

ICOM IC-4E with spare nicad pack, remote spkr/mic, mains chgr, manual etc, £180 ono. G3PLX rttty unit c/w keyboard, £25 ono. Carr extra on both items. Chris, tel: 0376 510664 after 6pm.

70cm ANTENNAS, Jaybeam MBM 88/70cm, £40 ono; SUS 485D 5/8 colinear +pole and lashing, £20 ono. Both ex condx. Buyer collects. Peter, G1DIZ, QTHR tel: 0473 74212.

YAESU FTV250 2m tvtr for FT101 cables manual, boxed, £95; 4m 3-ele Jaybeam, £8.50. WANTED: Datong FL1 audio filter also Tentec 40S linear for Argonaut. G4UOV, QTHR Crawley, tel: 0293 883075.

TS-430S WITH FM BOARD, am and cw filters, SP-100 spkr, Daiwa PS-300 30A psu; Daiwa CNW-419 atu. All mint with orig pkg, sensible offers invited. Yaesu 208R +YM24 spkr/mic +25W lin/preamp, £145. G3OPJ, QTHR, tel: 024026 2718.

DAIWA 65W 144MHz linear with GaAsFET, vgc, hardly used, £85; Pye Westminister 70.26MHz am, gwo, £30; 80m tvtr, 2m 1.5F, C M Howes kit in gwo, nicely boxed, £50. All prices ono. David A Dadds, G4WLL, tel: 0904 764965.

6ft FIBREGLASS DISH, £50; MTV435 atv tx, £100; MMC435/600 atv cvtr, £18; MM4000 rttty tcvr c/w KB £120; MMA144V sensing preamp £18; MMC144/28L0 cvtr £18; BBC model B computer, £190; Tektronix 849 high-performance storage scope, £150. G8AYN, tel: Lutterworth 57790.

COMPLETE RTTY TERMINAL, ZX81 with 16k, Maplin keyboard, Scarab i/face and program, variable Baud rate, ST5 TU with several tapes, all in neat metal cabinet. Buyer collects, Hastings area, £85. G4ERA QTHR, tel: 0424 812350.

FT757GX HF TCVR, £680; FP700 psu, £120; FC707 atu, £80; matching Yaesu stn, ex order and appearance, together £790. G3SRJ, QTHR High Wycombe, tel: 0494 442869.

9-ELE CROSSED TONNA 2m, £15; 88-ele parabola 70cm, £30. G6MNI, QTHR, tel: 01-950 9381 anytime.

KW2000B TCVR NEW PAs, fan, mic, £200; FRG7 rx, ext digital readout, £120; Trio JR310 rx, £80; Datong rf speech processor, £30; Datong FL1 at filter, £50; all vgc/ono. G4CZE, QTHR, tel: 01-361 1922 anytime. Can deliver 200 miles London.

STABILISED 13.8V high current psu, switched o/p 10 or 20A continuous, metered 0-20V, 0-25A, overvoltage and overcurrent protection, regulation better than 1%, £55; lambic keyer identical to ETM3C, 7-45 wpm with sidetone, £14. G3YJL, tel: 049525 2049.

TWELVE 811A VALVES, £15 ea. G4HTA, QTHR, tel: 092 881712.

TR10 TS700S, vgc, £350; Uniden hf tcvr, only been used on rec, vgc, £285; scanner SX200, £135; Rohde and Schwarz valve m/meter with manual, £25; plus carr; Shure 444 desk/mic, £7. Peter, G810Q, QTHR East Sussex, tel: 0323 763123.

MUTEK TVV144A 2m and TVV50A 6m tvtrs, homebrew switchbox, prefer sell complete 2m £130, 6m £180,

switchbox £15; muTek masthead preamp SBLA144E, £25 BNOS 40A psu, £200. G4XW1, QTHR Gravesend, Kent, tel: 66479 evenings.

YAESU FT780R 70cm multimode tcvr, ex condx, orig pkg and manual; Jaybeam 12XY 70cm crossed Yagi, 3mths old, £375 ovno for both. Consider p/exch 6m equip. G8WRV, QTHR, tel: 0480 217756.

FREE! Two 60ft poplar trees when you buy my large semi-detached house, 27ft through-lounge/diner with patio door, large bay window, fitted kitchen inc fridge, microwave, fgch, d/glazing, 2 double bedrooms +1 single, hall/stairs/landing artexed also all ceilings except kitchen, fully tiled bathroom with avocado suite and shower taps, 2nd WC outside, also built-on utility room plumbed for auto-washer, plus sink-unit, freezer, shack etc. Good size lawned garden with double garage, shed, patio, walled rose garden, caravan standing, garden to front plus long drive. Good size dry cellar, ideal for homebrew. £35,000. G4X00, QTHR, tel: 0709 590177.

MM144/28 TVTR, adds 2m multimode to your hf rig, 10W o/p, £80. David, G4JLU, QTHR, tel: 01-954 9180

BELCOM LINER2 2m ssb tcvr and X+Y Yagi (one broken element), £80. No offers. Mr C W Murray, tel: Aldershot 310661 evenings.

TF801D 10-480MHz sig/gen, £50; Kokusai MF455-15ck filter and xtal, £10; mains psu, £10; deviation meter, £10; misc 10-7MHz filters, £2.50 ea; 150MHz cavity filter, £10; see for list. WANTED: Heathkit SB101/301/401 spares. G300U, QTHR Surrey, tel: 07375 52170 evenings and w/ends.

FT480R, £325; BNOS 10-180 1pm, £250; Drae 24A psu £100; 4x19 70cm plus stacking frame, £100; Spectrum 48k plus progs, £50. G1CWP, QTHR Burgess Hill, tel: 0446 48423.

