RADio COMmunication

May 1987

Journal of the Radio Society of Great Britain

RSGB

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FRONT COVER

John Butcher MP, Secretary of State for Industry and Joan Heathershaw, G4CHH, at the opening ceremony of the RSGB's National Convention held at Birmingham on 27, 28 March.

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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.

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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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It may be important

to other amateur radio manufacturers to offer equipment that, first and foremost, is built around an all-singing, all-dancing microprocessor. It may be that the real need of the radio amateur, to communicate with the least fuss possible, was forgotten long ago. The approach from KENWOOD has always been different. Equipment reviewers have spoken for many years of "excellent ergonomics", the ability to pick up a piece of KENWOOD equipment and operate it first time with no reference to the user's handbook.

The three new models featured on this page continue this design policy; equipment built to a high specification that are a pleasure to own and use.

the NEW handheld from KENWOOD, the TH215E

Having used a TR2600E since its introduction, I must admit I could not see how it could be greatly improved. However, by making one simple change from previous models, the TH215E 2 metre handheld has become much easier to use. On the earlier TR2500 and TR2600E two buttons had to be pressed each time a frequency in memory was required. On the TH215E a memory is selected by pressing one button. A small alteration, but one that has changed the character of the handheld and brought it even more into line with the amateur's requirements.

A rugged diecast metal case adds to the strength of the handheld. For greater flexibility the TH215E operates on DC voltages from 7.2 to 16 volts. An external power supply connection is included on the rig's top panel (use optional power cable PG2V or PG3C). Output power is dependent on voltage. Switched to its high power setting, the TH215E produces 2.5 watts at 8.4 volts. This increases to 5 watts when supply is 13.8 volts. On its low power setting the output is approximately 500 milliwatts.

Making the microcomputer work for you, as opposed to you working for the microcomputer, has resulted in a truly flexible piece of equipment. The stepping rate when using up/down frequency shift buttons can be user programmed in either 5, 10, 15, 20 or 25 kHz steps. The repeater offset can also be programmed to shift from 100 kHz to 9.900 MHz.

Length of operation has always been a problem with the handheld transceiver. The TH215E with its battery saver successfully gets over this by switching off the receiver. The actual length of time the receiver is off can be determined by the user. In addition a comprehensive range of optional nicad packs are available which will extend operation. These are the PB1 (12V, 800mAh), PB3 (7.2V, 800mAh) and the PB4 (7.2V, 1600mAh).

The TH215E has ten memories which store frequency, frequency step and whether the rig is to operate in simplex or repeater mode. Memory 1 is also used as a priority channel and memories 8 and 9 serve to define the limits of programmable scan. There are three modes of frequency scan, band, memory and programmable. The receiver also has three stop/resume scanning modes. These are seek (where the scan instruction is cancelled once a signal is found), time (where the set holds on an occupied channel for approximately 5 seconds) and carrier (where the scan is held until the carrier drops.)

The transceiver also has reverse repeater, an illuminated display for night operation, priority channel operation so that an expected call is not missed, a lock which disables either transmit or keypad functions and an indicator which tells that the battery voltage has fallen below the level for good communications.

The KENWOOD TH215E comes complete with PB2 nicad (8.4V, 500mAh), nicad charger and helical aerial.

TH215E "2 metre hand held" £258.00 inc VAT carriage £7.00

the NEW TM221E common sense in a high power mobile

telephone and ask us why.

and TW4100E.

The NEW TW4100E dual band (2 metres and 70 centimetres) FM mobile transceiver follows on from the well-known TW4000A. Producing 45 watts on 2 metres and 35 watts on 70 centimetres the transceiver is 150 mm wide, 200 mm deep and 50 mm high. Unlike its predecessor, the TW4100E has full duplex facilities (you can transmit on 2 metres whilst, at the same time, receiving on 70 centimetres or vice versa).

All prices subject to confirmation

LOWE ELECTRONICS LTD.

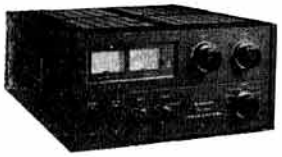
Chesterfield Road, Matlock, Derbyshire DE4 5LE
Telephone 0629 2817, 2430, 4057, 4995.

send £1 for complete mail order catalogue.

station accessories

TL922 HF amateur band linear amplifier

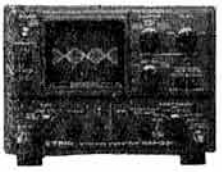
The TL922 is a class AB2 grounded grid linear amplifier using two high performance EIMAC 3-500Z tubes. It covers 160 to 10 metres for SSB, CW and RTTY modes of operation. Engineering perfection, those who have seen a TL922 will know what I mean. It is one of the few items of amateur radio equipment which 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 . . . £362.00 inc VAT, carriage £7.00
BS8 . . . £81.22 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 it 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 . . . £1095.00 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 . . . £895.00 inc VAT, carriage £7.00

send for the KENWOOD detailed leaflet

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 ST930S and it now has a place high in the affection of radio amateurs. Modes of aperation 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 . . . £1750.00 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 . . . £1195.00 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 . . . £995.00 inc VAT, carriage £7.00

All prices subject to confirmation

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Chesterfield Road, Matlock, Derbyshire DE4 5LE
Telephone 0629 2817, 2430, 4057, 4995.

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AR2002 interface.

AR2002

RC PACK

Now available for the AR2002 is an RS232 interface (RC PACK) which consists of an 8 bit CPU with its own ROM and RAM.

Designed to be connected directly to the AR2002 or with an additional adapter to the AR 2001, the RC PACK gives two methods of controlling the receiver.

Using the internal software and with your own computer acting as a dumb terminal, the RC PACK provides 50 memory channels, 10 search bands, selectable up/down steps and adjustable delay times etc. You can also assign station descriptions to each listed memory.

If you wish to write your own programs using the RC PACK as an interface then "the sky's the limit".

For those who own a BBC computer we have designed an additional control system which is available in ROM.

The RS232 settings of the interface are 8 bit, no parity, 1 stop bit and either 2400, 4800 or 9600 baud (internally switchable).

AR2002.....**£487.30** inc VAT carriage £7.00
RC Pack.....**£255.63** inc VAT carriage £7.00
ARPROM (BBC).....**£10.00** inc VAT carriage £1.00

DAIWA meters.

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

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

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

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

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

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

CN410M

NS660P

NS448

CN460M

data communications equipment.

CD600. . .RTTY, CW, ASCII, TOR, AMTOR decoder, output for UHF television, monitor and printer, can also be used as morse tutor. . .**£215.14 inc vat**, carriage £7.00.

CD670. . .A higher specification RTTY, CW, ASCII, TOR, AMTOR decoder complete with liquid crystal dot matrix display, variable RTTY shift, normal/reverse mode switch, outputs for TV, monitor and printer and can also be used as morse tutor. . .**£327.77 inc vat**, carriage £7.00.

CD660. . .Similar to the CD670 but without the built-in display. . .**£264.97 inc vat**, carriage £7.00.

LOWE SHOPS

In Glasgow.
the shop manager is Sim, GM3SAN,
the address, 4/5 Queen Margaret Road, off Queen Margaret Drive, Glasgow, 041-945 2626

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the shop manager is Hank, G3ASM,
the address, 56 North Road, Darlington, 0325 486121.

In Cambridge.
the shop manager is Tony, G4NBS,
the address, 162 High Street, Chesterton, Cambridge, 0223 311230.

In Cardiff.
the shop manager is Carl, GW0CAB,
the address, c/o South Wales Carpets, Clifton Street, Cardiff, 0222 464154.

In London.
the address, 223/225 Field End Road, Eastcote, Middlesex, 01-429 3256.

In Bournemouth.
the shop manager is Colin, G3XAS,
the address, 27 Gillam Road, Northbourne, Bournemouth, 0202 577760.

Although not a shop, there is on the South Coast a source of good advice and equipment, John, G3JYG. His address is Abbotsley, 14 Grovelands Road, Hailsham, East Sussex. An evening or weekend call will put you in touch with him. His telephone number is 0323 848077.

LOWE ELECTRONICS SHOPS are open from 9.00am to 5.30pm Tuesday to Friday and from 9.00am to 5.00pm on Saturday. Shop lunch hours vary and are timed to suit local needs. For exact details, please telephone the shop manager.

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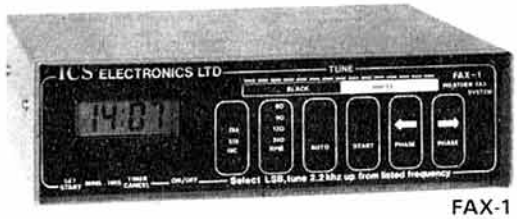

FAX-1

The World's first 5 mode terminal unit!

Now, PACKET, AMTOR, RTTY, CW, ASCII transceive in one compact, intelligent terminal unit. Works with any computer equipped with an RS232 interface. Incorporates a no compromise HF Modem, with an 8 pole bandpass filter followed by a limiter/discriminator with auto threshold correction. The correct bandwidth is automatically chosen for the mode selected. A front panel switch allows selection between two transceivers. No more switching cables when moving from HF to VHF. All code conversion is taken care of by the internal Z-80A processor. Built-in tuning indicator. 12 volt D.C. power requirement. User friendly application programs/interface cables available for many popular personal computers.

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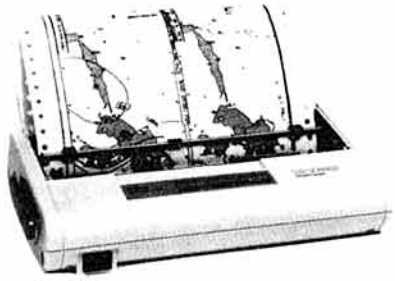

FAX-1a
PRINTER

New HF Fax Receiver price breakthrough!

UK designed and produced, you can now obtain weather maps, press photographs and satellite cloud cover detail on any Epson FX-80 compatible computer printer with amazing clarity. Do not confuse with other products offering only a low resolution screen display. They do not even come close to the FAX-1 in image clarity. Built-in tuning indicator. All standard R.P.M. and I.O.C. rates. Fully automatic operation (including START; RPM, IOC selection). 1:1 picture aspect ratio. 12v D.C. power requirement. Built-in tuning indicator. Built-in clock and timer. Battery powered compatible printer available for Marine, mobile applications. Needs only audio from an HF receiver and a suitable printer to operate. PRINT QUALITY COMPARABLE TO PROFESSIONAL UNITS AT ONE FIFTH THE PRICE!

Send for details and print sample.

FAX-1 ONLY **£279.95** inc VAT (£3.50 p&p)

FAX-1A (portable printer) **£458.85** inc VAT (£4.50 p&p)

NEW

PK-87

At last, a successor to the PK-80!
A brand new Packet Radio TNC from AEA

The Host mode of the new PK-87 can be utilized to improve terminal program operation.

Four new commands allow you to restrict the use of your station for both connects and as a digipeater. The Mailbox monitoring command allows monitoring without displaying the callsign headers, while standard monitoring includes both MFROM and MTO lists.

Software commands are used to select the terminal baud rate, the Packet baud rate (45-9600), and modem tones 1070/1270, 2025/2225, 1200/2200. Built in HF modem.

Hardware improvements also make the PK-87 stand above the rest. In addition to standard Data Carrier Detect, Push to talk, Status, and Connect indicators, the PK-87 has front panel LEDs for operation mode (Converse, Transparent, Command) and multiple connects. The PK-87 uses a Zilog 8530 SCC for hardware HDLC. The Modem disconnect of the PK-87 guarantees compatibility with high speed modems in the future.

A new generation of Packet terminal node controllers begin in 1987 with the new AEA PK-87.

PK-87 ONLY **£172.50** inc VAT (£3.50 p&p)

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Terminal unit still available **£245.00** plus £2.50 p&p

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Access VISA

THE RUMOURS ARE TRUE, WE COULD NOT KEEP THIS NEW HIGH-GRADE HF TRANSCEIVER QUIET FOR LONG.

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.

ICOM

IC-761, HF TRANSCEIVER with General coverage receiver.

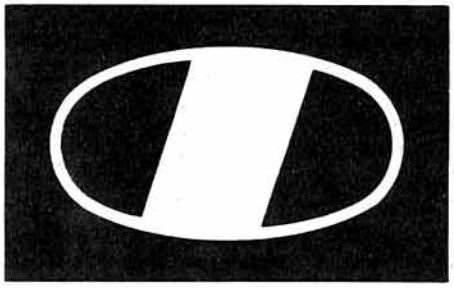
The new ICOM IC-761 H.F. Transceiver has many features making it probably the best top of the line Amateur transceiver available today. This all mode transceiver features an internal aerial tuning unit and A.C. power supply. The A.T.U. boasts a 3 second band selection and tune up with a VSWR matching 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.
This new equipment is fully compatible with existing ICOM accessories such as the IC-2KL 500 watt linear amplifier. Here we believe the IC-761 will set a new trend that others will surely follow. For more information please contact your nearest ICOM dealer.

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.

AND THERE'S MORE... NEW PRODUCTS FROM



ICOM

IC-475 ICOM's fantastic all mode UHF transceiver brings fixed mobile and portable operations to the discriminating amateur and OSCAR operator. Featuring 25 watts output, 99 memories, scanning, priority channels. Only 5 seconds for 99 memory channel scanning. Direct digital synthesiser and CI-V communications interface.
Options AG35 external pre-amp, SM8 desk microphone.

IC-MICRO 4 ICOM's micro 70 centimetre FM handportable, small in size, big in features, 10 memories, LCD readout, power saving, 1.5 watts output., Includes A.C. wall charger, flexible antenna, wrist strap, BP22 Battery pack. Options available, variety nicad packs, and cases, HS10 boom microphone and headset HS10SB., BC50 fast charger.

ICOM TEST METERS ICOM have introduced a range of test meters for the radio amateur. These new models would be a useful addition to any ham shack.
The DM10 is a digital pen type volt/resistance meter. The LCD display shows measurement in the range, D.C. volts 0.1mV-500V, A.C. volts 1mV-500V. Resistance 0.1.ohm-20M ohm. Its small size (21W x 31H x 161L) makes it an ideal handheld test meter.
The DM20 is a digital pocket type volt/resistance meter. The large LCD display shows measurement in A.C. and D.C. volts 1mV-450V, and resistance 0.1.ohm-200K ohms. This test meter is ideal for portable use, its size (51W x 106H x 10D) making it a useful piece of equipment to carry in your pocket.
The DM500 is the top of the range digital meter. The large LCD display shows measurements in the range, D.C. volts 0.1mV-1000V, A.C. volts 1mV-750V. Resistance 0.1ohm-20M ohms. DC current 0.1uA-10A. This meter measures 70W x 14H x 34D and is ideal to cope with most applications in your radio shack.

STOP PRESS! The ICOM Micro 2, 2 meter mini handportable is now reduced in price. The new R.R.P. is £239.00 and remember, all ICOM handportables include an antenna, a nicad battery pack, a wall charger, wrist strap, and full operating instructions. A host of accessories are available to complement this superb range of hand portable amateur equipment.

Telephone us free-of-charge on:

HELPLINE 0800-521145.

Mon-Fri 09.00-13.00 and 1400-17.30

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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This VHF/UHF tri-bander is truly under-rated—full duplex capability and twin VFO's

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* Dual metering
* Neat and highly **professional** unit

CALL IN AND TRY ONE—YOU'LL BE IMPRESSED!!

NONFICTION RECEIVER

CAT SYSTEM

FT 23 2m handie
FT 73 70cm handie

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HF Tcvr 1.8–430MHz

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ATU's	HF bands ATY 200W PEP	**115.00**	**HI-MOUND MORSE KEYS**			**MS 100**	Mobile Speaker	**10.35**
HC 200			**HK 702**	Up down keyer marble base	**42.00**	**T 100**	100 W Dummy Load	**38.00**
HC 400L	HF bands ATU 350W PEP	**199.00**	**HK 703**	Up down keyer	**38.35**	**T 200**	200 W Dummy Load	**56.00**
LINEARS VHF			**HK 704**	Up down keyer	**26.35**	**T 30**	30 W Dummy Load	**8.50**
HL 30V	30W 2m linear 0.5–3W input	**54.00**	**HK 705**	Up down keyer	**22.00**	**YM 1 X**	SWR/Power meter 3.5–150MHz	**28.50**
HL 35V	VHF linear 0.5–5W (3W in 30W out)	**76.00**	**HK 706**	Up down keyer	**21.80**			
HL 110V	110W 2m linear	**199.00**	**HK 708**	Up down keyer	**21.50**	**T 430 N**	144–430MHz 120W	**55.00**
HL 160V	160W 2m linear 10W input	**254.00**	**HK 802**	Up down solid brass	**112.54**	**T 435 N**	144–430MHz 200W	**59.00**
LINEAR UHF			**HK 803**	Up down brass	**107.75**	**YS 60**	1.6–60MHz 20/200/2kW	**81.00**
HL20U	20W 70cm linear	**82.90**	**HK 808**	Up down keyer	**66.95**	**YS 500**	140–525MHz 4/20/200W	**79.00**
HL 60 U	60W 70cm linear 10W input	**215.00**	**MK 704**	Twin paddle keyer	**22.50**	**AD 2**	140–525MHz Duplexer	**23.00**
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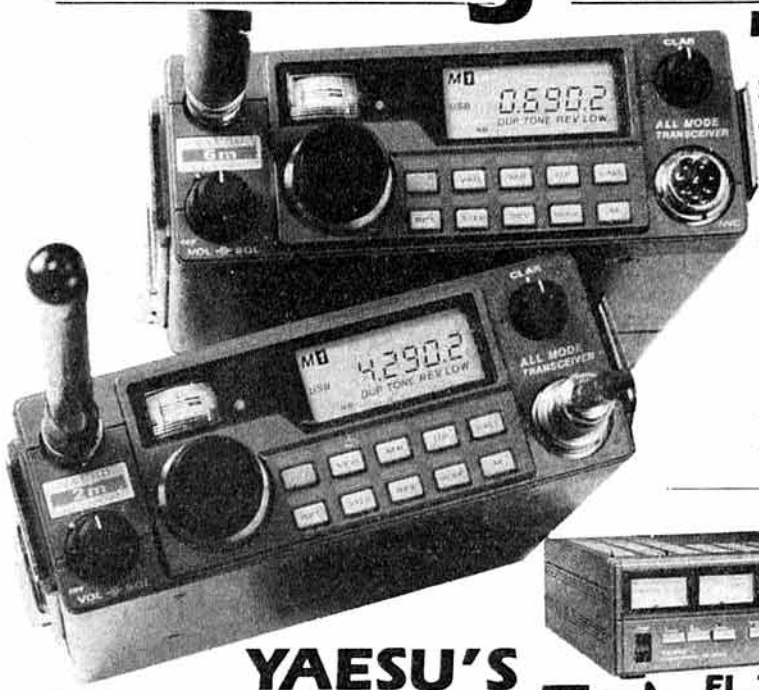

FT 290 R Mk II — 2 metres

See it, try it and really believe it! This amazing and **VERSATILE** multimode. Ideal portable/base, but ESPECIALLY **mobile**. It's a different rig altogether!

Latest features:

* Optional 25 W p.a.
* Speaker mike
* Noise blanker
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FL 7000 Qsk Linear 1.2kW

FRG 8800 All mode Gen. Cov. RX

FT 727 R Dual Band

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			50/726	6m module	**249.00**	**FVS 1**	Voice synthesiser module	**27.50**
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FRG 8800	Gen. Cov. RX 150kHz–30MHz All mode	**639.00**				**FVS 1**	Voice synthesiser 270R/ 270RH	**27.50**
			MMB31	Mobile mount	**16.50**			
FRG 9600	650–950MHz Scanner	**550.00**	**NC26C**	Charger	**10.50**	**FT 727 R**	Dual Band Handie	**390.00**
FRV 8800	Converter 118–174MHz	**100.00**	**FT 980**	HF transceiver with gen coverage RX (CAT system)	**1750.00**	**FL 7000**	Solid-State Qsk Linear 1.2kW	**1600.00**
NTSC	Video Unit for FRG 9600	**12.00**						
FT 767 GX	HF Tcvr 1.8–430MHz	**P.O.A.**	**1550.00**	External speaker with audio filter	**75.00**			

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FT770RH 70cm mobile 25/3W 12.5/25 kHz steps	~~£495~~ £395

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FT767GX **£1,550.00**

South Midlands Communications, YAESU's prime UK importer and distributor, presents the widest possible choice of Yaesu equipment for the radio amateur.

It will be years before the other manufacturers catch up with Yaesu's FT767GX. It offers so many features as standard fitting that the competition are still offering as "extras" at additional cost. What other amateur dedicated transceiver offers full on-board fitting of 2M/6M/70cm AND iambic keyer AND 600Hz CW filter AND die cast chassis ducted flow cooling AND tunable audio filter AND auto antenna tuner AND digital SWR meter AND direct VHF/UHF frequency readout AND . . . Well, come and see for yourself at our showroom at Eastleigh or one of our branches. We'll be pleased to see you. Talking of HF transceivers we maintain huge stocks of HF gear to meet all requirements.

FT757GX C/W FP757GT
~~£1169~~ **£895.00**

The Yaesu FT757GX is a fantastic performer, both as a base station and mobile. Mains or 12V DC makes it ideal for mobile/rally operation PLUS dual VFO's PLUS eight memories PLUS selectable frequency scan PLUS 100W PEP o/p at 100% duty cycle in all modes.

Both the above superb transceivers have full general coverage Rx, employ high (45MHz) I.F.'s and superb filtering for winkling out your signal from the QRM.

FT757GX + FP757GT **~~£1169~~ £895**

FT980 **£1750.00**

Still in stock for the connoisseur and professional users we have the superb FT980 and FT ONE respectively. Yaesu's superb FT980 is the 'classic' amateur bands transceiver incorporating all the best attributes of professional transceiving together with up to date micro-electronics. Two independent front ends are provided giving superb dynamic range on both general coverage Rx and ham band Rx. The FT980 uses MRF422s in the final on 24V. They hardly have to work while putting out a clean 100 watt signal.

For those who aspire to the ultimate in professional communications on HF we offer the Yaesu FT ONE. At a fraction of the cost of a commercially available transceiver the FT ONE has it all and performs consistently to the highest standards.

Die cast front panel, computer style plug in P/C boards, scanning on hand mic facility, every conceivable R.F. spectrum control, optional RAM board to prevent loss of stored frequencies in case of power failure, automatic scanning, full QSK and full temperature/SWR protection on the P.A. stage.

The above selection is a small sample of the very wide range from the no 1 UK distributor of Yaesu equipment. Call in and sample the delights of Yaesu with S.M.C.

You know it makes sense.

FT-ONE **£1995.00**

FT-211RH

- Very simple operation
- Reversible sloped front panel
- Green back-lighting on L.C.D.
- 10/45 Watts switchable output

£299.00

- Ten memories (inc. repeater splits)
- One touch repeater reverse
- Priority channel monitoring
- 12.5/25KHz steps

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LISTEN TO THE WORLD TALKING ON YAESU

FRG9600M **£550.00***

FRG-9600M

The FRG-9600M is an all mode scanning receiver that provides features never offered before, covering 60-950MHz continuously, with 100 keypad-programmable memory channels.

In addition to FM wide (for FM and TV broadcasts), FM narrow (for two-way business and amateur communications) and AM wide and narrow (for aeronautical and amateur communications), the FRG-9600 also provides SSB (single sideband) reception up to 460MHz, allowing monitoring of amateur CW and SSB, and the new ACSB mode now used experimentally as the mode of the future for VHF. A front panel tuning knob is provided to simplify tuning of SSB and narrowband AM. Seven tuning/scanning rates between 100Hz and 100kHz assure fast and efficient scanning while still permitting easy tuning of narrowband signals.

The scanning system allows either full or limited (keypad programmed) band scanning as well as memory channel scanning, with auto-resume.

A 24-hour clock/timer is included, along with a recorder output, for automatic power on/off switching and recording. Additional jacks provide cpu band selection outputs, multiplexed (FM wide) output, AF and RF mute and other control signals for maximum expansion potential with future options or for those who wish to provide their own add-on hardware for special applications.

The Yaesu CAT System provides a direct control link to the cpu in the FRG-9600, allowing operators with personal computers to add virtually unlimited customized control functions in software; such as multiple, organized memory banks; automatic tuning; and customized scanning systems.

FRG8800 ~~**£639.00**~~ **£619.00***

FRG8800

Featuring a large liquid crystal display with 100Hz frequency resolution and including a unique S/SINPO "bar graph" type indicator, the FRG-8800 also incorporates a 21-button keypad for digital frequency entry and programming of the 12 internal memories and multi-function scanner. AM, SSB, CW and FM modes are pushbutton selectable with both wide and narrow bandwidths (exc. SSB), and all mode data is stored in the memories along with frequency.

Selectable AGC rates, noise blanking widths and tuning rates are provided to ensure comfortable listening and easy operation even under adverse band conditions. Two 24-hour clocks with an automatic timer are provided for selectable display of local and universal time, and automatic power switching of the receiver and auxiliary recording equipment at preprogrammed time and frequency. All-mode squelch, tone and attenuator controls are also provided.

At the heart of the FRG-8800 is an 8-bit cpu controlling all of the tuning, mode selection, scanning, memory and clock functions. Three scanning modes are available through the keypad, by which either all or only selected memories can be scanned, or all frequencies between two memories (at selectable rates and steps).

The Yaesu CAT System allows operators with personal computers to add other functions as desired, such as unlimited additional memories, automatic tuning, customized scanning systems and even voting reception, using almost any personal computer and a Yaesu FIF CAT Interface Unit.

The FRV-8800 VHF converter, which mounts inside the FRG-8800, is available as an option to add the range of 118 to 173.999 MHz to the receiver. £100.00 inc.

AR2002 **£492.00***

AR2002

The AR2002 receiver provides high performance monitor and surveillance reception over a wide frequency range of 25-550MHz and 800-1300MHz. The wide frequency coverage, combined with reception modes of AM, NFM & WFM, make the AR2002 a versatile unit for a range of applications.

The two frequency ranges are covered in selectable increments of 5kHz, 12.5kHz or 25kHz, and any mode of reception can be used at any frequency or channel spacing.

Control of the AR2002 is either from a professional keyboard allied to a front panel tuning control which allows conventional rotary up/down tuning or by external control, an interface outlet being provided on the rear panel of the receiver. Twenty memory channels are provided, with easy keyboard entry and recall. Each memory channel stores frequency and mode information without any restrictions. The memories can be recalled manually, or may be automatically scanned in sequence for unattended monitoring. The complete frequency coverage of the receiver can be scanned in 5, 12.5 or 25kHz steps, and a further facility is the ability to search between two user programmed limits with high to low, or low to high searching.

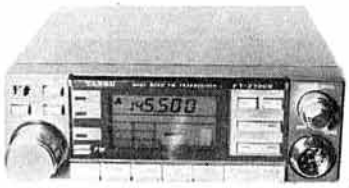
Front panel readout of information is by liquid crystal display which shows frequency, mode, memory channel number, frequency increment, delay engaged, channel lockout, etc. A bar type signal strength meter allows comparative measurements to be made, and aids in direction finding applications. A crystal controlled real time clock is provided in the AR2002, and time readout is also by the liquid crystal front panel display.

NRD515 ~~**£1132.00**~~ **£999.00***

NRD515

NRD515 by JRC is one of the finer receivers on the H.F. Broadcast Receivers Market today. Die cast front panel and aluminium chassis give the 515 strength and stability whilst electronic switching and JRC's long tried methods of RF resolution result in a receiver of excellent quality and performance. NRD515 has Pulse Controlled Digital VFO ensuring error free frequency setting and high stability crystal controlled PLL. The result is a receiver of impeccable performance and rock-steady stability.

At the time of writing we have only two of these receivers (ex demonstration) in stock. Phone us today for a price. You might be surprised!!



FT270RH ~~**£469.00**~~ **£399.00***

FT270 RH

FT-270 RH provides 45W in the high power mode. The "LOW" switch on the front panel allows reduced output power (5W).

Extremely rugged construction includes a unique diecast aluminium duct-flow heat sink, which serves as the main chassis for the transceiver. This innovative design technique results in high power transceivers smaller than competing designs of much lower capability.

Dual VFO capability, ten memories, programmable band scan limits, scanning steps, and two 4-bit microprocessors offer a host of convenience features that save you operating time. You can memorize a number of scanning parameters to maximize performance. For example, you may set upper and lower limits for band scanning, or scan the memories looking for a busy channel. You may also watch a priority channel for keeping track of a favourite repeater.

Two scanning modes are also provided, allowing either fixed (6 sec.) or carrier-controlled scan resume after the scanner has halted on an active channel.

FT290RII ~~**£429.00**~~ **£419.00***

FT-290R II and FT-690R II

Just three knobs and 10 keys make these sets really easy to learn and easy to use, while the latest microprocessor technology ensures that you have all modern features you might need: like ten memories holding mode, simplex or split (repeater) frequencies; two independent VFOs, priority and full or limited band scanning, one-touch reverse split, and all mode squelch. The analog meter shows received signal strength, and relative transmitter power output.

Special features for convenient FM operation include three selectable FM-channelized tuning/scanning steps plus 1MHz giant steps, analog S-meter and PO meter, and full functions for operation through repeaters, such as push button reverse split and an optional Tone Burst generator.

Selectable SSB and CW tuning/scanning steps of 25/100/2500 Hz are provided, along with 100kHz giant steps. Semi break-in keying and sidetone are provided for CW, while the all-mode noise blanker and receiver clarifier control make for comfortable SSB and CW VHF DXing.

The lightweight die-cast chassis and chip component construction make these sets tough, for reliable operation under really rough portable and mobile conditions, yet small and light enough to carry around comfortably all day long.

The 25-watt, 2m FL-2025 and 10-watt, 6m FL-6020 linear power amplifiers* mounted in the MMB-31 mobile bracket turn the FT-290R II and FT-690R II into super compact multi-mode mobiles. The main transceiver body can be slid into and out of the bracket/amplifier combination, for instant installation and portable conversion.

With a base station AC power supply, the FL-2025 and FL-6020 clip on to the FT-290R II and FT-690R II to make ideal full power base stations, without taking up the space of larger sets with less capability.

*FBA-8 and FL-2025 or FL-6020 may be optional.

With the clip-on FBA-8 Battery Case* and nine 'C'-size dry cells or Ni-Cds, the FT-290R II and FT-690R II as shoulder-carried portables provide extra high performance and 2.5W output for many hours after handhelds have eaten up their batteries. The set of choice for serious emergency field operations.

FT726R ~~**£809.00**~~ **£799.00***

FT726R

The world's best known VHF/UHF/satellite multimode base station is still making its mark with UK amateurs.

You choose the plug-in RF Modules for the bands you want to use. Up to three bands can be installed at once for cross-band operation or pushbutton band selection, and RF Modules can be easily changed for even further expansion at a later date. The 70cm modules include GaAs FET receiver preamplifiers.

Sideband selectable SSB, FM and CW are all included, with dual synthesized VFOs tuning 20Hz/step, plus an independent FM channel tuning knob with the standard channel steps of your area. All repeater operating functions are provided, including reverse shift and programmable odd split memory. A speech processor is included for SSB, and for CW, an optional 600Hz narrow filter is available for selectable CW narrow operation. An excellent IF shift system is provided, plus Yaesu's super IF width system; first time ever in a VHF/UHF transceiver!

All memories store mode (as well as band, of course), and can be scanned for busy or clear, pause or stop—even when on different bands. Programmable limited band scan between memories, and priority channel checking functions are also included. Every conceivable memory/VFO data exchange function is provided, and all memories plus the VFOs are backed up by a lithium battery.

With the optional plug-in satellite IF unit installed, full duplex cross-band capability is provided, with independent tuning, mode selection and indicators, and meter functions for transmit and receive. With just this rig and good antennas you have the finest amateur satellite earth station available.

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FT767Sx £1550

FT726R £809 £799

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- ★ Continuous RF power control
- ★ IF shift and width controls
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- ★ With optional plug-in modules

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HK710	Straight key	£ 39.95	MK706	Squeeze key	£ 30.40
HK802	De Luxe straight key	£112.54			
HK803	De Luxe straight key	£107.75		MORSE TUTORS	
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HK711	Knee key	£ 41.75	M/M MMS2	ADV Morse Talker	£169.00

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The future—DTI Minister of State collaborates

Never before has a Minister of State been involved with the Society's National Exhibition/Convention; with this in mind it was a great pleasure for the Society to welcome John Butcher MP, Parliamentary Under-Secretary of State for Trade & Industry, to open its national convention on 27 March 1987.

In his opening address (reported in this month's *News Bulletin*) the minister made reference to the links which exist between the Society and the Radiocommunications Division of the DTI. Such links have served the entire amateur community well in recent years and look set to continue to do so in the future. It does seem that the RD is committed to expanding and enhancing the amateur service in the UK at present; no clearer example of that could have been given than by the minister's reference to the possibility of new bands (including 50MHz) for Class B licensees. Certainly such a move would be consistent with RSGB policy, which is to achieve permission for Class B operation on all bands above 30MHz.

The minister's announcement that the DTI is to sponsor a "Young Amateur of the Year" award to mark the occasion of the Society's 75th anniversary in 1988 was greeted with much enthusiasm and applause. The Society will work with the DTI to formulate the rules for the £250 prize. This award comes at a time when the Society is about to embark on a major initiative to attract newcomers to amateur radio—an initiative which will only be successful if every radio amateur, every amateur radio company and every affiliated club, society and group in the UK are prepared to play a part. The future of amateur radio belongs to everyone, but everyone must be prepared to make that future happen. We will be suggesting ways in which you can help quite soon. Certainly the Government has already put some money where its mouth is, and for that we have to thank John Butcher MP and his staff at the DTI for their support.

Four months in, it looks as though 1987 could be a vintage year for amateur radio in the UK—we'll need your help to make sure it is.

David Evans, G3OUF

Members' Mailbag

THE EDITOR,
RADIO COMMUNICATION,
LAMBDA HOUSE,
CRANBORNE ROAD,
POTTERS BAR, EN6 3JE

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.

DISILLUSIONED CLASS A

Sir—After a few years of happy 144MHz ssb/cw, six months ago I managed to reach the dizzy heights of hf. What a disappointment it has turned out to be. No wonder several senior operators had previously said: "Don't look for me there, I've given up on hf". So, for any vhf/uhf operators thinking of trying it, here are a few tips which may save you hours of time and trouble.

1. Get used to your hard-earned clear frequency being stolen. Instead, find a busy one, switch on your giant linear, squirt it down your beam and walk all over everyone.
2. Forget your nice cosy chats about your station, your plans, family, locality etc. This is only for operators who have been having regular skeds for eons. Just remember your name, QTH,. check the wx and get used to giving reports which include "Lots QRM".
3. Unless you are QRO, don't waste an hour trying to get onto a dx net. The controller, like all dx stations, never ask if any low-power stations would like to have a try. They assume that every station is as big as their own, even though a recent W switched off his 1kW and was still S5.

If, like me, you have a 100W and no beam, the secret to success is simple. Use your cw, keep changing frequency and try "CQ DX" again. You will get a reply and find you can make it after all, given a fair crack of the whip.

Despite the difficulties I have worked some nice stations. Each new country is a thrill and there are many more for me to find. But, if any ancient aunt remembers me in her will, watch out! It's a dog-eat-dog world out there.

Brian Goldsmith, GW0DLW.

The replies to Mr Goldsmith ought to keep Potters Bar postmen in business for a while —any comments from the hf fraternity?

THOUGHTS ON "THINKING DAY"

Sir—In these days when we read so much about bad behaviour, both by radio amateurs and by young people, what a pleasure it is to write this letter!

On 21 February I ran a special event with the callsign GB4GG to celebrate "Thinking Day" for Brighton Girl Guides. (I should explain that 22 February is the usual date, this being the birthday of Baden-Powell and also of his wife who was the World Chief Guide. My xyl is a Division Commissioner for Girl Guides.) The event was run from my house, and we had a steady stream of Brownies and Guides from 0900 to 1630, less a welcome and necessary break for lunch. I had substantial technical and organizing advice and assistance from two friends, G2CMH and G2DBP. We made 62 QSOs, most of them inside the UK, and more than 80 Brownies and Guides came here, as well as many mums, dads and Leaders. So far as I am aware, all the girls and adults who wished to do so exercised their privilege of passing greetings over the air. The event was a tremendous success; the interest of these young people—and of the adults—was an eye-opener and very gratifying.

My wife organized a few games for the girls apart from the radio, and our small house was a hive of activity throughout. Not a single thing was broken, damaged or lost and when they had all gone not even the carpets needed cleaning. The good behaviour was immensely encouraging at a time when we all seem to hear about nothing but vandalism and hooliganism.

Finally, a tribute to my radio amateur colleagues, who in every case showed wonderful co-operation and sympathy as well as exemplary radio discipline. Several of our QSOs were other people interested in Guides and Scouts, some with special event callsigns; but also those who had no connection with these movements listened with sympathetic patience to our transmissions and made sensible replies—no stupid mickey-taking about tying knots etc.

We all felt completely shattered that evening, but what a great boost for the Guides and for amateur radio! Our thanks to all who spoke; QSL cards are already on their way to the QSL Bureau.

Barry Foreman, G0EXS.

HIGH POWER LINEARS ON VHF

Sir—I am new to amateur radio, being licensed for only three months, so perhaps I don't know the ins and outs of this subject, but I feel I have to air my views. I worked my first major lift on 28 and 29 November, and I enjoyed it except for the splatter caused by stations using 300 to 400W amplifiers with two and four stacked antennas. Is this really necessary? I worked many stations using 2·5W, and even some using 500mW, with 56/57 reports; this was with a portable beam.

I am not jealous of their equipment, but I am truly concerned about the use of high power. I know the licence permits this power, but I feel the high power stations should think of the other operators. Amateurs have to work together to promote the hobby, friendship etc, so perhaps some of them will take into consideration the other users of the band.

I am not a QRP operator; when conditions are bad I use a 30W linear and find this ample, but I get more satisfaction on 2·5W than 30W. I hope some people share my views.

A Nightingale, GU1WDT

We're not sure what point Mr Nightingale is making. There is no reason why stations with 400W and four stacked antennas should "splatter" any more than those with 10W to a small beam, assuming that users know how to use their amplifiers properly (we hope to feature a very high-quality power supply and control unit for large amplifiers in a forthcoming issue). However, many amateur receivers don't cope very well with strong signals, and we suspect that Mr Nightingales may come into this category. See Dr Ian White's series on front-end design Rad Com *April–July 1985.*

CAVEAT EMPTOR

Sir—I came into amateur radio rather late in life, and for this I am rather sorry because I have missed out on many years of radio rallying. I used to have to ration myself so that I did not suffer from the indigestion that comes from too much useful equipment lying around in the shack. Now my rule is that I must not buy anything without first selling something. I have found that this adds to the fun of rallying rather than lessening it. I hope you will find that this rule can with care give an enormous amount of pleasure without too great a capital outlay. I have also discovered that amateur radio hardware depreciates far less in money terms than it does electrically. This is in sharp contrast to other areas of private trading. All wonderful news to those who, like me, enjoy the fun of rallying but are unable to finance it adequately. I hope that armed with this philosophy you can now delve under the shelf and inside those dusty cardboard boxes to find all those pieces of equipment that might work well but don't seem to live up to their potential. These can then be your stock for a summer of disposing and acquiring, which is such a vital part of rallying.