BRAND NEW AND BOXED pwr supply 5V 20A, 12V 4A, etc £25; 200pF x capacitor, £5; roller coasters £5 and £10; brand new and boxed rf 4A ammeter, £5; 2764 IC £1.50; all plus carr. G3IDW, QTHR, tel: 0793 822055.

PRINTER 24-chars wide, ideal for rttty or just program listing, works with BBC, Dragon, Oric computers, c/w i/face cable and working. Half dozen available, £15 ea. Alan, G1JPG, QTHR, tel: 0582 585108.

SURPLUS TO REQUIREMENTS: Spectrum ZX48k+ computer with various tapes and software, hardly used, mint condx with instrs, £60 ono; printer Alphacom 32, four rolls paper, pwr pack, £25. Buyer collects or pay half carr. Tel: South Benfleet 753685.

TR10 R-600 rx, ex condx, gen/cov 0-30MHz, £220 ono GOEYP, QTHR, tel: Cheltenham 527171 after 6pm.

FERROGRAPH SERIES SEVEN with full w/shop manual and over 20 reels of tape, £40 ono; rttty terminal unit, needs ptt i/face (one transistor), space inside for Amtor timer, mains powered, £25. Neil, G4RQN, Kings Lynn, tel: 0553 675676.

S20SE FITTED CW filter with MIC50, £320; EC10, £45 EK150 keyer, £50, all items vgc. G4DTT, QTHR, tel: 0532 863191.

YAESU FT1012D Mk3 fan, hardly used, orig box, £450 G4PPU, QTHR, tel: 01-399 6746 anytime.

HIGH VOLTAGE CERAMIC CAPS: 1x, 1nF, 12kV, 1x 10nF, 4kV, 9x 6.8nF, 4kV, 15x 1nF, 4kV, 21x 1nF, 3kV, 9x 10nF, 2kV, 1x 10nF, 1kV. Offers? 2x large coaxial relays 28V, N-types, £20 ea. G6ELH, QTHR Watford. Tel: 0923 30254.

19" RACK CABINET, 44" high, well made, in gd condx £20 ono. G6XNC, QTHR, tel: 01-462 4461.

HAMMARLUND SP600JX-10 rx, 0.54-54MHz console mounting (case available) ex condx, handbook, useful for monitoring 50MHz! £140. Buyer arranges collection. Bob, tel: 0372 57837 after 8.30pm.

HQ-1 ANTENNA AND AR40 rotator, £120 cash together. Buyer collect. G4FML, QTHR, tel: 09905 8404.

STANDARD C58 2m multimode boxed +mobile mount and chgr, £225. G3MFW, QTHR, tel: 061 442 8334.

KENWOOD AT230 atu boxed +manual, as new, £160, unwanted gift; MP-64 Micropatch rttty +cw, £110 for Com64 computer. Buyer collects. G1DOX, QTHR, tel: Barrow 33591.

QTH DET: 3 beds, 1 acre-land, Dutch-bungalow, 2-receptn, full-tile bathroom, high-location remote, easy access interchange 42/M6 no antenna restrictions. Beautifully decorated, must be seen. Get away from crowds. Wonderful views, £55,000. G4IZW, Hamilton House, Carleton, Carlisle, Cumbria Tel: 0228 20786.

ICOM IC-255E 2m/fm mobile 25W, mint, £135. Dennis, G4RMM, QTHR, tel: Ruislip 631240 evenings.

YAESU FT780R 70cm multimode, mint condx, boxed with mobile mount, £300. C4KUR, QTHR, tel: 021-704 1236.

BBC MICRO COMPUTER with Acorn 8271 disk i/face and uncased disk drive with software incl morse prog and other amateur radio software, only £300. Philip, G6DAU, NOT QTHR, tel: 01-572 2418 evenings

TR10 4305 HF TCVR, am/cm/ssb, mint condx, c/w Kenwood MC-80 desk/mic, both boxed, very little use, £695. Buyer to collect and inspect. G4UNR, QTHR, tel: 0203 404088.

AMT-1 BY ICS Amtor rtty ASCII decoder with cw facility, C3MHO Eprom driver for BBC Micro available if required, £135, post paid. G3RDC, QTHR, tel: 01-455 8831.

FAX-1 FAX DECODER by ICS Electronics as new, £200 post paid. G3RDC, QTHR, tel: 01-455 8831.

TR10 TS9130, cradle, mic, plugs, handbook, boxed, vgc, £285; CBM-64 progs, superbase database, £20; EasyScript word processing, EasyCalc spreadsheet, Easyfile database, £12 ea c/w prog disks fully documented; CBM-64 Centronics i/face for Epson etc printers, £25. G4H51D, QTHR, tel: 0224 584774.

SILENT KEY SALE: KW Vanguard tx, £40; KW Valiant tx, £40; Heathkit RAI rec, £50; Eddystone 680X rec £80; McMurdo ex-WD/rec 18MHz-200KHz. Sensible offers? Plus other items, buyers collect, items as seen. c/o COBIT, tel: 0252 713642.

SILENT KEY SALE: Yaesu FRG7, £110; AOR2001 scanner 25-550MHz, £250; Altai DM6011A lcd DMM, £20; LAR swl omnichannel atu with rf amp, £30; Datong FL1 freq agile af filter, £40; Nombrex sig/gen no.31, 0.149-350MHz, £20; Micronta 22-024 transistor tester, £10; Tech TE15 GDO, 0.44-280MHz, £20; pair hi-fi ECM mics, £6. All gwo, most with instr manuals, c/o GBVPC, QTHR, tel: Saltford 873098 6.30pm-10pm only please.

GOING QRT, all superb equip worked much dx, P60 western tower, 2off safety winches, inc base unit, head unit, 4yrs, £325; mouth-watering FT1 hf tcvr, fm board, sacrifice, £1,100; FT726R inc 2/70/Gm & sat, £995; FT726R 2m only, inc cw filter and narrow/normal fm filter (work fm dx!), £695; 2m valve linear, built-in pwr supply and CH120 low-loss coax relays, homebrew but superb perf, 140W and clean! £75; mutek 2m 400W rating gasfet & controller, £75; mutek 70cm gasfet & controller, £85; mutek 2m masthead preamp (bipolar), £39; Welz SP400, 140-500 with pep, £50; Hanson FS500V vhf pep meter, £50; Hanson FS500H hf, £50; Daiwa PS300 30A pwr supply, £125; superb Dressler D200S 750W 2m linear, costs new £925, sacrifice £575; KR600 rotator, £90; benchor paddle, as new, £40; MM100W 70cm, £150; MDI desk/mic, £25; Offers for 2off 14-ele Cushcraft 2m, 2off Hirschmann rotators, TAR coax masthead switch, 2off 21-ele Tonna 70cm, much Pope H100 some unused. G4WVI QTHR tel: 091 2684609 daytime. View appointment first.

YAESU FT208R 2m/fm portable tcvr with case, nicad, rubber duck, NC-9C chgr and YM24 spkr/mic, £150. GOGOR, QTHR, tel: Bristol 672114.

SONY ICF 7600D, vgc, £90; also Bearcat 20/20 fb 40-chann scanner £80. Buyer collects. Gainsborough tel: 0427 880545.

AMTOR COMMODORE 64 advanced application prog on cartridge, also capable rtt and cw, new £35; Datacom 5MSC terminal unit assembled and believed OK, £35. GUS2C, tel: 0481 54833.

KENWOOD TR9130 as new, boxed, £350; Tono S50 communications terminal, gwo, £100; Drae loss scan rx, very minor fault, £150. Dave, Wilts, tel: 0980 42419.

FT290R 2m with strap, chgr, nicads, manual, HB9CV ant, £240; R600 gen/cov rx £250; Howes MTX20-CVF20 homebrewed 20m tx, £50. COHMR (G1UBX QTHR), tel: 0252 624358.

PSUs 40A linear 9-16V adj smoothed/regulated, fully wkg, several available, £69 plus £5 postage. Converted ham int Concord II cw fm/am use lsb orig mic, mint, £110. G4XOX, tel: 0245 324555.

WORLD WAR 2 RX R1071 1.2-17.5MHz wkg with lid and circuit diag, second R1071 for spares thrown in; Cossor twin-beam scope 1049 Mk11A wkg. Any offers? Buyer collects from Woking, Surrey. G3ZUJ, QTHR, tel: 01-891 1942.

TR10 TH21E 2m smallest handheld, 2 nicad battery packs, soft case, chgr, antenna adaptor, cigar socket dc-dc ctr lead, noise cancelling spkr/mic, boxed with instr book, £165. Tel: 051-428 6731.

FDK 2m MULTI 700EX, better than FT290, 1-25W o/p with rotary control, hand/mic, instr book, £150; desk/mic, £10. Tel: 051-428 6731.

TONNA 4-STACK 1296 ant, complete, perfect, £80; 4Cx250B qty2, £20ea; Varian Klystron VA222B

4Cx250B qty2, £20ea; Varian Klystron VA222B 7.1-7.4GHz 1W brand new, £50; service manual TR9500 TR9000, £5ea; AR22 synth rx 140-150MHz, £40 G8AVA, QTHR, tel: 0268 752434.

TR10 9500 70cm multimode c/w B09 system base, PS20 pwr supply, SP120 spkr, vgc, £450; Trio 9000 2m multimode, £200; Trio TW4000A dual-bander, £350; 17-ele cross and 17-ele long 70cm METS. Steve, G6KEY, QTHR, tel: 0932 242536.

RADCOM ISSUES: 1980 full set, 1982 April/May/June, 1984 binder of full set, 1985 full set, 1986 full set; RSCB callbooks 1983, 1984, 1985, April 1986, Autumn 1986, callbook foreign listings 1985 and three supplements WRTN 1984 and 1985; Bremi stabilized pwr supply, 13.8V 3A; Television and Radio Handbook 1980 to 1987 inclusive; BBC Handbook 1987; The Radio Directory, Winter 1983, Summer 1984, Summer 1986; TV Directory, Winter 1984/5, Summer 1985, Winter 1985/6; TV and Radio Directory, November 1986. Offers on any of the above? G1JLV, QTHR, tel: 021 400 0030 anytime.

TR10 TS120S vgc, £350; FT290R, mutek, 30W linear, nicads, case, 5/8 co-lin, beam, £300; Durst RCP20, £250; Mamiya C330S, 80mm/55mm/100mm/135mm +case +flash etc, £400; Ricoh XR1s 28mm 50mm 80mm 135mm ext tubes, £225; Daiwa AF606K filter, £60. GOFHY, tel: Worksop 732071.

COMPUTER TELE MODEM suitable for Prestel or ordinary communicat, £50 as new; tvtr 28 144MHz in perf wkg order, only used for short time, £95 as new. GOFLO, QTHR, tel: 061 483 7228.

FT203R +FNB4 3.5W, mint £160; BBC-B +RX4 i/face & locator progs, also some games, £200. All vgc. WANTED: 100W atu, 1.8-30MHz inc swr bridge. Will pay about £100. Jon, GOGHS, QTHR, tel: 0245 352522 anytime.

KENWOOD R2000 RX c/w handbook, dc leads, list price £637, as new £450. WANTED: BNOS 24A psu or one equal excellence specification wanted Sony 2001D urgently FT1012D handbook +spares list £5. Tel: Bristol 500742.