Another attraction at rallies are the traders. I find that they are a very good source of the type of stock that one needs to keep the bring-and-buy circuit going. A word of warning: I have discovered the hard way that it is all too easy to be taken for a ride by some traders, but I like to think that, as with cw, one's technique improves with practice and experience. Just now and then there is something out of the ordinary. Last year I spotted a little man with a suitcase outside one of the marquees who was selling what appeared to be 1m lengths of coaxial cable. Not much resale value in that I thought, but having £2 to spare, an inquisitive nature, and not wanting to spend it on beer as I had to drive home, I bought two lengths. The plugs would be useful after all. He smiled and gave me a scrap of paper. It was printed in the usual Anglo-Orientalese that we have all become fluent in. It ran:

This is the revolutionary SUPER-MAX coaxial connector. Insert it between your transceiver and antenna system and be amazed at the difference. Your SUPER-MAX will give you long-lasting service. Your new SUPER-MAX is built to full wide-band specification.

I tried it, and what a difference! Although I haven't got any sophisticated equipment for power measurement, I found that for around 10W input I was getting 25W at the other end. They also worked together so that for 10W input and two in series I managed about 75W output. A word of warning though. They got pretty warm, especially the second one of the two in series. Clearly not something that the QRPers will look out for. Well that was back at the end of last summer, or what should have been the summer. Now the covering of my Super-Max coaxial cable has lost its rigidity and deep plastic shine and lies limp and dull on the bench. It has lost its power as well. It is destined for the "useful box" as it seems that only the connectors are now of use. A short but exciting life.

My advice must be to look out for the little man with his suitcase at the corner of the field at the next rally you go to. If I see him first I am going to buy his whole stock, plus the suitcase, and charge twice the price at the next rally. Well, that's what rallying is all about, isn't it?

A J Anderson, G0BFM

We once saw "a little man with a suitcase" at a rally selling rather nice 500μF 500V electrolytics with a 6in length of wire attached to the positive terminal. His sales pitch was that they would dramatically improve reception of BBC Band 2 broadcast stations, and for only £1. We bought six—the capacitors were excellent for an ehv psu we were building at the time!

AN UNUSUAL RESTRICTION

Sir—One of the most fascinating periods of my amateur career started with the first crystal set I made in 1921 (age 13). My only instructions were from a small booklet. The set was based on an enamelled-wire coil on a cardboard former 12 by 4in with two sliding contacts, a crystal and a pair of 10,000Ω phones. Instruction for the antenna, took two lines in the booklet, but emphasis was on the earth and took half a page. Dig a hole, put in a pole, fill with sand and gravel, and the important part: keep soaked with an electrolyte solution (I think Glaubers salt). The set was said to be capable of receiving signals from the Midlands and possibly the Eiffel Tower. Unfortunately this never happened, but once the BBC started I heard my first broadcast.

Here nostalgia finishes and history begins. Under the Wireless Telegraphy Act 1904 it was necessary for me to have a licence to establish a receiving station. Nothing unusual in that, but one of the conditions on the reverse side may surprise many and even shock some of the more recent amateurs. I quote only part of the Condition 2: "If the licensee shall make any alteration or addition to the receiving set he shall not knowingly use parts manufactured elsewhere than in Great Britain or Northern Ireland."

I wonder whether any reader who remembers this can enlighten me on the following:
(1) What was the reasoning for this "Condition"?
(2) When was it repealed and why?
(3) Did it just fade away?
Comments would be appreciated by:

E T Webster, G3JX, formerly G3JZ prewar.

"WERE YOU ON YOUR RADIO LAST NIGHT?"

Angus McKenzie, MBE, FIERE, FAES, CEng, G3OSS*, discusses how strong transmitted signals are picked up in a tv installation, gives details of many emc tests, and reviews a range of filters.

Part 1. How rf gets in to the tv installation, and the use of filters

Most radio amateurs have had the ominous knock on the front door, the telephone call, or the polite words over the fence about television breakthrough complaints. Fortunately, the large majority of complaints can be dealt with amicably and efficiently by the use of filters, and the first part of this article deals with the ways in which the strong rf signal or field is picked up by the television and video recorder installation, and produces breakthrough to vision and/or audio if the installation's electromagnetic compatibility (emc) is inadequate. As the result of very many emc tests on over a dozen tv installations in 1986, it is quite clear that there is well over 20dB difference in vulnerability to disturbance between the best and worst modern sets. It is essential to understand the different ways in which the radio signal or field gets into the installation, but first of all one has to determine that the radio transmission itself does not contain components, spurii or harmonics which are actually causing the trouble, rather than the energy on the main transmitting frequency.

Sprogs, spurii and harmonics

Most hf, vhf and uhf transmitters that I have checked in the last few years have been adequately clean, and both harmonic and spurious outputs have been no higher than −60dB ref the maximum carrier output level. Very few hf rigs should cause trouble once you have added a well-matched lowpass filter, and only in exceptional cases have I noted spurious outputs out of band. However, just a few transmitters or transverters have shown up problems which are worth mentioning, as you may not realise just how a problem can arise.

An early 432MHz transverter gave the most horrific spurious around 488MHz, at only 30dB below the carrier level on 432MHz. The 488MHz signal, when amplified, caused a severe problem to Channel 23 video. Upon investigation, I discovered that in the transmit mixer from 28MHz to 432MHz the input i.f of 28MHz was being multiplied by three, and only then added to the 404MHz local oscillator frequency, thus producing 488MHz. The transverter had inadequate filtering in its rf stages, and the manufacturer had not provided sufficient rf gain, so that in order to get 10W p.e.p output it was necessary to drive the 28MHz input fairly hard. Very careful realignment of the rf stages increased the gain considerably, improved the rejection of 488MHz, and allowed the mixer to be driven at a much lower level, thus giving a 488MHz output at −70dBc, which was just about acceptable. The linear that was in use did not help the original situation, since its input circuits had a grossly excessive bandwidth.

One multiband rig included 70MHz, modified by the importer to replace the original 50MHz capability. The circuits had been inadequately tuned, and a serious complaint of tvi on Channel 23 proved to be due to an unwelcome amount of seventh harmonic at 491·4MHz (70·2 × 7MHz). A British solidstate linear amplifier happened to have a resonance around Channel 23, thus slightly exaggerating the problem when switched in. Incidentally, the same amplifier produced a second harmonic at 140·4MHz of −30dBc when driven to 80W p.e.p output on 70MHz, and had to be returned to the manufacturer for them to put in a lowpass filter on the output, which should have been there in the first place.

144MHz band harmonic problems

You are highly unlikely to have any serious problems with harmonic radiations from 144MHz rigs and linears, unless you live in an area which regularly has tv sets tuned in to Channel 34 (fourth harmonic), or Channels 52 and 53 (fifth harmonic). Fortunately, there is only one very important transmitter on Channel 34, Caldbeck/Sandale near Penrith in Cumbria. Having an output of 500kW erp, this transmitter on BBC 2 covers a huge area including the Borders and adjacent counties. If you live in a fringe area you will have to be very careful about the fourth harmonic. The remainder of transmitters on Channel 34 are listed in the table, and are all very-low-power relays covering small fill-in areas. Unfortunately, there are very many transmitters on Channels 52 and 53, and whereas the cw and ssb end of the 144MHz band will have a fifth harmonic in the video passband of Channel 52, fm channels from 145·4MHz upwards have the fifth harmonic occurring in Channel 53. This is not likely to cause a problem though, as the erp of the harmonic is likely to be very low. However, you will need to

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be careful, if you are using high power in the satellite band above 145·8MHz, as the fifth harmonic is right in the middle of the video carrier of Channel 53. I have not heard of any amateurs having fourth of fifth harmonic problems from 144MHz, but it is as well to mention the possibility of one, together with a recommendation for the use of an effective lowpass filter if you are within the coverage areas of the channels mentioned.

Breakthrough and blocking problems caused by signals directly injected into the centre core of the tv coaxial downlead

The tv antenna itself will pick up rf to varying degrees over a very wide frequency range, despite the fact that tv antennas are normally directional with maximum gain in Bands 4 and/or 5. The signals will transfer to the tv set or video recorder down the inner with reference to the outer, and can cause blocking of the input preamplifier stage of the equipment. Even if this is well filtered, signals can leak through to the first local oscillator circuitry, and many other circuit areas. This type of pick-up is normally only a problem at vhf and uhf, and most of the tv sets I have checked gave a comparatively adequate performance at hf. The two bands which are likely to cause most problems for this type of rf pick up are 144 and 432MHz. If you are active on both bands, then you may need to insert either a very good highpass filter with the knee at 470MHz, or a less-good highpass filter, but with the addition of appropriate tuned rejection filters covering at least the 432MHz band.

Occasionally you might have a problem on hf or lower vhf, in which case a comparatively-simple highpass filter should suffice, but as often as not the problem is more likely to be due to coaxial braid or mains lead pick-up.

RF pick-up on the braid of the coaxial downlead

Braid pick-up is more likely to be troublesome if the local transmission is on the lower frequency or hf bands. The pick-up levels are likely to be more severe if the length of the downlead relates to the wavelength of the transmission concerned. However, every braid acts as an antenna, and the currents that can be generated through the earth plane of the set and capacitively down to earth can be quite high. Some installations can be very immune to such currents, but poorly-designed sets can be rather vulnerable to these currents, and severe breakthrough to i.fs, control circuits, microprocessors and audio circuitry can occur. Some form of braidbreaker is required, which will pass Bands 4 and 5, but which will block off lower frequency currents. There are several types of braidbreaker, including uhf transformer versions, capacitive breakers and coaxial loop inductors. Ferrite rings can, of course, be used combined with loops or coaxial coils to increase the rejection effect. I have measured tens of volts of rf between the bottom of a downlead braid and a mains earth, and high emfs can generate very nasty rf currents through a set's earth plane.

Braid pick-up is not normally a problem with higher vhf and uhf, but can be the cause of a severe problem at 50 and 70MHz.

Mains lead rf pick-up

Although the large majority of modern tv sets and video recorders do not have an earth connection to the mains, rf pick-up on the two-core mains lead can be troublesome. RF can be capacitively coupled through to the set's groundplane, and to many of the circuits. Even if house wiring earths are well made on the mains input to the house, all the house wiring itself can become quite a good receiving antenna which can contribute rf into the set. Even if you have filtered the coaxial downlead very adequately, you can still have trouble with mains pick-up, and it is often the video recorder that introduces the problem. In-line mains filters placed at the mains socket end can be a help, but if there is a serious problem, you may well have to use appropriate ferrite rings at the tv or video recorder end of the mains lead to choke off the rf from the set.

Direct rf pick up on the chassis or internal wiring of the tv or video recorder

If you have tried filtering the coaxial downlead and the mains lead to the video recorder and to the tv set, and breakthrough is still noted on video and/or audio despite using all the appropriate filters, then the set itself is vulnerable to the actual rf field generated by the transmissions. Audio breakthrough can result from pick-up by long loudspeaker leads, and is particularly prone to occur if there is a connection from the set to an external loudspeaker or hi-fi system. Pick-up on external audio wiring can be minimized by the appropriate use of ferrite rings, but direct pick-up within the set is by far the most serious problem as a cause of television breakthrough. My own tests have shown that direct chassis pick up is most likely to rear its ugly head if the rf is at vhf or uhf; high field strengths on the 144MHz band created by ssb signals being the most troublesome. The degree of pick-up can often be dramatically reduced if the set is rotated slightly, but careful attention to antenna location and an increase in height of the transmitting antenna can often be a help. The social and political problems that can arise are beyond the scope of this article, but I do recommend the greatest caution in dealing with any chassis pick-up problem, and it is extremely important to keep the "temperature" cool, and also to study the advice given by the RSGB. Do make sure that you really have tried all the appropriate filters in the downlead and mains leads. Don't forget to note down carefully the make and model of both the tv set and video recorder for later reference, so as to avoid disturbing your neighbour when making further enquiries.

Table 1. Some tv stations lying on the fourth and fifth harmonics of the 144MHz band

Station name/locality	Channel	Power (ERP)	Service	Pol'n
BRAILES. Shipston on Stour	34	45W	ITV	H
CALDBECK. Nr Penrith	34	500kW	BBC 2	H
CHISLEDON. Avon	34	19W	ITV	V
EASTER COMPTON. Avon	34	10W	ITV	V
FINTRY. Strathclyde	34	26W	BBC 1	V
KEWSTOKE. Avon	34	12W	ITV	V
MOEL-Y-SANT. Welshpool	34	115W	BBC 1 Wales	V
REDCLIFF BAY. Portishead, Avon	34	10W	ITV	H
OVER BIDDULPH. Stoke-on-Trent	34	22W	BBC 1	V
WEST KIRBY. Wirral Peninsula	34	13W	BBC 1	V
ALSTON. E Cumbria	52	400W	BBC 1	V
ANGUS. N of Dundee	53	100kW	C4	H
BACUP. Lancs	53	250W	C4	V
BEACON HILL. Torbay	53	100kW	C4	H
BIRCH VALE. SE Manchester	53	250W	C4	V
BRIGHTON, Sussex	53	10kW	C4	V
CARMEL. Dyfed	53	100kW	C4	H
DOVER. Kent	53	100kW	C4	H
HEYSHAW. E Pennines	53	500W	C4	V
KINGS WESTON HILL. Bristol	52	1kW	C4	V
LES TOUILLETS. Channel Is	52	2kW	C4	H
LETHANHILL. Ayrshire	53	250W	C4	V
REIGATE. Surrey	53	10kW	C4	V
SALISBURY. Wilts	53	10kW	C4	V
SHATTON EDGE. West Derbyshire	52	1kW	BBC 1	V
STRANRAER. Dumfries & Galloway	53	250W	C4	V
STROUD. Glos	52	500W	C4	V
THORNHILL. Dumfries & Galloway	53	500W	C4	V

Notes: There are just under 60 low power stations on Channels 52/53, too numerous to mention. Additional information in *Radio and Television Stations, 1986* available from BBC Engineering Information Department, Broadcasting House, London W1A 1AA, free of charge, but sae required.

Coaxial cable filters

Highpass, bandpass, bandreject and various braidbreaking filters all come within this category. They are normally supplied with a coaxial Belling Lee type socket at one end for the down lead, and a plug on the other end for insertion into the tv set. It is worth noting that they are normally designed for 75Ω matching, and it should be remembered that the input impedance of the tv set or video recorder is usually anything but 75Ω! The set's input impedance will also vary greatly with frequency, being almost equivalent to a short-circuit at some frequencies, and extremely high impedance at others. For this reason, the degree of a filter's attenuation of an rf transmission outside Bands 4 and 5 may not be as much as is claimed, but

Angus McKenzie became a licensed amateur in 1960 and was soon active on 144MHz and hf. Currently, he is active on all bands (when time allows!) on ssb and cw, vhf/uhf bands, and on fm. He first transmitted stereo multiplex on 144MHz in 1970, then stereo pcm, 16-bit digital in 1983, including colour tv. He has the Supreme vhf/uhf awards (including Seniors) on 70, 144, 432 and 1,296MHz.

He entered the sound recording and audio industry in 1955, and became an audio consultant in the late 'sixties. He spent some time in gramophone record and hi-fi retailing, and his time now is spent in "audio criticism" including writing reviews and articles. He is a consultant to legal and consumer organizations on audio engineering and rf matters, and is currently a member of the RSGB Council and of the VHF Committee.

even so it should be adequate to cope with the powers used by radio amateurs. There is no hard-and-fast rule about the positioning and order of filters when you have to use more than one, and a degree of trial and error is essential. You should already have found out which bands are causing the main trouble, and so some degree of appropriate filter choices should already have been made before you visit the problem installation.

It may not be sufficient just to filter the downlead at the point where it feeds into a video recorder, as the lead connecting the latter to the tv set itself can also pick up rf from the field and transfer both forwards to the tv set and backwards through the output circuits of the video recorder and into its more vulnerable circuits. One case of video breakthrough was completely cleared by adding an additional coaxial transformer braidbreaker hard on the output socket of the video recorder, having already added ferrite rings to the mains leads, and excellent filters to the coaxial input sockets.

If the set is receiving a comparatively weak signal on Bands 4 or 5, you should bear in mind that the use of too many filters in series may well attentuate the required tv signals too much, and thus produce snow and poor colour instead of rf breakthrough patterning etc. You may require both a braidbreaking action and highpass filtering, and while a combined filter may well be the easiest to install, you may achieve a lower loss if you use a straightthrough highpass filter combined with a coaxial coil filter having additional ferrite rings or coring.

It is as well to consider problems that might be caused from bands on which you do not normally operate. It will save you a lot of aggravation, and your neighbour much frustration, if the filters that you have installed will also give a good attenuation on a band such as 432MHz which you might very well be attracted to at some time in the near future.

If the problem is braid pick-up, then remember that the braid may itself re-radiate, near the tv installation, a field picked up further up its length. You may well find that you can achieve improved results with the braidbreaker installed several metres away from the set. It is also well worth trying a thick braid earth strap between the coaxial downlead braid and the nearest water pipe, if this is conveniently placed. It may make matters worse, but there's a good chance that it may help.

Mains breakthrough filtering

There are many types of mains filter available either as adapters for use at the mains socket end, or within 13A plug tops. Assuming these are efficient, they will only filter the mains at a point 2m or so away from the set, and if you are in a difficult situation you may well have to use ferrite rings through which you wind the mains lead, as near to the set as possible. This will mean that you will have to take off the plug top, which hopefully is not a moulded type, but doing this takes some time, and it might be prudent to accomplish the filtering as quickly as possible. AKD have now introduced a new type of ferrite-cored component in several parts, enabling you to wind the mains lead around the U-shaped pieces, followed by complete assembly and installation.These components are more expensive, but are much more easy to use and could well save the day.

Checking the neighbour's antenna

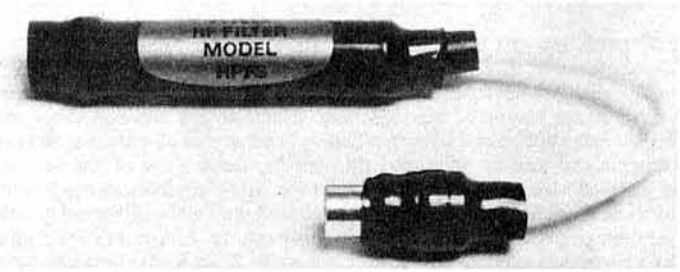
As often as not, the tv signal being received by the set is a lot weaker than it need be. Many antennas turn out to be very old and partly rusted, water may have got into the downlead, and poor-quality splitters might have been used to feed more than one set. Don't forget that resistive splitters lose at least twice as much signal as do transformer types. A transformer splitter may also give a degree of bandpass filtering action.

One of the worst evils to cope with is a tv antenna masthead preamp. Some models are already quite well filtered, have a good noise figure, and have a good bandpass characteristic for just Bands 4 and 5. Some others, however, seem to amplify just about everything from dc to light, and can be upset with only the slightest provocation! You may well have to apply some efficient filters in front of the preamplifier, as well as at the bottom of the downlead. It is worthwhile examining the complete tv installation at a neighbour's premises before you even start any filtering experiments. Frequently, a neighbour has no idea whether a masthead preamp is installed or not, as the installation may well have been inherited from a previous occupier. There may even be splitters feeding points that have long since disappeared, leaving an unterminated line on the unused port. If you can improve a neighbour's picture by some careful checking, you will be improving the atmosphere, but it is not advisable to touch the alignment of anything in the installation. By all means ask your neighbour to twiddle the knobs if you know that there is a problem such as frame hold or inadequate tuning.

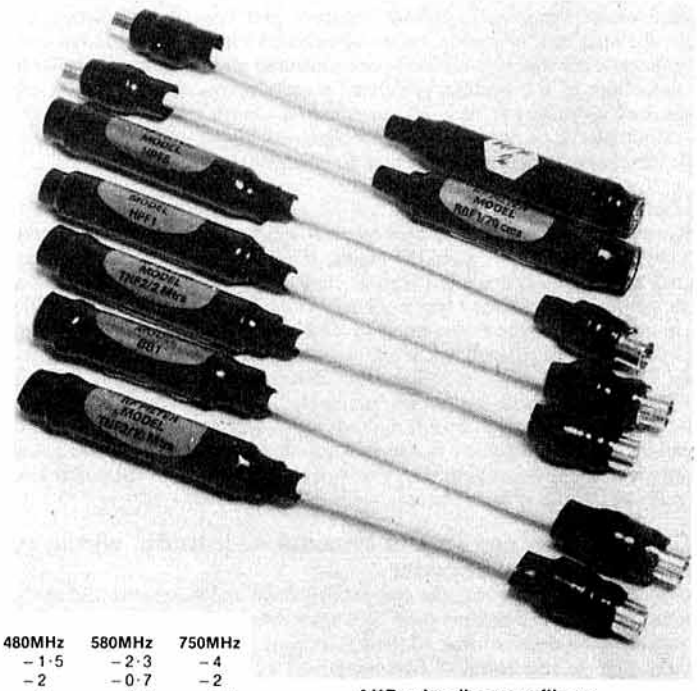
You might also check that the neighbour's antenna is actually pointing in the optimum direction, as I have known many antenna riggers who just copy the direction in which other antennas in the street are pointing! You can imagine what happens when a cowboy firm installs the first tv antennas in the street!

AKD coaxial filters

Since the summer of 1986, several filters in the AKD range have been made available to RSGB members and non-members from RSGB Headquarters, and are regularly advertised in *Radio Communication*. I have taken some measurements of these filters on several bands, and have also checked the insertion loss on Bands 4 and 5 in a 75Ω circuit. Please see the table for the insertion losses measured on the inner with reference to the outer. The braidbreaking action was not measured. I am also including various AKD and other filters which are either only available in the complete AKD kits, or have been available through the DTI, and, formerly, the Post Office Interference Service.



The AKD HPFS filter



AKD miscellaneous filters

Table 2. Filter test measurements

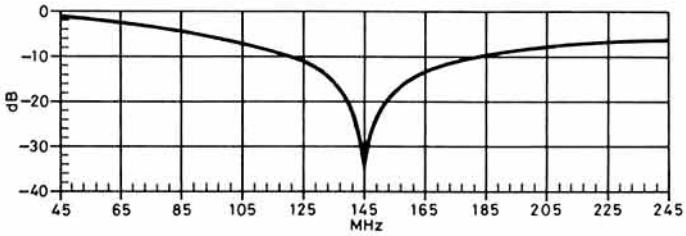
FILTER	28MHz	50MHz	70MHz	100MHz	144MHz	432MHz	480MHz	580MHz	750MHz
HPFS	−59	−60	−52	−44	−38	−4	−1·5	−2·3	−4
HPF 1	−55	−29	−31	−43	−24	−3·1	−2	−0·7	−2
PO six-section special	< −65	< −65	< −65	< −65	< −65	−50	−4	−0·7	−1·1
BB1	−3	−2·8	−2·6	−2·3	−2·2	−2·6	−2·5	−2·5	−4·1
TNF/2/2m	−0·5	−1·5	−3·5	−20	−25	−0·5	−0·5	−1·1	−1·8
HPF 2	−63	−39	−17	−2	−1·5	−0·8	−0·9	−1·4	−2·4
PO five-section	< −65	< −65	< −65	< −65	< −65	−46	−10	−1·2	−1
TNF/2/10m	−33	−9·7	−38	−15	−9·5	−1·5	−1·4	−0·5	−1·8
RBF1/70cm	−20	−15	−12·5	−9	−6·5	−13·5	−3·4	−1·2	−1·4
PO/DTI FS74A (barrel)	−5·4	−3·8	−3·1	−3	−2·7	−1·9	−2·4	−2·7	−2·9
PO/DTI FS 72A	−68	−62	−58	−58	−55	−20	−2·7	−0·9	−1·3

AKD HPFS (RSGB). This filter includes a transformer braidbreaker and has a steep highpass filter action below the 432MHz band. It is suitable as an excellent filter for hf and vhf, but is not likely to be of any help in rejecting 432MHz. It has an acceptable insertion loss on Band 4, but the loss on Band 5 could be just a little high in fringe areas. It also gives an excellent braidbreaking action.

AKD HPF1. This highpass filter incorporates the simpler capacitance braidbreaking action, which is useful but not so effective as the HPFS type. The HPF1 is excellent at hf, and may be adequate at vhf, but it is not suitable for 432MHz. It has less insertion loss than the HPFS, but if you are primarily an hf operator it could well suffice. You may need to add a ferrite ring/coaxial coil braidbreaker of your own make to improve the braid rejection for hf. This model is supplied in the complete kits, and is also available direct from AKD.

AKD HPF2 (RSGB). An excellent filter for use with Band 2 fm radio installations, as it cuts hf extremely well, is good at 50MHz, and gives some useful rejection at 70MHz. By 88MHz it only has 0·7dB through loss, although this loss varies to a maximum of 2dB on Band 2. It does not give any useful attenuation on 144 or 432MHz. The through loss on Band 4 and 5 is low.

AKD TNF/2/2M (RSGB). This filter can give a notch of up to 35dB on the 144MHz band, but my review sample was slightly maladjusted with the notch appearing at 140MHz, thus giving just an adequate notch on the 144MHz band. It is not suitable for use with Band 2 fm tuners, and will not give any attention at hf, nor at 432MHz. It gives a very low insertion loss on Bands 4 and 5. There is an internal pre-set adjustment for tuning the precise notch frequency. A second sample notched correctly, and the overall, response from 45 to 245MHz is shown below.

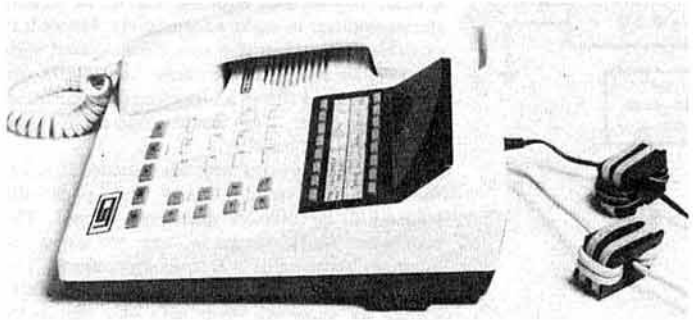


AKD TNF2/2m filter insertion loss plot; 35dB rejection at 145MHz in a 75Ω system

AKD TNF/2/10m. This filter can be used if you just have a problem on 28MHz, although for some odd reason the review sample also gave a good notch on 70MHz. It is not suitable for use with Band 2 fm tuners, but does have a low insertion loss on Bands 4 and 5. Note that it does not give any significant attenuation on 144/432MHz. Other models are available for 21 and 14MHz bands, direct from the manufacturers.

AKD RBF1/70cm (RSGB). Specifically designed for rejecting strong 432MHz band signals. It should give a rejection of around 20dB on this band, but the notch position was placed too high in the band on the review sample, 21dB notch being noted at 438MHz, but only 13·5dB at 432MHz. It gives a low insertion loss at the top end of Band 4 and on Band 5, but there will be a marked loss on Channels 21, 22 and 23, which may be relevant in a fringe area. The filter also gives some attenuation at hf and lower vhf. It is not suitable for Band 2 fm tuner feeds. You may need to adjust the small tuning preset inside for the particular part of the band that you are most likely to be using with high power, eg 432·3MHz for ssb centre or 437MHz for atv centre.

AKD BB1 (RSGB). This is a simple but very effective transformer type braidbreaker which just plugs in line with the tv downlead. It is also useful for Band 2 fm tuner installations. The insertion loss is slightly higher than the original Post Office/DTI type FS74A, but the manufacturers claim that

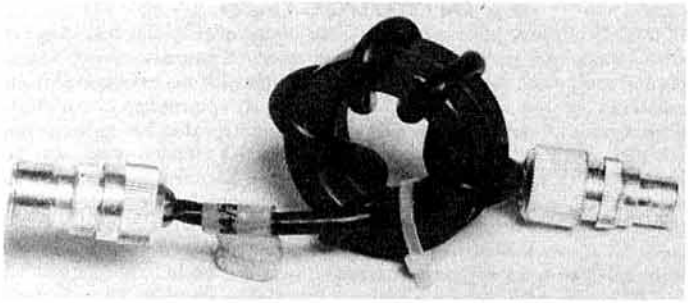


The PBT600S telephone with new AKD diy ferrite ring filters

The FS74A transformer braidbreaker

it has a better braidbreaking action at hf. Its use would not be advisable if channels at the top end of Band 5 are in use in a fringe area, in which case you might have to resort to a ferrite ring with the coaxial looped several times around it as an inductive braidbreaker, which would have a barely perceptible loss on the inner. Ferrite ring inductive braidbreakers were once available from the Post Office/DTI under the type numbers FS62/1A and 62/2A, the two types having different numbers of turns around the ring.

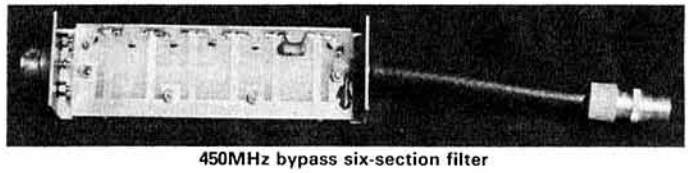
The former Post Office/DTI type FS74A transformer braidbreaker was originally supplied as a small cylindrical in-line model having a plug on one end and a socket on the other, without any flying lead, allowing it to be put right on the output of a video recorder. More recently it was modified to have a flying lead on the output with a plug, and the performance was not quite so good.



Ferrite ring FS64/2/A coaxial braidbreaker

PO/DTI FS72A

This filter was nominally designed as a high pass on the inner only, and was intended to remove the entire hf and vhf spectrum. It had quite a low loss on Bands 4 and 5, and while some samples did give some rejection at 432MHz, others did not; the design changing over the years. Although a very useful filter, one almost invariably had to use some form of braidbreaker with it.



450MHz bypass six-section filter

PO 5 and 6 section highpass filters

The original Post Office Interference Service used to supply five-section filters which had a superb performance at hf, vhf and even at 432MHz. There was no braidbreaking action, and while the insertion loss in Channels 21, 22, 23 was rather high, losses on higher channels were low. A few six-section filters were specially made, and I am lucky enough to have one of these. They were handmade, and offered a fabulous rejection at all frequencies up to the top end of the 432Hz band, and yet the insertion loss on Bands 4 and 5 was low. It is to be hoped that a new version of the six-section filter might become available shortly.

Conclusions

Probably the most important filter to consider for hf and lower vhf is the HPFS, but you may have to consider the HPF1, or an old FS72A with an inductive braidbreaker if you are in a fringe reception area. The notch filters can be useful, but you will have to make sure they are on frequency. Although expensive, the new ferrite inductor kits from AKD are very useful for inserting inductance on audio and mains leads, and these can also be recommended for use with telephones and other appliances which have a poor electromagnetic compatibility. Don't forget that when you are carrying out tests with a neighbour, you should always choose the most favourable antenna direction, which may not necessarily be one which is beaming at the tv antenna. Taking trouble over removing a neighbour's tvi problem becomes a useful investment in the furtherance of your hobby.

(TO BE CONTINUED)

A *RAD COM* IN-DEPTH KIT REVIEW

C M HOWES TRANSMITTER AND RECEIVER KITS

PETER HART, G3SJX*

INTRODUCTION

In this era of black boxes of ever-increasing complexity and cost, there is a desire among a growing number of amateurs to return to simple home-brewed equipment. Apart from the satisfaction which can be obtained from building your own, contacts on home-brewed equipment can give a much greater sense of achievement. The same technology that has given us the complex black boxes—semiconductor integrated circuits—may also be used to advantage to build simple and effective low-cost receivers. CW is inherently simple to generate and is by far the most effective mode for low-power communication. Even at this low ebb of the sunspot cycle, a few watts of rf on 14MHz with a reasonable antenna and good operating technique can bring cw contacts from all over the world.

C M Howes manufacture a range of kits for the amateur. These include direct-conversion receivers and simple cw transmitters for most of the hf bands, vfos, atus, 144MHz to hf transverters, 144MHz linear amplifiers and miscellaneous accessories. These kits are not intended as complete items of equipment but comprise a pcb and all board-mounted components. The constructor must provide a suitable case, controls, knobs, sockets, plugs etc, and engineer the required metalwork.

This review looks at the items which comprise a complete station for 14MHz—the MTX20 10W cw transmitter, CVF20 vfo, DCRX 14MHz receiver, CSL4 dual-bandwidth audio filter and CTU30 antenna tuning unit.

ASSEMBLING THE KITS

All the items in the Howes range may be obtained either as kits or as assembled pcbs. The CTU30 atu and CVF20 vfo were obtained in kit form, and the other items were preassembled. Good-quality glass-fibre printed circuit boards are used, with all component locations printed onto the top side of the board. The components are of good quality, are easily identifiable from the instructions, and fit correctly into the boards. The instructions are clear and complete, and include how to solder. No problems were experienced assembling the boards, and this task may be confidently tackled by the inexperienced constructor. The coils in the receiver and vfo are prewound, but in the transmitter and atu these need to be wound by the constructor. Full details are given in the instructions. The smaller coils need to be varnished to keep the turns in place. The assembly time for each of the boards should be less than 3h—the atu was completed in 1h and the vfo in 1h 20min.

Having completed the pcb assembly, the boards need to be mounted in a suitable metal box or boxes. The receiver requires two good-quality 50pF variable capacitors for tuning the oscillator and the rf front-end. The CVF20 vfo also requires a similar component. These are not provided with the kit, but are currently available from Howes while stocks last. In addition, a slow-motion drive is essential for tuning the receiver oscillator or vfo. Other components which will need to be provided include antenna sockets, headphone or speaker jack, key jack, all transmit/receive switching, filter switching for the CSL4 and power connectors. Potentiometers for the volume control and vfo irt are included with the kits. Both are 4·7kΩ; this is not stated in the instructions. The MTX20 transmitter kit is provided with a crystal for the QRP calling frequency of 14,060kHz.

Layout within the boxes is the personal choice of the constructor. A few points need to be taken into consideration. For the receiver, the DCRX and CSL4 can be located in a single box. The main tuning capacitor should be sturdily mounted with a suitable slow-motion drive, and wired in circuit with a short stiff lead. In addition, this lead should be kept away from the antenna wiring, the preselector wiring and L1 and L2 to minimize oscillator leakthrough to the antenna.

The atu should be mounted in a separate box to either the transmitter or receiver. Note that the frame of the variable capacitors in the atu are not at ground potential and should be suitably insulated. This includes where the spindles pass through the front panel. Insulated spindle extenders may be required.

To prevent pulling, the CVF20 vfo must be housed in a separate shielded box. The board and tuning capacitor should be solidly mounted and connected with short thick leads. A slow-motion drive is required as for the receiver. The CVF20 may be used with the receiver as well as the transmitter to make a transceiver. Hence it is possible to put all units in a single enclosure, with the CVF20 in a separate metal box within the enclosure. Fig 1 shows a suggested configuration for a transceiver. This was the line-up adopted with the review boards.

The only alignment which is required is to set the oscillator tuning range and peak the transmitter circuits for maximum output. The oscillator tuning range is best set using an auxiliary receiver or a frequency counter. The tuning cores inside the coils can be conveniently locked by wrapping them with ptfe plumber's tape prior to alignment.

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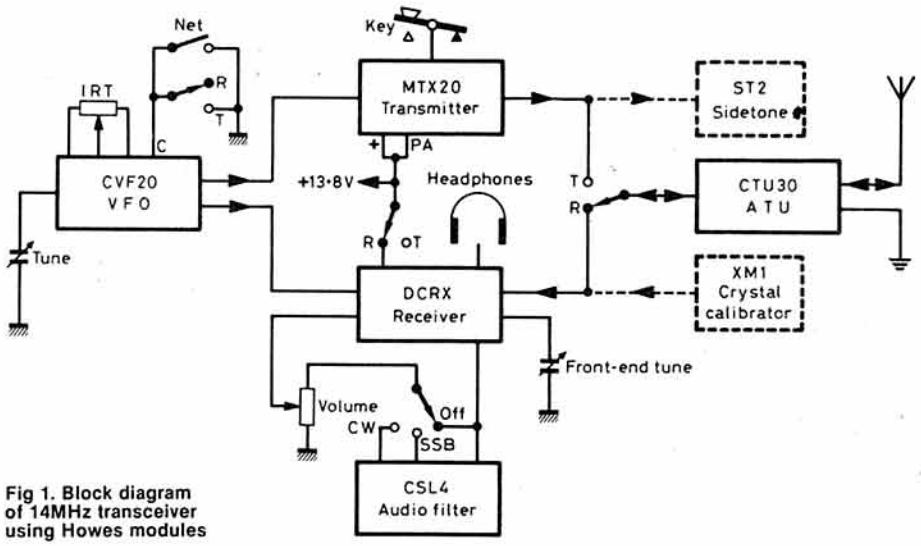


Fig 1. Block diagram of 14MHz transceiver using Howes modules

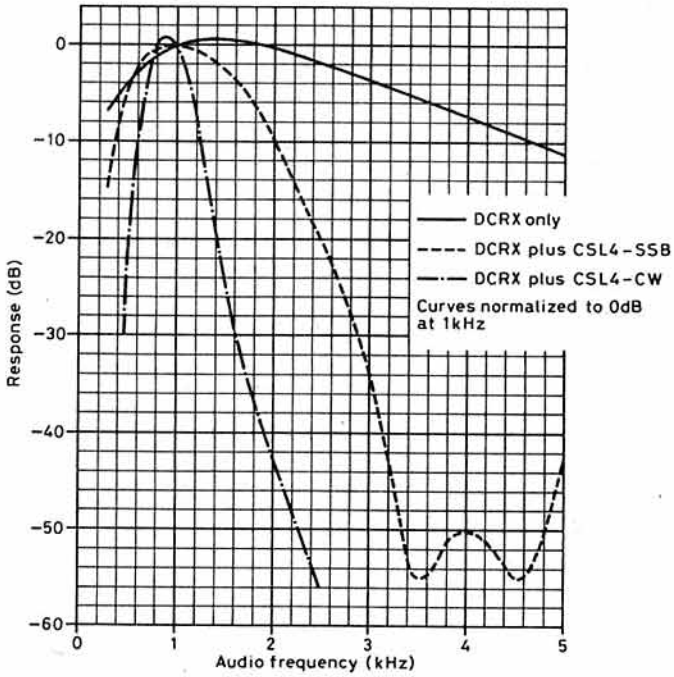


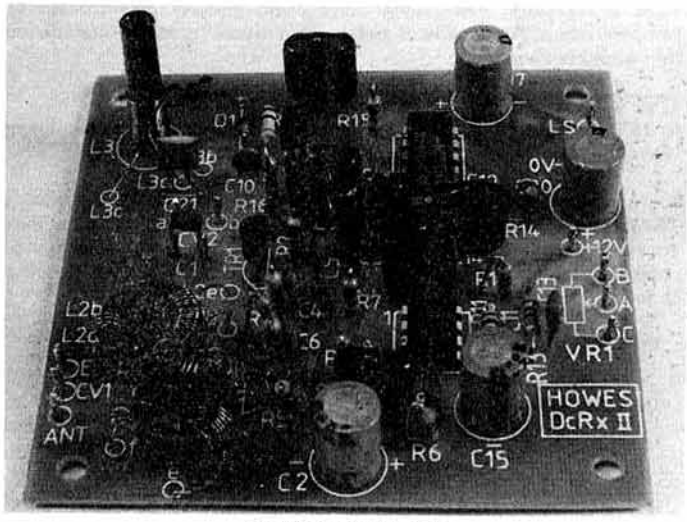
Fig 2. AF response of DCRX and CSL4

DESCRIPTION

All the boards operate from a 12–14V supply, although maximum transmitter power is only achieved at the higher level (13·8V).

DCRX receiver

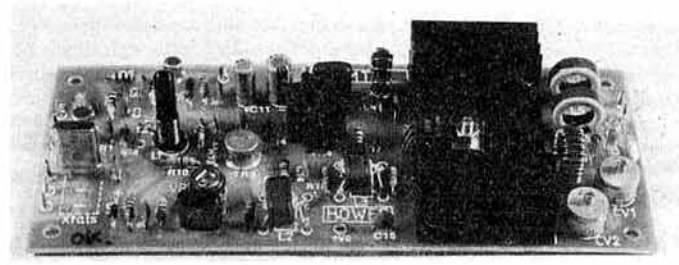
The direct-conversion receiver board measures 7·5 by 7·5cm. The circuit comprises a push-pull 2N3819 fet mixer with a single tuned circuit front-end and balun drive. A further 2N3819 is used for the local oscillator. Audio gain and filtering is provided by a single TL071 op-amp followed by an LM380 af power amplifier. There is sufficient audio output to drive a loudspeaker.



DCRX receiver board

MTX20 transmitter

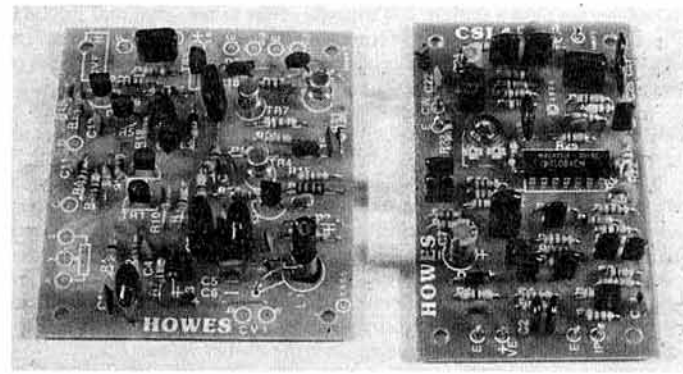
The MTX20 board measures 14·5 by 6cm and incorporates a small heatsink for the power amplifier transistor. The first stage is a BSX20 crystal oscillator with provision for up to three crystals on the board. Some pulling of the crystal oscillator is possible with an added variable capacitor to give a tuning range of a few kilohertz. Alternatively, this stage can operate as a buffer for the vfo. The output of this stage is tuned and is followed by four stages of amplification, 1 × BSX20, 2 × 2N3053 and 1 × MRF475 power amplifier. Broadband transformer coupling is used between stages. The power amplifier is tuned and followed by a two-section lowpass filter for low harmonic output. Maximum output is about 10W, adjustable down to about 2W by reducing the bias on the second amplifier stage. The first amplifier stage is keyed and the keying characteristic shaped for minimum clicks.



MTX20 transmitting board

CVF20 vfo

The CVF20 vfo board measures 6·5 by 7·5cm. The circuit comprises a 2N3819 fet oscillator stage using a similar circuit to the DCRX receiver. This is followed by a BSX20 buffer and two separate BSX20 output stages each delivering about 2V pk-pk for driving the transmitter and/or the receiver. IRT is provided by a variable capacitance diode across the tuning capacitor. This is a 1N4004, not a true variable capacitance diode, but a sufficient change in capacitance is obtained for irt use. FM can also be applied if required. IRT is essential for transceiver operation, as the receiver oscillator frequency must be offset from the transmit frequency by the audio beat note. Four transistors control the irt switching, and there is an on-board voltage regulator. To obtain adequate stability, the vfo must run continuously. Where a separate receiver is used, the irt may be offset to prevent the vfo from interfering with the received signal.



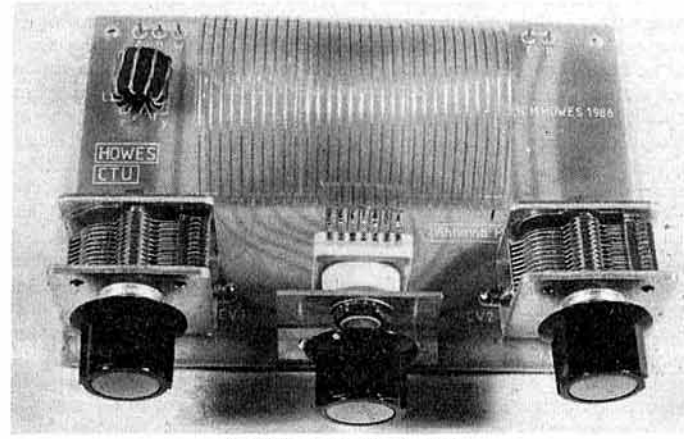
CVF20 vfo board (l) and CSL4 audio filter board

CSL4 audio filter

This product was introduced at the beginning of 1987, and the unit supplied for review was a pre-production sample, The selectivity of the DCRX can be greatly improved by using this filter. Two bandwidths are provided, tailored for ssb and for cw use. A TL084 quad op-amp is used in an active filter network. The board measures 5 by 8·5cm.

CTU30 antenna tuning unit

The unit measures 13·5 by 10cm. A "T" network is used for matching unbalanced wire or coaxial fed antennas to 50 or 75Ω. The circuit comprises two variable capacitors and a 12-position tapped inductor. The frequency



CTU30 antenna tuning unit

range covers 1·8 to 30MHz with maximum transmitter powers up to 30W. A balun is also incorporated for balanced feedlines, although this is not suitable for high impedance tuned feeds. A novel coil construction is used based on lengths of ribbon cable bent into a "U" shape and soldered into the pcb where the coil turns are interconnected. Taps are easily provided. The Q has not been measured, but as the losses seem fairly low, the Q must be acceptable.

ON THE AIR RESULTS

The boards were assembled according to the configuration shown in Fig 1. For the purpose of the review, the boards were laid out on a groundplane comprising a sheet of copper-clad board and unboxed. It was found necessary to fully shield the vfo unit to prevent pulling. Even when fully shielded there was slight pulling with antenna tuning and a trace of chirp. This could be minimized with careful tuning of L1 on the MTX20 board. The problem did not occur when using crystal control. Two antennas were used, a square loop with half wavelength sides and a DX33 beam.

With the band well open, the receiver sounded lively and resolved all but the weaker signals audible on the main station receiver. There are two characteristics of a direct-conversion receiver which differ from a normal superhet and are immediately apparent. First, the lack of agc means that the true dynamic range of the signals is presented to the ear and, as a consequence, the audio control is used much more. Second, the audio image gives two tuning points on cw, one each side of zero-beat, and requires a little more skill in resolving ssb but this is quickly mastered. The effect is similar to using a broadcast-type superhet receiver with a bfo in the centre of the i.f passband. We have become accustomed in recent years to the single-signal ssb receiver with its inherent easy tuning characteristics. When netting onto a station, it is necessary first to zero-beat that station in the receiver before tuning the transmitter vfo to zero-beat. If the transmitter vfo is netted for the same audio beat note, it is possible that this is set on the audio image and could be a couple of kilohertz or more off the wanted frequency. With the transceiver system described, netting is performed by zero-beating the received signal with the irt off, and then switching on the irt and setting this for a convenient beat note.

The stability of the vfo and the receiver main tuning after a few seconds warm-up seemed very good for oscillators operating at 14MHz. Air currents across the tuning components shifted the frequency by a couple of kilohertz but this would not occur in a box. The tuning range with the capacitors provided by Howes was 14·0–14·32MHz, just less than the whole band. This capacitor was measured as 17pF min and 55pF max, a range of 38pF which is not quite enough for full band coverage. The frequency variation was less than 1kHz for supply voltage variations in the 10–14V range.

The CSL4 audio filter made a big improvement. Without this filter the bandwidth sounded quite wide. The ssb position sounded ideal for ssb and most cw operation. To make effective use of the cw bandwidth position, which is quite narrow, a good slow motion drive is essential on the oscillator tuning. One problem which direct-conversion receivers tend to suffer from is direct demodulation of a.m broadcast stations in the mixer. This gives rise to a background of the broadcast station programme content which is largely unaffected by the oscillator tuning. To guard against this, it is essential to use a mixer with good large signal performance and sharp front-end selectivity. The DCRX suffered slightly from this problem when signals were strong on the adjacent broadcast bands. The front-end selectivity in the DCRX comprises a single tuned circuit which is fairly flat. The problem could be susbstantially diminished by using the CTU30 atu tuned for high loaded Q.

The transmit cw note quality on crystal control was excellent, with acceptable envelope rounding for low key-clicks. As mentioned previously, some chirp was experienced on vfo control but this appeared to the reviewer to be largely due to inadequate vfo shielding. For transceiver operation, some form of sidetone is normally required to monitor the transmitted code. Howes manufacture a sidetone accessory, the ST2, which can operate from the key contacts or sense the transmitted rf. Another useful Howes accessory, if using vfo control without an external well calibrated receiver, is the XM1 crystal calibrator. This provides a variety of calibrated marker signals at intervals from 10MHz down to 2·5kHz. Neither accessory was included with the review items but are shown in the complete transceiver system (Fig 1). At full power and key down for a few minutes, the output transistor, driver transistor and associated heatsinks became quite hot, and there was a marked reduction in power output. The power amplifier choke L4 ran extremely hot, as did the output tuning inductor L7, indicating a loss of rf power in these components.

The atu was flexible in matching a variety of antennas. In most cases several different settings could achieve a matched condition but with different loaded Q factors. The higher loaded Q conditions (sharper tuning) helped in minimizing a.m breakthrough in the receiver. The loss in the atu seemed low, generally less than 1dB. Quite a reasonable figure.

On the air, QSOs were made all around Europe and the USA, including KP2 and South America; 10W is, after all, only 10dB down on the UK legal limit.

ELECTRICAL MEASUREMENTS

DCRX Receiver

(*i*) **Sensitivity for 10dB s+n:n.** No af filter 4·8μV, CSL4 ssb 3μV, CSL4 cw 2μV. These figures suggest the receiver is about 25dB less sensitive than most modern full price communication receivers and would resolve signals down to 20dB above band noise on a quiet band.

(*ii*) **AF response.** See Fig 2.

(*iii*) **Oscillator leakage out of the antenna.** This depends on the layout of the tuning capacitor wiring. At best this was measured as −45dBm but can degrade by 10dB or more with poor layout; −45dBm is acceptable but higher levels could cause interference to local stations.

(*iv*) **A.M breakthrough.** Direct demodulation of out-of-band a.m signals was measured at 30 per cent modulation depth. The level of the interfering a.m signal was increased until the demodulated signal was equivalent to a 10dB s+n:n on channel signal. This level was −30dBm (7mV) for close-in signals rising to −22dBm (18mV) for signals 3MHz away. This change mirrors the front-end selectivity.

(*v*) **Third-order intermodulation.** The third-order input intercept point was measured as +8dBm, giving a two-tone dynamic range of 78dB.

MTX20 transmitter

(*i*) **Power output.** The maximum power output was measured as 11W when operating from a 13·8V supply and was reducible to about 0·5W. The maximum power output decreased rapidly with supply voltage, achieving 7·5W output at 12V. The power output also reduced with rising temperature, dropping from 11W to 8W when hot, and there was a distinct hot smell from L4. Under vfo control, the variation across the band was about 1W.

(*ii*) **Harmonic output.** −45dB (2nd).

(*iii*) **Current consumption.** 1·6A at 11W output and 13·8V supply.

(*iv*) **VXO pulling range.** The crystal oscillator frequency in the transmitter may be varied a little by connecting a variable capacitor across the crystal. The maximum value that could be used before oscillation stopped was 70pF, but this will depend on crystal activity. A 7kHz tuning range could be achieved. For maximum tuning range a capacitor with a low minimum value is necessary. The tuning range could possibly be increased by combinations of fixed inductor and variable capacitor; some experimentation would be required.

CVF20 vfo

(*i*) **IRT tuning range.** +1·7 to −2·9kHz with a somewhat non-linear characteristic.

CONCLUSION

The Howes kits offer a straightforward and surefire approach to building your own simple hf equipment, whether this be a receiver, transmitter or combined as a transceiver. The cost of the items described in this review is as follows:

	Kit	Assembled
DCRX receiver	£15.30	£20.90
MTX20 transmitter	£21.90	£27.70
CVF20 vfo	£9.90	£15.90
CSL4 audio filter	£9.90	£15.90
CTU 30 atu	£24.90	£29.90
ST2 cw sidetone	£8.60	£12.90
XM1 xtal calibrator	£16.80	£21.90

To these costs must be added the parts external to the boards—case, connectors, controls etc. These can, if all purchased new, double the above costs. I am sure it would be attractive to the constructor if Howes provided these items as optional extras, in particular ready-drilled metalwork. Using the above kits, the complete transceiver shown in Fig 1, including crystal marker and sidetone but less atu, should cost betwen £90 and £120 depending on the contents of the individual junk box.

The performance is excellent, considering the cost, and construction may be confidently tackled by the inexperienced constructor. The transmitter runs sufficient power to achieve worldwide contacts given the right conditions, and the receiver provides an excellent introduction to home-construction and amateur radio.

ACKNOWLEDGEMENT

I would like to thank C M Howes Communications of Meopham, Kent, for providing the kits for review.

A DIVERSITY RECEIVING SYSTEM FOR REPEATERS

A Barrett, G8DOR*

"Baz" Barrett started with amateur radio at an early age, encouraged by his father, G2BWW. He joined the RSGB at the age of 12 and was licensed in 1969 while still at school. He has been on the committee of the Reading & District Amateur Radio Club since 1972, and was a founder member of the Berkshire Downs Repeater Group. He built GB3BK, GB3RD and GB3RU. By profession he is a radio systems engineer and currently a director of Key Radio Systems Ltd.

THE BERKSHIRE DOWNS REPEATER GROUP was formed in 1977 by members of the Reading and District Amateur Radio Club. The original repeater was GB3BK on 432MHz and this was later joined by GB3RD on 144MHz and GB3RU on 1·3GHz. After nearly 10 years of service, it was decided to replace the original 432MHz equipment with a Mk2 unit, and incorporate some new ideas. One of these was the implementation of a diversity receiving system, the outlines of which were presented in a lecture at the 1985 RSGB National VHF Convention.

To explain briefly the reason for this experiment, the repeaters are sited on the eastern edge of the Berkshire downs, some nine miles to the west of Reading and looking along the Thames Valley. Although the mobile coverage in the town of Reading was quite good, the signals from portables —with their lower transmit power—were not so reliable. In order to improve matters, some experiments were carried out in 1984-5, replacing the colinear receiving antenna of the repeater with a beam directed towards the town.

As expected, the signals into the beam were greatly improved, but out of it they were reduced, and the idea of using both the colinear and the beam, selecting the source of the strongest signal, and repeating that, was conceived. After a great deal of experimentation, when time permitted, the solution described here was finalized, and has been operating satisfactorily for over a year.

The repeater has two separate, identical receivers, with a common local oscillator. One takes signals from the colinear, and the other from the beam. If the two receivers have equally, strong signals from the same source, the two demodulated outputs are coherent and identical, enabling them to be summed at audio without distortion. As the equal signal is reduced in level to the point where it becomes noisy, there is an interesting effect. Because the two noise components are random and the wanted audio is coherent, the summed signal has a better signal-to-noise ratio than either of the individual signals. This is most useful at the weaker levels, so it was decided to exploit this factor in the design, rather than simply switching between the two signals.

Subjective tests with speech, showed that the optimum improvement by summing was when the two signals differed in sinad (signal to noise and distortion) or quieting, by less than 6dB. For greater differentials, the noisier signal tended to degrade the quieter one. The final version used a mixture of summing and switching. There is a "sinad window", and if the two signals fall within it they are summed and, if they fall outside, the weaker one is switched out.

One other problem had to be overcome, the summed signal is in theory twice the amplitude of each individual one. This is mostly overcome by summing the two low-impedance audio outputs through a resistive combiner, and switching the inputs to it. This reduces the combined level by 6dB, but barely attenuates at all when one leg is open circuit. Just to make sure, the output to the transmitter is passed through an age amplifier (vogad) to ensure a constant level of deviation. The vogad cuts in somewhat below the required level, with the useful side-effect that late night "I can't speak any louder because the harmonics are asleep" type of QSOs come out fully deviated. There is, of course, an increase in background noise under these circumstances on all but the strongest signals, which tends to weed out those who use the repeater to compensate for poorly-adjusted transmitters.

Circuit implementation is quite straightforward. The analogue dc output from the squelch circuits of both receivers is tapped off and brought out to the diversity unit. Most fm receivers have a squelch which operates by feeding high-frequency noise from the discriminator into a rectifier, the output of which is at a maximum with no signal input (all noise) and falls to zero with a strong signal (fully quietening). The squelch threshold is set by switching on the audio when this rectified level falls below a predetermined value. Since many receivers alter the gain of a high-frequency amplifier to set the squelch, it is imprtant that the two receivers are adjusted to be the same.

The two outputs are then fed into a comparator, through simple RC lowpass filters. The dc gain of the comparator is set to a convenient value to give good resolution of the "sinad window". I set it arbitrarily to give one third of supply output at 6dB difference in one direction, and two thirds for 6dB in the other direction. The output of the first comparator is then fed to two more comparators, which set the switching limits of the "window". No hysteresis was found to be needed on the last two comparators as, in real life, signals never remain near either threshold for long. I used a single TL084 quad op-amp for all these, although the type is not critical. The outputs from these two comparators are used to control the switches which feed the audio from the receivers to the resistive combiner. I used the HEF4066 hex solidstate switch, but reed relays would be just as good. Care needs to be taken to ensure that there is no dc offset across the switching device, as this will produce a "click" when the voting changes. Finally, the combined output goes through the vogad, which is really a nicety that the system works perfectly well without, provided that the input impedance of the modulator is high, compared with the combiner.

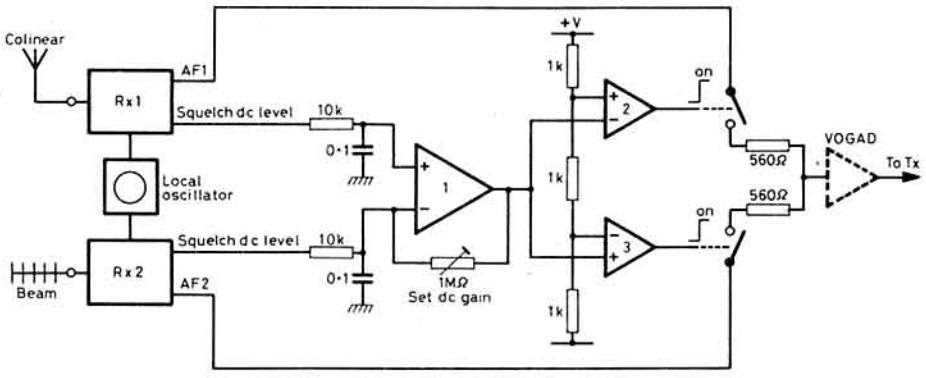


Fig 1. System circuit diagram

In operation, the system works without vices. The only unusual effect is that occasionally on signals from fixed stations on the side of the beam, the audio changes from faintly noisy to fully quietening and back, as fading makes the switch operate.

The colinear and beam antenna at GB3BK are vertically separated by about three wavelengths, which produces a degree of space as well as directional diversity. This has the added benefit of removing, or reducing deep "nulls" in signals from mobiles moving in slow traffic.

The diversity concept has been described mainly in terms of repeater operation, but it applies equally to any other type of receiving installation. While working on the system at home, I was impressed with the improvement in signals from mobiles when each receiver was connected to one half of a crossed Yagi, so perhaps there is also an application there. □

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Technical Topics

by Pat Hawker, G3VA

AS *TT* (BORN APRIL 1958) staggers into its 30th year of publication, it is interesting to speculate on the degree to which all the new technology we have witnessed has actually changed the hobby. Some would argue that home-construction, home-maintenance and ham-ingenuity have vanished together with the profound sense of wonderment that used to come from discovering that a simple receiver and simple transmitter could span the oceans. Today, in the UK, it is possible to lift a telephone handset and dial-direct to subscribers in 173 countries, and the young seem often more fascinated by the artificial intelligence of a personal computer than the marvels of Marconi.

Allan Taylor, G3JMO, worries that the factory-built, all-band transceivers, whose owners are often unwilling to risk using them with simple diy wire antennas, are opening the way to a breed of "systems co-ordinating consultants" as part of the marketing scene. They will arrive, measure your garden, advise on decorating and furnishing the shack; and their firm will then install and check out the equipment—and leave the newly-licensed amateur with naught to do but watch the visual display units and pay the instalments. How different, he suggests, from the days of the 0-v-1, the tri-tet, the Zepp and the human skills needed to copy a weak, drifting, chirpy dx signal. He foresees a long, slow decline of the hobby as it was for so many years.

I am less pessimistic. The mere fact that *TT* has chalked up around 1·5 million words, around 2,000 diagrams, all largely devoted to diy "kiss" forms of amateur radio, with a continuing problem of finding space for the many ingenious ideas that crop up, is surely proof that the hobby continues to flourish and is far from having entered into a terminal decline.

Ralph Taylor, GW2HCJ, and Urban Smith, GW3UTI, preparing to launch a series of instructional videotapes they have made themselves, remind us that the "kiss" principle is of long-standing, an unchanging truth: "Simplicity in the construction of machines cannot be too warmly recommended to the young engineer; for complexity increases the friction and expense, and endangers the chance of success from the de-arrangement of the parts", *The Mechanic's Calculator* by William Grier, 19th edition, 1862, p312. In amateur radio, "friction" refers perhaps to band behaviour!

An "ultra mini-beam" from VK2ABQ

For many years the various low-cost "wire" two-element antennas (and bow-tie dipoles) developed by Fred Caton, VK2ABQ/G3ONC, and introduced initially in *TT* and *Electronics Australia,* have become well-established as a logical and technically-justifiable approach for those with small gardens and/or limited budgets. The basic VK2ABQ wire array gained the cachet of being included, with some further suggestions, in *HF Antennas for all locations* by Les Moxon, G6XN. This design maintains its popularity and, for example, turns up again in *Practical Wireless* (February 1987).

Recently VK2ABQ has sent along one of his annotated sketches outlining a new 14MHz "double triangle dipole" array (Fig 1(a)) suitable for very small gardens etc. It uses no loading coils or traps, and he believes it to be more efficient than an array with capacitively end-loaded elements. He stresses that being a fairly high-Q structure, the bandwidth is restricted and that its main attraction is that it provides a unidirectional antenna with good side rejection and some gain in spite of its small size. Size, rather than the overall performance of a full size beam, is the main attraction.

Both the dipole and the reflector consist of two open-ended loops in the form of equilateral triangles, each of the four triangles being formed from about 17ft of light hook-up wire. It provides a unidirectional cardioid radiation pattern, and can also work well on 21MHz in the form of extended dipoles, although the feedpoint impedance (about 40Ω on 14MHz) increases; presumably it could be scaled down as a 21/28MHz array.

It is necessary to adjust the loops using a grid dip oscillator, first adjusting the driven element and then making the "voltage-driven" reflector identical. Good insulation is needed, particularly at the central voltage nodes.

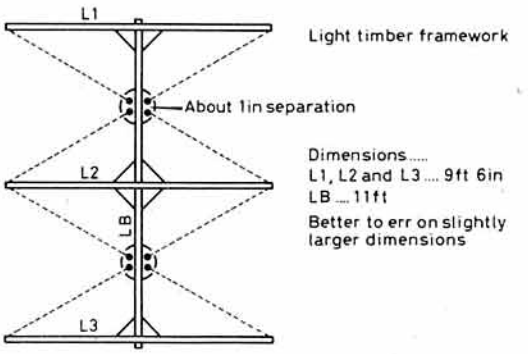


Fig 2. Light timber framework for the VK2ABQ array

VK2ABQ suggests mounting the array on a light timber frame (Fig 2). He points out that the antenna is not a close-spaced Yagi, since the reflector is voltage-driven with an inherent quarter-cycle phase shift. An equivalent lumped circuit (Fig 1(b)) may help to explain the principle. He adds that maximum gain will be achieved only when L1 and L2 are identical and in the form of equilateral triangles, although those experimentally inclined may wish to use a small stub at the reflector in lieu of the "link" shown.

I trust this is an accurate and understandable interpretation of Fred's rather cryptic notes.

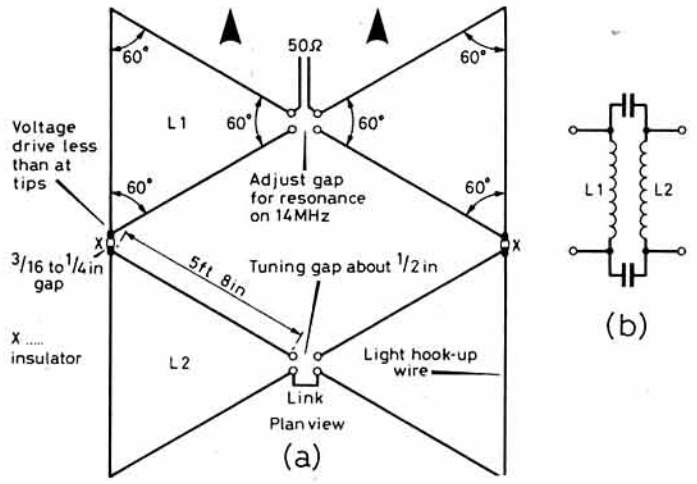


Fig 1. (a) Bird's eye view of the VK2ABQ "Ultra Mini Beam" for 14MHz. (b) Equivalent lumped circuit with inherent phase shift between L1 and L2.

Safety and mast guying

In the March *TT* (p180), Bob Butcher, G3UDI, showed clearly that it needs a minimum of five guys to protect a mast that is free to move about its base in the event of the loss of one guy. Since this type of installation is commonly a lightweight mast used for field-day or similar operation, the question of why a guy may fail was not considered. Experience suggests that cows have a penchant for entangling themselves in the guy ropes of masts and tents. But for more substantial or permanent installations the question of guys breaking under wind-strain etc becomes very important.

In this connection, David Row, G0EUE, offers an important rider, affecting safety. He writes: "Consider again Fig 2(c) of the March *TT*. For simplicity, assume that the wind is in the direction of Guy A and is towards the mast. Let the tension in A arising from the wind at the moment of failure be T_A. As soon as A breaks or parts, T_A is shared equally by B and C.

"Now consider Guy B (or C, which would be the same because they are symmetrical with respect to A). The tension to which it is subjected because A has parted is increased in inverse proportion to the cosine of its angle with

A, seen in plan. For the five-guy arrangement, this angle is 360/5 which is equal to 72°, and the tension in B, namely T_B, is increased thus:

$$T_B = \frac{1}{2} \cdot \frac{T_A}{\text{Cos}72°} = 1{\cdot}6T_A$$

"Since A, B and C are presumably all of the same strength material, it is unreasonable to expect B and C each to stand up to over 1·5 times the tension which caused A to part. In short, if wind (other than a gust of shortest duration and which does not repeat) causes the failure of one guy, the mast will come down.

"A five-guy arrangement is, as G3UDI explained, the minimum which will ensure stability when setting up the mast in *no-wind conditions*. This is a useful characteristic of antennas like the K1WA (*ARRL Antenna Handbook*, 14th edition, pp8-12 *et seq*) because it allows single-handed repair and adjustment of the accessible end of the dipoles with the mast still standing and stable.

"In practice, the calculation above over-simplifies the problem. For example, it takes no account of the effect of elasticity in the guys, and it assumes perfect symmetry. Generally the complications which occur in the real world worsen the result. In particular, bear in mind that the cosine function is not linear, and 72° is the region where it begins to take off; suppose obstructions in your garden lead to one of the angles being increased by only 4°, then T_B increases from $1{\cdot}6T_A$ to $2T_A$. At 80° it approaches $3T_A$.

"As an old sailor who, as a young man, set sail in the square-rigger *Cutty Sark*, may I offer a sailor's solution: namely, to fit *preventers*—a system of ropes which, from the point of view of engineering design, are redundant structures. Preventers are rigged to prevent catastrophic failure by taking the load if the designed system fails. For example, in the K1WA "wigwam" a useful preventer would be three stout guys, not necessarily from the top of the mast, quite independent of the five-dipole self-staying main system. Belt-and-braces? Yes, and a good night's sleep through the roughest weather!"

As I read it, G0EUO's valuable contribution applies generally to mast guying strains, whether or not the base is free to rotate, and deserves careful consideration. Tall radio and tv broadcast masts are customarily stayed at several heights, partly I imagine to minimize flexing and oscillation. It was once my task to prepare a long non-technical explanation of the little understood problem of "vortex shedding". It was largely due to this phenomenon, which can occur at quite low steady wind speeds and which can cause a mast to go into violent, resonant oscillation, that the 1,265ft Emley Moor mast came crashing to the ground in March 1969. One result was that two other similar masts were equipped with heavy counterweights suspended inside the cylindrical steel structure to damp out oscillations. Perhaps fortunately mast oscillation frequencies are not usually a problem with amateur radio masts! Vortex-shedding, incidentally, is often the cause of the loud hum that can come from overhead telephone wires.

A less shocking keyer

From Bill Sterling, GM4DGT, a long-time advocate of touch keyers, come some tips relating to switching and keyers. He writes:

"Last year I purchased a well-used FT200 with the intention of using it to transvert on to 50 and 70MHz. I soon found that it exhibited the same annoying feature I had experienced on an old FT101. This was that the relay contacts would stick together, requiring much thumping of the keyer to release them. I have found that the addition of a 300Ω resistor in series with the keying lines alleviates the problem although it does not effect a complete cure.

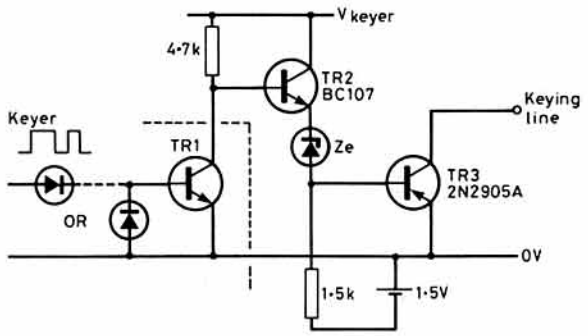


Fig 3. GM4DGT's "shockproof" keying arrangements. TR1 is either the original npn keying transistor or the relay contacts. TR3 2N2905A has withstood the bias voltage but an MJE350 might prove more reliable. An extra diode has been connected between TR1 base and earth. In normal positive keying GM4DGT uses a series diode in the base of TR1 to guard against collector/base breakdown and the transmitter bias etc

"I have also noted that a number of the factory and home designs for solid-state switching of the keying line use an npn transistor (or pnp device in a strange configuration). For a bias-keyed rig this means that the negative (earth) rail of the keyer floats at the open-circuit potential of the bias supply. With a metal-enclosed keyer or, in my case, a touch-keyer (*TT*, May 1977), an unpleasant 40V to 60V 'dirl'* may be felt if in contact with the keyer while making adjustments to the rig.

"The circuit of Fig 3 circumvents this 'shocking' state of affairs. I have used this arrangement since 1974 and wonder why so simple a solution appears not to be more widely used. The battery life is very long; the original was still working, although oozing, in 1983.

"TR1 may be the existing keying transistor in the keyer (or the relay). TR2 is a small-signal device (eg BC107) which, in conjunction with the zener diode, holds off the keying transistor, TR3, by nullifying the −1·5V from the single-cell battery. The zener diode is selected to be equal to the keyer supply voltage less the 1·5V (ie for a 9V keyer supply the zener diode would be a 7·5V type).

"For those who do not want to delve into the innards of the keyer, the whole unit (TR2, TR3) could be housed in a box with an input socket and key lead fitted. The supply could then be derived from a separate 9V battery."

*The word "dirl" is used as in the Scottish bagpipes "skirl". You get just as big a "fleg" (fright) and jump just as high when they start up unexpectedly!—*GM4DGT*

Feedback on 1·8MHz shielded loop and G4UAZ vfo

No matter how hard everyone along the publishing chain from original letter-writer to the printer tries, errors do creep into published material.

John Hawes, G4UAZ, draws attention to the vital caption of Fig 2 (*TT* June 1986, p417) giving the component values of his stable bipolar-assisted mosfet vfo. An obtrusive "k" crept unnoticed into the values of the emitter and collector resistors (R4, R5) for TR2. The value of each should have been 270Ω not 270k. G4UAZ mentions that there has been considerable interest in this vfo, suggesting that home-construction is not dead. He still has "no reason to doubt this is the 'ultimate' vfo circuit for stability". At least, until someone comes up with a "more ultimate" arrangement.

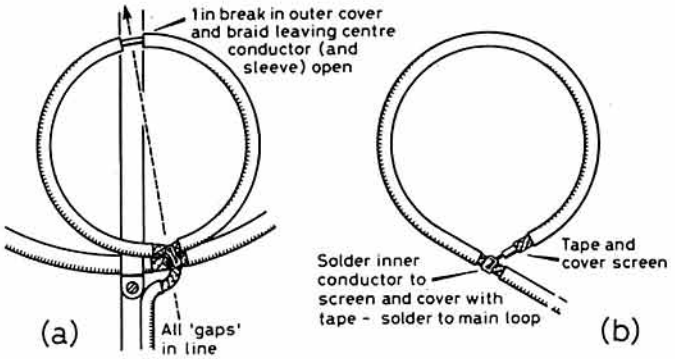


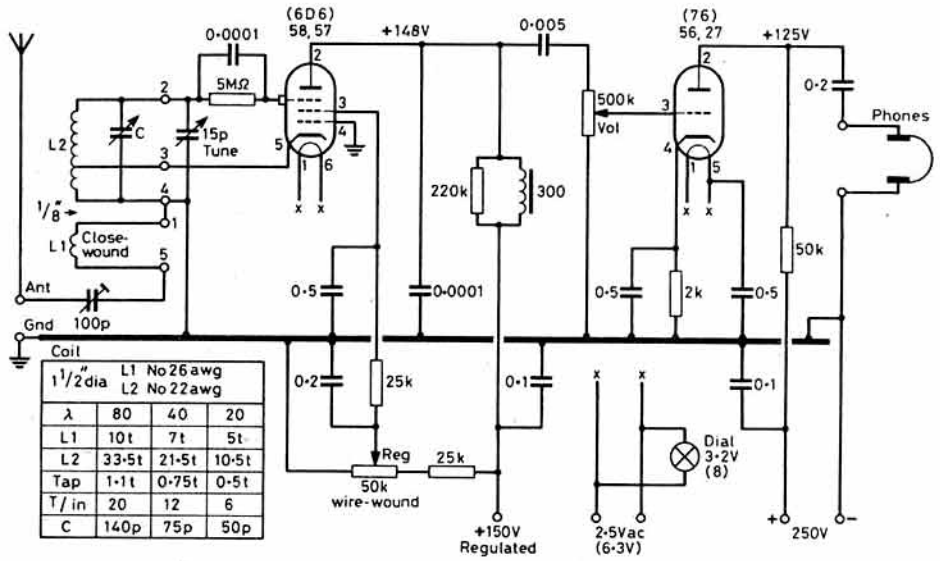
Fig 4. (a) Correction to the passive loop antenna shown in *TT* March indicating the 1in break in the outer braid of the small coupling togs opposite the feedpoint. (b) A possible alternative method of forming a Faraday type coupling loop.

More recently the 1·8MHz shielded loop receiving antenna developed by Mike Shepherd, G8YZW, from a *Wireless World* article (*TT* March, Fig 4, p181), unfortunately omitted the essential "gap" near the top of the small coupling loop where the outer covering and screening braid of the cable has to be removed over about 1in (see Fig 4(a)). Alternatively it might well prove possible to re-arrange the connections at the base of this coupling loop so that it forms a Faraday loop as used in some atus and tvi screen-breaker filters (Fig 4 (b)).

The April *TT* item on PME had Figs 2 and 3 transposed.

The trf receiver—still useful?

The April *TT* included details of a simple regenerative, general-coverage hf receiver based on two twin-valves (ECC81, ECL82) which Alan Radmore, RS88565 built primarily to listen to hf broadcast stations but also to serve as a back-up set for monitoring the hf amateur bands. By adding a simple rf attenuator ahead of just a single tuning circuit he found that his simple set could cope surprisingly well with the strong signals that come these days from 100, 250, 500kW or more transmitters used for external broadcasting. Selectivity of such receivers depends almost entirely on the Q-multiplier effect of a regenerative detector when adjusted just below or just above the point of oscillation, plus the possiblity of further enhancement, particularly on cw, by using a peaked audio filter or resonant headphones etc.



1½" dia	L1 No 26 awg L2 No 22 awg		
λ	80	40	20
L1	10t	7t	5t
L2	33·5t	21·5t	10·5t
Tap	1·1t	0·75t	0·5t
T/in	20	12	6
C	140p	75p	50p

Fig 5. Circuit diagram of ZL2JJ's replica of a 'thirties "blooper" 0-v-1 receiver based on an early American design. Measured sensitivity at 7MHz compares well with a modern superhet receiver

Nobody would claim that such a receiver can achieve true single-sideband or single-signal reception but in virtually all other respects the performance can, with care, be made surprisingly good, coping well with the reception of cw, ssb and a.m (and nbfm). I still look back with pleasure to pre-second world war contacts with Australia, Southern Rhodesia (as then was), Newfoundland, Brazil, Argentina and the USA made with about 10W dc input and an 0-v-1 receiver using two of the old 2V-filament battery valves.

The development and implementation of the regenerative detector form of direct-conversion receiver reached its peak in a number of the excellent German military communications receivers such as the Lorentz FuG10, designed in 1937 as an aircraft receiver or the Torn Eb tuned radio frequency receiver (2-v-1) with an eight-band turret (see "German World War 2 communications receivers—Technical perfection from a nearby past" Part 1, by Dick Rollema, PA0SE *CQ* August 1980), and three-gang tuning.

But just how good (or bad) were the simple amateur "bloopers" as they were sometimes called? In the thirties nobody subjected them to the type of laboratory bench measurements that we expect to find today in equipment reviews—though one should always be careful in accepting that laboratory tests are a certain guide to the operational "feel" of a receiver.