ICOM IC-402 70cm tcvr 19-ele Tonna, £200 ono; Yaesu FT230R 2m mobile, £190 ono; Revco gutter mount, 5A supply. Offers? WANTED: FC707 atu FV707DM external vfo. Chris, G6LRY, QTHR Wantage, tel: 023 57 2205.

SHACK CLEARANCE: Icom IC240, £120 ono; Belcom Liner2, £60 ono; Yaesu FT207R with chgr, 1/4 wave whip and YM24A spkr/mic, £95 ono. All gd condx with handbooks. Also HQ1 minibeam boxed, never used, £120 ono. G4EHJ, QTHR, tel: 0344 775164.

SCANNER REALISTIC PRO 2008 from Tandy, direct entry programmable 8-memories, ranges 68-88MHz 144-174MHz and 410-512MHz manual, £95. WANTED: 137MHz down to 28-30MHz cvtr MM I guess. John, G6PFD, QTHR, Rotherham, S. Yorks, tel: 0709 374747.

FT290R mutek nicads, £255; 30W linear, £40; psu 25A, £65; colinear, £11; Sp-200 swr pwr lkw, £50; SEM atu Ezitune, £65; DX-302 dig rx, £85; BBC-B with rcd, £155. All ex condx. G6VVP, tel: 01-989 3471.

TR10 TW4000A. The ultimate 2m/70cm fm mobile tx/rx 25W both bands; also MA4000 dual-band antenna and diplexer, complete mobile installation, £450. May split and haggle. G4REO, QTHR North Staffs, tel: 0538 722825.

SONY AIR-7. The ultimate portable, programmable, scanning, air-band rx, 108-136MHz am; also 76-108MHz fm and 150 to 219kHz cw, £120 ono. G4REO, QTHR North Staffs, tel: 0538 722825.

HQ1 MINIBEAM WITH COAX Hirschmann rotator, £100 the lot. G4LSB, QTHR, tel: Dean 44329.

YAESU FR7700 antenna tuner, FRV7700 vhf cvtr, 70-80, 140-150, 118-130MHz, boxed and as new, Revcone antenna, unused, covers 50-500MHz, £80. Bob, G1RST, QTHR, tel: Morpeth 790296.

FT290R WITH CHGR, case, little used, £260 or swap for Sony 2001D or FT23R. Ferguson 22" colour tv, £55; 5ft subbed, £90; BMW 323i 2DR, Aug'83, metallic sapphire, PAS, sunroof, stereo, £6,100. G3UYK, QTHR, tel: Winchester 67819.

TR10 TR7800, 2m fm tcvr, £150, p/exch for FT290. G6IUD, QTHR Watford, tel: 0923 50569.

KW2000E TCVR WITH KW110 Q-mult, £160; KW202 rx, £70; KW107 Supermatch, £80; all wkg condx and clean cabinets, buyer collects or pays carr at cost. Sensible offers considered. Brian, G4BPJ, QTHR Penzance, Cornwall, tel: 0736 61211 after 7pm or w/ends.

FT101E, good condx cw filter, double balanced first mixer module fitted, £250. G4AUY, QTHR, tel: Telford 48585.

MIRAGE B3016 2m linear amp, very clean 150W+ o/p specified, £99 ono; terminal configured to use Dragon64 as processor, also driver software plus Flex operating system and various other software, 80-col display separate keyboard, £75. G4UCV, tel: 0732 833662.

2m 4Cx250B LINEAR, built-in psu 300W pep silver plated anode line c/w rf relays, little use, £350. Acorn Electron c/w rtty terminal and software, xtal tone unit, 10-100 baud, split screen, type ahead, 10-memories. Offers? G6P2T, QTHR Essex.

FT1012D FM Mk3 fan mic manual box, ex condx, £485. Prefer buyer inspects and collects. G4MWP, QTHR, tel: 0203 462035.

YAESU FT480R mic mobile mount, vgc, £320 ono; Icom IC255E mic mobile mount, vgc, 5-25W fm, vgc, £150. Sinclair Spectrum Plus, plus microdrive etc, printer and monitor, good progs, £180. G6KLD, Hoveton, Norwich, Norfolk, tel: 06053 3957.

JAYBEAM PBM18 18-ele 70cm 13.5dbd, £10; Trio TS700G all-mode base stn 2m, vgc, £300. G6KLD, tel: 06053 3957.

KW VESPA Mk11, gd condx, two spare PA valves, KW swr meter, KW dummy load, handbooks and circuit. Buyer collects, £75; Mosley TA31JR plus masthead support, roller bearing, 4-guy, approx 22ft 2" mast sleeve bearing, approx 50ft coax, buyer collects, £50; Jaybeam 8XY Yagi approx 25ft coax each section, buyer collects, £17.50. G3YDZ, QTHR, tel: 0502 659222.

ICOM 751 hf tcvr, fitted filters and voice module, £900; AT100 atu, £200; PS15 pwr supply, £70; Kenwood low pass filter, £15. All gd condx. G4SWT, QTHR, tel: 061-2581110.

SONY 20inch professional mono monitor, £25. G3WMT, QTHR, tel: 01-303 1721.

REALISTIC DX160 REC 0.15-30MHz, £75; faulty vhf rotator, £15 (problem lies in control box); KX2 receive atu, £15; FC901 with manual, £115; SX200N, £180. WANTED: Vertical hf antenna SX400, also arri antenna manual/books on antennas. Tel: 0504 265675.

EDDYSTONE 770U, vgc, revalued, manual, £50; Wright and Weaire R1444 reel/reel rcd 8.25", vintage collectors item, £10; Creed 7B toolkit as new c/w jigs, gauges, spanners, lubricants, lined wooden cabinet, £20; Grove CVR-1A scanner: enables 118-136MHz scanners to receive 225-400MHz, £35; Anlod Cambridges low-band, £5ea. WANTED: Circuit details to convert Bearcat 220 to am. G6IDL, QTHR, tel: 0638 76230.