Baz Kirkwood, ZL1BN, disclaims any intention of disposing of his modern Icom IC751, but nevertheless is one of the increasing number of people who have become keenly interested in "vintage gear" of the early 'thirties, and has been busy building 0-v-1 and more recently 1-v-1 trf receivers.

His interest has been stimulated by making the acquaintance of Peter Byam, ZL2JJ. ZL1BN writes: "One rainy afternoon I heard a musical 3·5MHz cw signal wobbling a little within the passband of my IC751 and so made the acquaintance of ZL2JJ. He was using a one-valve tnt power oscillator based on a design in an ARRL *Radio Amateurs Handbook* of about 1931 vintage. As a receiver he was using an 0-v-1 design of about the same era: Fig 5. Later I visited his farm in Taranaki and was utterly amazed at how serviceable his old-time gear was, and what fun it was to use. He builds immaculate replicas of early 'thirties designs, even turning brass terminals on his lathe. I returned home and lashed up an 0-v-1 receiver which performed well but suffered from a few cross-modulation problems due mainly to the long earth lead to an upstairs shack. I have since progressed to a 1-v-1 receiver which is now the apple of my eye and I am collecting bits for a companion transmitter."

A disadvantage of a regenerative detector in an 0-v-1 arrangement is that it responds to strong signals on harmonic frequencies when oscillating. "On 3·5MHz I can hear local stations working on 14MHz but have increased the screening and the rf gain-controlled stage helps; also extremely careful decoupling and a top-cap grid valve," he writes.

Peter Byam, ZL2JJ, described and illustrated his 1931 replica receiver in the "Old Timers Club" feature in *Break-in*, July 1986. He introduced it as follows: "It's simple, easy to build and works astonishingly well. Even today the venerable 'blooper' deserves careful consideration. It makes an ideal companion to a homebrew cw transmitter and parts are not hard to find . . . . Like the self-excited power oscillator (seo) transmitter, a regenerative receiver, when coupled directly to an antenna, can be a bit tricky. The receiving antenna should be non-resonant and should not sway in the wind. Mine is about 30ft of wire hung around the shack. The real problem is body-capacity affecting the tuning. A very short earth connection helps as otherwise the receiver chassis and panel may be 'hot' to rf."

Many of the problems of a straight regenerative receiver are reduced by using a tuned or aperiodic rf stage. For example, it reduces the radiation from an oscillating detector directly coupled to an antenna which can otherwise be a source of interference to receivers in the locality. An oscillating detector needs to be made as stable as possible, with good electrical bandspread tuning. The one-time Eddystone click-stop band-set tuning system (as used in their 'thirties "All-World Two" etc but also marketed in component form) was an excellent arrangement, but there can be relatively few of these left in junk boxes. Resonant antennas connected directly to a regenerative detector tend to produce dead spots, due to suck out, etc.

Just in case readers may get the impression that *TT*, in pursuit of home-built 'kiss' equipment, is in danger of turning into an "old-timers column" it is worth emphasizing that well-designed solidstate regenerative-detector receivers can give good results, although the homodyne form of direct conversion is the more usual approach. Fig 6 shows a 14MHz triple-gang-tuned regenerative receiver designed specifically for operation on 14MHz. This was by F9GY and appeared initially in *Radio-REF*, with the circuit diagram reproduced in *ART*. Japanese 3SK88 dual-gate-mosfets could be used in lieu of the 40673 devices.

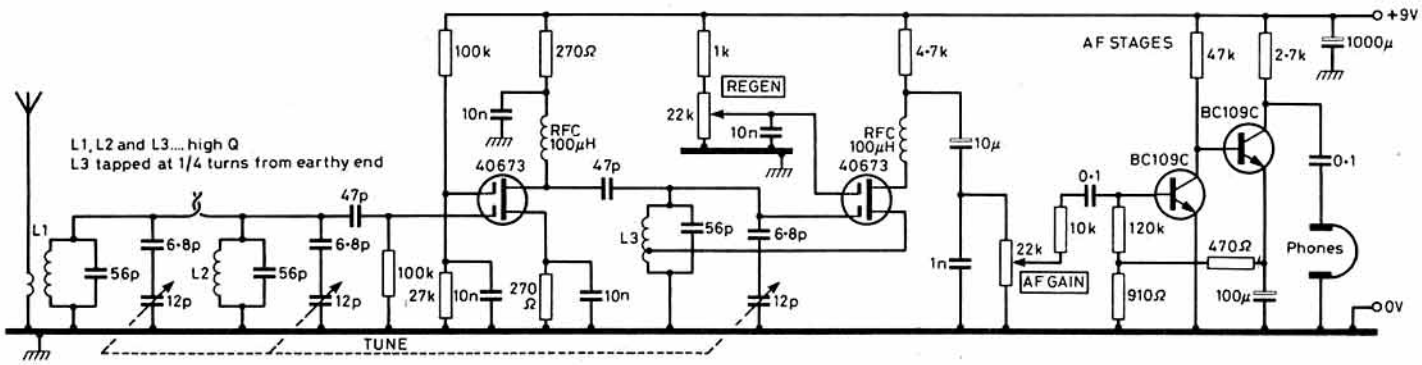


Fig 6. Solidstate 14MHz trf "straight" receiver originally described by F9GY in *Radio-REF* in the 'seventies and intended primarily as a monoband cw receiver

Measured performance of "bloopers"

The receipt of information on ZL2JJ's replica receiver led Don Sutherland, ZL2AJL (who conducts the New Zealand "Old Timers Club" column) to present himself at ZL2JJ's farm with a wagon load of test equipment. The aim was to establish an objective comparison between the sensitivity of modern receivers/transceivers with those used in the early and mid-'thirties. The results were illuminating.

In a series of tests he found that on about 7MHz this old-style 0-v-1 had a sensitivity virtually limited by noise: (1) with a signal input of 1μV (emf in 50Ω cable, ie -113dBm) the (s + n)/n ratio was 30dB. (2) With the input from the signal generator reduced to give an (s + n)/n = 12dB, the input level was 0·12μV (-129dBm). (3) With the receiver "just oscillating" blocking began to occur with an input level of 200μV, representing a dynamic range (from 12dB snr) of 62dB. (4) By advancing the regeneration (reduced sensitivity), the dynamic range could be extended by another 20dB. (5) Measurement of the noise figure resulted in a double-sideband value of 12dB (15dB ssb).

As ZL2JL puts it: "It is clear that such a receiver of elementary design is able to match closely the performance in some of the important areas of many of the most modern, sophisticated receivers and transceivers. We see that claims of excellent performance made on behalf of these simple sets by 'old timers', based on their recollections of half a century ago and more, are fully substantiated. Only in the 'blocking' performance does it leave much to be desired."

This not only bears out the claims made by Alan Radmore in the April *TT* but suggests that the incorporation of a simple rf attenuator as he suggested can be an effective means of reducing the blocking problem and so giving back to the regenerative-detector approach to direct-conversion receivers a credible role even on today's crowded bands. With careful construction and use, a regenerative receiver could not only give that vital "pre-licensing" swl experience that many believe essential, but could also provide an operational receiver, for cw and possibly ssb, at least below about 10MHz. Similarly, with modern improvements in stability, there seems no reason to doubt that such simple-to-build receivers can work well on 50, 70 and possibly even 144MHz. Above this, the super-regenerative approach remains a possibility.

Ignition interference suppression

Back in 1976, D W Morris, G3AYJ, of Lucas wrote a virtually definitive article on "Suppression of vehicle interference for mobile radio operation" (*Radio Communication*, May 1976, pp336-343). There have also been various useful manufacturers' brochures on rfi suppression (eg *Giving two-way radio its voice* publication No 7R, 1978 by the Champion Spark Plug Company of Ohio, USA). More recently, pulse suppression ic devices built into some vhf/fm car radios have helped reduce the problem for broadcast reception on in-car entertainment systems.

Yet many amateurs still experience problems when installing mobile equipment. It is also well-proven that some vehicles tend to generate much more vicious electrical interference than others.

V Heaton, G3JIS, experienced a high level of pulse interference on 144MHz when he acquired a new car. His first reaction was that this could be because the car bonnet was made of plastic, partly but not entirely covered on the underside with an earthed metallic material. He writes: "A recent change of car caused me to re-investigate the problem of suppressing ignition interference on 144MHz. The new vehicle was claimed to be ready to take in-car entertainment equipment but has a plastic bonnet top and fuel injection equipment. The ignition coil had no fitted suppressor capacitor.

"When the car engine was run, both 144MHz equipment and a portable tv set in the house were adversely affected.

"Previous experiments on hf had shown that the lead length of the suppressor capacitors has a considerable influence on their effectiveness at high frequencies. The shorter the lead length, the more effective the suppression. This is due to the inductance of the lead lowering the series resonance of the capacitor and lead combination. Above the resonant frequency the impedance of the lead inductance effectively disconnects the capacitor from the circuit.

"To enable a direct A-B comparison with and without suppression, an inductance and capacitor low-pass network was constructed using Lucar connectors: Fig 7. Capacitor lead length is reduced to approximately 0·25in (about 6mm).

"The difference in the level of interference was very noticeable. The suppressor systems completely removed all pulse noise on reasonable 144MHz signals and almost completely removed noise on threshold-strength signals. On even the weakest receivable signals ignition noise was barely perceptible.

"It is interesting to note that while the car manufacturers had used very effective suppressor high-tension spark-plug leads, they had allowed the

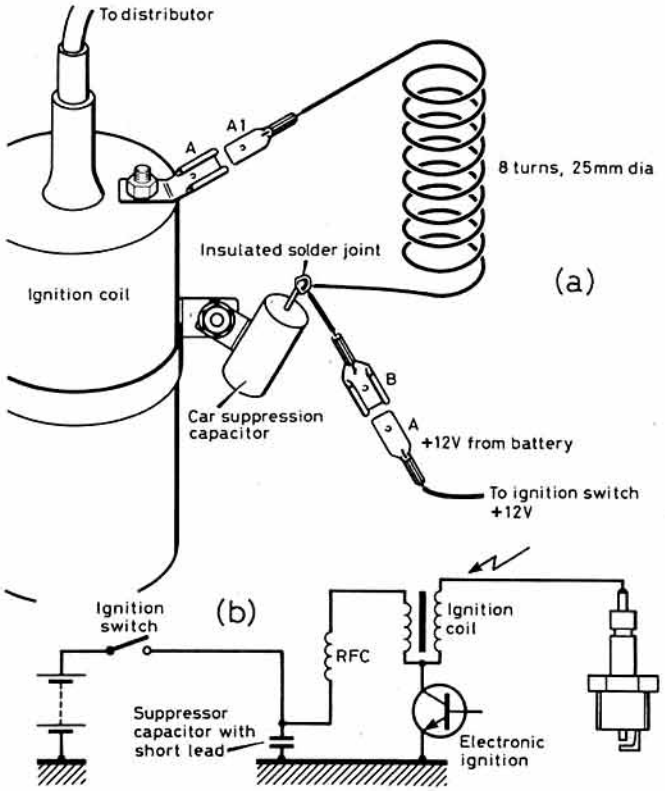


Fig 7. G3JIS's method of investigating and improving ignition interference suppression on 144MHz

low-tension return path to the battery to run through the whole of the wiring harness and dashboard area. Additional suppression provided at the source, by allowing a return path for the ignition current pulse at the coil and by blocking the higher frequency components with the series inductor, removed all pulses from the wiring harness, thus eliminating many metres of potential antenna path.

"Fig 7 shows Lucar connector A, which normally connects into the coil socket at A, ready to be connected into connector B of the coil return path filter. The capacitor is a normal car-type suppressor capacitor and the inductor consists of eight turns of 25mm diameter of 7-10A self-supporting flexible car wiring. Each turn is spaced the thickness of the wire from its neighbour."

Tracing mobile interference

The 16-page brochure "Giving two-way radio its voice" (Champion Spark Plug Company, Publication No 7R, 1978) provides a useful compilation of rfi suppression hints specifically in connection with two-way radio communication rather than the more usual hints on fitting in-car entertainment equipment. It notes at the outset that, while the suppression techniques and devices fitted by US vehicle manufacturers are usually adequate for standard broadcast reception. "Amateur radio, citizen band, police and fire services and marine communication systems may require additional measures beyond the basic suppression methods used by the vehicle manufacturer."

One section covers advice on locating sources of elusive interference, including the need to check reception with any squelch circuit taken out of operation. Where additional suppression is found necessary, the first step is to identify the source(s) of the interference.

On a weak incoming signal, *ignition interference* produces a popping sound that changes with engine speed and stops immediately the ignition key is switched off at fast idle. *Generator* or *alternator* noise appears as a high-pitched musical whine increasing in pitch as the engine speed increases. It does not stop instantly when the ignition key is switched off at fast idle. *Voltage regulators* (electromechanical) produce irregular, ragged, rasping sounds, often in conjunction with generator whine and similarly not stopping instantly when the ignition key is turned. Solid state regulators do not produce this form of interference. Instruments can produce various hissing, crackling, clicking sounds when the gauges operate and tend to be worse on rough roads (verify by jarring the dash).

A loud intermittent hash (sometimes more pronounced when the dash is jarred) can be caused by the voltage limiter used with fuel and temperature

gauges mounted behind the instrument cluster. The brochure suggests: "Disconnect the gauges or their sender units one at a time . . . the rfi should disappear. Bounce the vehicle to actuate the fuel gauge sender unit." *Accessories* should be initially checked with all turned off, then turned on one at a time.

Wheels and *tyres* (static electricity) can produce an irregular popping or rushing sound but normally only in dry weather while travelling at speed and it usually disappears when the brakes are lightly applied.

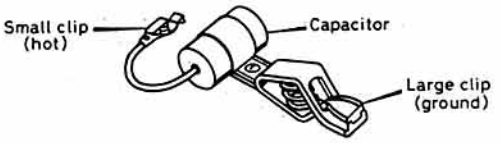


Fig 8. Use of a capacitor "touched" in turn to "hot" electrical points in order to trace sources of interference

The brochure suggests that where the source of interference proves particularly elusive, it may be possible to locate it with the aid of either: (1) a grounded capacitor touched to "hot" electrical connections in turn (Fig 8); and/or (2) a sniffer coil (Fig 9). To make and use a sniffer coil, disconnect the antenna from the transceiver. Wrap 50 turns of insulated wire (eg bell wire) into a coil 2in in diameter. Mount it on a wooden pole. Then, using a few feet of electric lamp cord, connect one side of the coil to the receiver antenna input, the other side to ground: "start the engine, turn on the radio, and probe around the engine and wiring with the coil. Bounce or shake the vehicle during probing. Maximum interference will be heard when the probe is near the source." I cannot help feeling that the details of the sniffer coil may stem from checking for rfi to medium wave broadcast reception (a near optimum frequency for electrical interference). If you are concerned only with 144MHz operation it might, I suspect, be advisable to use just a one- or two-turn loop and a coaxial cable connector rather than lamp cord. Alternatively check on a mf/lf car radio.

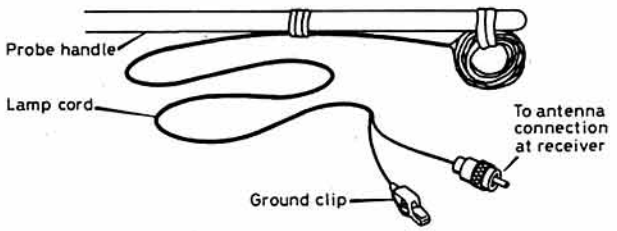


Fig 9. Sniffer coil for tracing sources of vehicle interference

TT has referred a number of times to the potential hazard and repair-costs that can result from emc problems in vehicles increasingly fitted with vulnerable electronic systems. For amateurs, rfi problems can arise not only from their own transmitter or that of a passing vehicle with powerful two-way radio but in extreme cases from radio and tv broadcast transmitters, communication centres, radar installations and the like.

R P Hope, GW8TVX, draws attention to an article "TV puts car electronics at risk" in the *New Scientist* (26 February 1987). This notes that "Car and component makers are reluctant to admit that their customers may be at risk from anti-lock braking systems or electronic transmission systems driven haywire by television and radio transmitters. But there is anecdotal evidence that some are powerful enough to stop engines and send instruments into a spin."

The magazine welcomes the news that Gaydon Technology, part of the Rover Group, has opened an £800,000 test chamber in which their engineers can study vehicle emc problems. It notes that in West Germany, it has been necessary for the authorities to install a giant Faraday cage over a stretch of autobahn that runs by a defence establishment. Amateurs contemplating operating mobile in a bright new "electronic" car should make sure that cmos devices, microprocessors etc are sufficiently resistant or shielded from local rf fields, as not to be affected by a near-by transmitter, including their own.

Biological effects of non-ionizing radiation

The possibility that there may be athermal biological effects (ie effects other than those due to rf heating of tissue or organs) resulting from the non-ionizing radiation of radio transmitters, high-voltage power lines or even deliberate malevolent "zapping" continues to excite the media, despite the continued absence of reproducible evidence from scientifically controlled experiments. I think that few experts now entirely discount the possibility that low-level radiation *does* have some biological effects, the argument now being whether these are *harmful* effects.

A long article "The waves we all live in" by Cynthia Kee in *The Observer* (March 8, 1987, page 51) reviews in layman's language the "evidence" that has been advanced over the years to support the belief there are athermal effects. Much of this will be familiar to anyone who has attempted to follow this debate since the publication in 1977 of the book *The Zapping of America*. Many of the claims made in that book, including the suggestion that the Russian over-the-horizon radars were intended to brainwash the Americans, have long been discounted but it did concentrate attention on this subject, helped to bring about a revision of the American safety standards and has stimulated much research into this subject. However, one sometimes gets the impression that British research is more often aimed at simply disproving that there are any harmful athermal effects.

After a 1985 London conference "Electric and Magnetic Fields in Medicine and Biology" (IEE Conference Publication No 257), I wrote in *Electronics & Wireless World* (March 1986): "The effects of electric and magnetic fields on the human body remain in dispute. With the exception of thermal effects, directly related to power, everything else still seems to be open to question . . . for every claim there seemed to be a counterclaim. For example, Dr A T Barker of Sheffield University accepts that many thousands of difficult bone fractures have been cured, particularly in the USA, by treatments involving the use of low-energy, low-frequency pulsed waveforms 'to stimulate bone growth' but he provided experimental evidence that suggests the pulsed waveforms do not actually contribute significantly to the healing process, since he claimed that similar success can be achieved with the generator switched off. Similarly, a double-blind clinical trial at Sheffield of pulsed 27MHz energy in the treatment of soft tissue injuries failed to show a statistically significant difference between those so treated and control groups on whom 'dummy' machines were used. On the other hand, the Sheffield group speak highly of magnetic stimulators, and many of the 33 papers seem to show useful applications of magnetic or electric fields or currents in medicine, without any clear idea of how this comes about.

"A study at Manchester University sought to answer the question 'Can induced 50Hz body currents affect mental functions?' The experimental results seemed open to more than one interpretation, though the technique was also tested against the amount of alcohol drunk the previous night and it was found that subjects responded faster in syntactic-reasoning tests when they had had a longer night's sleep, a not unexpected result . . . Similar uncertainty was reflected also in papers on leukemia and electromagnetic fields, overhead power lines and childhood cancers. Absolute certainty was little in evidence."

In *The Observer* article, Dr John Dennis of NRPB, the organization charged with radiological protection, is 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. Nobody loves us."

I must admit, that where radiation hazards are concerned, I feel less confident than Dr Dennis that the public would happily live with a risk factor of one in a thousand. Some of us would like to see a little more certainty about the risks, or lack of risks, involved with low levels of electromagnetic radiation, a matter of some importance to radio amateurs, their families and their neighbours. The now-current American standards may be about right. If so, the risks from amateur radio are very small if normal precautions are taken; but it would be nice to be certain!

Tips and topics

Charles Wells, G4ZZG, in describing his 807 amplifier (*TT*, February) mentioned that he was compiling information on valves and valve bases. As a result he received many letters and much useful information, duly acknowledged except for the anonymous "Bert" (postmark Scotland) who sent a much appreciated 36 pages of valve data from an old American handbook. G4ZZG adds: "such actions prove that the old cameraderie and helpfulness of amateur radio is not dead and forgotten and contradicts the popular impression that amateur-spirit has got lost on the way to digitalization, packet radio and gigahertz frequencies."

Some brief hints and kinks from *QST*:

K0JFN: "An old trick for soldering to aluminium is to place a drop of oil on the aluminium and then scratch the metal with a knife or other sharp instrument until the area to be soldered is shiny. After the solder has taken wipe the oil from the surface."

WN9RIJ: "When soldering wire to an SO-239 female chassis connector, insert the head of a pair of chain or round-nose pliers into the contact sleeve on the front of the connector. The pliers act as a heat sink and will prevent the plastic insulation between the inner and outer conductor from melting." □

NEWS BULLETIN

NEC — "the best yet"

Class B on 50 and 70 MHz, hints Minister

Well, it was a vintage NEC this year. The trade show was - in the words of several visitors we spoke to - "terrific"; "the best yet"; "absolutely tremendous" and "best show in Europe nowadays".

A grand total of some 8 000 visitors made the trip, in spite of the best efforts of the elements to deter them; very high winds blew lorries all over the motorways which, combined with heavy rain and spray, caused fairly ferocious delays to traffic. British Rail's 25 kV power lines were damaged at various places between Euston and Birmingham, not to mention further north. The change of days from Saturday & Sunday to Friday & Saturday was successful with the Friday attendance being about 1 000 up on the previous year's Sunday attendance. Saturday remained about the same.

The three main UK amateur radio importers attended the exhibition ICOM UK Ltd, formerly Thanet Electronics, Lowe Electronics showing Kenwood equipment for the first time and Yaesu, being represented by South Midlands Communications. All companies were showing the very latest in amateur equipment and accessories.

The real highlight of the show was its opening by the Parliamentary Under-Secretary of State for Trade and Industry, John Butcher MP. His speech reflected several of the things he'd mentioned in a recent interview with the Society (see p.337 for the text of it), but most striking of all was the strong indication that Class B licensees will shortly be permitted access to both 50 MHz and 70 MHz. Obviously we'll carry more on that story as soon as it becomes available, but it seems that the Department of Trade & Industry is viewing the Society's proposals for these bands with some favour. We suspect that there may be something to announce in the next month or so.

We'll have a fuller version of the Minister's NEC speech next month - the shortage of space in this month's Bulletin is something chronic - but for now here are some of the main points of what John Butcher had to say.

Following an introduction by Joan Heathershaw, G4CHH, the President of the Society, Mr Butcher said that he was delighted to have been invited to open the Society's National Exhibition and Convention, which was, as he put it, "....the showcase of amateur radio in Britain". He said that he had been disappointed to read recently that there was a decline in the numbers of people taking up university places for electrical engineering courses; industry "....desperately needed more skilled radio engineers" and that many of the most senior and well-placed electronic engineers in the industry had been "....launched on their careers as a direct result of their interest in amateur radio". He added that "....today's enthusiast is tomorrow's technologist".

Mr Butcher said that "we desperately need to encourage more young people to fill places available for university electronic engineering courses to meet the demand from industry".

The Minister then said that a new prize would be awardrd by the Department of Trade and Industry to recognise the achievements of young people in the field of amateur radio. It would be awarded in 1988 to coincide with the Society's 75th anniversary. More information would be given on this at a later date.

The Minister also made a very significant announcement in relation to the 50 MHz band. He said that the UK had taken the lead in Europe by allowing amateur access to the band, which was still used for broadcasting. He said that the careful strategy adopted by his Department had been successful and that further development could now be considered. The Minister stated that the Department would "favourably review" the matter of giving Class B licensees access to the 50 MHz band and he added that this would be considered in conjunction with the possibility of giving Class B licensees access to the 70 MHz band.

- LATE FLASH -
New repeaters

Quite literally five minutes before we were about to send this edition of the Bulletin off to the printers, we heard from the DTI that the following UHF repeaters had been licensed;

GB3BV - Hemel Hempstead, RB1
GB3DD - Dundee, RB10
GB3DT - Wimborne, RB0
GB3GM - Paisley, RB12
GB3PD - Peterhead, RB10
GB3RE - Chatham, RB11
GB3SG - Cardiff, RB15

More on operational dates, etc, next month.

COMMITTEE EXPENSES

One of our members wrote in to HQ recently expressing a wish to have information on the expenses incurred by the Society's committees during the financial year 1985-86. We thought it might be interesting to give them a bit more publicity, if only so that you can see what good value we get for money. These figures relate to the total expenditure by volunteers attending meetings of their respective committees:

Education:	£1,443
EMC:	£1,749
Exhibition & Rally:	£1,609
Finance & Staff:	£1,363
HF:	£649
HF Contests:	£1,078
IARU:	£367
Licensing Advisory:	£806
Membership & Representat'n:	£837
Microwave:	£816
Propagation Studies:	£561
Raynet:	£1,963
Repeater Management Gr'p:	£2,169
Technical & Publications:	£769
VHF:	£561
VHF Contests:	£1,040

OLDEST CLUB?

We've always thought that the oldest radio club in the UK was the Derby & District Amateur Radio Society, mentioned in an item in the Daily Sketch for 6 February 1913 as being the first of its kind in England - it was known then as the Derby Wireless Club. However, Regional Representative Bert Donn, G3XSN, has discovered that radio enthusiasts in Liverpool met at the Stork Hotel in Liverpool in the year 1910; an item in the May 1913 edition of The Wireless World" mentioned that the first meeting of the newly formed Liverpool Wireless Association "....took place recently" and also refers to the "Liverpool and District Amateur Wireless Association" which, according to the piece, "....is the first of the kind in the country". In fact, their first guest speaker was Oliver Lodge, later to become Sir Oliver Lodge around 1913. Digressing slightly, Bert is proposing to publish a booklet on the history of amateur radio in Liverpool and various events to commemorate the 75th anniversary in March 1988 are currently in the planning stage.

All of which makes us wonder - who was first? Anyone like to suggest which was the first amateur radio (sorry - wireless) club in the UK? Please let us know and we'll amend our records - our archivist, George Jessop, G6JP, will also be interested to have any further details.

MORSE TESTS

The following list shows the dates and locations of all the available test centres from the end of May to mid July 1987, 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
Greater London	Wanstead, London E11	29/05/87
Hertfordshire	North Watford	29/05/87
West Midlands	Sandwell ARC	30/05/87
Strathclyde	Glasgow	01/06/87
Derbyshire	Clay Cross, Chesterfield	01/06/87
Gwent	Newport	01/06/87
Guernsey CI	St.Martins	04/06/87
Cambridgeshire	Cambridge	05/06/87
Greater London	Eltham SE9	05/06/87
Wiltshire	Swindon	06/06/87
Dumfries & Galloway	Stranraer	06/06/87
North Yorkshire	York	06/06/87
Somerset	Burnham-on-Sea	07/06/87
Suffolk	Ipswich	11/06/87
Northants	Tiffield, Northampton	11/06/87
Leicestershire	Wigston Magna	13/06/87
West Sussex	Horsham	14/06/87
Derbyshire	Derby, near to Elvaston Castle	14/06/87
Hampshire	Winchester	20/06/87
Co.Armagh	Armagh	22/06/87
Avon	Redland, Bristol	24/06/87
Greater London	Wood Green, London N22	24/06/87
Nottinghamshire	Mapperley, Nottingham	27/06/87
Dyfed	Carmarthen	02/07/87
West Yorkshire	White Rose ARS	07/07/87
Lancashire	Fleetwood	11/07/87
Dorset	Dorchester	11/07/87
Isle of Wight	Binstead, Ryde	11/07/87
Mid-Glamorgan	Rhydyfelin, Pontypridd	12/07/87
South Glamorgan	Penarth	14/07/87
Central	Stirling	14/07/87

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.

OVERSEAS AMATEUR EXHIBITIONS:

Peter Crosland, G6JNS, is hoping to arrange package trips to two major overseas amateur events next year.

The Dayton Hamfest - in Ohio, USA - takes place in April 1988 and the Freidrichshafen Radio 88 Exhibition - in Germany - takes place in June 1988. Anyone interested in attending either or both events is asked to contact Peter, who is QTHR, enclosing a stamped addressed envelope.

STACKS OF PACKET:

The Headquarters packet repeater GB3HQ has done good business in its first couple of months of operation. As of the end of March this year, more than 1 000 messages had been handled through it and over 250 different stations had logged on. Stations in GU, GW, PA, ON and DL made use of the machine. Will you be next? And are you a subscriber to the RSGB's CONNECT INTERNATIONAL? Info from Tim at HQ.

Talking POINT

Thank you Minister

It isn't every day that we get the chance to talk to the Parliamentary Under-Secretary of State to the Department of Trade and Industry - he's the Minister who has responsibility for almost everything to do with civilian-type radio in the UK, which obviously includes amateur radio. So 13 March 1987 was rather a special day for us. Some time ago we asked the DTI whether we could do an informal interview with John Butcher MP - the Parliamentary etc - for the Bulletin; the answer was "yes, with pleasure", so we took ourselves off to Birmingham (where he happened to be at the time) armed with the proverbial notebook and several pencils.

Before he became an MP Mr Butcher was an executive in the computer industry, with special experience of microcomputers and micro-electronics. He served on Birmingham District Council prior to becoming the MP for Coventry South West in May 1979. In 1981 he was appointed Parliamentary Private Secretary to the Chief Secretary of the Treasury and he took up his present appointment with the DTI in April 1982.

It may well be his computing background that gives John Butcher a keen interest in anything to do with science and technology, and we quickly found out that the Minister was very enthusiastic about the amateur radio scene in the UK. We asked him first of all about the place of the radio amateur in society at large; did he think amateur radio was still important in our electronic age?

JB: - "It is obviously true that the field of communications in general is expanding at an enormous rate, and I think amateur radio has a very significant part to play in that expansion. It clearly has great benefit as a leisure activity, but over the years radio amateurs have also contributed a great deal to our understanding of various radio phenomena. Quite apart from that, there must be many leading professional radio and electronic engineers who began as radio amateurs and were inspired to make it their career.

"We talk to John Butcher, MP, about amateur radio and its future"

RSGB: - "The DTI has undertaken to review the terms of the amateur licence. Can the Minister offer any indication of its likely findings or suggest any changes which the Department would like to see come about?

JB: - "We share the Society's view that a thorough revision of the amateur licence is long overdue; it has had various amendments and modifications over the years but it is time that it was completely revised. From our point of view, we want to be as liberal as possible whilst keeping in mind our responsibilities towards other radio users and our international agreements. But we are aware that there is a good deal of new technology in amateur radio and we hope that there will be more. In short, we want to see a licence to take amateur radio into the twenty-first century. We know that the Society has been asking its members for their input and the Department's deliberations are also well advanced. It will not be long before our proposals will be put to a Joint Licence Review Consultative Committee that we intend to set up with the Society It would be premature to say much more before then, but we certainly intend to take a long and hard look at log- keeping requirements the need for a separate maritime amateur licence and the incorporation of the common CEPT licence. As far as presentation of the licence is concerned, we want to improve the print quality and we also want to consider the question of portability. There seems to be a good case for a two-part licence document, with a single sheet showing individual details and a separate booklet which sets out terms and conditions.

RSGB: - "You mentioned the CEPT licence; when do you expect the UK to be in a position to adopt the CEPT recommendations?

JB: - "As I said, my Department wants to examine the adoption of CEPT Recommendation TR 61-01 as part of the overall review of the amateur licence: we envisage that the new revised licence document will permit the UK amateur to operate at home in the normal way and also on a temporary basis whe travelling in those countries which have also adopted the CEPT proposals. There will need to be an order in Parliament, known as Statutory Instrument, to permit foreign amateurs to operate in the UK under the terms of their CEPT licences. Of course, this is another area in which the separat booklet setting out terms and conditions of the licence would be useful, since a copy could be given to visiting amateurs from overseas. It would probably be printed in three languages for that very reason. The intention is to reduce the administrative burden of reciprocal licensing. The present procedures are a disincentive to taking amateur

equipment abroad, especially on short trips such as visits to fellow amateurs or motoring holidays. The CEPT recommendation allows its twenty-two member states to take the measures which will allow radio amateurs to operate on a temporary basis when travelling abroad. For our part, when we adopt the recommendation we would envisage a licence which would be valid for two months in the UK. Although it is too early to say when the UK will be in a position to adopt the CEPT recommendation, one thing we will do is to examine the terms and conditions of various foreign licences to see if we can include some of their best ideas in the new UK licence.

RSGB: - "Changing the subject, how does the Department view the Society's Morse test service one year on?

JB: - "We think you have done very well and got off to a fine start. I am sure that you and your members will know that one of the central themes of my Department's activities is the promotion of competition in various fields. The result of putting the Morse test facility out to tender was a perfect example of how competition can improve standards and reduce costs at the same time. Radio amateurs now pay slightly less than half the original fee and have a far wider choice of centres where the test can be taken. I should also like to take this opportunity to pay tribute to the work of the Society's Chief Examiner, Neville Ianson. He has been unstinting in his efforts to make the new service a success, and the wide variety of options available to candidates is largely due to his tireless work in selecting examiners.

We asked whether the Department would consider enlarging on this success - would competition apply to licence issuing or the Radio Amateur's examination, for instance?

JB: - "The contract to issue amateur licences was only recently awarded to the Post Office; it would be premature to consider any change in this arrangement in the foreseeable future. As far as the RAE is concerned, there are some complex issues which would have to be considered. Both my Department and the RSGB appoint members to the Radio Amateur's Examination Consultative Committee, so both organisations are well able to exert influence through this Committee.

RSGB: - "Is the Minister satisfied with the present scope and degree of liaison between his Department and the RSGB, particularly in relation to such matters as resolving problems of electromagnetic compatibility? Is he able to identify any particular areas in which this liaison might be put to greater use?

JB: - "The Society's own figures show that the Department devoted more than five hundred hours to joint meetings during 1986, and over the same period we exchanged more than a hundred and fifty letters and telexes. I think that such a large commitment of my Department's resources - which are finite - is a measure of the value which we attach to amateur radio and to our dealings with the Society. Probably the most obvious example is the very complex and involved discussions which we have had on the very awkward questions involved in electromagnetic compatibility, and in passing I should add that we have been very pleased with the awareness displayed by the Society in this area. We have noted the advice which you give to members on how to avoid EMC problems, and we fully endorse that advice. Obviously we must all try to avoid situations in which a difficult EMC problem gives amateur radio in general a bad name: from our point of view the main thrust of our policy has been to put the radio amateur in touch with the neighbour. The Radio Investigation Service is always ready to discuss individual problems, and we have improved mutual co-operation on licence abuse.

RSGB: - "Does the Department regard the present harmonisation proposals as sufficient to cause a significant reduction in EMC problems?

JB: - "We regard it as important that proper standards be applied to prevent interference to transmitters and receivers. We expect the European Commission to make a formal statement shortly, in something called a Community Directive. This will have the effect of making common standards approved by the CENELEC organisation mandatory throughout the European Community. This will improve protection of the radio environment, although I must stress that we see the process of standards-making as being a continuous one which needs to keep pace with the relevant technology.

RSGB: - "Does the Minister share the Society's belief that giving more widespread and detailed publicity to the successful prosecution of serious offenders against the Wireless Telegraphy Acts - particularly those convicted of deliberately or maliciously causing interference to essential services - would act as a deterrent to others who might otherwise commit similar offences? Might such publicity not also serve to remind radio amateurs of their responsibility to other users of the spectrum?

JB: - "This is a very difficult area. For my Department to adopt a high profile in publicising individual cases would have broad implications for various aspects of natural justice. However, I see no reason why we cannot release details of the kind of activities which occasionally bring an amateur to the notice of the courts. I do hope that our activities and the general publicity which they attract make it clear to all users of the radio spectrum that we do prosecute offenders, that they do get convicted and that we do take matters of this sort extremely seriously. Let me give you one example. Our activities against unlicensed broadcasters receive a considerable amount of coverage in the Press, even though this does not always seem to act as a deterrent and even though we explain in detail the dangerous interference which they cause. We do give widespread and detailed publicity to the enforcement activities of the RIS, and in fact we issued a Press Notice in March 1987 which set out some details of their successes in 1986 (SEE THIS BULLETIN - ED).

RSGB: - "What about giving more detailed publicity?

JB: - "It rather depends what you mean. If by detailed publicity you mean should we, the DTI, single out particular offenders, the answer must be no; we should not victimise individuals by naming them ourselves. They are, of

course, named in the courts, and the local papers - or you yourselves - are quite free to print the details of a particular case if they or yourselves find them sufficiently interesting. Putting it colloquially, I don't think it would be right for the Department to put individuals in the stocks and persecute them once they have been tried and penalised in court in accordance with the provisions of the law. I hope that all amateur radio operators are aware of their responsibilities to other users of the radio spectrum; I know that the RSGB does a great deal to increase that awareness and sense of responsibility, and my Department and myself are grateful that it does.

RSGB: - "Changing the subject again, does the Department consider the current 50 MHz operation to have been a success? If so, may we look forward to some relaxation of the restrictions currently surrounding the allocation? Does the Department favour the proposal that the use of the band should be permitted to Class B licensees?

JB: - "Yes. I must say that the Department went out on something of a limb as far as giving limited access to 50 MHz to UK amateurs was concerned, and we noted that where we led, other European countries followed. However, 50 MHz is still a part of the spectrum allocated to broadcasting and it is imperative that we tread very warily. As you know, we were careful to set initial limits on the numbers active in the band and the power levels which could be used. I am glad to note that no problems were caused and we can now think about some further progress. We are currently looking at the results of our own monitoring and also considering the Society's recent submissions. We are looking sympathetically at the possibility of giving Class B licensees access to the band and I can tell you that we will also link this to the possibility of Class B access at 70 MHz.

RSGB: - "That is good news. How does the Minister see the future of the amateur beacon and repeater services, especially in respect of the recently introduced packet radio network?

JB: - "Packet radio and data techniques in general are an important development for radio amateurs because in a sense they are another link between pure technology and pure communication. On a practical level, I also believe that encouraging a link between amateur radio and the computers which have found their way into so many of our homes and which have captured the imagination of young people can only be beneficial to British industry. I have to admit that we have not done very well in producing amateur radio transceivers, but we are strong in computers and software and this must be maintained. This is one reason why the Department has worked so enthusiastically to licence the new packet repeaters, especially the new packet gateway station at the University of Surrey, which will help to establish satellite links with radio amateurs in the USA. I am also pleased that beacons and other types of repeater under the custodianship of the Society have been so enthusiastically received by the majority of radio amateurs.

RSGB: - "Is the Department satisfied with the current standards of entry into amateur radio?

JB: - "As I said earlier, I am glad to see that the RSGB is a long-standing member of the RAE Consultative Committee. You will know from that forum that my Department recently undertook a study of the Examination and found no evidence of any deterioration in standards (SEE THIS BULLETIN PAGE 340 - ED)

RSGB: - "How do we encourage youth into amateur radio? Can the Minister identify any means by which UK industry might be encouraged to take a more active part in the production and marketing of amateur radio equipment?

JB: - "We clearly must encourage youth into amateur radio; it is a stimulating and absorbing hobby, and today's junior amateur may well become tomorrow's highly qualified and creative radio engineer. You know, of course, that next year is the Society's 75th anniversary - to mark the occasion I am delighted to be able to tell you that my Department will be awarding a prize for youth achievement in amateur radio. We will release more information later. But as well as encouraging youth, we must also constantly encourage UK industry to take a more active role in the field of amateur radio. I must say that I am delighted to have been invited to open the Society's Convention this year; this is, of course, the largest showcase for amateur radio in the UK and I hope that it will attract the attention of potential manufacturers. My Department regularly meets the mobile radio industry; we have told them clearly about the opportunities in hobby radio and we shall continue to highlight these opportunities.

RSGB: - "Your Department has been responsible for the administration of amateur radio in the UK for the past four years. What has given you most satisfaction during that period?

JB: - "Well, there have been a number of major changes since the Department of Trade and Industry took over from the Home Office, and I feel that they have considerably enhanced amateur radio in Britain. We have already discussed 50 MHz, for instance, which was and is an exciting development made possible largely by the Department's initiatives. We have also seen Class B licensees entitled to use Morse and have extended the validity of the Morse test for life. All these are changes for the better. I am pleased to put on record the positive role adopted by the RSGB in these processes of change and enhancement. I think that what pleases me most is the dialogue which the Department has developed with the amateur community; our efforts seem to have been enthusiastically received, and we will go on making them. We must obviously be accountable to the public and we will do our best to give the UK radio amateur the best possible understanding of our decisions and the reasons for them. I must add that I was delighted to note that we "hi-jacked" most of one edition of Radio Communication last year to explain our policies relating to 50 MHz; that was a rather extreme case but I hope that we can continue to publicise our work with the help of the RSGB.

RSGB: - "Finally, Minister, might you consider becoming licensed yourself in the near future?

(over)

JB: - "There is only one reason why I am not already a radio amateur and that is bound up with the question of time. Apart from my family obligations I am responsible to my constituency, the House of Commons and the DTI, so when I go home I am chiefly interested in catching up on my sleep. At the moment I could not even be a night-time operator. However, if I do find myself with some spare time in the future, amateur radio is definitely something to which I would be attracted. I am, after all, a politician, and politicians enjoy contact with the broadest possible cross-section of people. Amateur radio gives unrivalled access to a very broad variety of interesting and informed people, and it has an undeniable attraction"

So ended our interview with John Butcher MP, Parliamentary Under-Secretary of State for Trade and Industry. We found it very heartening that the Minister who is ultimately responsible for our hobby has such a positive and comprehensive view of our activities, and we certainly hope that we can capitalise on his and the Department's goodwill for our future endeavours.

As far as 50 and 70 MHz are concerned, expect a special feature (or several) in the Bulletin as soon as there's some news.

RIS NEWS

A recent Press Release from the DTI set out the fortunes of the Radio Investigation Service during 1986. It seems that they were in touch with about 60 000 radio users (that's about 270 every working day!) about licensing requirements and problems. They issued 2 800 formal warnings about unlicensed use of radio, mainly to users of CB, illegal cordless telephones and PMR and marine radio. There was a total of 727 convictions in 1986, of which 601 were for CB misuse, 18 for illegal use of mobile radio and 16 for use of unapproved cordless telephones. The RIS carried out 209 raids on 70 pirate broadcasters and 74 people were convicted.

DAM BUSTERS' SPECIAL EVENT:

On 17 May the Dambusters' Association will present a Memorial Plaque and dedicate a monument to the members of the 617 Dambusters' Squadron in the village of Woodhall Spa, Lincolnshire. The plaque will be presented at the Petwood Hotel - formally the Officers' Mess - and the special event station, GB2DB will be operated from the 'Dambusters Bar' by Sgt Ernie Knight, G4NVD and other RAFARS members.

It is hoped that some of the survivors of the raid will be present to pass greetings messages to stations who call in and anyone who was connected in any way with the 617 Dambusters Squadron is welcome to visit or contact the station. Special QSL cards will be available.

Operation will be from 10-18 hrs on or around 3,710 kHz and details can be obtained from G4NVD either direct or on the RAFARS net held most evenings from 1830 hours on 3,710 kHz.

RAE standards - DTI considers

One of the topics which crops up more or less routinely in conversations between amateurs is the standard of the Radio Amateur's Examination. The usual feeling expressed is along the lines of "of course, the examination is much easier today than when I took it", and this can refer to having taken it in 1957, 1977 or 1987! The DTI has recently been considering the matter of RAE standards and has produced a paper on the subject; some interesting points have emerged, although we're not sure we completely agree with their conclusion. Some of the points which emerged along the way were rather interesting and we thought we'd give them a wider audience.

The RAE as such started life in 1946, and in that year 388 candidates sat it. From then right up until June 1967 the results of the examination were calculated manually; the first RAE in which the results were worked out by computer was the December 1967 sitting. During the early years of manual marking there were some intriguing features of the results. Only 36.8% of the candidates were successful in 1947 as opposed to about 75% in the previous year. The numbers taking the examination each year fluctuated quite widely and did not exceed 1,000 until 1959; as it happened the pass rate that year was only 59.6%, the lowest in the previous twelve years. Until then - with the exception of the 1947 result - the percentage of candidates passing the examination had remained fairly high.

The number of candidates continued to increase steadily, until by 1962 it had become necessary to provide two examination dates per year. Until then each sitting had taken place in May and it was decided to augment this with a winter examination. Initially there were few candidates for the extra sitting; only 416 sat down to take the November 1962 paper compared with 1,199 in May but the results showed little variation; the pass rates were 68.1% and 70.7% respectively.

The RAE continued in much the same way for a number of years, and although the pass rate for the years 1963-67 showed some variation it could hardly be described as dramatic; somewhere between 66 and 70% was the norm. The advent of the computer made little difference apart from apparently reducing the variation in pass rate a little more, and something like 66% of all candidates who took the RAE between 1967 and 1978 ended up with an amateur licence.

By then, of course, the times were changing somewhat. Until December 1978 the RAE had consisted of a single paper divided into two parts. From 1946 until December 1976 it had been necessary to pass both parts at the same sitting; however, the examining body (the City & Guilds of London Institute) introduced a referral system which meant that failure in one part of the paper meant that only that part needed to be re-taken at a subsequent sitting. In 1979 the first multiple-choice paper was introduced, which some immediately felt was the beginning of the end of civilised amateur radio as we know it. After all - the heated debates and furious arguments ran - could you not easily teach anyone to recognise the correct answer to almost any question? Was this mere recognition and response not a completely different matter from being able to demonstrate a clear

and proper understanding of the matter at hand? Was the logical next step not to abolish the examination altogether? After all, why bother with such simplistic nonsense as a multiple-choice examination for something as subtle and demanding as an amateur radio licence? Might as well not have an examination at all. And so on and so forth, on practically every band, repeater and simplex channel in the UK for ages and ages.

Well, according to the DTI it wasn't like that at all. Analysis of the results of multiple-choice examinations shows that the percentage of successful examinees in the multiple-choice era has remained more or less constant and also that the average percentage of passes is pretty much in line with those of the years immediately preceding the introduction of multiple-choice. In fact, the pass percentage has remained consistently between 69.9% and 63%. It's worth adding at this stage that we're not completely convinced that this proves very much about standards, taken in isolation - it might simply show that the pass mark is adjusted so that a fairly consistent percentage of candidates passes a particular examination - although the DTI seems to feel that it proves that standards have not chnaged since the introduction of multiple-choice. They suggest that a graph which compares the success rate of RAE candidates over the forty years since the examination was established clearly illustrates that standards have remained as high as they ever were, and that the consistency of results in recent years is a useful indication that the standard of questions being set is sufficiently uniform to assure each and every candidate a fair chance of gaining a licence.

Be that as it may, a bit of further analysis shows that the average pass rate under the multiple-choice system has been 67%, whilst that under the old regime was 63%. It could therefore be argued that about 4% of candidates who might have failed before the multiple-choice Big Bang are passing the current one. However, it could also be argued that the multiple-choice beast is a more real test of understanding of the syllabus, rather than of proficiency in the use of the English language.

It's also interesting to note that the statistics show candidates to be consistently more successful in the paper on licensing conditions and interference than in the one on operating procedure, practices and theory. This could reflect the fact that the smaller permutation of questions available for paper 01 offers a better chance for candidates to learn by rote than is possible in the case of paper 02. In setting the pass mark appropriate to a particular paper, the City & Guilds chaps take account of the general level of performance by paying particular attention to those questions in which candidates have done either consistently well or consistently badly. By analysing the results separately, you can show that the average pass mark (percentage) for paper 01 has been 62%, derived from the range 57 to 69%, whereas the corresponding figure for paper 02 is 43% (range 39 and 47%). The DTI, which has examined these results, consider that this represents a reasonable variation. Their argument is that although it has been suggested that the figure for paper 02 is on the low side, adding both papers together gives an overall average in the region of 50%. This compares favourably with that required for a GCE O-level or a university degree.

Having pondered all this for about a year, the DTI has concluded that the evidence refutes claims that the RAE is too easy. They point out that, although there has been some criticism of the required standard, it has proved impossible to determine whether those who criticise would wish to see a higher pass mark, more difficult questions or a more comprehensive syllabus. On balance, however, they appear to be happy that C & G is maintaining standards and, at the same time, ensuring that would-be radio amateurs are offered a consistent chance of success. All of which ought to keep Member's Mailbag bursting at the seams for a few months!

Around the Groups

6th ANNUAL STRAIGHT KEY EVENING:

The Edgware & District Radio Society's 6th Annual Straight Key Evening will take place on Friday 29 May from 1900 BST on 3,550 kHz. All are welcome to take part and callers should call "CQ SKE" This is not a contest it's just a satisfying evening of working the key at your own pace in a friendly atmosphere. The club will be running the special event callsign GB2SKE throughout the month as a run-up to the event. Details from:-

John Bluff, G3SJE
52 Winchester Road
Kenton
Harrow
Middx. HA3 9PE
or tel: 01-204 1034

RAYNET NEWS:

Due to the resignation of Madeley Smith, G8KVU there is anow a vacancy for a representative in Raynet Zone 9. This zone is comprised of the counties of Shropshire, Staffordshire, Hereford & Worcester, West Midlands and Warwickshire.

Raynet members resident in this zone may forward nominations for their zonal representative to "The Secretary (Raynet)" at RSGB HQ. Nominations should be supported by five Raynet members who are currently registered within the Zone, and they must be received no later than 5.15 on Tuesday 30 June 1987. They should be accompanied by a declaration from the nominee that he or she is a) normally resident within the zone, b) is a currently registered Raynet member c) is a member of RSGB and d) is willing to serve if elected.

The period of appointment is normally three years. When more than one valid nomination is received by the due date, an election will be held during the month of October.

QTI-TNA:

QTI-TNA, the talking newspaper for blind radio amateurs, recently took delivery of a Telex 1-3 mono high-speed copier.

This machine copies both sides of a C90 cassette in just over two minutes in batches of three, it cost £1,700 and is the second new copier that the Association has bought. The funds were raised at rallies over the past four years and with the help of the Worked All Britain Awards group, RNARS, RAFARS and many other clubs and individuals. The copier will be known at the 'Rod Young Copier' in memory of the first treasurer of QTI who died suddenly and unexpectedly on 27 February.

QTI-TNA is a registered charity which provides a taped magazine fortnightly to visually handicapped amateurs and shortwave listeners in IARU Region 1 and a technical magazine monthly worldwide. Donations and new members are always welcome.

Details from:-

QTI-TNA
2 Cartmel Walk
North Anston
Sheffield S31 7TU

(over)

AMSAT-UK NEWS:

Ron Broadbent, G3AAJ tells us that OSCAR-10 should be back in full sunlight by now and, assuming that the world's satellite users have refrained from using this satellite over the last two months, we should see a continuation of good operating conditions through this highly sophisticated (but ailing) amateur satellite. A calendar of expected operation times for OSCAR-10 is available free of charge for the obligatory stamped addressed envelope.

Non-AMSAT-UK members may be interested to know that the second AMSAT-UK Colloquium will be held at the University of Surrey during 17-19 July. Those wishing to attend should contact Ron as soon as possible as places are limited and going fast. Last year's Colloquium was very well organised and gave those who attended a wider insight into the ins and out of amateur satellite operation. Full details of this and other AMSAT-UK matters from:-

Ron Broadbent, G3AAJ
AMSAT-UK
London E12 5EQ

... and please remember the stamped addressed envelope!

WELSH ISLANDS EXPEDITION 1987:

The Newport Amateur Radio Society is planning an expedition to three island off the Dyfed coast during the first week of August.

Activity will be in the 160m-10m bands and on 144.432 MHz in the 2m band. The callsigns will be GB4WIE located on Skokholm, WAB SM70; GB2WIE located on Skomer, WAB SM70/71; and GB0WIE located on Grassholm, WAB SM50/60. The Maidenhead Locator for all three islands is IO71. Special awards will be available for working all three islands or three different operators irrespective of callsign. Skeds can be arranged via GW6ZUQ, QTHR or via the Newport ARS at PO Box 33, Newport, Gwent. More details later.

DOUBLE ANNIVERSARY:

The North West of Ireland Amateur Radio Society celebrates its 50th Anniversary this year. In addition to this, the society's callsign GI3CFH is 40 years old this year.

To mark this double anniversary, there will be a special event station active for one day and the club station will be active throughout the months of June, July and August. A special QSL card will be available for all contacts and a certificate for working both stations. More details later.

Dear John...

In this new column we hope to be able to clear up some of the questions that are frequently asked of the Membership Services team. The usual questions often arise from interpretation - or misinterpretation - of the amateur licence conditions or operating proceedures. The answers are usually quite simple - but we bet you've heard many a heated discussion over the air about topics such as these....

To start the ball rolling, here's a typical example:

MOBILE OR PORTABLE?

Christopher, of Goring-by-Sea, West Sussex, asks about the difference between "mobile", "static-mobile" and "portable" stations.

First of all there's no such thing as "static-mobile". You're either a mobile station or you're not and it doesn't matter whether you're moving or parked. There is no "15 minute rule" about changing to -/P - where did this old chestnut come from?

Perhaps the best test of whether your station is -/M or -/P when you're parked on a hillside and fending off the pile-up is whether you can drive away without having to dismantle an antenna farm. If you can, you're "mobile". However, if you have a 30' pole lashed to the side of your car, with guy-ropes pegged out around you and the entire assemblage threatening to crash down on your head in the howling wind and lashing rain, you're "portable" - believe it or not.

Stations in mobile homes or caravans fixed on a site that has a postal address can be either "fixed" stations (no suffix), if they are the permanent residence of the licensee, "temporary" stations (-/A suffix) if, for instance they are holiday homes which will be occupied for a continuous period of less than four weeks, or "alternative" stations (-/A suffix) if occupied for a continuous period in excess of four weeks - for which you should notify the local RIS office in the area. Stations located in caravans which have been towed up a mountain side are regarded as "portable" stations (-/P suffix).

Having cleared that one up, how about log-keeping in these situations?

There are two types of amateur radio (transmitting) log books: the general station log book with all the details such as date, times, frequencies, stations called/worked, reports etc. and the mobile log book with the date, time of commencement of journey, time of end of journey and area in which transmissions take place.

Mobile stations are required to record only the details outlined above - though many amateurs like to keep a detailed log for their own reference. Fixed, portable, temporary and alternative stations are required to keep more detailed records as laid out in the amateur licence.

Next month, we'll have a look at some more typical questions.

PHILATELY GETS YOU EVERYWHERE!:

The Amateur Radio Club of Cognac (Dept. of Charante, France) and the French national society, Reseau des Emetteurs Francais, will commemorate the ITU's annual World Telecommunications Day on 17 May with an exhibition and demonstration of amateur radio activities.

In conjunction with the event there will be a philatelic exhibition covering ITU & World Telecommunications Day, World Communications Year 1983, Amateur Radio, Broadcasting & Television, Microwave & Satellite Communications, Inventors & Users in Radio, and The Telephone.

A special 4-colour philatelic cover will be issued with an illustrated postmark of the French PTT. The price for one cover is 10FF + p&p or 6 IRCs incl p&p. Requests should be sent to:-

Mr Raymond Aupetit
14 Residence Bois Boutin
F-16340 L'Isle d'Espagnac
France.

CHANGE OF DAY FOR SARCON:

This year's Scottish Amateur Radio Convention will be held on Sunday 13 September and breaks with the traditional Saturday to cater for those who work a six-day week. The convention, which will be held at the Magnum Leisure Centre, Irvine, is being organised by four clubs in Region 14 - Cunninghame & District; Kilmarnock & Loudoun; Cumnock and Ayr radio clubs. Details from Bob Low, GM0ECU, QTHR.

Helplines

We're pleased to hear that this column is proving to be quite popular and that the response to items is encouraging, so keep sending them in. To start this month's column we've got a stickler for you:-

IF YOU SEE STAN, TELL HIM!

A French amateur, Rene Corneg F6AZC, is trying to trace a UK amateur named Stan. That's not a lot to go on except that Rene last met Stan in 1945 whilst in the services during the war. So if anyone out there knows an amateur named Stan who was in France at the end of the war, ask him if he knows of Rene. If so, tell him to get in touch with us at HQ and we'll try to arrange a reunion. Good hunting!

HF COMMITTEE VACANCY:

The RSGB's HF Committee has a vacancy for a full committee member who will be expected to take on a substantial share of the work involved in organising the HF Convention and the HF presence at the Society's annual convention/exhibition. Attendance at both events will be necessary.

Regular committee meetings are held in central London approx 8 times a year, commencing at 1700 on a Thursday evening and committee members are expected to attend the majority of these.

Applicants should write, giving details of their HF interests and any previous management experience, to the HF Committee Chairman:-

Martin Atherton, G3ZAY
41 Enniskillen Road
Cambridge
CB4 1SQ
or tel: 0223-311714

Martin would also be pleased to hear from members who have contributions to make in other HF areas as it may be possible for them to join the committee at a later date or participate as 'corresponding members'.

STOLEN EQUIPMENT:

Barry Sowter, G3NAP, informs us that his Trio 7500 was stolen from his car outside a house in Coventry on Sunday 22 March.

Serial number: 930214

Also taken was an Adonis mic control unit. Any information to Barry Sowter on 0203-464279.

Council Brief...

The second Council meeting of 1987, held on 13 March, had a full agenda. The main topic for discussion was a paper presented by the Secretary on the encouragement and retention of newcomers to amateur radio. This major new initiative is seen by Council as being of the highest priority and the ideas contained in the paper were endorsed unanimously; however, a considerable amount of further planning will be required. The Society expects to work with industry, the DTI and various educational facilities to promote amateur radio. One early action would be to conduct a survey amongst all associate members of the Society.

The "75th Anniversary" Committee reported to Council after its first meeting. Further work would be required prior to the selection of a venue for the July 1988 celebrations. The President's Advisory Group would meet shortly to discuss how to make the Society work more effectively at local level. To allow additional time for discussion, the period of office for Regional Representatives was to be extended by six months to the end of 1987. The views of RRs were to be sought as part of the discussions.

In the absence of the Honorary Treasurer, the Vice-Chairman of the Finance and Staff Committee reported a deficit of some £14000 for the first six months of the 1986/87 financial year. Ways of reducing expenditure and increasing income were discussed. The deficit was put into context against the general background status of amateur radio and the UK economy. Plans for the forthcoming National Convention, which was to be opened by the Parliamentary Under-Secretary of State for Trade and Industry, John Butcher MP, were discussed.

The Secretary reported on;

a) 50 MHz - it was hoped that various concessions would be granted in a few months time.

b) The CEPT licence - the Society had been informed by the DARC that the unilateral agreement whereby UK amateurs would be permitted to operate in West Germany was to be reintroduced. Council felt that the commencement of work on the statutory instrument necessary for overseas amateurs to operate in the UK was of a very high priority.

c) Progress on improving the response time of the Membership Services Department

d) Publications.

e) The callbook - some 2,200 members had been asked to assist in giving some location information.

There were further discussions on EMC and the backing being given to a member who was being threatened with a licence variation by the DTI. The view was expressed that when this particular case had been resolved, the Society must publicise the effort which had gone into establishing its position. The spin-offs in the case had already been of great benefit to amateurs as a whole in helping to alleviate the problems of EMC. The EMC manual was also discussed, as was the composition of the EMC Committee.

Council discussed and agreed terms of reference for the new Planning Committee, the formation of which had been a step taken in recognition of the important nature of this work. Harold Fenton, G8GG, had been appointed the Chairman of this new Committee by Council.

Other matters discussed during the meeting included: special event call-signs, dxpedition funding, the proposed expulsion of a member, the future of the Marconi Medal, direction finding, the publication of Committee expenses, repeaters, AGMs with respect to proxy voting, the 70-year age rule and whether proxy holders could address meetings, cheque signatories, the IARU intruder monitoring system, the recognition of those who had been members for over 60 years, historic equipment, letters to other magazines, reports from honorary offices and committee chairmen and the forthcoming Region 1 Conference.

The Society had received a film from the Japanese Society (JARL) on the Fuji satellite; the Secretary would acknowledge with thanks.

Particulars withheld – or not?

Some options for you to consider

We're offering a couple of features for future editions of the Callbook which you might like to consider.

As you'll know, the issue of "particulars withheld" had been something we've been debating and inviting members' views on for some time. Society policy is to encourage as many licensed amateurs as possible to give some information as to their location, even if it's no more than you'd normally give on the air. If your details are currently withheld from publication, please give some thought to the amateur or listener who might be interested in knowing where your station is situated, even if it's only the name of your city or town - for instance, how about an entry on the lines of "GOZZZ, station located near Potters Bar, Herts"?

We have some other options, of which you can take advantage free of charge. Option 1 is your surname and initials, followed by "Address details withheld at license's request" printed after your callsign. Option 2 is to include your post town after the callsign, as in the example above. Option 3 is to include both your name and post town after the callsign.

Whilst on the subject of optional entries, we propose to offer a "personalised" facility for the next and subsequent Callbooks. For the trivial sum of £2.55 (or £3 if you're not an RSGB member) you may have up to 200 characters including numbers and spaces; you can include more or less what you like, such as forename, additional callsigns if any, telephone number, alternative address, locator/QRA/WAB square or whatever.

Requests for any of the "withheld" options or personalised entries must be made in writing and dated and signed. Please address them to the Call Book Editor at RSGB Headquarters. Information received in this way directly from licensed amateurs will be used in preference to that supplied by RALU and will appear in future editions of the Call Book unless you advise us to the contrary.

For this scheme to work well it's important that non- members as well as members get to hear about these options for future Call Books. Please give them a mention at your club and on the air and ask non-members to let us know what they want as well as members. That way we should have the best and most useful Call Book, which will be to all our benefit.

A MORAL:

In February's Bulletin, we gave details of the DTI's change of policy regarding the reissue of lapsed amateur radio licences and we said that the onus was on the licencee to provide evidence of having held the licence originally. But what if you've no proof?....

Fred, G3GDY regained his old callsign in February this year after it had laid dormant for 34 years, but it was no easy task.

The problem was that Fred had sent his licence back to the Post Office - as required in the licence conditions - in 1952. He had no copy and no other paperwork available which would prove he held the callsign at all. After contacting the Society for advice, Fred borrowed a copy of the 1951 Callbook, found his callsign, name and address listed and contacted the DTI. As the callbook is produced from the DTI's records (or Home Office, as it was then), a spokesman for the Department agreed that the callbook entry was sufficient evidence that Fred held the callsign in 1951, and as long as he could prove that he lived at the address given and that he was who he said he was, the Radio Amateur Licencing Unit would reissue the licence with the original callsign, on payment of the current fee.

The moral of this little story is simple: had it not been for the callbook entry, Fred would have had to resit the RAE and the Morse test before regaining his licence. So "particulars withheld" can present problems and licencees should think long and hard before taking that option when applying for a licence.

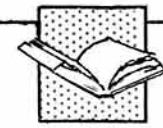
QSL BUREAU SUMMER HOLIDAY DATES:

The RSGB QSL Bureau will be closed from 1 August to 23 August inclusive. Please make a note in your diaries NOT to send any cards which will arrive during that period.

QSL SUB-MANAGER FOR NEW G7 SERIES:

The G7 series of callsigns for class B licencees will be upon us very soon. The Sub-Manager for the series is:-

Mr D J Hudson, G6OVO
62 Derron Avenue
South Yardley
Birmingham B26 1LA



BOOK NEWS

Over 2 000 copies of the new Spring 1987 Edition of the Callbook were sold at the Society's NEC exhibition. Also on sale was a new book on repeaters entitled "The Ins and Outs of Repeaters". This is obviously our cue (large and loud fanfare of trumpets) for an unashamed plug for these two super books.

The new Spring 1987 edition of the Callbook & Member's Handbook, with a distinctive blue cover, is now available at a by-post cost of £5.13 to members and £6.04 to non-members. There are no less than 302 pages in this latest epic (in fact the book is over a centimetre thick) and as well as UK callsigns up to GOGRJ and G1WQN and the EI callsigns it has a 48-page section with masses of useful operating information on the Society's services and officers, bandplans, repeater and beacon lists, slow Morse practice schedules, news and information services, awards and heaps of other good stuff. Every shack should have one next to the rig, and we guarantee that you'll give your copy a fair bit of use every time you go on the air. Truly a bargain and cheap at double the price - order yours today. Alternatively, if you're passing through Potters Bar you're very welcome to call in and purchase a copy, and the money you save on postage and packing can be put towards buying another of our publications....

Which could well be our other new publication this month, "The Ins and Outs of Repeaters". This is nothing less than the authoritative guide to how to use the UK repeater network; it's written by the RSGB Repeater Management Group and it contains everything you could think of about the UK repeater scene - it even tells you what to do if your local club decides that there's a marked gap in coverage in your neck of the woods and you'd like to fill it. This book will rush you £1.89 if you're a member and £2.22 if you're not (shame on you), both prices by post of course.

We do, of course, have lots of other superb books on sale here at Headquarters - take a look at the price list at the back of the magazine for a taste of what's available.

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'.

3 MAY

BATC Rally - Crick Post House Hotel, near Rugby. Opens 10.30am. Traders & junk stalls. Not just TV!! Details Trevor, tel: 0532 670115.

Swansea ARS Rally - Patti Pavilion, Swansea. Opens 10.30am. Bring & buy stall, usual traders, lucky programme, full catering. Talk-in S22 by GB2SWR and via GB3WG on RB6. Details GW4HSH, tel: 0792 404422.

4th Anglo-Scottish Rally - Tait Hall, Kelso, Borders. Opens 11am, traders, club stalls, bring and buy, raffles, refreshments & bar. Talk-in on S22. tel: 0573-24664.

4 MAY

Mid-Cheshire ARS Rally - Winsford Civic Hall. Opens 11am, free parking. Details G4XFD QTHR.

10 MAY

Drayton Manor Rally - Drayton Manor Park, Staffs. On A4091, 1 mile from A5 junc. Opens 11am, talk-in on 2m by G1MAR/A and 70cm by G3MAR/A. Details Norman G8BHE, tel: 021-422 9787.

Swindon Rally - Oakfield School, Marlowe Ave, Swindon. Opens 10.30am. Bring & buy stall, usual traders, raffle, attractions for family, ample carparking. Details Ken G8SFM, tel: 0666 89-307.

3rd Yeovil QRP Convention - Preston Centre, Yeovil, Somerset. Details Eric G3CC, tel: Yeovil 75533.

17 MAY

30th Northern Mobile Rally - Gt.Yorkshire Showground, Harrogate. Opens 11am by 4th entrance (disabled visitors by 6th entrance NO staircases. 90 traders and craft stalls, *RSGB stand*, mammoth bring & buy, refreshments and bar. Ample free parking, 2 caravan site, talk-in S22. Details Harry, G3CQQ, tel: 0943 602118.

Cambridge & DARC Rally & car boot sale - Colleridge Community College, Radegund Rd, Cambridge. Opens 10.30am (10am disabled). Trade stands, bring & buy, refreshments. Ample car parking, talk-in S22 by G2XV. Details G4TRO, tel: 0223-353664.

24 MAY

Maidstone Mobile Rally - Maidstone YMCA Sports Centre, Melrose Close, Maidstone. Opens 10.30am. Usual traders, children's room, refreshments. Talk-in on S22. Details G6FZD, tel: 0622 50709.

11th East Suffolk Wireless Revival - Civil Service Sports Ground, Bucklesham, near Ipswich. Opens 10am, free parking, lots for the whole family. Details G4IFF, tel: Ipswich 688204.

Plymouth ARC Mobile Rally - Plymstock School, Plymouth. Opens 10am, ample free parking, talk-in S22. Details GOBNT, tel: 0752 777777.

30/31 MAY

Milton Keynes Amateur Radio Exhibition
CANCELED THROUGH SUNDAY TRADING REGULATIONS

31 MAY

Bolton ARC Rally - Dean Sports Complex, New York, Junction Road, Bolton. Trade stands, refreshments & bar. Facilities for disabled and ample carparking. Details Kenneth Wightman, tel: 0204-696906.

6/7 JUNE

West Middlesex Radio Group Rally - Twickenham Rugby Football Club. Details G1DDR.

7 JUNE

Spalding Mobile Rally - Springfields Gardens, Spalding, Lincs. Opens 10am, usual traders. Details D Hoult G4OO, tel: 077 586 382.

14 JUNE

Elvaston Castle Mobile Rally - Elvaston Castle Country Pk, near Derby. Usual traders, talk-in on 2m & 70cm by GB2ECR. Details G4PZY, tel: 0332 767994 or G4CTZ, tel: 0332 799452.

RNARS Mobile Rally - HMS Mercury near Petersfield, Hants. Opens 10am. Talk-in on 2m and 70cm. Details G4UJR, tel: 0703 557469.

Mid-Lanark ARS Open Day - Wrangholm Hall Community Centre, Jerviston Street, New Stevenson, Motherwell. Satellite operation, RTTY, HF/DX demo, QRP. Traders, junk sale, car-boot sale. Talk-in on 2m. Details GM1SSA, tel: Holytown 732403.

19/21 JUNE

Ham Radio '87 - Friedrichshafen, Germany. 100+ international exhibitors at largest amateur radio exhibition in Germany. Exhibition Centre Friedrichshafen on Lake Constance.

21 JUNE

Denby Dale Mobile Rally - Shelley High School, near Huddersfield. Opens 11am. Usual traders, refreshments. Talk-in on S8, SU22 and 10m FM. Details G3SDY, tel: 0484-602905.

28 JUNE

30th Longleat Rally - Longleat Park, near Warminster. Usual traders and displays. Gardens and other attractions for the whole family. Details G4FRG, tel: Portishead 848140.

12 JULY

Worcester & DARC Droitwich Mobile Rally - High School, Droitwich. Details GOAOC.

Sussex Mobile Rally - Brighton Racecourse. Usual trade and club stands. Free mini-bus to the Brighton sea-front for children and families. Refreshments and bar. Talk-in on S22. Details G4HUJ, tel: 0903-200572 evening.

17/18/19 JULY

AMSAT UK Colloquium - University of Surrey, Guildford. All-in weekend cost of approx £45 (includes accomodation and all meals). Places booking fast, very few left! Series of lectures and demonstrations by leading lights in the amateur satellite field. Social events, Delegates Dinner and tours of UoSAT control station. Remote Imageing Group, BARTG, AMRAC and many other groups will be present. Details Ron, G3AAJ, tel: 01-989 6741. NOT UNIVERSITY OF SURREY.

19 JULY

Cornish Mobile Rally - Camborne College of FE. Opens 10am, usual traders. Talk-in available. Details G1AJB.

McMichael '87 Rally - Haymill Youth & Community Centre, 112 Burnham Lane, Slough. Opens 10.30am (10.15am for disabled visitors). Usual traders, real ale bar, something for the whole family. Car-boot sale, ATV demo, HF Special Event Stn GB4MR. Talk-in on S22 and SU8 by G6WIR - Burnham Beeches RC. Details GOBTY, tel: High Wycombe 29868.

Anglian Mobile Rally - High Woods Sports & Leisure Centre, Severalls Lane, Colchester. Opens 10am, all usual traders, bookstall, raffle, bring & buy, home catering. Talk-in on S22 by G4CRA. Details G6HQI tel: Colchester 862403.

26 JULY

Scarborough ARS Rally - The Spa, Scarborough. Open 11am, usual traders, right on the beach so ideal for the family. Talk-in on S22, SU8 and via GB3NY. Details Ian G4UQP, tel: 0723-376847.

IN BRIEF - More details later.

2 AUGUST

RSGB MOBILE RALLY - Woburn Abbey, Woburn, Bedfordshire.

Rolls-Royce ARC Mobile Rally - Rolls-Royce Sports & Social Club, Barnoldwick. Details, G4ILG, tel: 0282 812288 or 0282 813271 (day).

9 AUGUST

30th Derby Mobile Rally - Lower Bemrose School, St Albans Road, Derby. Details Martin G3SZJ, tel: 0332 556875.

Hamfest '87 & Craft Fair - Wimbourne, Dorset. Details GOCDY, tel: 0202 872503.

16 AUGUST

Red Rose Rally - Bolton Sports & Exhibition Centre. *RSGB Stand* Details G1IOO, tel: 0204-24104.

30 AUGUST

Torbay ARS Mobile Rally - STC Social Club, Brixham Road, Paignton. Details G3KZJ, tel: 0803 51995.

6 SEPTEMBER

Preston ARS 20th Annual Rally - Lancaster University. Details G3DWQ, tel: 0772 53810.

Bristol Radio Rally - Hareclive Youth & Harecliffe Community Centres, Hareclive Road, Harecliffe, Bristol. Details Len G4RZY, tel: 0272 834282.

West Kent Amateur Radio Rally - Angel Centre, Tonbridge, Kent. Details G4KIU, tel: 0892 515678.

13 SEPTEMBER

Lincoln Hamfest - Lincolnshire Showground, Lincoln. Details G8VGF, tel: 0522 25760

Scottish AR Convention - The Magnum Sports & Leisure Centre, Irvine, Ayrshire.

National Amateur Radio Car Boot Sale - Old Warden Aerodrome, Beds. Details G6EES, tel: 0582 607623.

SMC Open Day - Chandlers Ford Industrial Est, Eastleigh, Hants. Colin Ward (SMC), tel: 042 15-55111.

Telford Mobile Rally - Telford Racquet & Fitness Centre. Details G3UKV.

20 SEPTEMBER

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

Trafford Rally & Components Fair - Lancs CCC (Old Trafford), Talbot Road, Stretford, Manchester. Details G1IJK, tel: 061-748 9804.

Vange ARS Rally - Nicholas School, Leinster Road, Laindon. Details G4OJN, tel: 02774-4386.

27 SEPTEMBER

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

4 OCTOBER

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

Great Lumley AR & ES Rally - The Comunity Centre, Great Lumley, Chester-le-Street, County Durham. Details G4MSF, tel: 091 469 3955.

10 OCTOBER

RSGB Midlands VHF Convention - Madeley Court Centre, Telford, Shropshire. Details Peter G3UBX.

23/24 OCTOBER

Leicester Amateur Radio Exhibition - Granby Halls, Leicester. Details Frank G4PDZ, tel: 0533 553293.

1 NOVEMBER

Carmarthen ARS Exhibition & Rally - Leisure Centre, Johnstown, Carmarthen. Details GW3GUE, tel: 026 783 460.

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 GW1OUP, tel: 0656 723508.

22 NOVEMBER

West Manchester RC Winter Rally - Pembroke Halls, Walkden. Details G1IOO, tel: 0204-24104.

6 DECEMBER (Provisional)

Verulam Christmas Rally - St Albans City Hall. Details Hilary G4JKS, tel: 0727 59318. Trade: Watford 52959.

OTHER EVENTS

19 JULY

Microwave Bands Assembly and Dinner - The Dunstall Suite, Dunstall Racecourse, Wolverhampton. Details F T Smith G6FK, tel: 0902-343746.

GB Calls

The list below shows ALL the special event stations licensed for operation during May and early June - (as at press date)

It is taken direct from the GB Calls file on the HQ computer. These callsigns 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 MAY:

GBORRA - RED ROSE AWARD: Astley, Tyldesley, Manchester. Details G3BSA.
GB2BHS - BALSHAWS HIGH SCHOOL: Leyland, Preston. Details G4BEE.
GB2BS - BEDFORDSHIRE SCOUTS: Walesby Forset Scout Camp, nr Newark, Notts. Details G4HYX.
GB2FSF - FALKIRK SPRING FLING: Callendar Park, Falkirk. Details GM4MCB.
GB2RMF - RUFFORD MEDIAEVAL FAIR: Rufford Park, Rufford, Lancs. Details GODYK.
GB2SJC - ST JOHN CANNOCK: Cannock Baths, Cannock, Staffs. Details G4PFO.
GB2YSC - YMCA SPORTS CENTRE: Maidstone, Kent. Details G4YTU.
GB4HVP - HISTORIC VEHICAL PARADE: Sandwell Valley, West Bromwich. Details G4ZAD.
GB4LF - LLANSTISANT FESTIVAL: Town Hall, Llantrisant, Mid Glamorgan. Details GW3POM.
GB8RRA - RED ROSE AWARD: Bolton, Lancs. Details G1IOO.

2 MAY:

GB2MG - "MG" (CAR OWNERS): Jersey Rugby Club, St. Peter, Jersey C.I. Details GJ4TXB.
GB2RAM - RAMSEY: Bride, Isle of Man. Details GD4PTV.
GB2WWW - WORCESTER WILDLIFE WEEK: BBC Wood Norton RC, nr. Evesham, Worcs. Details GODXX.
GB4SWA - SWANLEA: Swanlea, Kent. Details G4WYG.

3 MAY:

GBOLIB - LIBERATION DAY: Oberlands, St. Martins, Guernsey C.I. Details GU4NXR.
GB2SKE - STRAIGHT KEY EVENING: Kenton, Harrow, Middx. Details G3SJE.
GB2SWR - SWANSEA WIRELESS RALLY: Patti Pavilion, Swansea, West Glamorgan. Details GW4HSH.
GB2WST - WHITWORTH SCOUT TROOP: Greenbank Primary School, Rochdale, Lancs. Details G4TMV.
GB4LAC - LYDNEY AIR CADETS: Lydney, Glos. Details G4ZFN.
GB4SAC - SUTTON AND CHEAM: Wallington, Surrey. Details G4FKA.

8 MAY:

GBOIOS - ISLE OF SKYE: Dunvegan, Isle of Skye. Details G5LP.
GB2GBB - GLASGOW BOYS' BRIGADE: Boys' Brigade Hse,

Events Diary

Glasgow. Details GM4HYF.
GB2LOW - LOW POWER: Yeovil QRP Convention. Details G3GC.
GB2SEM - SOUTHERN ELECTRICITY MUSEUM: The Old Power Station, Christchurch, Dorset. Details G3MDH.
GB8SRC - SWINDON RADIO CLUB: Oakfield School, Swindon. Details G8SFM.