NRD515 RX AND ACCESSORIES, rtty transceiver terminal/vdu, very comprehensive, well-documented, ask for details. Offers? Maplin af sweep gen, £10; Elector tuneable audio filter, high/low pass, two notch, £39; Marconi af sig/gen, manual, £15; Toni Tuna, Vero case, bar leds, £30; ST5 rtty rx T.U, Vero case, ttl o/p, £30; Heathkit HD1250 fet gdo, £35; Maplin 3008D telephone modem, £35; Gould 12V, 10A switch mode psu, as new, £20. G4CXE, QTHR Derbyshire, tel: 0298 78861 after 5pm.

YAESU FT-2700RH 2m/7cm mobile dual-bander (full Duplex cross-band) incl Welz duplexer, £335; Yaesu FT-709R 70cm handheld with FNB3 (3W), FNB4 (4W) and spkr/mic, £250. Bruce, G4WVX, QTHR, tel: 06286 64415.

YAESU FT1012D fm board with Mosely tribander and Daiwa CNW48 atu, £525, will split; Standard CS800 multimode 25W, 5hrs use, £300 ono. G6BZK, Eastbourne, tel: 0323 29214.

TR10 TS830S with 500Hz and 250Hz cw filters, de-luxe tuning knob and service manual, vgc and little used, £800; MC50 mic, £35; YG455C 500Hz cw filter, £55. G3PEK, QTHR, tel: 0244 300897.

AMT2 MICROPROCESSOR CONTROLLED terminal unit RS232 rtty Amtor ASCII morse, £150. G4UVJ, tel: 0268 697978.

3-ELE JAYBEAM 10m/15m/20m, almost new, £200. Tel: 0202 695123.

FT290, £230; FT790, £230; MM432/30L 1W i/p, £100. All accessories, all mint condx. G1BAS, Kettering area. Tel: 0536 743748.

TR10 TH21E/TH41E, 2m and 70cm handhelds, each with soft case, two nicads, chgr, box, £150 and £160 respectively; Akai VS4EK video rcd, remote control, on-screen display, SP/LP, with instrs and service manual, £190. G6NDC, QTHR, tel: 04555 2123

TR10 R100 GCRX 0-30MHz, no mods, c/w manual and orig pkg case, £200. Bill Tingley, Suffolk, tel: 044 086 475.

LATTICE TOWER SECTIONS, triangular cross-section 12.5ft long, h/duty c/w jointing plates, nuts and bolts as required, 4 sections available, £30 per

section. Buyer must collect. G3XBN, tel: 0273 506797 office hours OR 0273 557766 evenings and w/ends.

TR10 TR2500 two nicad packs, chgr, soft case, belt hook, spkr/mic, £180; TR3500 two nicad packs, soft case, belt hook and manuals, £180; Welz SP300 swr/pwr meter, £80; Marconi FT95A/S sig/gen, £60. GWIFY, tel: 0222 708336.

YAESU FT757GX hf tcvr c/w FP757HD pwr supply, FC707 atu and Adonis desk/mic, all units in immac condx, £675 ono. CW3YKZ, NOT QTHR, Newport, Gwent, tel: 0633 858314.

SM220 STN MONITOR fitted BS8 panoramic display, little used, with manual etc, £325; Yaesu FL2100B, gd condx, manual, orig pkg, £275; Heathkit electronic keyer, unused, £30. G3AVD, QTHR, Epsom, tel: 0373 61976

R390A/URR PROFESSIONAL rx with manuals, National HRO Junior, Senior, mx, ST, models, sensible offers? Scarabs rty terminal unit, Spectrum i/face, software, £50; Microwave modules MM2001 rty cvtr, £100; Hallicrafters SX28 Super Sky rider rx, £50. Tel: St Albans 39333.

TR9130 2m MULTIMODE +PS30+B09A base+spkr, all boxed as new, £625, will not split as this is a set. Buyer collects. KR400RC rotator c/w 8-ele quad +2m/70cm vert+all cable+2x18m coax, £100. Steve, G1IEY, NOT QTHR, Croydon, tel: 686 9958 before 9pm.

FT221, muTek front-end, pip tone, £345; 70cm tvtr MMT432/28, £90; MET 17-ele, £25; MML114/100S 2m 100W linear, £90; also 2m Yagis. WANTED 50MHz gear G6XRA, QTHR Glos, tel: 0452 613887.

FRG7 RX, vgc, £85; 15A psu, £30. Will deliver local otherwise collect preferred. Brian, G4VBP, tel: Sheffield 731246 office hours.

ALTRON SM 30ft slimline telescopic mast, wall-mounted, 3ft post hinge, rotator head, KR400RC rotator, Jaybeam LWB/2m, cables, as new condx, £350 the lot. (Cost £500+). G1IJN, QTHR, Poole, tel: 0202 746516.

TR10 TS120V c/w MC35S mic wipe swr bridge and homebrew psu in very gd condx, not used mobile, ideal QRP or tvtr driver, £350 ovno. WANTED: Memory keyer suitable MS variable-speed tape rcd. GOGMS, QTHR, tel: 0403 55011.

ICOM IC275 2m 10 weeks old; IC475 70cm 5 weeks old Kenpro KR600RC rotator 35m elect cable 5 weeks old Offers? G1LCH, tel: 0946 67278.

TR10 9130 2m multimode, vgc, c/w mobile brkt, manual, boxed, £400; FTV 901R tvtr, 2m and 70cm fitted, vgc, leads, boxed, £250. Nick, G6OHL, NOT QTHR, tel: 0244 535696.