9 MAY:
GB0ALG - ALGERINES: "The End Peg", Matlaske, Norwich. Details G0AZR.
GB0DAS - DOUGLAS ATWELL SHIELD: Winscombe, Somerset. Details G4SIY.
GB4BKA - BEEKEEPERS ASSOCIATION: The Royal Agricultural Show Ground, Stoneleigh, Warks. Details G4BCY.

10 MAY:
GB0NBB - NEW BIDEFORD BRIDGE: Northam, N.Devon. Details G0DLC.
GB2SRR - SOUTHEND RADIO RALLY: Details G3YOA.

15 MAY:
GB0BRC - BREDHURST RADIO CLUB: Bell Public House, Bredhurst, nr Gillingham, Kent. Details G0AMZ.
GB2NTS - NATIONAL TRUST FOR SCOTLAND: Greenbank Gardens, Clarkston, Glasgow. Details GM3MTH.
GB2PAW - PATROL ACTIVITY WEEKEND: Notts County Scout Assoc., Walesby Forest Scout Campsite, Notts. Details G4NJH.
GB4COV - COVENTRY: Ambulance Hall, Parkside, Coventry. Details G3YGB.
GB4SJF - ST JOHNS FAYRE: St.Johns C.of E. School, Wigan. Details G4NRO.
GB4WYS - WEST YORKS SCOUTS: Scammonden Moor, Huddersfield. Details G3SDY.
GB8GS - GLANFORD SCOUTS: Primrose Campsite, Manby Wood, nr Scawby. Details G3OUX.
GB8WYS - WEST YORKS SCOUTS: Scammonden Moor, Huddersfield. Details G3SDY.

16 MAY:
GB2DB - DAMBUSTERS: The Petwood Hotel, Woodhall Spa, Lincs. Details G4NVD.
GB2ELS - EAST LOTHIAN SCOUTS: Smeaton Camp Site, East Linton, Eas Lothian. Details GM4EZJ.
GB2SAC - SUTTON AND CHEAM RS: Cheam Park, Surrey. Details G0AXA.
GB4SJ - ST JOHNS (AMBULANCE): Towneley Park, Burnley, Lancs. Details G4BLH.
GB4STC - SAVE THE CHILDREN: Lyle Hill Monument, Greenock. Details GM4CBV.

17 MAY:
GB2STM - ST. MARY'S (SCHOOL): Maddenham, Bucks. Details G0FCV.
GB4RI - ROTARY INTERNATIONAL: Stockwood Park, Luton. Details G0COQ.

18 MAY:
GB4CPF - CRIME PREVENTION FESTIVAL: Municipal Buildings, Greenock. Details GM4CBV.
GB4EWD - ENDON WELL DRESSING: St.Lukes's Church, Endon, nr Stoke-on-Trent. Details G4KME.
GB4MSA - MIDLAND SPASTIC ASSOCIATION: Harborne, Birmingham. Details G0EJL.
GB8MSA - MIDLAND SPASTIC ASSOCIATION: Harborne, Birmingham. Details G8VBE.

20 MAY:
GB2ECR - ELVASTON CASTLE RALLY: nr Derby. Details G4PZY.

21 MAY:
GB1WYS - WEST YORKSHIRE SCOUTS: nr Scammonden Water. Details G6DQS.
GB2DJ - DIAMOND JUBILEE: Drum Hill Scout Camp, Little Eaton, nr Derby. Details G4XPE.
GB2WYS - WEST YORKSHIRE SCOUTS: nr Scammonden Water. Details G3OYI.
GB4ERD - DERBY & DARS (CLUB SUFFIX): Drum Hill Scout Camp, Little Eaton, nr Derby. Details G0DMS.

22 MAY:
GB2ORN - ISLE OF ORONSAY: Details GM3NIG.
GB2RCC - RADIO CARAVAN CAMPING CLUB: Castleton. Details G4EPN.
GB4BCM - BARNARD CASTLE MEET: Barnard Castle, Co.Durham. Details G4WUI.
GB8MSM - MOUNT SAINT MARY'S: Spinkhill, Sheffield. Details G1RXD.

23 MAY:
GB2EFA - EXETER FESTIVAL OF ARTS: The Arts Centre, Exeter. Details G3TDW.
GB2RGF - ROTARY GAME FAYRE: Meols Hall, Churchtown, Southport. Details G4TUP.
GB4FHR - FRENSHAM HEIGHTS RADIO: Frensham Heights School, Rowledge, Surrey. Details G0EUV.
GB4PF - PAISLEY FESTIVAL: Barshaw Park, Paisley. Details GM0BLX.
GB4SAM - SAMARITANS: Rolls Royce Sports & Social Club, Barnoldswick, Lancs. Details G4LWG.
GB4SWR - SUFFOLK WIRELESS REVIVAL: Civil Service Sportsground, Ipswich. Details G4IFF.

25 MAY:
GB0RAF - ROYAL AIR FORCE: RAF Waddington, Lincoln. Details G4NVD.

27 MAY:
GB4RBW - ROYAL BATH & WEST: Showground, Shepton Mallet, Somerset. Details G4WSB.

29 MAY:
GB2NSJ - NORFOLK ST.JOHN (AMBULANCE): Sennowe Park, Guist, Norfolk. Details G0CLR.
GB8DX - DX: Hanger Hill, Weybridge, Surrey. Details G4VGO.
GB8HE - HIGHLAND EXPRESS: Scottish Air Show, Prestwick Airport. Details GM4SUC.
GB8HSC - HAMPSHIRE SPECIAL CONSTABULARY: Hampshire Police Training College, Bishops Waltham. Details G8NLF.

30 MAY:
GB2LAC - LANCASHIRE AUTOMOBILE CLUB: Norbreck Castle Hotel, Blackpool. Details G4PLB.

1 JUNE:
GB0PGD - PLESSEY GALA DAY: Plessey RC, Beeston, Notts. Details G4VFK.
GB0SJA - ST. JOHN'S AMBULANCE: St.John's HQ., West Bromwich. Details G4ZAD.
GB2GF - GREENWICH FESTIVAL: Plumstead Common, SE London. Details G4DFI.
GB2PPC - PRIOR PARK COLLEGE: Bath. Details G3LYW.

5 JUNE:
GB2NTS - NATIONAL TRUST FOR SCOTLAND: Kirkcoswald, Ayrshire. Details GM3MTH.
GB2OTR - OLD TIME RALLY: The Showground, Aldham, Colchester. Details G3FIJ.
GB6BSW - BRISTOL SOUTH WEST: Woodhouse Park, Almondsbury, Bristol, Details G6ETL.

6 JUNE:
GB2SAR - SOUTHDOWN AMATEUR RADIO: Hailsham Leisure Centre, Hailsham, E.Sussex. Details G4KAR.
GB2TCR - THREE COUNTIES RADIO: Lurgashall Village Green, W.Sussex. Details G4UWJ.
GB4DRC - DUDLEY ROAD CORRIDOR: Dudley Road Hospital, Winson Green, Birmingham. Details G4ZAD.
GB4FMC - FORD MOTOR COMPANY: Dagenham, Essex. Details G0BQF.

7 JUNE:
GB0DCT - DERBY CITY TRANSPORT: Ascot Drive, Derby. Details G0GHD.
GB1DCT - DERBY CITY TRANSPORT: Ascot Drive, Derby. Details G1SFR.
GB4SPF - SURREY POLICE FORCE: Guildford, Surrey. Details G0GFP.
GB6ABF - AMBULANCE BUS FUND: Wigston, Leicester. Details G6PFN.
GB8SPF - SURREY POLICE FORCE: Guildford, Surrey. Details G0GFP.

Contests

Listed below are the VHF and HF contests for the next quarter. The full list of RSGB's VHF and HF contests for 1987 was given in the December 1986 issue.

VHF CONTESTS 1987

2/3 MAY:	432 MHz - 24 GHz (rules March 87)
10 MAY:	10 GHz Cumulative
30 MAY:	432 MHz Trophy & SWL (rules April 87)
31 MAY:	1296 MHz Trophy (rules April 87)
14 JUN:	432 MHz FM (rules April 87)
21 JUN:	10 GHz Cumulative
4/5 JUL:	VHF NFD (rules April 87)
12 JUL:	10 GHz Cumulative

HF CONTESTS 1987

17 MAY:	Region Round-up
	DF Qualifying - Coventry
6/7 JUN:	HF NFD CW IARU
11/12 JUN:	SWL Contest (rules May 87)
14 JUN:	DF Qualifying - Northampton
27/28 JUN:	Summer 1.8MHz
	DF Qualifying - Dartford Heath
12 JUL:	DF Qualifying - S.Manchester
19 JUL:	QRP Field Day

INTERNATIONAL CONTESTS

9/10 MAY:	CQ M CW/Phone (RSF)
16/17 MAY:	Italian International - rules May 87.
16 MAY:	World Telecom Day CW (LABRE)
17 MAY:	World Telecom Day Phone (LABRE)
30/31 MAY:	Ibero-America Phone (URE)
6/7 JUNE:	Field Day CW (DARC)
20/21 JUNE:	All Asian DX Phone (JARL)
4/5 JULY:	YV DX Phone (RCV)
11/12 JULY:	HF World Championship CW/Phone (IARU)
18/19 JULY:	HK DX CW/Phone (LCRA)
	SEA Net CW (MARTS)
25/26 JULY:	YV DX CW (RCV)

ATV CONTESTS:

4 MAY	May Day Microwave
20/21 JUN	Summer Fun (all bands)

PS

Subscriptions for DUBUS Magazine are due now. Details from Ken Hatton, G4IZW, "Hamilton House", Carleton, Carlisle, Cumbria CA4 0AD or tel: 0228-20786.

"Deregulation of the Radio Spectrum in the UK" is a report by CSP International, commissioned by the DTI following a recommendation by the Merriman Review. It's available from HMSO Books (P9D), FREEPOST, Norwich NR3 1BR at a cost of £9.50.

A VERY SPECIAL EVENT WHICH YOU JUST WON'T WANT TO MISS

A Summer Festival of Amateur Radio to celebrate the Society's 75th Anniversary.

Book your holiday now; 14-16 July 1988.

Our celebrations will be centred on the City of Oxford in the heart of England.

More details later.

-*-

Oh by the way, the Society is looking for a good logo to use in the promotion of its 75th Anniversary Year. If any member has a suggestion for the design, would they please write to the Secretary, at RSGB HQ, enclosing a sketch.

NEWS & VIEWS

HF

*John Allaway, G3FKM**

THERE ARE SOME ASPECTS of amateur radio which particularly attract the attention of specialists but which are also of some interest to all. One of these is the idea of having beacons operating on designated frequencies which indicate when certain paths are open and generally give a lot of information on propagation. The network on 14·1MHz and the present IBP system on 28MHz are already proving most useful. However, it is sad to note that a recent application to the FCC in the USA to extend the band in which Technician and Novice licence holders may operate to cover the present beacon segment on 28MHz has been granted. Unfortunately the Report and Order in which this was announced displays a worrying lack of knowledge about 28MHz propagation as it says: "The prospect of interference to the 10m beacon system expressed in the comments is speculative and may never become a concern, given the record of amateur operators in adhering to voluntary arrangements. Moreover, *the low power limit* proposed for stations with Novice control operators should satisfy this concern." What is this "low power" limit? Two hundred watts (of A1A and F1B)! Those of us in countries where the power limit is less than this for holders of the top grade licence may be forgiven for wondering just how severe the interference will be and not whether it will become a concern.

Still more cases of alleged piracy. This time G0BID reports receiving a report of his call being used by someone claiming to be in Liverpool, and G4WHK has received a large number of QSLs for contacts he is supposed to have made on 14MHz cw—so many that he thinks it too much of a coincidence for them to be the result of mistakes in callsign reception.

Dxpeditions

The Exmouth ARC expedition to The Gambia resulted in a total of 607 contacts with 65 different countries. The operators stayed at the Hotel Fajara and received all possible co-operation from the management—which was more than can be said of the customs officials who confiscated their equipment until they had obtained their licences from Gamtel. The result of this is advice to anyone wishing to go to The Gambia to operate to apply for a licence at least six months before it is needed as in this case licences had been applied for in late September 1986 and were received on 26 January 1987—five weeks after the party arrived home. The temperature in Banjul was 115°F—rather different from the 33°F at Gatwick when the group departed. The chairman of EARC (R F Maynard, G4YRM, 7 Phillips Avenue, Exmouth, Devon EX8 3HY) would be pleased to supply further information to anyone interested.

The Maryland Apple Dumpling RAS will activate a dxpedition-style operation as KT4A, Tangier Is, from 15 to 18 May. They will be found on cw at 7 and 37kHz above band edges, and on 3,937, 7,237, 14,237 and 21,237kHz on ssb. Tangier Is is in Chesapeake Bay, in rare Accomack County, Virginia. For special QSL card please send an sae to the address given in "QTH Corner".

Ian, G4LJF, has reported on his recent very successful trip to the Seychelles and passes along some interesting information. He began negotiations with the Seychelles Government for permission to make the expedition several months beforehand and found that they were extremely good at replying to correspondence. At first permission was given to operate only from an established station, but Ian asked for a change of mind to allow him to operate from a beach hotel with his own equipment and free from operating constraints. This was agreed, and with the help of S79CW a suitable hotel was booked. The target was 5,000 QSOs with the emphasis on the lower frequency bands, and a Butternut HF2V and 27 radials were taken. The location was Bird Is — expensive but ideal for the purpose. The Butternut worked beautifully and worked even into N America with 100W on 1·8MHz cw. One hundred and fifty countries were worked and the QSO target was met. QSL cards for S79LF were expected to arrive from the printers in mid-March. Europe provided 44 per cent of the contacts and N America 18 per cent: 641 Is, 222 DLs, 219 UK stations, 155 OKs, 132 YUs, 122 EAs, 117 SPs, 96 OHs and 87 SMs. Some 366 stations worldwide made dupicate contacts and the worst "pile-up stoppers" seemed to be VU, YB, and ZS stations a few of whom insisted in giving names QTHs etc. The cost of the expedition (excluding transportation) was US $2,700 — which comes to US $0.53 per contact. Most cards received direct have contained an sae and postage, those without are being answered via the bureau. Finally, a band breakdown: 1·8MHz cw-9; 3·5MHz cw-15; 3·5 MHz ssb-524; 7MHz cw—185; 7MHz ssb-1,159; 14MHz cw-243; 14MHz ssb-2,163; 21MHz cw-242; 21MHz ssb-538; 28MHz cw-6; and 28MHz ssb-31.

Members of the Windy Yett Contest Group will be visiting the islands of Colonsay and Oronsay (off the west coast of Scotland) from 23 to 25 May. Operation will be on 3·5 and 7MHz ssb and will be from Colonsay on the 23rd and 24th from squares NR39, NR49 and NM40, and from Oronsay on the 25th from square NR38. The callsign will be GM3NEQ/P and /M from Colonsay, but a special event callsign has been applied for to be used from Oronsay. The operators will be Ian, GM3UTQ; Dennis, GM3NIG; Tom, GM4YMA; and Alistair, GM3NEQ.

DX news

Still some conflicting information on activity from the **United Arab Emirates.** *DX News Sheet* reports that A61XL was operated by Sam, A6XB, who will be in the UK this month. A61XL is said to be an experimental callsign and the holder expects a normal callsign soon. A61AB has advised that the QSL manager will be WA3HUP but, at the time of writing, IK8DYD was claiming to have logs for the period December 1986 and January 1987.

Gerald, V85GA, has been worked in the UK on 7MHz ssb around 1700 with a very good signal. Reg, V85GF, is often on 14,130kHz at 1530—his wife is V85HF. Richard, G3CWI, arrived in **Brunei** in March and was due to stay for two months; his callsign is V85NT.

Hubert, 5A0A, telephoned me from Zurich during his attendance at a professional emc symposium. He seemed to be surprised that his signal was radiating so well, and he was looking forward to an immediate return to **Libya.** According to the *Long Island DX Bulletin* he is authorized to use the lower 5kHz of all bands. The European DX Foundation has donated an FT981DM to him and it was despatched by air on 23 February. Hubert asks callers not to make duplicate QSOs.

4W1AA was worked by TK5FF at the end of January, and a QSL was duly sent to W5GJL. Much to his surprise a properly-printed QSL arrived in an envelope which had been posted in **N Yemen!** However, no news is available about the acceptance by ARRL for DXCC purposes of 4W1AA cards.

DXpress reports a visit by DL5QW to YI1BGD. The station in use is an Atlas 210, and a Drake 4 line with L4B linear. Antennas included a 3·5/7MHz double-dipole and a TH3 beam. The official club station in the Scientific Centre has the PO Box 5864 address—all other box numbers given are private ones. Licensed stations are YI1BGD, YI0BIF, and YI4AY, and it is important to mention the operator's name when QSLing. All other callsigns are unauthorized.

DXNS reports that VK9ND is often to be found on 14,154kHz around 0730.

Those seeking a contact with **Togo** should look for 5V7SA who is a missionary and who will be there for several years. He has been working near 14,220kHz at 2200. 5V7WD keeps a schedule with WB4LFM who acts as QSL manager for both of them on 14,165kHz at 2100 on Mondays. ZD9CK is on **Gough Is** and runs 50W to a dipole; he has been working into the UK in the early evening around 14,140kHz. 9J2WS should be on the air from **Sierra Leone** by now as 9L2WS, and should be there until the end of June. ZD8CW will remain active until the middle of this month; at the time of writing he was appearing on 7,005kHz between 2200 on Saturdays until 0100 on Sundays and then moving to 3,535kHz. TR8SA is reported to be active between 14,215 and 14,230kHz quite often at about 2100. 9G2MR is said to be quite active from 1900 near 14,197kHz and promising to appear on 7 and 21MHz, I do not know whether he is properly licensed.

SP5EXA will return to **Svalbard** in June and should remain until August. He is said to be investigating the possibility of visits to **Bouvet** and/or **Peter I Is** next year.

QSLs for contacts with 3Y1EE and 3Y2GV will be counted for DXCC purposes from 1 June, and they may also be claimed then towards the Golden Jubilee DXCC. It is reported that the DXAC has voted against allowing DXCC status to TP2CE and Tierra del Fuego. T50DX cards are not being accepted for credit, and it seems that documents produced by 12JSB do not mention amateur frequencies or a callsign.

*10 Knightlow Road, Birmingham B17 8QB

QTH CORNER

A61XL	Magid Al Qasimi, Box 341, Ras al Khaymah, United Arab Emirates.
CX0XY	Ricardo P Susena, Cebollati 1570 1-B Montevideo, Uruguay.
KA1CRP/FP	KA1CRP, Box 382, Lebanon, NH, 037766, USA.
FS5IPA	M Deyber, 12 Allee des Pinsons, F-77178 St Pathus, France.
FW0AF	F6ILB, 42 Av Bernard, F-33510 Andernos, France.
GW3ZEY/SU	P A Jones, GW4HAT, 68 Pastoral Way, Tycoch, Swansea SA2 9LY.
J6CQ	(see J70A.)
J6DX	(CQ Test only) W8UMD, PO Box 91, Greenville, OH, 45331, USA.
J6LIH	W2GBX, 2069 SE NE Collins Cir, Jensen Beach, Fla 33457, USA.
J70A / **J74A**	K4LTA, 101 Baylor Dr, Oak Ridge, TN, 37830, USA.
V85GF	Box 914, BSB, Brunei.
V85NT	via G3ZAY, M Atherton, PO Box 146, Cambridge.
VK9NP	Phil Connolly, PO Box 39, Norfolk Is, 2899, via Australia.
ZD9CK	PO Box 2236, Pietermaritzburg, Natal, 3200 Rep of S Africa.
4M0ARV	PO Box 3636, Caracas, Venezuela.
8Q7CL	H Sundberg, Flygplatsv 3, S-78193 Borlenge, Sweden.
9M8PV	Andy Lingham, ENG. No. 2, PO Box 89, Bintulu, Sarawak, 97007, E Malaysia.

At the time of writing (mid-March) G4AAL reported that QSLing for his *Operation Raleigh* contacts would be completed very soon. Cards sent via the bureau would be the last to be despatched. No further news of amateur activity by the expedition was to hand.

LU5EVB/Z is on Seymour Is, in **Antarctica,** and will be there until the end of the year. He has already been worked on 7,003kHz at 0400.

A further letter from Phil, VK2BPC, says that his **Norfolk Is** callsign is VK9NP and that cards may be sent direct to the address in "QTH Corner". Please enclose one large sae and two ircs—if QSLs are sent via the bureau, please mark "for VK2BPC". Phil is the retiring VK2 QSL bureau manager and makes a suggestion to help those who send single cards in envelopes to the bureau. He suggests marking the outside of these with the callsign of the person for whom the card is intended. The whole thing can then easily be re-directed without being opened. Phil hopes to work many UK stations during his stay, which may extend until the end of the year.

Welcome

To the following, who became Society members during February: DF9ED, DJ0MAR, K0TO, VE2BRC, VE6ABC, ZF1MW, 9L1AH. Mr M Byrne (EI) and Mrs A Brahms (W6).

Contests

Apologies to **G4LJF**, whose callsign was inadvertently left out of the list of UK scores in the **1986 Bermuda Contest**. In fact Ian came second with a very creditable 325,800 points — tantalizingly near to the winner.

World Telecommunications Day Contest
0000 16 May - 2400 17 May
The objective of this contest is for amateurs throughout the world to contact other amateurs in as many different ITU zones as possible in order to enable their countries to win the "ITU Plaque". 1·8 to 28MHz may be used and phone and cw are separate contests. There are single-operator, single-transmitter and multi-operator, single-transmitter sections. Exchange RS/T and ITU zone (UK is 28). QSOs between stations in different countries in the same continent count one point on 14,21 and 28MHz and two on 1·8, 3·5, and 7MHz. Intercontinental QSOs count two and four respectively. QSOs may be made with own country but count only for multiplier credit. A station may be worked once on each band. The multiplier is number of ITU zones worked on each band added together and final score this figure multiplied by the total QSO points. Use separate log sheet for each band and include the usual signed declaration. Post no later than 31 July to LABRE, ITU Contest Committee, PO Box 07-0004, 70 000 Brasilia, DF, Brazil. A handsome plaque goes to the country with the highest aggregate score decided by totalling the top five single-operator scores and the top multi-operator score both on phone and cw. Copies of the rules are available from G3FKM.

Italian International Contest
1600 16 May to 1600 17 May.
Amateurs everywhere work stations in Italy, San Marino, Vatican City, and SMOM. Single-operator cw or ssb, single-operator mixed modes, multi-operator (mixed modes), and listener classes (mixed mode only). 1·8 to 28MHz but band may only be changed after 10min of operation. Note that Italian amateurs may use 1,830-1,850kHz, 3,613-3,627kHz, and 3,647-3,667kHz. Exchange RS/T plus QSO number (from 001). I stations will send RS/T plus two letters indicating their province. QSOs count two points and the same station may be worked on the same band on each mode. The multiplier is one for every province (plus T7, HV and SMOM) worked on each band. Listeners must log any one Italian station not more than three times on each band on cw and /or on ssb. Send logs to ARI International Contest, c/o ARI, via Scarlatti 31,20124 Milano, Italy, within 40 days of the contest. Please use the official summary sheet which is available from ARI.

Fred, GI4MWA, (l) and his brother Alan, G4BGH—top scorers in the 1985 CQWWDX Contest (phone) from GI in the multi-op section

The Worked All Italian Provinces Award will be issued to entrants who have contacted 60 provinces during the contest. Enclose written application plus a separate list of contacts upon which the award is being claimed. The cost for the WAIP is 10 ircs. In this case no QSLs are needed.

1987 ALL-BAND TABLE No 1.

Callsign	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total
G4OBK	48	43	57	23	9	1	181
GM3YOR	42	42	61	5	2	-	152 (all cw)
4X4FL	-	9	25	38	44	14	130
G0FYD	1	5	41	35	20	2	104
G4GOF	7	13	13	18	9	-	60

Next deadline. Scores **to reach G3GIQ** no later than **9 May 1987** please.

10MHz COUNTRIES TABLE

	All-time	1987
G3PJT	90	40
G4OBK	55	30
G4VDX	67	25
G4YWG	58	24

1987 28MHz COUNTRIES TABLE

G4JBR—28	G4OBK—1
G4XAH—17	G0FYD—1
G4MUW—6	G4NXG/M—1
G3XQU—4	

Apologies to **GI4MWA,** whose score was inadvertently left out of the results of the **1985 CQWWDX Phone Contest** as published in the November 1986 column. In the multi-operator, single-transmitter category, GI4MWA scored 133,500 points and was first in GI.

In the **1986 OK DX Contest, G3ESF** was top UK entrant in the all-band category with 24,048 points, G4ODV came second with 23,680, and G4OTV (2,703), G4OKN (2,700) and G6OI (1,560) were also listed. On 14MHz GM4ELV scored 2,232 points and **G6NK** 1,430. **GB0WKS** scored 534 points on 3·5MHz, and **G3XWZ/A** 3,690 on 1·8MHz.

Awards

Sue Squibb, G1TZU, has produced a book containing information on a large number of awards. It is in A4 size and computer printed. The cost is £3, 15ircs, or US$8. More information is available from Sue at 36 Frognal Gardens, Teynham, Sittingbourne, Kent ME9 9HU.

DXCC Golden Jubilee Award
This is being offered by ARRL for contacts with 100 countries during 1987. No QSLs are required but applications must be submitted on special forms which are available from Communications Dept, ARRL, 225 Main Street, Newington, Conn, USA, 06111.

Worked All Belgian Provinces
This is awarded by UBA to those who can show that they have made contact with every Belgian province on at least two bands. A log extract plus 10ircs, US$3, or £2, should be sent to UBA HF Award Manager, Van Campenhout Mat, ON5KL, Hospicestraat 175, B-9080 Moerbeke-Waas, Belgium.

A special expedition will be carried out by ON6JG to help those working for this award. He will be activating all nine provinces on 3·5 and 7MHz during a journey on 1, 2 and 3 May. If all goes according to plan he will put three provinces on the air each day and appear on schedule on 7,060kHz at 1500 and on 3,760kHz at 1600. Callsigns will be ON6JG/M followed by the appropriate province abbreviation, ie AN, BT, LM, HT, OV, WV, NR, LG or LU.

Band reports

A very comprehensive report from G8KG this month. It reads as follows: "It is frequently asked these days whether or not Cycle 22 has started and, if not, when can we expect it? There is, unfortunately, no simple or certain answer to these questions, though there are some relevant facts.

"Sunspots belonging to the new cycle are distinguishable by having relatively high latitude on the sun's surface, and such spots have been present since July 1986 and now outnumber those belonging to the old cycle. There can, however, be an overlap period of as much as 18 months before the mean level of solar activity begins to climb.

"Part of the difficulty in being precise is that the standard of reference is the "smoothed monthly sunspot number" which is a kind of running 12-month average—so at the time of writing it is only known up to August 1986. To make matters even less clear, the recent history of Cycle 21 is rather unusual. After the dramatic decline of solar activity in 1982-4 there has been a prolonged period of only very slow decrease—the smoothed monthly solar flux has been varying gently between 73·5 sfu and 76 sfu from the beginning of 1985, and it looks increasingly as if the cycle, having had an almost flat top during 1980-1, is now having a "flat bottom". This makes forecasting difficult, and since late 1986 SIDC Brussels has adopted a working hypothesis of a minimum date in the summer of 1986, which means that they now forecast rising activity in 1987.

"Both the smoothed monthly sunspot numbers and the corresponding solar flux figures did show a small "minimum" in the spring of 1986, and if this were the true minimum we should have had a cycle of less than 10 years' duration—unusual but not impossible. The cycles in the past 150 years fall into two groups—one with a mean duration of 10·25 years and the other averaging 11·7 years (Cycle 20 belonged to the latter group). It seems much more likely that the dip in 1986 was simply a statistical consequence of the exceptional activity in October 1986. If the latter is

discounted, the trend in solar activity is clearly downward up to and including February 1987 when the provisional monthly number was 4·0 and the average of December, January and February was below seven, the lowest value since the same months in 1975-6. It will need a very early and steep rise in activity if the smoothed numbers for late 1986 are not to fall well below the "false minimum" of the earlier months.

"The above may be thought to be rather a lot of words with which to say that, in the writer's view, the minimum has probably not yet been reached and that it is unlikely to have been before late in 1986—but the situation may be clearer six months from now!

"What has been important this winter is that the level of geomagnetic activity has dropped significantly compared with a year ago, giving some prolonged spells of good conditions on the lower bands despite more or less "rock bottom" solar activity. The first week in February was a good example, and things could have been a lot worse on the ARRL contest weekends. The same can be said of the Golden Jubilee Commonwealth Contest, which was spared the geomagnetic upsets which have sometimes marred it in years of much higher solar activity. This time it was very much "BERU" at the minimum—whereas 50 years back we were at the peak, albeit only a moderate one, of Cycle 17."

The following kindly supplied logs from which the next section has been compiled: G1XEO, G3YY, G4QK, G5JL, GM3CSM, G3s GVV, KSH, PJT, PXT, YRM, G4s EHQ, JBR, GW4KGR, G4s LRS, NXG/M, OBK, UZN, XAH and RSs 25249 and 52868.

As usual, stations listed in italics were using A1A.

1·8MHz 0000 UL7ACI, UV9FM. **0400** *J6CQ, K5HK/KP2, P40GD, VP2VA, 4X4NJ, 9H1CG.* **0500** *W1-W5, W8-W0.* **0600** FM5WS, HK4DLM, HK0HEU,HH7PV, WB5YWU/HR1, PT8CB, TI2CC, V31CV, 8R1RPN. **0700** EA8QL, P40GD, VP2VA, K8WW/VP9. **1600** OH0NA.

3·5MHz 0000 HH7PL, VU2GDG, *8P9HG.* **0100** AP2ZA, HH2MC, *UW9YU, ZB2EO, ZD8CW,* IK1FOS/5N2. **0200** *J6CQ, J70A, J74A.* **0300** *FM5BH,* PZ1DV, *UG6GCK,* XE3AAF. **0400** *HR6A.* **0500** FG5CB/FS. **0600** *NF5Z/J6L,* PJ0B, V31CV, *N6RA/V44,* XF4DX, *ZF2JR, ZL1-ZL4, ZY0SB.* **0700** TK5BL/FS, HD2A, LU, N7ERR, ZL7s BKM,DE. **0800** CN2AG. **2000** VK7AE. **2100** TR8JLD, 9H4B. **2200** *FM5BH, LU6UO/Z, VK6HD,* 6W2EX. **2300** C6ABC, V2AO, VK9YS, VP2VA, ZD8HH, *9V1TL.*

7MHz 0000 ZS6ADO, *9J2BO.* **0100** *FY4EE.* **0200** *A4XJZ,* KP2D, *LU6UO/Z, OA, TA4A, KK9A/VP2V, 4K1HB.* **0300** *OY5JH, K2SS/VP2V, 5A0A.* **0400** *KP21.* **0500** *VP8BFM, 4M0ARV.* **0600** *K5KG/LU, TE4T,* VK9LM, *ZL7DE.* **0700** *VK, VK9LM, ZL1-ZL3.* **0800** VK0GC, YN3EO. **0900** *K5PWG/J6L.* **1400** *OX3BR, UJ8JA.* **1500** *N6RO* (LP). **1600** HV2VO, *HZ1HZ,* JA, *VK6LW, VU2LAM,* 9N1MC. **1700** *YC5PDC.* **1800** JA6FKY, JG1FVZ/5N0, *9V1TL.* **1900** *VK, VU, 5A0A.* **2000** TA1T, TR8DX, *VS6DO, ZS6QU,* 7Q7LW. **2100** FS5IPA, 3C1MB. **2100** FS5IPA, 3C1MB. **2200** AP2ZA, S92LB. **2300** DU9RG, HL5OC, *VK6HD, VP2MDY,* ZD8HH.

10MHz 0000 *LU2YA, ZD8CW.* **0800** *JA5CLK, VK3, 5, 6, 7, ZL3.* **0900** *PY, VK2AVC, VK5FE.* **1100** *W1, W2.* **1200** *FG5XC, 5A0A.* **1400** *JA1IFB, UW9TB, VU2LAM.* **1500** *UM8MU.* **1700** *TR8JJC, 9M2FP, 9V1VS.* **1900** *J88AY, PZ1DV, VE1, W1, 2, 4, ZS4AAD, ZS5BH.* **2000** *OX3CS, W3, 4.* **2100** *FM5BH.* **2200** *FG5XC, J37XC, 7X2AX, J6LAD/9Y4.* **2300** *W9.*

14MHz 0800 *BY0AA,* BY1PK, FK8EB/M, HL9YQ, KL7, V85HG, VK9s XS, YS, ZL, ZL7AA, 3C1MB. **0900** BV6IA, H44AF, HH2MC, HL0O, KH6J, *KH7CN.* **1000** AP2MQ, J37AH, VK0GC, ZL. **1100** H44DL, J88AQ, YI1BGD. **1300** VU4APR, 9N1NC. **1500** A61XL, *VK9XS.* **1600** *FR5EM, ZK1QY.* **1700** *FS5IP,* ZY0SA, 4S7VK. **1800** HK0HEU, SU1s, ER, MR. **1900** FH4EC, *ZY0SB, 9Q5DI.* **2000** *CX0XY,* FR/G/FH4EC, JA, S92LB, TJ1CH. **2100** C6ADR, OA4OA, 4U1UN. **2200** P43DO. **2300** CX0XY.

21MHz 0900 OD5PL. **1000** VK, VK9YS, VU, 407PVR, 4X5000. **1100** JY5ZM, LU, OD5RF, VK, *VS6DO,* VU4APR, 7Q7LW, 8Q7CH, 9L1IS. **1200** S79CW, TR8SA, *VK8SA,* ZY0SA, 5H3RD. **1300** D68AM, *J6CQ,* VP5SL, YB, 3D6CW, 5X5GK, 8Q7QL. **1400** *FH8CY,* HC5TJ, HH7PV, *VK,* 8R1RPN. **1500** VP8BKK, ZS6NPSA, 7Q7LW, 9Q5KI. **1600** HZ1AB, J88AQ, *V31DX, 7P8DX.* **1700** CE, *LU6UO/Z,* K2KTT/PJ7, TZ6FIC, ZS3GB. **1800** J37AE, TZ6VV. **1900** *VP8BFM.* **2000** P43GR, VP8JC, *W1-4, W9-0.* **2100** HH2SD, PY, YV, *7X2AX.*

28MHz 1100 5X5GK, 7Q7LW. **1200** FR4DL, S79CW, ZS. **1700** CE, CX, LU, YV. **2000** CE3HFI, EA8BLO.

Acknowledgements to the editors of the following for items extracted: *DXNL* (DL3RK), *Long Island DX Bulletin* (W2IYX), *DX News Sheet* (G4DYO), *The Ex-G Radio Club Bulletin* (GI3OEN/W6), *Long Skip* (VE3IPR), *Lynx DX Group Bulletin* (EA2JGO), the *DX Family Newsletter* (JH1KRC), *DX'press* (PA3CXC) and *CQ Magazine* (W1WY).

Closing date for receipt of material for **July** issue is **15 May.**

HF F-layer propagation predictions for May 1987

The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band, ie $\frac{0}{0}$ = 0000, $\frac{0}{2}$ = 0200, $\frac{0}{4}$ = 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 0000001111122 0246802468 02	24MHz 0000001111122 0246802468 02	21MHz 0000001111122 0246802468 02	18MHz 0000001111122 0246802468 02	14MHz 0000001111122 0246802468 02	10MHz 0000001111122 0246802468 02	7MHz 0000001111122 0246802468 02	3.5MHz 0000001111122 0246802468 02
** EUROPE								
MOSCOW	.....	.....	....111.111.	...12322343.	..2566656883	545554445788	7642222235 78	53.....24+
MALTA	.....	.....	....11..132.	...13322365.	1..566667894	645655556799	986432223578	++4.....25+
GIBRALTAR	.....	.....	.....11.	....1111134.	...255445783	511666556798	976543333589	++42.....25+
ICELAND	.....	.....	.....	.....1.	23333452	411355556677	766543333467	5542.....34
** ASIA								
OSAKA	.....	.....	.....	....12221...	..1243333141	1..131112463	241	.....
HONGKONG	.....	.....	....11111...	...1332231..	..1244335532	1....11113575	253	.....2.
BANGKOK	.....	.....	....12211....	...2343221..	..123434442.	21....1113565	1.....256	23
SINGAPORE	.....	.....	...12211....	..1334331...	..22343442..	21...1111345.	1.....254	23
NEW DELHI	.....	.....	...1221122...	..133433442.	..2323345762	421..1113577	41.....257	2.....24
TEHERAN	.....	.....1..11..	...22322342.	..144433575.	114433345785	6431..113588	731.....257	4.....24
COLOMBO	.....	.....1.....	...223221...	..1334333...	..2224345...	221..1113244	51.....257	2.....24
BAHRAIN	.....1..	...1111.12..	...22322453.	..1444446761	214323345786	7531..113588	741.....257	5.....24
CYPRUS	.....1..	...11111231.	...34433565.	..1666557872	325666667897	876433334689	873111111368	+4.....35
ADEN	.....11..	...1111232..	...3344466..	..1444557721	313423345766	8641..113578	851.....257	52.....24
** OCEANIA								
SUVA/S	.....	.....	.....	.....11..11.	...13332.441	..2332111431	..12.....21.	.....
SUVA/L	.....	.....	.....1.	...1.....31	11.5.....53	112421..1342	..12.....21.	.....
WELLINGTON/S	.....	.....	.....	.....1.	..121..1..41	113421122252	..11.....22.	.....
WELLINGTON/L	.....	.....	.....	2	2111.....15	2234.....43	.122.....121	.....
SYDNEY/S	.....	.....	...11.....	...23.....	..2552..1212	112421.12454	...1.....252	.....2.
SYDNEY/L	.....	.....	1	1.....3	3..1.....6	21141.....54	...21....151	.....2.
PERTH	.....	.....	...232.....	..1454.....	1.34541.....	3211211.1351	2.....255	23
HONOLULU	.....	.....	.....	.....1..111.	....23..3321	.1333211231.	..22.....	.....
** AFRICA								
SEYCHELLES	.....1...	...1111231..	...3344464..	..144555762.	1.3423345774	6431..113588	851.....257	52.....24
MAURITIUS	.....12...	...1112231..	...3344563..	...4455676..	1.3434345743	6.41.1113578	831.....257	52.....24
NAIROBI	.....1123..	....112345..	...23345781.	...444567831	3.3533345776	8452...12588	873.....257	54.....24
HARARE	.....1233..	....112455..	...2335678..	...444567811	4.1643345756	83531.112578	8751.....257	542.....24
CAPETOWN	.....121...	....11242...	...133565...	...3555661..	...6543454..	43.431112523	7722.....257	552.....24
LAGOS	.....1245..	....1.24671.	...13246895.	...35456787.	231653235792	78542...2577	8752.....257	552.....24
ASCENSION Is	.....1252.	....1.12574.	....3224787.	64357892	1...54235797	61..31..2478	86.1.....257	552.....24
DAKAR	.....1242.	....1.12464.	....3225687.	...154456892	3214543336 97	875431..1378	8852.....157	552.....24
LAS PALMAS	.....11.	....1..1133.	33234671	...165456884	411576666898	975654334589	886421111368	++3.....3+
** S. AMERICA								
Sth SHETLAND	.....1...	.....12...	.....1453..	.....25651.	2345751	324111112476	7752.....247	552.....4
FALKLAND Is	.....13..	.....2352.	.....24685.	.....145787.	..1..234568.	335311112464	7752.....136	552.....3
R DE JANEIRO	.....132.	.....1254.	2245771	4355784	41..14333588	8751211.1268	8852.....37	552.....4
BUENOS AIRES	.....122.	.....1244.	1235772	2356784	51.1.4344578	8754.1111258	8852.....26	552.....3
LIMA	.....1.	.....12.	122352	1.....233465	6..121333357	85333111...25	77521.....2	452.....
BOGOTA	.....	.....2.	111242	1....1233355	6...13333247	852321 11..14	67521.....2	352.....
** N. AMERICA								
BARBADOS	.....1.	.....12.	2112252	1....4233465	6...24332357	8633311...26	77521.....3	552.....
JAMAICA	.....	.....1.	111132	1.....222244	5....2332236	75221211..13	57521.....1	242.....
BERMUDA	.....	.....1.	1111132	1....2222254	5....4332356	74212211..24	67521.....2	342.....
NEW YORK	.....	.....	.....1.11	1212133	4....3333246	64211211..24	47421.....1	.42.....
MEXICO	.....	.....	11	111133	3.....232224	4421..11....1	2642.....	.32.....
MONTREAL	.....	.....	11	1112133	4....3333245	642112111124	47421.....1	.42.....
DENVER	.....	.....	.....	111	2.....122223	3321..111.11	1442.....	..2.....
LOS ANGELES	.....	.....	.....	11	1.....22222	2222...121.1	.342.....	..2.....
VANCOUVER	.....	.....	.....	.....	1.....12122	223211112111	.2421.....	..2.....
FAIRBANKS	.....	.....	.....	.....	...121111111	112331112221	..12.....	.....