YAESU FT480R, £300; Icom IC490E 70cm multimode, as new, £400; BNOS LP144 10/50/2m linear, £80. G6YVS, QTHR, tel: 0427 616977.

ICF2001D 150-30MHz am/cw/ssb, airband 116-136MHz, fm/bcast 76-108MHz etc, brand new (18/6/87); Sony (UK) factory replacement, c/w mains psu+all books cost £329, bargain £240 ono. Genuine reason for sale. Simon, G4ODX, NOT QTHR, Crawley, W Sussex tel: 0293 512924 evenings.

ITT/CREED 2300/5 teleprinter+ plinth+ two line terminal units, 200hrs use from new, £80 ono the lot; Tequipment D52 dual-beam oscilloscope 6MHz bandwidth, full service manual, gd condx, £50 ono. Delivery possible. Simon, G4ODX, NOT QTHR, Crawley W Sussex, tel: 0293 512924 evenings.

TR10 TR9130, 2m multimode, boxed as new, £350; Icom IC490E, 70cm multimode, as new, £350. Both rigs never been mobile. G1ATO, QTHR, Luton, tel: 0582 580395.

SILENT KEY SALES: Yaesu FT101Z with hand/mic, £400 IC22A, £115; KW ZEE-match, £45; Datong auto-notch filter, £50; pwr supply 13.8V 3A, £5; SML SWR25, £7.50; Philips gen/cov rx D2999, £200; Mizuho KX2 atu rx only £12; test meters etc, see for list. Buyer collects or carr at cost. G3IER, QTHR, tel: 0242 583664.

YAESU FT101ZD, £390; Tokyo hi-pwr 144MHz linear amp 0.5W-5.0W i/p 8W-35W o/p, £20; Jaybeam quad four antenna, £10. Simon, Winterbourne, Bristol, tel: 0454 773057.

SALE TIME AT G8PO01 Yaesu FR50B recently calibrated, £60; Epson RX80 RS232/Centronics, as new and boxed, £160; Minor Miracles WS2000 modem with auto-dial and answer, new and unused, £120; pr new CDC 8" disk drives in case with psu and leads, £150; Nascom2 computer with all data, £40; new approx 150 key ASCII keyboard £40; RS console/computer case, new, £40; BATIC testcard/gen with encoder SPC, £50; AMD RS232 terminal new, £150; b/w 24MHz 12" monitor, £20; box of 10 8" disks, £15; Advance 4-230MHz am/fm test/gen, £45; Rogers 4ft

message maker, £50; also motors, meters, crts, videcons, books, ribbons, ICs, psus, tv spares, valves, S100 boards, BBC software, 813s, photomults, trackerball, cameras, manuals etc, etc Too many items to mention. You won't be disappointed. SAE Simon, G8PO0, QTHR, tel: 0661 842389.

H01 minibeam c/w 1:1 balun, £95 ono. Will deliver 40 miles radius Manchester. G6FMP, tel: 0706 817386.

HEATHKIT UMATIC memory keyer, full iambic touch paddles, very versatile, fully digital, keypad entry, also teaches Morse at any speed, brand new, £85. Steve, CM4GTU, QTHR, Aberdeen area, tel: 0224 743039 evenings.

RACAL RA17, rack version, vgc, perfect wo, £140; telescopic mast 27ft with insulated base and guys, £20; 24V dc to 240V ac inverter chgr, £25; mm/lw dig clock/radio & cassette, vgc, £20; 1950s Echo 9" tv, offers? Shaw, tel: 0793 750130.

HY-GAIN TH3-JR 3-ele beam and info, £100; AR-22XL rotator, needs slight attn, £15; buyer collects. G3PJN, QTHR, Chesterfield, tel: 0246 566040.

FT290R, incl muTek front-end, nicads, case, strap, manual, boxed, little used, £230. G4MJM, QTHR, tel: 0375 371475 evenings.

ICOM R71E, immac condx, fm fitted, manual, £595. GOFRM, QTHR, tel: Melwyn Garden City 322862.

WANTED.....

G4EAG/REW TRANSCIVE PROJECT for Yaesu FRG7700/Trio R1000, complete and wkg, bits and pieces, or accessories such as broadband AMP, atu, o/p filter (switchable cut-off). Simon, Merseyside tel: 051 339 4101 extn 629 daytime OR 051 625 7909 evenings and w/ends.

SOFTWARE FOR EINSTEIN - anything considered, send your list for mine, swaps? G1VLT, 23 Prince of Wales Lane, Yardley Wood, Birmingham B14 4LB OR tel: 474 6325 after 6.30pm please.

CENSOUND VHF auto scanner rx MJ666 or handheld vhf/rx with easy access to repeater channels, tel: Burnham on Sea 781513.

DRAKE MN2700 MN7 MN2000 ant tuning unit 500Hz xtal filter for R4C. G4LW, QTHR, tel: Trowbridge 3166.

SUFFOLK/NORFOLK AREA, Trio R1000, Yaesu FT225RD, must be mint/ex condx with manuals, diagram etc, can inspect and collect. FOR SALE: RAF Morse key type D, £26, carr pd. Details to: G3XCK, QTHR OR tel: 0502 64160 evenings.

EARLY WIRELESS AND XTAL SETS; particularly WW1 sets or parts, early valves, horn spkrs, bound volumes "Wireless World", catalogues, prewar tv, also interested tinplate trains and good hf tcvr. Jim Taylor, G4ERU, 5 Luther Road, Winton, Bournemouth, tel: 0202 510400.

DRAKE R4C and T4XC or T4XC only, good condx essential. Ken, G0HJA, tel: 0403 52023.

CIRCUIT OR MANUAL FOR army surplus A-41 tx/rx, also correspondence with anyone using this equip for 50MHz fm work. Spare A41 modules and valves also required. G4WXX, QTHR.

ICOM R70 OR R71E, details condx etc. G1NNE, QTHR, tel: 0388 777398.

HELP! Surplus xtals needed for Kenwood 3200 70cm tx, repeater and su 16 freq. G4ZUE, QTHR, tel: 0203 346819.

ATLAS 210X circuit diag, service manual, operating instr, required urgently. Will photocopy or buy. All costs pd. Lionel, GOGZS, Essex, tel: 04022 28896 evenings.

TR10/KENWOOD ATU type AT200 or AT230. G3FLB, 4 Buckingham Road, Swindon SN3 1JA, tel: 0793 35771.

EDDYSTONE EB35 am/fm broadcast rx, no reasonable offer refused for right model. Contact Fraser, CM4WPU, QTHR, tel: 0382 552295 after 6pm.

GOOD HWB preferably unmodified. G2CNN, QTHR Thetford, tel: 0842 878326.

KENWOOD DIPMETER DM81 or similar. G3ASE, QTHR, tel: 0480 63129.

TS430S HF TCVR, must be in gd condx, prefer model with fm board and am filter fitted, but consider other. Must be fault free. G3WCS, QTHR, tel: 0606

891913.

VERSATOWER P60 OR SIMILAR, tiltover, must be able to deliver; Daiwa HR750 rotator, dummy load 200W or greater. Please write G1VVU, QTHR. Sorry, no phone at present.

SOLIDSTATE HF RIG 3.5-30MHz, QRO, capable of 12V operation, broadband o/p eg FT707 required by Stevenage & Dist Society. Tel: (0438) 724991 OR 350136 OR 720871.

FC902 OR FC901 ATU. Your price paid for gd condx unit. Could collect within 150 miles of Norfolk. G4GIY, QTHR, tel: 0485 41978.

KDK 2m MOBILE MODEL FM144 10SXRII manual or circuit, purchase or loan. G4HQH, tel: 0246 38249.

HELP! TELEQUIPMENT D66 scope requires replacement mains txfr or data. Reasonable costs paid. Else offers for D66 gmo, except mains txfr requires EHT rewind. G6DOM, QTHR.

GOOD HOME WAITING FOR TS130V with cw filter, orig pkg, low mileage and any other redeeming features making it a good buy! G4KJJ, QTHR, tel: 0480 68330 anytime.

9-ELE TONNAS. If you have one for sale call me, as I need four for my new antenna system. Also 21-ele old-style Dx70cm Tonna, Julian Iether, Highview, Banbury Lane, Culworth, Banbury OX17 2AX, tel: 0295 768152.

HEATH SB610 MONITOR, with manual. Details and price please. G4FVV, QTHR, tel: 0786 811237.

KW204 OR COLLINS 3253 tx KW107 KW228, must be good condx; KW2000 series psu, any condx. FOR SALE: Trio 240 vfo, mint, £80 ono. GOGGI, QTHR Cumbria, tel: 0229 89635 anytime.

ROTATOR MEDIUM DUTY Bell such as KR400/KR400RC/AR40/CD45 for pole mounting. Must be vgc, little used, or new. G6ZH, QTHR, tel: 0491 651259.

PYE R/T service manuals for W30AM, W15AM boot mounts, also PF2AMB portables. Will buy or copy. Alan G1OKB, QTHR, tel: Sheffield 863541.

YAESU FT101ZD with WARC bands and fm facility, in good wkg condx, possibly with accessories. Best offered, secures £500 cash. If you are selling, please call Eddie, G0AQI, QTHR, tel: 01-445 0528 evenings and w/ends.

YAESU FT290R with mods, must be in mint condx. Also Yaesu FP80A psu and Trio P530 psu. Stan Hunt, G1VUK, tel: 01-230 4001 office hours.

COSSOR 1930 MELODY MAKER, sold in kit form with pwr unit, blue crackle case. G1MMH, QTHR.

CIRCUIT DIAG OR HANDBOOK for Marconi sig/gen TF1064/B5; also xtal filter for Totsuko TR2100M; also handbook for Pye fm Olympic. Usual arrangements. ANY information gratefully received and your price paid! G4EAB, Wolverhampton, tel: 090 722 2349.

ICOM IC202S ssb/cw tcvr, AT120, SP230, SP120, G-whip antennas, any mobile atu. FOR SALE: Hi-mount key HK707, £10, sstv handbook, £5; Scott Taggart Book of Practical Radio 1934, £5 Handbook of Wireless Telegraphy vol 2 1938, £5. Tel: 0952 79792 evenings.

HELP WANTED to complete my KW line-up KW107 KW109 atu. Price and particulars. G0EHO (ex-G8PDR), QTHR Bradford, tel: 0274 572406 evenings.

TRIBANDER BEAM, tower and rotator. Details please to Dave, tel: 0792 795517, 9am-5pm weekdays.

TR10 KENWOOD AT230 atu, must be in gd condx. Ron, G3AWK, QTHR, tel: 0522 753136.

DRAKE RX, model and condx not important. Cash or exch gen/cov Eddystone 830 5-30MHz. G8CKM, QTHR, tel: 0939 250679.

YOUR PRICE FOR SALE or loan of service info for Philips VR2022 vcr, Pye 20VR22, also info and cct for Trio 9RS9D rx, around £30 offered for Hansen or Welz hf pwr/swr meter in gmo. G3VRU, QTHR.

IC251E C/W muTek board. Must be in gd condx and would prefer with orig pkg. G6JNS, QTHR OR tel: 0905 620041 and leave a message with Charles if I am out.

DRAKE MODEL 1531 M57 matching spkr. GOGVO, QTHR, tel: 0753 653553.

OSKARBLOCK SWR METER twin dials. Howard, G1WQZ, tel: 0394 460 474.