The provisional mean sunspot number for February 1987 issued by the Sunspot Index Data Centre, Brussels, was 4·0. The maximum daily sunspot number was 19 on 27 February, and the minimum was 0 on 1-9, 13, 16-19, 22 and 23 February. The predicted smoothed sunspot numbers for May, June, July and August 1987, are respectively: (classical method), 18, 19, 21 and 22; (SIDC adjusted values) 27, 28, 30 and 30.

VHF/UHF

*Ken Willis, G8VR**

Transatlantic sporadic-E

With the sporadic-E "season" probably having already started on 50MHz by the time you read this, with hopefully 144MHz openings to follow, it is timely to consider some current theories which might lead to a better understanding of this mode.

The 50MHz contacts which have been made between the UK and the North American continent during July in recent years have generally been ascribed to double-hop sporadic-E propagation, though several people have disputed this on grounds that it is very unlikely that patches of ionization will be present at just the right spots for this to occur. Fig 1 shows the usual interpretation, an incident wave being first reflected off the patch of E-layer ionization nearer to one side, then off the sea to encounter a second patch which finally reflects the signal down to the far side to complete the path. In March *VHF/UHF*, Ray Cracknell explained how a measurement of the time taken for the signal to traverse the path would be invaluable in determining whether this was the mechanism involved.

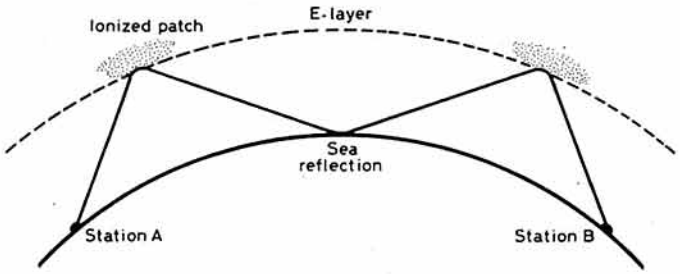


Fig 1. Usual representation of double-hop transatlantic Es

On the same subject, a most interesting letter from John Branegan, GM4IHJ, provides further food for thought. He says that the duct between the surface of the earth and the E-layer through which the ray passes is really quite thin. Most representations (like Fig 1) show a duct which is completely out of proportion with the diameter of the earth. In practice, the duct is much too thin to contain the "saw-tooth" paths which feature widely in radio amateur literature. John provided the illustration of Fig 2, which is a computer-generated path of a signal travelling in a duct above the surface of the earth drawn to a true scale. Now it can be seen that after the first reflection, the ray simply grazes the surface of the sea, and if a second reflecting patch occurs on the far side, distances of more than 4,500km could be covered by these means.

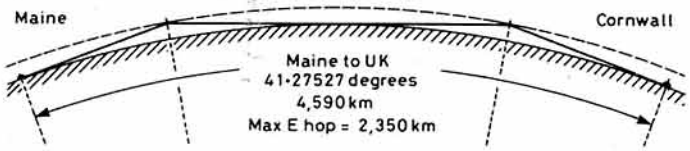


Fig 2. Transatlantic sporadic-E path, Cornwall to Maine. The true scale of the E-layer above the earth: earth radius 6,378km, E-layer height 110km. Two E partial reflections, no ground/sea reflection necessary or practical

John says that any ground or sea reflection towards the mid-point of such a long path would need to be at grazing angle incidence, or more likely not be reflected at all since, as the figure shows, under the right conditions the path across the ocean can be unimpeded, needing just the second reflection at the far end to complete it. He goes on to say that measurements of sporadic-E cloud ion-densities suggest that full reflection from the cloud is generally not possible, propagation being by partial reflection only. An E-layer forming at 110km above the earth would support forward propagation by a single hop, ground-to-ground, between two stations as far apart as 2,350km. Double-hop Es could be expected to give coverage of up to 4,700km, more than enough to bridge the distance between Cornwall and Maine. In fact an arc from Boston, Mass, to Newfoundland should fall within range of the western UK.

Finally John commented that Es seems to be located like a series of stepping stones, this theory being supported by space probe and ionospheric measurements which have located the Es "platelets" on the outer bends of jet-stream winds, at the wind-shear boundaries. He says that it is not surprising that "a meandering sinusoidal jet-stream collects meteor dust in a pattern of 'clumps' outside each successive bend in the stream". Since jet-streams tend to follow the same routes for months, two-hop propagation across the Atlantic via sporadic-E is distinctly possible on 50MHz, and in addition, eastward paths to Asia should be investigated. Whether 144MHz propagation by this mechanism is possible, John thinks it is doubtful but by no means impossible.

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Beacons

Paul, G4IJE, reported that in March, the 50MHz beacon GB3RMK (IO77UO) was back on the air after being off for just over a year, and that he understood that it was running 40W to a dipole 350ft above ground. The feeder loss was stated to be about 3dB, but Paul said that the signal, via meteor scatter, was superb, especially during the early morning hours, so that he could often copy the full callsign and locator in a single burst. Many of the reflections are at strengths as high as S7, and even during the evening, Paul finds that he needs to listen for no more than about 30s before a ping is copied. He thinks this beacon will prove to be a very useful auroral indicator too, so even if you are not able to operate on 50MHz, a simple receiving converter tuned to GB3RMK, plus a dipole, might be a useful addition to the station for auroral monitoring, since these events tend to show up much earlier on the lower frequency band than on 144MHz.

Writing in *Dubus*, Stane, YU3ES, mentions a new Yugoslavian beacon signing 4N3ZVK on 144·927MHz from HG square (JN769), and 4N3ZUK on 432·950MHz from the same location. Also in Yugoslavia, YU3VHF and YU3UHF are reported to be no longer QRV, having been replaced by beacons (calls not given) which operate on 28, 144 and 432MHz from the same location. Another beacon, YU3DAN is on 432·125MHz from GF19a (JN65) from the top of Mount Trstelj, 644m asl.

Some overseas vhf news

Gerald, G4OIG, who keeps in touch with several overseas operators through his meteor scatter interests, sent some items of news showing what can be done on 144MHz. Rudi, OK2PEW/OK2KZR, told him that he has worked some excellent dx using all the available modes except eme. On meteor scatter, he worked UD6DFD at 2,792km and UA9FAD (2,745km). On sporadic-E, his best so far is EA8XS (3,598km), while on aurora he has worked EI5FK (1,760km). Using tropo, UA3PIR provided a contact at a QRB of 1,575km. Incidentally, these results show clearly the advantages that stations centrally placed in the land-mass of Europe enjoy. They have a much greater catchment area for dx than we in the UK, since to the west we are faced mainly by the ocean, offering only "wet squares" to be worked.

Other items of news from Gerald are that both I3LGP and EA7TL are off the air due to antenna problems, and the latter is also changing his QTH. Staffan, SM3JGG, is active on packet radio, and Gerald asks whether this has been tried on meteor scatter. If my memory serves me correctly, a packet QSO via this mode was accomplished in the USA quite recently.

Expeditions

This is the time when expeditions to rare squares or countries are being dreamed up by various vhf groups, and the SM6AFH/SM6EOC *2 Metre News Sheet* is running a poll to find the five most wanted squares in each country in Europe, as a guide to groups proposing travel. If you would like to identify those you need, drop me a line and I will compile a list for Olle and Thomas.

Johannes, LA6HL, will be in Iceland again this year between 16 July and 6 August, then going on to Greenland until 10 August. He plans to operate on 50, 70 and 144MHz. More information later, but this might be a good time to write to him QTHR if you have any special tests or skeds in mind.

Ingo, SM6CMU hopes to activate some of the rarer Norwegian squares in July/August, while another Johannes, OE3JPC, is seeking information on which square or squares to visit with his Austrian colleagues this year (write to Johannes Siegmeyer, G.5, A-2361, Laxenburg, or catch him on the vhf net).

Bob Thompson, G6HUN (Berks), has sent advance information on an expedition to Eire being planned by the BBC Ariel Radio Group (Caversham) with the Newbury & District ARS. From 17 July to 10 August they plan to visit UM, UL, VL and WL squares, operating on hf, 70, 144, 432 and 1,296MHz using cw, ssb and packet modes. Operators so far named (with their Irish calls where appropriate) are Bob, G6HUN (EI3VTU), Al, G4VSQ (EI2VZB), John, G1AWD, Roger, G3UAX, and Roger, G6IBI. They apologise for not being there during the Perseids shower, this being due to the fact that the operators in the group want to stay at home and work the shower themselves! They checked on a 50MHz

licence for their trip, and were informed that on the date of their enquiry, only eight EI licences for the band had been issued, and there were 25 EI stations on a waiting list, so they do not hold out much hope of a permit for the band being granted.

Bob, G6HUN, also reported that the Derbyshire Hills Group will be in Cork for the Perseids, but so far no information has come in from this group. Bob has also heard from Phil Williams, G3YPQ, who is radio operator on board the *QE2* and who was to act as "half-way house" for the ill-fated 144MHz transatlantic attempt by the West Kent Group (*VHF/UHF* June and October 1985) which was abandoned due to very bad weather. Phil told Bob that he would be "QRV again this year, just in case you will be attempting the impossible, and will be pleased to give you some even rarer squares—wet one's!". So maybe the BBC and Newbury expedition team will have a go if they can get someone standing by at the far end.

Keith Tatnall, G4ODA (Lincs), sent advance information on the Five Bells Group's intentions, namely an expedition to UM square (IO42) from 14 to 26 June. Keith did not know the Irish callsign at the time. Operation is planned on 144·215, 432·215 and 1,295·285MHz, and hopefully on 50 and 70MHz also. With luck we shall have fuller details in the June issue before they are actually on site. There's not a lot of land in that square, so they are sure to be in great demand.

I will mention this again in more detail in a later issue, but G4NXL's dxpedition across the North Sea is now planned for 9–11 October 1987, activating squares BM, BN, CN, DO and DP from a ferry boat, and operating on both 144 and 432MHz. Callsign will be OZ1EVA/MM. This call is "owned" by Flemming, G4MJC (Eastbourne), and other operators will be G4MDZ and G6VYH. They should be kept somewhat busy I think!

50MHz meteor scatter

Paul Turner, G4IJE, says he has noticed that meteor trail reflections from GM often seem better between 0900 and 1000gmt than at the "usual" time of 0600, and wonders if anyone can explain why this might be so. To investigate this further, and to encourage more activity on random ssb on 50MHz, he suggests an extension of the weekend activity periods. He proposes that the period be 7am to 11am, every Saturday and Sunday. Lest this long period should deter some operators, it is not suggested that operation be continuous during the period, as there are probably not enough stations on the band to justify this. His idea is that stations wishing to join in mid-morning should always start their operation *on the hour.* Thus late risers can join the activity at, say, 10am and expect to find others doing the same. The frequency is 50·350MHz, and GM/GI stations should transmit first, using 1min periods on ssb. While slow cw is recommended for CQ calls etc, it is not suggested that it be used for the whole contact.

European vhf/uhf contests

These contests, sponsored by *Dubus* magazine, are held during the first weekends in May (2,3), July (4,5), September (5,6) and October (3,4), the dates in parenthesis being those for 1987. Each event starts at 1400gmt Saturday and ends 1400gmt Sunday. The contest call is "CQ dx test" for cw, or "CQ dx contest" using voice. Stations must exchange RS (T) report, plus serial number and European locator (yes, European, not Maidenhead, so the rules say). Each QSO counts one point, and the final score is arrived at by multiplying the total number of contacts by the number of different squares worked. Logs must be submitted no later than the last day in the month in which the contest takes place. Entries for 432MHz and above should go to Frank Fischer, DL4EA, Kolner Strasse 133, D-4000, Dusseldorf 1. Entries for 144MHz only should go to Edmund Ramm, DK3UZ, PO Box 38, D-2358, Kaltenkirchen.

Repeater news

The January 1987 newsletter of the Speyside Repeater Group contained much of interest. The group operates repeaters GB3GN, PD, SS, BI and OC, with licences pending or issued recently for GB3NG, BA/DU and KM. I particularly liked one comment in the newsletter to the effect that GB3BI had been fitted with a new antenna cable "left by a commercial company on the mast". This must be the radio equivalent of falling off the back of a lorry!

President of the group is Ed Brumby, GM8YKT, and the secretary is Eileen Scott, GM8RMR, with a well-known vhf call GM4ILS (Ron Adam) as Treasurer and Project Manager. Jim Harris, GM4WKO, has been building some very handsome filters for the group which has "always been committed to single antenna working".

Brian, 5N3BPC (ex 5N4BPC, 5N0BPC and EI2VBN) wrote from a hospital in Manchester to say that he has an FT208R with him and is getting his first experience of listening on vhf in Europe, and wishes to thank all operators, mainly in the north west, who have given him many happy moments while confined to bed. He said that it is not easy to keep a log when lying on one's back, so he does not have a full record of what he has heard. Brian confirmed that there is vhf activity in Nigeria, mainly in Lagos and Kano, since there are repeaters at these locations, both on R1. It is planned to replace the Lagos repeater, currently in the dock area, by one further inland on R3, while the old repeater will be overhauled and moved to Wari. For you sea-going operators who call at those parts, Brian says that there are nets every evening at 1800h local time with 14 vhf stations active in the Lagos area. I am sure we all wish Brian a speedy recovery and perhaps a UK licence so that we can hear him on the air.

Another Newsletter to arrive was from North Cambridgeshire Group, Secretary John Arnold, G4NPH and Treasurer Gordon Smith, G6XMU. This group was unfortunate in that its application for a licence to establish a 144MHz repeater at St Peter's Church, Wisbech, could not be supported by RMG after a survey had indicated that when another proposal (from the Peterborough Group) was taken into consideration, the coverage proposed for the two systems would to some extent overlap. These are difficult decisions for RMG to take, yet this is their role, since unfortunately there are limited channels available for repeaters.

More on calling channels

In March, the subject of calling channels on vhf bands was raised, and though to many it may appear to be a dull topic, it still invokes a lot of controversy, especially among operators in areas where activity is low. Here's what they say: GM4UPL (Inverness), "I agree with GM4ZUK, where else do you listen on a silent band? It may be difficult to believe, but up here, even 3·5MHz can be silent!"

Ritchie, GM1LKD and John, GM6KJD (Aberdeen), support GM4ZUK since: "In north Scotland, without a calling channel being used, it would be difficult to have QSOs." They find that even in "lift" conditions, calling away from 144·300MHz usually produces nothing, whereas you can mostly raise someone on the calling channel. Ritchie is also surprised at the alleged activity on 144MHz in the south, since often when GB3VHF and some southern repeaters are strong with him he gets no replies to his calls. Iain McHardy, GM3JFG (Ross-shire), a call much sought in auroras, is another who wants to retain the calling channel on 144MHz. He says that several other amateurs in his area are also strongly in favour of 144·300MHz since if they "had to listen over a 10–20kHz segment, it would almost debar us from using ssb on the band". He adds that signals from G are so rare that it is common practice to leave the receiver on 144·300MHz and wait until a signal is heard, and he is convinced that GM beams are turned to the south a great deal more than G beams are looking to the north!

Stan White, G4EGH (Gillingham, Kent), has his own solution to the problem of tuning around the general calling-channel area, to cater for the suggested "centre of activity" rather than a specific calling frequency. He has an FT290, and finds it has a facility not mentioned in his handbook. It is the use of the clarifier, and the procedure he adopts is to set the main tuning to 144·300MHz, press the clarifier scan button, then press the microphone scan button (up or down) when "the transceiver now tunes itself from 144·290 to 144·310 and back again, continuing indefinitely, even if a signal appears". It is an oldish FT290 but its microcomputer has been replaced, and both the new and the earlier one operated in this way. He also has an FT790, and this works just the same.

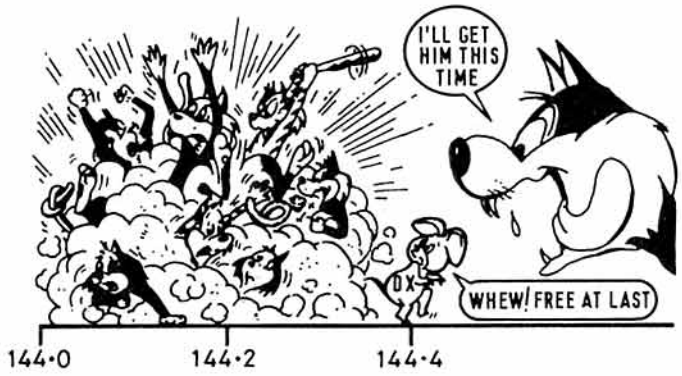
From here and there

An interesting comment from Jan, OH1ZAA, relating to the record low temperatures experienced in Finland during the winter. He says, "During the cold weather, when temperatures went to −40°C, noise figures of mast-head preamplifiers went real low!"

January *Radio Communication* carried a comprehensive account of Syledis and Mould, two systems which cause a lot of problems for amateurs operating on 432MHz from certain parts of the country. The VHF Committee recently appointed Roger Basford, G3VKM, as a corresponding member to cover these topics. Roger is professionally involved in Syledis systems, and has experience in all aspects of them from licensing through to operations. As the article indicated, there is little chance of an early reduction in Syledis activity but at least the Society is now well-placed to keep abreast of the situation as it develops in future.

Stan Clark, G6NUO, asks if anyone heard a Moroccan station on 144MHz at lunchtime on 2 March, around 1330gmt. Noting a high-pressure system on the tv weather map, he pointed his beam (a modest eight-element) south from Birmingham, and heard a CQ call from "Charlie Nancy 8 Victoria X-Ray". He is not certain of the last two letters in the call, but he had time to swing the beam and confirm that the signal was at least coming from the right quarter. Others were on the calling channel at the time, but nobody responded to the CQ call despite several calls in both French and English from the remote station. (These things never happen at my QTH.

The illustration gives an idea what would happen in the south-east!) Stan was reluctant to believe that he had heard correctly, but there is plenty of evidence to show that these things occur from time to time. If anyone else heard or worked the station, perhaps they would let us know.



A CN8 appears on 144MHz. Courtesy *Dubus*

Dave, G4FRE, has received a listener report from none other than Peter John, DL7YS (JO62OL) in Berlin, who copied his signals on 70MHz on 21 September 1986 at 559. The QRB is 1,252km, "amazing where you can be heard" as Dave says. Incidentally, Dave points out that in the January issue, I mentioned his record-breaking 70MHz contact with GM4ZUK/A as being "during the 432MHz Trophy", a confusion, of course, between 70MHz and 70 cms for which I apologise. G4FRE, who has wide tastes since he is active from 70MHz to microwaves, says he has found another use for his 144MHz rig, apart from its usual role as an i.f amplifier for microwave reception. He is now into sstv, and has become sufficiently hooked to take down his three-element 144MHz array and replace it with a nine element, which has enabled him to work four countries and eight squares on 144·5MHz by this mode. There is no truth in the rumour that he plans to operate on 1·8MHz shortly.

Stop Press: Cyprus team attempting contact with UK on 144MHz QRV all day during last week in May and throughout June. QRG 144·010MHz beacon mode and 144·200MHz, with talk-back on 14·330 and 21·330MHz. More next month.

SWL

*Bob Treacher, BRS 32525**

I AM PLEASANTLY SURPRISED by the response to the new style tables which appear for the first time this month. With the greater activity on the lower bands, it is not a surprise to see almost twice as many lower frequency entries as hf. No doubt the emphasis will move back to hf as the year proceeds.

Contests

The 7MHz contests got a sizeable mention earlier in the year. Now it is time to give a pat on the back to the UBA who have put their name to two listener contests which coincide with the CQ WPX contests at the end of March and May. This extends the listener contests through the year such that all the major transmitting contests will now have a listener contest running in parallel. For the CQ WW contests, the swl has my HF Challenge, and now the UBA have added theirs to coincide with CQ WPX. Added to this, the Society's swl contest coincides with the IARU Radiosport event, the White Rose RS If contest normally occurs during the *73 Magazine* contests, while the Cray Valley RS contest happens during the Scandinavian contest. Including the internal contests organized by the Society, the hf swl can look forward to a competitive future.

LF news

By the time this is read, the 1987 dx season on the lower bands will be something that will have been almost forgotten. However, a few lingering glances over our shoulders will not go a miss. The lasting impression was one of continuing superb conditions on 7MHz. Many reporters added

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1987 Country tables

HF

Station	DXCC	10	15	20	Total
BRS8841	147	9	53	139	201
BRS87677	85	9	47	74	130
BRS1066	76	0	31	71	102
BRS88639	70	7	16	63	86
BRS20249	57	0	11	41	52

LF

Station	DXCC	40	80	160	Total
BRS8841	158	121	122	47	290
BRS32525	153	128	111	45	284
BRS52543	129	94	106	55	255
BRS87156	121	97	99	45	241
BRS1066	86	69	50	45	164
BRS31976	79	0	57	53	110
BRS87677	74	48	57	0	105
BRS20249	45	31	34	6	71
BRS88639	30	27	7	0	34

plenty of good dx to their totals, both All time and in 1987. All the big expeditions spent much time on the band; VK0DA on Heard Island spent a few evenings on 7,040kHz, as did FT8WA and FT8ZA. Generally, the evenings provided something good every night. Stations from the Far East and Africa were good copy most days. Conditions in the mornings were noticeably disappointing. The ZL2AAG net tended to QRT just as the band was peaking in G land. However, having said that ZL7,ZL8, KH3 and KX6 were reported. Still lots of QRM on the band, but many listeners are coming to terms with it, and to increase the numbers of countries heard, it's a case of putting up with it!

The 3·5MHz band seemed not so flamboyant in its ways. Much was heard from the USA and the Middle East. The JAs were audible—some days much better than others. The path to W6/7 in the morning was fair, with KL7, KH6 and KH3 on the band regularly. The path to ZL was quite good at sunrise, but few good signals were heard at sunset. Africa was sparse and the South American and Caribbean dx was run-of-the-mill. However, for those on the band for the first time this winter, there were useful additions.

Mick Toms, BRS31976 relates an interesting occurrence. He heard an HA calling CQ dx on 3,799kHz. He was called by a 4S7, who was told to stand-by as the HA was calling CQ dx. The HA then went on to call CQ dx Stateside! Another operator who would have benefitted from a better grounding as an swl.

That leaves us with 1·8MHz. Mixed feelings about conditions here this last winter. I personally found the band poor, but others have fared better. Andy Smith, BRS50134, shares my view. He only head one JA, but his high speed cw defeated him, logging only JA2C - -. Andy burnt the midnight oil hoping to find VU2GDG at around 0115, but with no success.

David Whitaker, BRS 25429, added 8R1RPN for a new one, and Martin Parry BRS52543 now only needs five more for the 100, thanks to SV5, UL7, HA, PY, VP2V, YV, 8R1, FM5 and V31. Another nearing the 100 is Andy Smith, who caught HK and 8R1 for countries 95 and 96. Tony Blackburn, BRS87156 caught RZ1OWA on Franz Josef Land for a new one. Robert Small, BRS8841, logged NP4A for a new one on ssb. Lastly, Mick Toms thought 1·8MHz was Band of the Month in February. UI8DAN, OX3CS and YB0JH went into the log for countries 77, 78 and 79. VK6HD, VS6DO, 4X4NJ. UA9FM, EA8XS, several JAs and a few rare Europeans joined them. VEs and Ws had been logged at 2045 at Mick's QTH and during one of the cw contests on the band, several USSR stations were audible all day. This led Mick to recollect when experiments on 1·8MHz by GM3SVK, G3TZZ, GI6TK and EI6AS were carried out to test the daylight capabilities of the band. Mick also recalls W1BB's signals being heard during daylight hours. How things have changed, with more and more stations active and an increasing number of countries having use of the band.

VHF corner

Time to look back on VHF, mainly by way of taking stock of 1986 and preparing for 1987. Last month's piece looked at the leading swls additions during the winter. News of plenty of QSL cards from last summer's activity too. Mick Toms mentioned confirmations from OK3BWY/P (JO70), OK3CBU (JN98), EA3KC (IN73), I4YNO (JN54), OE3JPC (JN88), UR2RHF (KO38) and YU1LA (KN04) which helped take him over the 100 square confirmations mark, and G5UM did the rest, by sending him a 100/20 sticker for his "4-2-70 Squares Award". At my QTH, cards from YO2IS and TK4DL were particularly pleasing. Mick had a go at the March contest. Plenty of stations heard at a distance of 250–300km, plus one HB9. Looks as though Mick might have won that one. Martin Parry (snow) and I (ill) did not take part.

Finale

Space has well and truly beaten me this month. News, views and table scores for the July issue should be with me 4 May with late news by 12 May. □

MICROWAVES

*Mike Dixon, G3PFR**

Local oscillator source

Two small gremlins appeared in the second part of this article, fortunately neither "fatal". The first, in Fig 4, showed transistors TR1 and TR2 transposed: since these are identical devices, this is of no consequence although, for the sake of accuracy, should be corrected. The second was that the caption on Fig 5 should have read "Typical output spectrum (Output 1) with Output 2 disconnected". Similarly Fig 6 should have read "Typical output spectrum (Output 2) with Output 1 terminated in 50Ω".

I have received a sufficient number of enquiries expressing an interest in the board for the components service to have some made. In order to have these made quickly and inexpensively, the first batch will be *undrilled* in the first instance: the constructor will need to drill the necessary holes and slots and also to countersink the upper groundplane where clearance is needed. None of these operations should prove difficult for the "kitchen table" constructor: indeed, all the prototypes were constructed thus! It was felt that it would be more sensible to produce the boards in this way to minimize production time and cost until the board is established as a regular item in the components service listings. The first boards should have been available in late March, long before this issue is read!

Two or three other items of interest regarding this design: first, if it is to be used to produce nbfm for mixing or multiplying into higher bands, the circuit originally described for use with the Microwave Committee 384MHz (nominal) board can be easily and simply used. Second, the crystal is located close to the die-cast box endwall so that a home-built crystal oven, consisting of a thermistor sensor and heating resistor can be built around the crystal, with easy access for the necessary external circuitry via feedthroughs in the box wall. Thermal stabilization of this type is almost certainly needed for the most exacting applications—for instance, a beacon source—where thermal drift must be minimized or eliminated. Indeed, I understand from Sam, G4DDK, who designed the board, that the source is to be used as the driver in the GB3BPO beacon during a forthcoming rebuild/upgrade and will be thermally stabilized by the means outlined above. I hope to be able to publish these ideas in more detail shortly. One further point: in the unlikely event of stability problems with the crystal oscillator, it may be worth changing C2 for an 18 or 22pF capacitor. "Surplus" BFY90s have been known, in similar oscillator circuits, to have caused occasional problems, so beware!

Operating and other news

After a lot of uncertainty about the status of amateur licensing in Belgium, I am very pleased to be able to confirm that new regulations were introduced last December.

There are now three classes of licence as follows:

Class A—"Beginners": special examination, no telegraphy, maximum power 10W on 144MHz **only.** (Callsigns probably ON2.)

Class B—VHF **only**. Normal examination without morse test. Power 150W on 144 and 432MHz, 30W on microwaves and callsigns ON1/ON9.

Class C—Normal examination **with** morse test—all bands (callsigns ON4/ON8).

Of particular interest to readers of this column are the microwave allocations, which are as follows (30W limit on all bands):

1·240	to	1·300GHz	(Secondary)
2·300	to	2·450GHz	(Secondary)
10·000	to	10·500GHz	(Secondary)
24·000	to	24·050GHz	(Primary, exclusive)
24·050	to	24·450GHz	(Secondary)
47·000	to	47·200GHz	(Primary, exclusive)
75·500	to	75·600GHz	(Primary, exclusive)
76·000	to	81·000GHz	(Secondary)
142·000	to	144·000GHz	(Primary, exclusive)
144·000	to	149·000GHz	(Secondary)
241·000	to	248·000GHz	(Secondary)
248·000	to	250·000GHz	(Primary, exclusive)

These confirmed allocations should go some way towards assuring the future of (at least) UK to near-Continent microwave experiments, and it will be very interesting to see what emerges from the April IARU Region 1 Triennial Conference with respect to planning and agreeing international "common" working frequencies and practices. As hinted-at in recent issues of *Microwaves*, there have been a number of inconsistencies in the way in which national authorities have dealt with the question of microwave allocations, leading to differing allocations in several of the nearer countries with whom normal (terrestrial) microwave communication is possible.

Certainly RSGB will be pressing for common narrowband allocations —and hence, band plans—to be adopted. Indeed, the Microwave Committee would like to secure the traditional "narrowband" sections (each 2MHz wide) as **Primary** allocations, with the usual "wideband" allocations unchanged, as now. We feel that these aspects of microwave planning are rather more important to the future of amateur microwave radio than arguments about, for instance, multipliers for contests, bands, timing and frequency of contests, or even the controversial "Locator *vs* QRA" argument. All these are trivial compared with the importance of establishing and confirming our presence and serious usage of the bands. There seems to be little mileage in arguing such points if there are no allocations to debate!

Accordingly, our delegates will be pressing for the adoption of common, fairly "broad-brush", plans based around the concepts outlined above. In this respect there has been established a degree of commonality, particularly with DARC, the German national society, and particularly with regard to the proposed international plan for 1·3GHz. Other bands may not be quite so clear-cut until we are certain of the allocations available in the other member countries: what must surely be a common aim in the forthcoming meeting is to set sights on an agreed common policy for the next World Administrative Radio Conference (WARC) due, it is thought, in 1992. This would mean only one more "triennial" after our April meeting! As I said in the opening remarks, it will be very interesting to see what emerges from the conference; hopefully a determination to seek and define internationally agreed "common" allocations and usage.

Frederick, G6FK, has sent some more details of the forthcoming "1987 Microwave Assembly & Dinner" (Wolverhampton, 18 July). One-and-a-half hours have been set aside for a formal presentation which will aim to cover the following topics:

1. "Introduction to and summary of bands above 1GHz;—usual modes of operation for the respective bands;—what the newcomer might expect from microwaves;—audience participation on band usage.
2. "Do you purchase or build?";—sources of information;—desirable test equipment, simple and advanced.
3. "How to start on 23cm";—development to higher bands.
4. "A Gunn project for 10GHz + demonstration".
5. "Narrowband approach to 10GHz."
6. "Phase locking techniques."
7. "Operating sites—access and restrictions."
8. "Questions and answers."

Further details from G6FK, QTHR, although I hope to have further details to publish in the June column.

Apropos earlier observations of "strange" propagation phenomena on 1·3GHz, John, G1TZT, sent me a cutting from the *Bournemouth Evening Echo* (echo seems appropriate!) which noted that a local company, Air Wight, has signed a contract to undertake low-level over-sea flights ". . . to characterize radio refracting layers in the air . . . these were a common meteorological phenomenon in still air. The layers were not easily visible, were present from sea level to 1,500ft and appeared around dawn . . . they were rather like fog banks, and they (the company) would be on 24h standby, should the banks build . . . the aircraft was being fitted with nearly £30,000 of electronics. Data from antennas on the 'plane would be fed into two on-board computers". The research (for AERE, Harwell, acting for SERC) would commence in July 1988, the aircraft "flying along two microwave paths between Christchurch and Lannion, Brittany, and Portsmouth and Cap d'Antifer . . . the radio refracting layers interfere with radio and tv reception".

My reaction to this one is: has someone out there suddenly discovered anomalous tropospheric propagation?! All applause for a systematic investigation of this kind, although it is difficult to know what can be done about the radio and tv interference: keep looking for such signs and catch the openings! Persistent observation and reporting of such phenomena by amateurs could help shed light on the mechanisms involved and could greatly enhance the findings of any research project such as this.

Meanwhile, can I remind you all that the portable season is now in full swing, with the first of the 10GHz Cumulatives completed by the time you read this! Note that this year, as detailed in *Radio Communication* and the *Microwave Newsletter*, there is a tv section as well as the usual wide- and narrowband sections. There were some very successful tv contacts last season, and it is to be hoped that the inclusion of this section will encourage further activity in this sphere this season. Good hunting: I hope to be more active this season, and look forward to working many of you from May onwards. □

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COMPUTING

*John Morris, GM4ANB**

Greyline predictions

Greyline propagation can be a useful way of working the odd bit of dx on hf under apparently flat band conditions. In February 1985 I gave a program for predicting the times of sunrise and sunset, and the angle of the greylines at those times. Program 1 goes further. It asks for the position of a dx station, and calculates the days in the year when the greyline will pass through the positions of both you and the other station. This is very useful if you are looking for a particular area, or are setting up a sked and want to choose a favourable day.

The program has three sections. In the first (lines 50 to 100) the great circle bearing from you to the other station is calculated. Next (lines 150 to 270) the days on which the sunrise or sunset greylines will fall on the sme great circle are found. There are generally four such days, two for sunset and two for dawn. Finally (lines 280 to 350) the times at which the sun rises and sets are calculated, so that you can decide whether it is really worth getting up that early.

Program 1

```
 10 TP=2*PI: DR=PI/180: EL=23.442*DR
 20 HN=56.05 * DR: HE=-3.33 * DR
 30 INPUT "DX latitude  (N)"; DN: DN=DN*DR
 40 INPUT "DX longitude (E)"; DE: DE=DE*DR-HE
 50 SI=SIN(DE)*COS(HN)*COS(DN)
 60 CO=COS(DE)*COS(HN)*COS(DN)+SIN(HN)*SIN(DN)
 70 CO=SIN(DN)-SIN(HN)*CO: AZ=ATN(ABS(SI/CO))
 80 IF CO<0 THEN AZ=PI-AZ
 90 IF SI<0 THEN AZ=-AZ
100 IF AZ<0 THEN AZ=AZ+2*PI
110 PRINT: PRINT "Bearing: ";INT (AZ/DR + 0.5)
120 PRINT "Sunrise:";: AR=AZ-PI/2: RF=1: GOSUB 150
130 PRINT "Sunset:";:AR=PI*3/2-AZ: RF=0: GOSUB 150
140 PRINT: GOTO 20
150 T1=COS(HN)*COS(AR)/SIN(EL)
160 IF ABS(T1)>1 THEN PRINT "No day found": RETURN
170 EW=ATN(T1/SQR(1-T1*T1))
180 FOR I=1 TO 2
190 SD=SIN(EL)*SIN(EW): CD=SQR(1-SD*SD)
200 SI=SIN(EW)*COS(EL): CO=COS(EW): RA=ATN(SI/CO)
210 IF CO<0 THEN RA=PI+RA
220 T1=-TAN(HN)*SD/CD: TH=PI/2-ATN(T1/SQR(1-T1*T1))
230 T1=2*ATN(TAN(EW/2-2.46611884)/1.01686)
240 MS=T1 - 0.016718*SIN(T1)
250 D=365.2422*(MS/TP+0.006837807): D=INT(D+0.5)
260 IF D>365 D=D-365
270 IF D<=0 D=D+365
280 IF RF THEN TM=(RA-TH-HE) ELSE TM=(RA+TH-HE)
290 TM=TM/TP-0.27676777-0.00273791*D
300 TM=23.93448*(TM - INT(TM))
310 IF D<=59 THEN D=D+365
320 MN=INT((D+63)/30.6001): DY=D+63-INT(30.6001*MN)
330 IF MN>13.5 THEN MN=MN-12
340 TM=INT(TM*60 + 0.5): HR=INT(TM/60): MT=TM-60*HR
350 PRINT ;"  ";DY;"/";MN-1;" at ";HR;":";MT;
360 EW=PI-EW: NEXT: PRINT: RETURN
```

Fig 1 shows an example run. The dates are given as day of the month and month number. No account is taken of the year. In theory there is a small variation from year to year, but in practice propagation is never so precise. It is best to treat the dates given as the middle of a period during which there is a better than usual chance of working the dx. The sunrise and sunset times ignore diffraction and yearly variations, so should be taken as plus or minus a few minutes.

The program is more intricate than most that appear in *Computing*, with complex formulas and long constants, so take care when entering it. The vast majority of letters I receive about programs not working turn out to be due to typing errors made when copying from the magazine. After testing the program, change line 20 by replacing "56·05" by your own latitude, in degees north, and "−3·33" by your own longitude, in degrees east (ie a negative value for those west of Greenwich).

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As with any propagation program, the results from Program 1 should be regarded only as a guide, to be interpreted using background knowledge of how the propagation works. A useful introduction to the subject of greyline dx, and how best to exploit it, is given in the RSGB's *Amateur Radio Operating Manual*.

```
DX latitude  (N)?-9
DX longitude (E)?-14

Bearing: 192
Sunrise:  4/3 at 7:3  9/10 at 6:41
Sunset:  6/4 at 18:52  6/9 at 18:48

DX latitude  (N)?-45
DX longitude (E)?170

Bearing: 24
Sunrise:  24/4 at 4:53  18/8 at 4:59
Sunset:  14/2 at 17:7  27/10 at 16:37
```

Fig 1: Example run of Program 1

CW sending monitor

If you are busy practising for the morse test, Program 2 will be of interest. It acts as a practice oscillator, but at the same time lets you look at the code you are sending, so that you can check the lengths of the dots and dashes and the spacing between them.

It is specific to the BBC, but similar programs should be possible on other computers which have a real-time clock and suitable graphics.