SERVICE DATA ON COLLINS R 388 URR. Will pay deposit to ensure return of any data on loan. G2AVI, QTHR, tel: 0227 37 4774 anytime.

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432.5B	5 Ele	9.2dBd	£19.49 B
432-19T.ATV	19 Ele	14.2dBd	£40.94 A
432-17X	17 Ele Crossed	13.4dBd	£56.55 A
432-17T	17 Ele Long	15.0dBd	£45.08 A
2M			
144.5	5 Ele	9.2dBd	£22.48 A
144.7T	7 Ele	10.0dBd	£27.77 A
144.8T	8 Ele Long	11.0dBd	£35.95 A
144.14T	14 Ele	13.0dBd	£53.72 A
144.19T	19 Ele	14.2dBd	£64.26 A
144-6X	6 Ele Crossed	10.2dBd	£45.71 A
144-GP	Ground Plane	Unity	£16.57 B
4M			
70.d	3 Ele	7.1dBd	£34.64 C
70.5	5 Ele	9.2dBd	£52.60 C

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CODE	MODEL	GAIN	COST inc. VAT
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50/2	2 Ele	4.7dBd	£32.00 A
50/3	3 Ele	7.1dBd	£39.95 A
53/5	5 Ele	9.2dBd	£59.90 A
CK50	50-2-50/3 Conversion Kit		£11.50 B
POWER SPLITTERS			
70cms	2 Way		£23.46 B
	4 Way		£27.60 B
2M	2 Way		£30.60 B
	4 Way		£34.50 B
SE/4/432	Stacking/Frame		£29.75 B
NON-METALLIC MAST			
RPM 1.5M (1 1/2" dia) With Fixing Clamp			£19.75 B
RPM 3.0M (1 1/2" dia) With Joiner and Resin			£39.50 B
RPM 1.5M (2" dia) With Fixing Clamp			£22.25 B
RPM 3.0M (2" dia) With Joiner and Resin			£44.50 A



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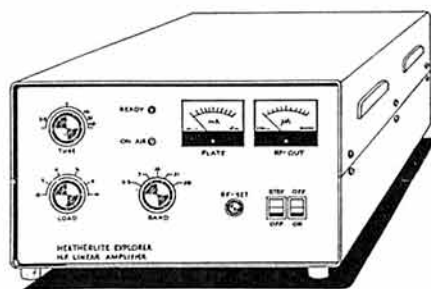


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The program comes with an adapter board which plugs into the Spectrum expansion port and accepts the interface or T.U. It will work with any 48k/128 Spectrum, including the +2. Tape + adapter £35. Users of our CW QSO program can upgrade for £25. BBC and CBM64 programs £20 tape, £22 disc.

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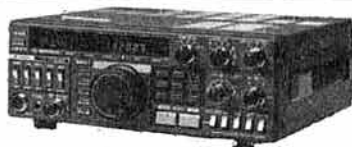
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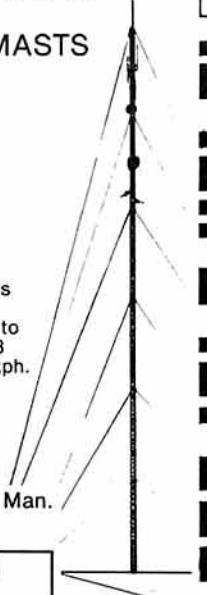
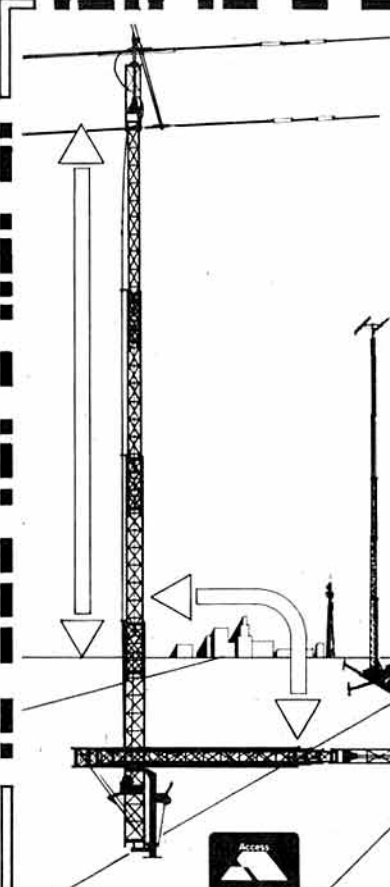
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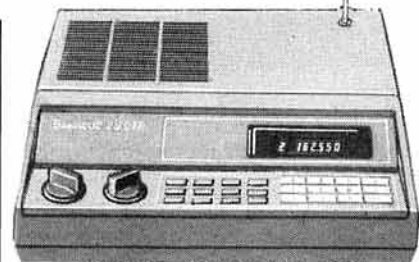
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Hit hard-to-reach repeaters with a powerful 5 watts on both 2 meters and 70 cms.

Work the bands quickly and easily with a wealth of microprocessor-controlled commands:

Jump between the separate VHF and UHF VFO registers. Program each of the ten memories for instant recall of repeater input and output frequencies and odd splits.

Scan the memory channels, the entire band, or a band segment. And return to any special frequency with the priority feature.

Conserve power with the battery saver. It lets you monitor silently

while drawing negligible current. And measure your battery level with the digital battery voltmeter. There's even a "Low Battery" LED.

Finally, your operation is rounded off with features like VOX capability. A one-touch repeater reverse switch. An LCD readout with illumination lamp. A high/low power switch. Remote computer control capability. And Yaesu's full line of optional accessories.

So step up your operating capability now with the logical choice in portable operation.

Yaesu's dual-band FT-727R.



YAESU

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