The key should be connected to the left hand FIRE button on the joystick interface. This is pin 13 on the 15 way D-type on the back of the BBC. Pin 6 is the most convenient earth point. If you do not have a suitable plug to hand, a temporary connection can be made by carefully pushing in short wire pieces. A half inch trimmed from the end of a resistor is ideal.

When the program is run, an oscilloscope-like trace moves across and then down the screen, stepping up and down as you press and release the key. Anyone who has used a logic analyser will be familiar with the type of display.

Program 2

```
10 MODE 0: SI=1: DX=2
20 TIME=0: ET=0: F=0
30 FOR Y=950 TO 0 STEP -50: MOVE 0,Y+25*F
40 FOR X=0 TO 1279 STEP DX
50 ET=ET+SI: REPEAT UNTIL TIME>ET
60 IF F=FNKEY GOTO 80
70 F=1-F: DRAW X,Y+25*F: SOUND 17,-F*8,100,-1
80 PLOT 1,DX,0: NEXT: NEXT
90 DEF FNKEY=ADVAL(0) AND 1
```

Program 3

```
10 DEF FN k(x)=(INKEY$(0)"")
20 LET f=0
30 FOR y=165 TO 5 STEP -10: PLOT 0,y+6*f
40 FOR x=1 TO 255
50 IF f<>FN k(0) THEN LET f=1-f: DRAW 0,f*12-6
60 DRAW 1,0: NEXT x: NEXT y
```

The result is a graphics display of what you sent and, more important, how you sent it. Any deviations from perfect morse, such as over-long gaps or abbreviated dashes, are immediately apparent, and you can take steps to correct them.

The program works by sampling the input at approximately 10ms intervals, and using simple plotting commands accordingly. At the same time the sound generator is turned on and off, so that you can hear the code as well as see it.

To change the program to read code from other inputs modify function FNKEY in line 90. This function must return to zero if the key is up, and one if the key is down. For example, to monitor code tapped out on the SHIFT key, use:

90 DEF FNKEY = INKEY(−1) AND 1

The timing is very tight, so whatever is put into line 90 must be short, otherwise the display will not keep up with real time.

Line 10 can be modified to change the display format and speed of the trace. The program will work in any of the graphics screen modes. Variable SI gives the sample interval, in 10ms units. Variable DX gives the distance the trace moves across the screen in each interval.

The program will run on the Electron (with changes to line 10), but the slower speed of the computer means that SI must be made 3 or more for the timing to be accurate.

Program 3 is a similar utility for the Spectrum. It will trace out the code tapped out on any key. If you have an i/o port for your Spectrum, change FNk in line 10 to return 1 for key down, and 0 for key up.

The Spectrum suffers from a lack of an easily accessible real time clock, so Program 2 simply free-runs. Although this means that the timing is not spot on, in practice the results are quite acceptable.

Besides letting you evaluate your morse style, these programs can also be used as logic analysers. With a suitable interface they can be used to monitor the switching behaviour of a digital circuit being developed. As they stand, the sample rate—about 100Hz—is rather slow for most circuits. By recoding in machine code rates of a few tens of kilohertz should be possible, which will have a rather wider application. □

DATA COMMS

Ian Wade, G3NRW *

Amtor primer, part three

Before continuing with the Amtor story, a brief word from regular South East Asia correspondent Colin Richards, 9M2CR. He says that it was good to see a re-statement of the features and virtues of Amtor in the March column, particularly in comparison with packet on hf. However, he also says that I should have described Amtor as "Amateur *Microprocessor* Teleprinter over Radio"—I had missed out the word "microprocessor", and after all it's the microprocessor bit that makes all the difference between rtty and Amtor. Point taken Colin, consider my knuckles rapped!

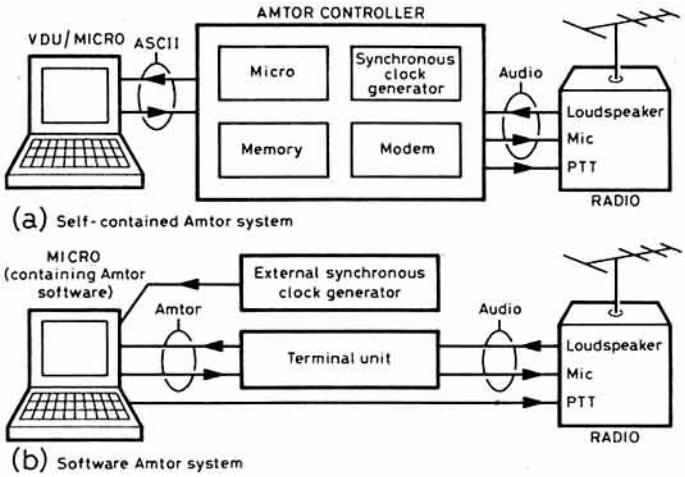


Fig 1. Two ways of setting up an Amtor station. Using a dedicated unit (Fig 1a), all of the Amtor processing is handled in a self-contained box independent of the vdu and the radio. A cheaper approach is to use the home micro (Fig 1b), but a separate synchronous clock generator is still required as the micro's internal clock cannot be relied upon for accuracy

Amtor hardware

This month we take a look at the hardware required to run Amtor. As usual with data comms, there are several different ways of doing things, depending on the mix of software and special hardware. Perhaps the simplest, and most expensive, approach is to use a dedicated Amtor controller (Fig 1(a)), which sits between the vdu (or micro) and the radio. The controller does everything that is necessary to run Amtor, and contains its own micro, memory, synchronous clock generator and modem. The vdu is simply used as a glass teletype handling message characters.

The synchronous clock generator

Amtor is a synchronous system, which means that there are no start and stop bits in Amtor characters. Each character is sent simply as a stream of seven bits, and so each three-character Mode A data block is 21 bits long. The transmitted data rate is always 100bps—at any other speed it wouldn't be Amtor—so each bit is therefore 10ms long. For successful Amtor operation, the clock controlling the data rate must be as accurate as possible. CCIR Recommendation 476-3, upon which Amtor is based, states that it should have an accuracy of better than 30 parts per million. This means that a special clock generator circuit is required in the controller, and once set up it should not be tampered with.

The software approach

Question: if I already have a micro, why do I need to go to the expense of buying a dedicated Amtor controller? Amtor is a slow system, so surely I can use the processing power of my own micro to handle it? Answer: yes, you certainly can, and, if you have a BBC or a Dragon, it has already been done for you (Fig 1(b)). Here, the Amtor software resides in your computer, but you still need an external synchronous clock generator (the internal computer clock cannot be relied upon to be accurate enough), plus a terminal unit to convert between digital pulses and audio tones.

The original Amtor MK-II board

Yet another approach, particularly interesting if you want to use a standard baudot teleprinter on Amtor, is to use the original MK-II controller board designed several years ago by Peter Martinez, G3PLX, see Fig 2. (Don't confuse the MK-II with the similarly named AMT-2 marketed by ICS electronics, which is a much more powerful unit).

As with the dedicated controller mentioned above, all of the Amtor functions (including synchronous clock generation) are handled on the MK-II board. However, you still have to provide a suitable terminal unit, and you also need a separate level converter interface to ensure voltage level compatibility between all the units. The interconnections look a little messy, but the whole arrangement is quite straightforward, and a suitable design for the level converter interface is described in the fifth edition of BARTG's classic publication *RTTY The Easy Way* (available from BARTG and RSGB).

Terminal units

Most of the well-known terminal units designed for rtty will also work on Amtor, as the shift on Amtor signals is the same as for rtty (170Hz). Probably the best design is the renowned ST5 and its derivatives; contact BARTG for details. However, some rtty terminal units have very tight receive filtering, optimized for 45·45/50bps operation, and so may be unsuitable for 100bps Amtor signals. In this case it will be necessary to widen the passband or make other special arrangements to ensure minimal phase distortion of the incoming signals.

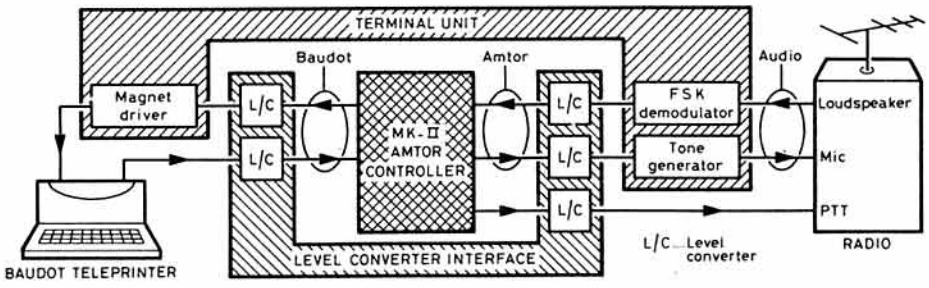
Transmit/receive changeover delays

For successful Mode A operation, it is essential for your radio to be able to switch from transmit to receive (and from receive to transmit) in less than about 20ms. Otherwise you run the risk of losing acknowledgements from the other station, either because the acknowledgements arrive too early (when your radio is still switching from transmit to receive) or too late (because the radio is switching back to transmit at the beginning of the next Amtor cycle). For a full explanation of what happens when switching between transmit and receive, refer back to this column in the January 1986 issue of *Radio Communication*.

Some Amtor system suppliers

Machine-specific systems: BBC (also handles rtty and cw)—from G3WHO/G3LIV; Dragon and Tandy Color—from Grosvenor Software (G4BMK); Commodore 64/128/SX64—PK-64 (also packet, rtty, ascii and cw)—from various suppliers.

Fig 2. Using a baudot teleprinter on Amtor. The MK-II controller board handles the Amtor processing, but additional voltage level converters (L/C) are required to interface between the board, the terminal unit and the teleprinter



*7 Daubeney Close, Harlington, Dunstable, Bedfordshire LU5 6NF. Prestel Mailbox 219999743

Self-contained units: AMT-2 (also handles rtty and cw)—from ICS Electronics Ltd; PK-232 (also packet, rtty, ascii and cw)—from various suppliers.

MK-II: Originally supplied by ICS Electronics, but no longer made. BARTG may be able to pinpoint sources of secondhand boards. A full description of the board is given in the article *"Amtor the Easy Way"* Peter Martinez, G3PLX, *Radio Communication* June/July 1980. □

SATELLITES

*Bob Phillips, G4IQQ**

FOLLOWING ON from the March column in describing some of the terminology of amateur satellite communications. This month I will focus on one aspect of the elliptical orbit which has been very apparent with the Oscar 10 satellite, namely *precession of the argument of perigee.*

First the term itself. Precession simply means the change of a parameter with time due to some external influence. The main cause, in this case, is the fact that the earth is not a perfect sphere but has a bulge at the equator. A rather horrific looking relationship has been developed between the rate of precession and several of the orbital elements, as follows:

rate of precession $= 4{\cdot}982 \left(\frac{R}{a}\right)^{1{\cdot}5} \times \left(\frac{R}{p}\right)^{2} \times (5\cos^2 i - 1)°$ per day.

where R = the earth radius, 6,378km; a = semi-major axis of the orbit; p = $a(1-e^2)$; e = orbit eccentricity and i = orbit inclination.

It is interesting to consider the situation where a and e are taken to be fixed but it is possible to select the inclination, i. In this situation the first part of the expression can be evaluated as a constant. For example, Oscar 10 has a semi-major axis of 26,103·6km and an eccentricity of 0·6022. Hence the expression for the precession of the argument of perigee reduces to $0{\cdot}0883 \times (5\cos^2 i - 1)°$ per day.

Fig 1 shows what happens to the second half of the expression if we substitute different values of inclination. The value of the expression varies between 4 (for i = 0°)and −1 (for i = 90°). For Oscar 10 with an inclination of approximately 26° the value of the complete expression equates to $0{\cdot}0883 \times 3{\cdot}039 = 0{\cdot}268°$ per day. In practice this means that the perigee rotates around the orbital plane at a rate of approximately 0·268° per day, ie it takes about three years and eight months for the perigee to complete one cycle around the orbital plane.

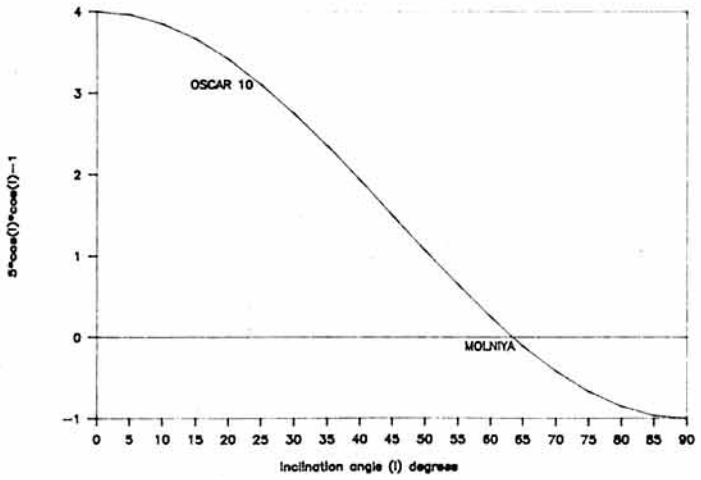


Fig 1. Change in argument of perigee versus inclination

The effect of the change of the argument of the perigee is that the portion of the earth that benefits from maximum coverage times also changes. When the perigee is in the southern hemisphere good operating conditions are obtained in the northern hemisphere and vice-versa.

Before leaving this topic it is also worth considering a particular value of orbit inclination which corresponds to what is referred to as the *Molniya* orbit. If we substitute an inclination of 63·43° in the expression $(5\cos^2 i - 1)$, the result is zero. So for this specific case the rate of precession is also zero. Thus we have a very stable orbit where the perigee, and more importantly the apogee, remains at the same position during the lifetime of the satellite. This type of orbit has been used extensively by the USSR to provide reliable communications to its territory at high latitudes.

Finally it is worth emphasizing the difference between mean anomaly and the argument of perigee both of which change with time. The mean anomaly refers to the position of the satellite in its orbit at any time and of course completes one complete cycle every orbit. The argument of perigee refers to the orientation of the satellite ellipse within the plane containing the orbit and this parameter varies much more slowly.

Oscar 10

There has been some conflicting information concerning the use of the satellite during the last two months. As I reported last month, a detailed analysis by James Miller, G3RUH, indicated that the transponder should not be used at all during March or April due to poor angles of solar illumination. This advice has been supported by several other sources but it has also been suggested that the satellite be used at every opportunity as its future is very uncertain. I would certainly favour the advice of those suggesting restraint, since one sure way of killing off the satellite is to discharge its batteries.

Assuming the satellite has indeed managed to survive the last two months, G3RUH's analysis shows that after April 27 illumination conditions improve quite quickly and operation until the end of August should be possible.

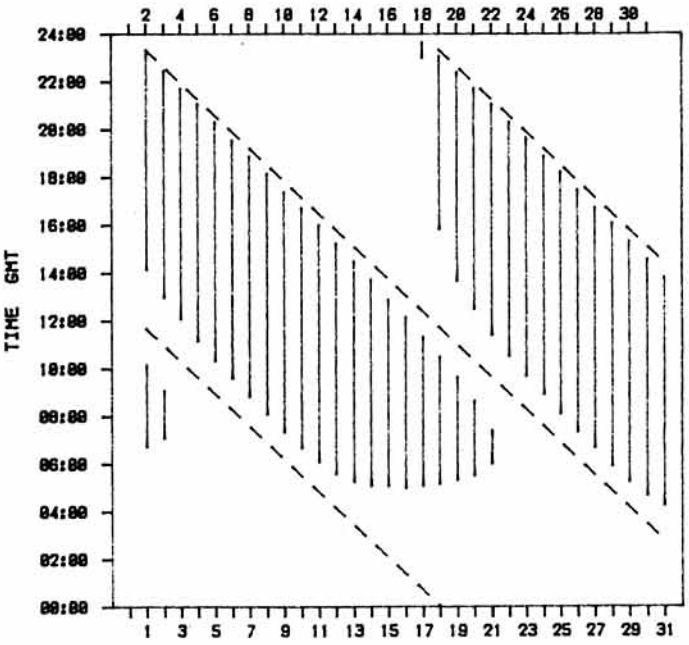


Fig 2. Oscar 10 visibility (London area)—May 1987
_____satellite inview- - - - -perigee (MA = 0)

The argument of perigee for Oscar 10 has now moved to around 205° (on 1 May) and hence the apogee (the highest point in the orbit) occurs well into the northern hemisphere. As a consequence, the elevation angle to the satellite is now reaching values of up to 58° (1340gmt on 29 May) so you may find considerable difficulties if your antennas are fixed horizon pointing. The general visibility of the satellite for May is shown in Fig 2.

Uosat

Both Uosat Oscar 9 and 11 continue to perform well and the more consistent operating schedule has been most welcome. A further refinement to the schedule for UO11 has been introduced recently in response to requests from the many educational establishments that receive the satellite signals. To avoid problems of switching between data display programs for the telemetry and whole orbit data (wod) it has been decided to separate their transmission periods. In future the schedule for Wednesdays will be as follows:

0000-1400gmt Digitalker (15s), Telemetry (4 min)
1400-2359gmt constant wod dumps.

RS satellites

There were reports of a high degree of confidence of a launch for RS9/10 in late March or early April. If so, the satellites should be audible by the time you read this column. □

*Transvaal Cotttage, New Barn Road, Swanley, Kent BR8 7PW.

Contest News

Affiliated Societies Team Contest 1987 results

The AFS Team Contest must be the most popular event in the RSGB calendar as evidenced by the 48,000 plus contacts made by the 433 different operators in the 120 separate teams competing during the four hours of the 1987 contest. The overall team winners were the Marple CC "A", who will receive the Edgware Trophy and the certificate for the highest individual score which was achieved by their club station entry, G4MCC. Previous AFS winners, the Three As "A" were in second place with Stockport RS "A" third. The scoring rates achieved by 21 of the leading stations averaged over 60 plus contacts an hour for the duration of the event, an excellent performance bearing in mind the very high levels of QRM.

Many club secretaries commented on the contest and while the majority are very happy with the rules and timing, there were two points that were raised in many letters; the 50 mile rule and the use of excessive power by some entrants. It was suggested that the smaller clubs have no chance of competing against the specially formed Contest Groups who select the best operators from a wide area well outside the catchment distances available to the average district or town AFS. Several proposals were made to limit the catchment area to a maximum of 5 or 10 miles, while one club suggested splitting the event into an open section with the present 50 mile limit and a restricted section with a 5 mile limit. There were a number of comments about the use of linear amplifiers and a plea from several clubs and individual operators that these should be banned from the contest in line with the NFD rules. The HFCC would welcome further comments on these two proposals (addressed to HFCC, Box 73, Lichfield, Staffs, WS13 6UJ). The QRS corral seems to have been well received and most entrants slowed down when working in this 15kHz segment, thus helping some of the slower operators (and themselves) to gain points. This will certainly be a regular feature of AFS. A very large percentage of the callsigns that appeared in the logs were from stations who sent in entries, thus enabling the adjudicators to cross-check the majority of contacts. Well over 80 per cent of all entries lost points because of callsign errors, poor transcription from rough to entry log, or unmarked duplicate contacts.

With the large number of entrants and the limited time scale available before *Radio Communication* deadlines, it was a case of all hands to the pump and virtually every member of the HFCC participated in the adjudication. The position was not helped as a number of packets arrived "found open in the mails" and much detective work had to be done to sort the separate log sheets that had become detached. Several cover sheets and log pages did not arrive at all and one batch of logs (a big one) was returned to the sender. The HFCC has done their best to sort out the problems, but if an entry is not shown in the tabulations it is because it did not arrive at Box 73. Club secretaries should take more care to ensure that logs are properly packed, a single thin envelope crammed full with 20 or 30 logs sheets is asking for trouble.

G6LX

Posn	Total points	Club	Stations contributing to score				
1	12,977	Marple CC "A"	G4MCC	GW3YDX	G0CMM	G4WQN	G3SJJ
2	12,050	Three As CG "A"	G4FAM	G3FXB	G3SXW	G4BUO	G3MXJ
3	11,060	Stockport RS "A"	G3PEK	G3NOM	G3KAF/A	G4OBK	G3HQH
4	10,740	Leicester Poly ARS "A"	G3OAY	G4JGV	G3RIR	G4BCA	G3SDC
5	10,593	Verulam ARC "A"	G3VER/A	G3RTE	G3UJV	G4BOU	G3DJX
6	10,371	Mid-Beds CA	G4MBC	G4DRS	G5LP	G4GIR	G4JOL
7	9,638	Addiscombe ARC	G3UFY	G3SJX	G4ALE	G3VYI	G3ROZ
8	9,010	Hereford ARS "A"	G3FKH	G3HVX	G4CNY	G4ASR	G4FFD
9	8,150	Norfolk ARC "A"	G4RKK	G3PDH	G4ODC	G3XVF	G4DYC
10	7,850	Newark & DARC	G3TBK	G4HVC	G3XWZ	G3ZOA	G4BPE
11	7,597	Leicester Poly "B"	G4ARI	G3XYC	G4KGG	G4CZB	G4KRS
12	7,580	RNARS Portsmouth "A"	G3LET	G3LPN	G3LIK	G3JFF	G4INI
13	7,270	West of Scotland ARS	GM4TOQ	GM4FDM	GM4CXM	GM3RAO	GM4LCP
14	7,240	Southgate ARC "A"	G3RWL	G4UOL/A	G3SFG	G3ZVW	G3KTZ
15	6,637	Verulam ARC "B"	G4JKS	G4JBD	G4WLG	G4SUP	G0EHO/A
16	6,597	Edgware & DARC "A"	G4IUZ	G3SHY	G4UMS	G4HMD	G3ASR
17	6,493	Farnborough & DARC "A"	G3OLB	G3OLK	G4HZV	G4JFN	G3CZM
18	6,420	Grimsby ARS "A"	G3RXP	G3RSD	G4EBK	G4HZF	G4PYD
19	6,400	Halifax & DARS "A"	G2UG	G4MH/A	G3IGW	G4ZXY	G4SCC
20	6,239	Stockport RS "B"	G4FAS	G0CBD	G4GRU	G4ECI	G4KRG
21	6,140	Leicester Poly "C"	G0CLP	G4VVY	G4GLC	G5MY	G0AKC
22	6,060	Crawley ARC	G3GRO	G3JKF	G3YVR	G4IQM	G3KAU
23	5,900	RNARS London "A"	G3HZL	G3LCS	G4LNA	G4PSA/A	G4FRN
24	5,880	Torbay ARS "A"	G4EDG	G3TIR	G3LHJ	G3UFZ	G3ABU
25	5,817	Aberdeen ARS "A"	GM3WTA	GM4SID	GM3DZB	GM3VEY	GM4OBD
25	5,817	Preston ARS "A"	G3SYA	G4OTN	G4KGK	G4VAJ	G3DWQ
27	5,740	Maidenhead & DARC	G3WYK	G3VCT	G3TWG	G3LVW	G3IOF
28	5,700	Chiltern ARC	G4PIE	G4RGK	G3COJ	G4VNR	G3BXS
29	5,430	Crawley Court ARG "A"	G3OGY	G4IBA	G3RDQ	G3LMH	G4DZS
30	5,420	Government Comms ARC	G3NKS	G3SSO	G3JJG		
31	5,400	White Rose ARS	G3PSM	G3FCW	G4UZN	G4NXY	
32	5,300	Leicester RS "A"	G3LRS	G4OOS	G4ITP	G3TQF	G3HYH
33	4,990	Scunthorpe ARC	G3PDL	G4OGB	G3KNU	G4NFX	
34	4,970	RNARS Birmingham	G4PTX	G4SFO	G4IP	G4MSR	G4NCY
35	4,940	Sth Manchester RC "A"	G3SVW	G3PFZ	G4TFU	G3ZDM	G4HON
36	4,730	SRCC "A"	G6LX	G3BFP	G4GTO	G8TB	G3MCX
37	4,707	Humberston CG	G3JS/A	G3VIP	G4ZNH	G4JHO	G3ELZ
38	4,637	Tyneside ARS "A"	G4ILW	G0AYN	G4SIE	G3ZOM	G4UIP
39	4,631	Colchester RA	G3YAJ	G3GLL	G4LZB	G4KTI	G4HKC
40	4,600	Thames Valley ARTS	G3OGP	G3LOP	G3BPM/A	G3GN	
41	4,430	RNARS Medway "A"	G3YEC	G0BDC	G4ZAW	G6SX	G3WP
42	4,397	Glenrothes & DARC	GM3YOR	GM3PFQ	GM3YBQ	GM4EJI	
43	4,290	Weston-super-Mare RS "A"	G3SWH	G4KMB	G4CXQ	G3BLO	G4SIY
44	4,269	Cheltenham ARA	G4VXE	G4PDQ	G3BCC	G3CJ	G4ENA
45	4,267	Guildford & DRS	G4BCY	G5OD	G3YXX	G3ZDD	
46	4,260	Braintree & DARS	G3OLU	G4COU	G4YRJ/A	G3YXJ	G0AUQ
47	4,220	Worthing & DARC	G3TNO	G3KXF	G4OAY	G4LGK	G4SLE
48	4,091	Verulam ARC "C"	G0AMG	G4PUR	G4DJJ	G4VVU	G4HKA
49	4,080	Echelford ARS	G3KKQ	G3MCK	G4GSC	G2HDJ	G3EAO
50	3,960	RNARS Rosyth "A"	GM3UM	GM3YTS	GM3HUN	GM4JHG	GM4BAG
51	3,920	Sutton & Cheam RS	G3DNJ	G3WHK	G2DMR	G2FHV	G4HSD
52	3,790	Reigate ATS	G3BBR	G3MPB	G3AEZ	G3JRC	
53	3,640	Marple CC "B"	G4MUL	G4IXF	G4TQM		
54	3,570	Yeovil ARC	G3GC	G3CQR	G3BEC	G3FOO	G3KSK
55	3,461	Gravesend RS	G4FJW	G0DYX	G3ORC	G0AFH	G4VBC
56	3,310	Stockport RS "C"	G0BVZ	G3GMM	G4RHB	G4BJU	G4HXB
57	3,217	RNARS Nottingham	G3TTH	G4MQM	G3BOV	G4UUH	
58	3,130	Bromsgrove & DARC	G4AAL	G4UIW	G2CLN	G4IVJ	G3RBL
59	2,970	Reading & DARC	G3YDV	G3WGV			
60	2,947	Clifton ARS	G3BSN	G3DIC	G3GHN	G4TJE	G0DCG
61	2,900	RNARS Portsmouth "B"	G3KOJ	G3TZL	G4ZIY	G4ZGA	G4DIU
62	2,770	Aberdeen ARS "B"	GM4TEF	GM3UU	GM0FRT	GM3HGA	GM4BKV
62	2,770	RNARS Stockton	G3AWR	G4KTH	G3SSH	G4FCH	
64	2,590	Shefford & DRS	G4YRF	G3WRJ	G3DOT	G0BVW	
65	2,370	Flight Refuelling ARS	G3VMO	G4RFR			
66	2,250	Cheshunt & DARC	G3TIK	G4UNL	G3WFM	G4YGH	
67	2,230	RNARS Swansea	GW4HDB	GW4SPL	GW4ZUO	GW4KVJ	
68	2,180	Worcester & DARC	G3TOD/A	G4OPD			
69	2,030	Hornsea ARC	G4IGY	G3TLI	G3GAW		
70	2,004	Axe Vale ARC	G3VW	G3HAL			
71	1,950	Gloucester ARS	G3MA	G4YYR			
72	1,927	Edgware & DARC "B"	G3ZDJ	G0CNO	G0EZN		
73	1,920	Three As CG "B"	G0AAA				
74	1,910	RNARS Harrogate	G4KNM	G4ODS	G0CLY		
75	1,853	Plymouth RC	G3ULN	G3VCN	G4KXZ		
76	1,840	RNARS Copenhagen	OZ3QN	OZ4CB	OZ1CMC	OZ5IN	
77	1,830	Hereford ARS "B"	G3WRQ	G0DJF	G4JSN	G4SJZ	
78	1,820	Norfolk ARC "B"	G4GVR	G0BGD/A			
79	1,790	Macclesfield & DARS	G3LDT	G0AMU	G0AXE	G3AUB	
80	1,770	RNARS Lowestoft	G4UJQ	G0AZR			
81	1,737	Farnborough & DARC "B"	G4IZB	G4BJQ	G4UZK		
82	1,720	RNARS London "B"	G3AQM	G8IB	G4PXA		
83	1,680	BBC Ariel Radio GP	G4LWA	G3CIK	G3RFJ	G2BCI	
84	1,660	Halifax & DARS "B"	G3ONQ	G4KIE	G4RAW	G4VOB	G4LIW
85	1,484	Verulam ARC "D"	G4WKJ	G3HJF	G4GOU/A	G3RFS	G4PVB
86	1,450	RNARS Plymouth	G4KKZ	G3VNG	G4FJZ		
87	1,360	RNARS Yeovilton	G4KJD	G4COI			
88	1,220	Leicester RS "B"	G4WYN	G0ATR	G4JDI	G0AIZ	G0BAI
89	1,170	Sterling & DARS	GM0BGS	GM4RTN	GM0BWR	GM4ZGB	
89	1,170	RNARS Liverpool	G4HWK	G3SGQ			
91	1,140	Milton Keynes & DARS	G3YLC	G0ERE			
92	1,070	Swansea ARS	GW4GXG	GW0BBO			
92	1,070	Hastings E & RC	G3YYF	G4WCP			
94	1,037	South Birmingham RS	G4EYD	G4FCO			
95	940	Aberdeen ARS "C"	GM3WIJ	GM0CPQ	GM0CQV	GM3ZBE	GM3FRI
96	860	Crawley Court ARG "B"	G3HQX	G3HRH			
97	740	Stevenage & DARC	G4DDX				
98	700	Torbay ARS "B"	G3KZJ	G3SNU			
98	700	RNARS Medway "B"	G4PTE	G4TUO			
100	660	Preston ARS "B"	G4OOT	G4RSK			
101	640	Southgate ARC "B"	G0ASA	G0ANN			
102	620	Exmoor RC	G4JBR				
103	470	Sth Manchester RC "B"	G0FCF	G3HZM	G3VIW	G0AOU	
104	430	Leicester Poly "D"	G4OOR				
105	420	Grimsby ARS "B"	G4NVR				
106	400	Tyneside ARS "B"	G4MRT	G4KJN			
107	380	Horndean & DARC	G4FBS				
108	330	Conwy Valley ARC	GW3QN	GW0CNK			
109	260	SRCC "B"	G3EUU				
110	240	Weston-super-Mare "B"	G4REH				
111	220	Halifax & DARS "C"	G4XUK	G0CVC			
112	200	RNARS Rosyth "B"	GM4FGD				
113	70	Verulam ARC "D"	G2PA	G0EAC			
114	40	RNARS Belfast	GI3NQH				
115	20	Aberdeen ARS "D"	GM0CSZ				

Checklog: G4PGW

Posn	Callsign	Checked score
1	G4MCC	2,867
2	GW3YDX	2,800
3	G3PEK	2,690
4	G3NOM	2,630
5	G4FAM	2,580
6	G3OAY	2,547
7	G3FXB	2,500
8	G3BWP	2,470
8	G4MBC	2,470
10	G0CMM	2,450
11	G3VER/A	2,443
12	G3RTE	2,440
12	G4WQN	2,440
12	G3OLB	2,440
15	G3SXW	2,430
16	G3SJJ	2,420
17	G4UFY	2,417
18	G4BUO	2,400
19	G4DRS	2,384
20	G3KAF/A	2,380
21	G3FKH	2,360
22	G4MUL	2,350
23	G3LET	2,330
24	G3SJX	2,267
25	G4JGV	2,241
26	G5LP	2,180
26	G3NKS	2,180
28	G3PDL	2,140
28	G3MXJ	2,140
30	G3GRO	2,130
31	G3SYA	2,120
32	G4GIR	2,107
33	GM3YOR	2,097
34	G3TBK	2,080
35	G3HVX	2,050
35	G3YEC	2,050
37	G3RIR	2,048
38	G4ALE	2,044
38	G4BCA	2,044
40	G3WYK	2,040
40	G3SSO	2,040
42	G4OBK	2,020
43	G3PDH	2,000
43	G4EDG	2,000
43	G3UJV	2,000
46	G4RKK	1,960
46	G2UG	1,960
48	G4ARI	1,937
49	G3OGP	1,930
50	G3PSM	1,920
50	G0AAA	1,920
52	G3TIR	1,880
52	G4CNY	1,880
54	G4BOU	1,870
55	G3SDC	1,860
56	G3RWL	1,850
57	G4JKS	1,850
57	G3SVW	1,850
59	G4DJX	1,840
60	G4HVC	1,830
61	G3RXP	1,800
62	GM4TOQ	1,760
62	G3SWH	1,760
64	G3TOD/A	1,740
65	G3OLU	1,700
66	G3KKQ	1,680
66	G3PFZ	1,680
68	G3VMO	1,670
69	G4IUZ	1,640
69	G3SFG	1,640
71	G3YDV	1,623
72	G3ZOA	1,590
72	G4AAL	1,590
74	G3JKF	1,580
74	G3VYI	1,580
76	G3LPN	1,570
76	G4ODC	1,570
78	G4PIE	1,560
79	G3SHY	1,547
80	G4VXE	1,535
81	G3RSD	1,530
81	G3LRS	1,530
83	G4UOL/A	1,520
84	GM4FDM	1,510
84	G3OLK	1,510

Posn	Callsign	Checked score
81	G3LIK	1,500
	G3XVF	1,500
	G4OGB	1,500
	G6LX	1,500
90	G4FAS	1,490
	G4KGG	1,490
92	G4CZB	1,460
93	G4MH/A	1,450
94	G3FCW	1,440
	GM4CXM	1,440
96	G4ASR	1,430
97	G4KRS	1,410
98	G4UZN	1,400
	G3OGY	1,400
100	G3TTH	1,390
101	G3XWZ	1,380
	GM3RAO	1,380
103	G4ILW	1,360
104	G4JBD	1,357
105	G3HZL	1,350
	G4BCY	1,350
107	G3WGV	1,347
108	G3HQH	1,340
109	G3ROZ	1,330
110	G4PTX	1,320
	G4RGK	1,320
112	G3LCS	1,310
113	G3XYC	1,300
	GM4SID	1,300
	G4EBK	1,300
	G3BBR	1,300
	G3GC	1,300
118	G0CLP	1,290
	G4FFD	1,290
120	G0CBD	1,284
121	G4KNM	1,280
	G4FJW	1,280
123	G5MY	1,270
	G4SFO	1,270
125	G4VVY	1,260
126	G3YAJ	1,254
127	GM3WTA	1,250
	G3VIP	1,250
129	G4ECI	1,247
130	G3IGW	1,240
	G4GLC	1,240
	G4OOS	1,240
133	G4GRU	1,234
134	G3LQP	1,230
	G4JOL	1,230
136	G4WLG	1,220
	G3JFF	1,220
	G4IBA	1,220
139	G4PDO	1,214
140	G4LNA	1,210
	G4HMD	1,210
	G3MCK	1,210
	G3COJ	1,210
144	G4UMS	1,200
	GM3DZB	1,200
	G4SUP	1,200
	GM3PFO	1,200
	G3JJG	1,200

Posn	Callsign	Checked score
149	G5OD	1,190
	G4IP	1,190
151	G3YVR	1,180
	GM4LCP	1,180
153	G3PJS/A	1,170
	G3MPB	1,170
155	GM3VEY	1,167
156	G3ULN	1,153
157	G3ZVW	1,150
	G4FRN	1,150
159	G3YXX	1,140
160	G4HZF	1,120
	G3TNO	1,120
	G3VCT	1,120
	G4DYC	1,120
164	GM3UM	1,100
165	G3VW	1,097
166	G3DNJ	1,080
	G3BFP	1,080
	G3KTZ	1,080
	G0AKC	1,080
170	G3MA	1,070
	G3GLL	1,070
172	G0AYN	1,067
173	G3AWR	1,060
	G4ITP	1,060
175	G4OTN	1,050
176	G3RDQ	1,040
	G4LZB	1,040
178	G4KGK	1,027
179	G0EHO/A	1,020
180	G3TIK	1,000
	G3ASR	1,000
182	G4JFN	997
183	G4KRG	984
184	G4GVR	980
	G3TWG	980
186	G4BPE	970
187	G4ZNH	967
188	G4INI	960
189	G4IGY	950
	G3KXF	950
	G4GTO	950
192	GW4HDB	930
193	G3LHJ	920
	G3AQM	920
	G3BPM/A	920
	G3LMH	920
197	G4ZXY	910
	G4UJQ	910
	G4KKZ	910
	G3WHK	910
201	G0DYX	907
	G3HAL	907
203	G3CQR	900
	GM4OBD	900
	G3HYH	900
206	G0AMG	897
207	G4YRF	890
	G3KOJ	890
	G0BVZ	890

Posn	Callsign	Checked score
210	G4PSA/A	880
	G3TZL	880
	G4YYR	880
213	GM4TEF	870
	G4IXF	870
	G4OAY	870
	G4VNR	870
	G3WRJ	870
218	G3BSB	867
219	G4SIE	860
	G3ZOM	860
	G0AZR	860
222	G4VAJ	850
	G3WRQ	850
	GM3YTS	850
	G3TLI	850
	G4DZS	850
227	G0BGD/A	840
	G4SCC	840
229	G4LGK	830
	G3LVW	830
231	G4DJJ	827
232	G4PUR	820
	G3GHN	820
234	G3GMM	810
	G3KNU	810
	G3AEZ	810
	G3ZDJ	810
238	G0CNO	807
239	G4KJD	800
	G4CXQ	800
241	G4VVU	800
242	GM3HUN	790
	G2DMR	790
	GW4SPL	790
245	G4GSC	780
	G4RHB	780
247	G4JHO	780
248	G4HZV	773
	G3CZM	773
250	GM0BGS	770
	G3DWQ	770
	G3IOF	770
253	G4COU	760
254	OZ3QN	750
	G0BDC	750
	G2FHV	750
	G4KTH	750
	G3DOT	750
259	G4HKA	747
260	G4IOM	740
	G4DDX	740
	G3BCC	740
	GM4JHG	740
	G3BXS	740
265	G3YLC	730
266	G4ZAW	710
	G4YRJ/A	710
	G3BEC	710
	G4UNL	710
270	G4RFR	700

Posn	Callsign	Checked score
271	G4IZB	680
	G4KMB	680
273	G4MQM	677
274	G4PYD	670
275	G3UFZ	660
	G3HQX	660
	G4UIW	660
	G4MSR	660
	G4BJQ	660
280	G4HWK	650
	G4TFU	650
	G3ORC	650
	G0AMU	650
284	G4NXY	640
	G3YXJ	640
286	G4HKC	637
287	G3DIC	630
	G4KTI	630
289	G4JBR	620
	G8TB	620
291	GM3YBQ	610
	G3BLO	610
293	G4OOT	600
	G3ROV	600
	G3SSH	600
296	G3LDT	590
	G4ZIY	590
298	G3ZDD	587
299	GW0BBO	580
	G3MCX	580
301	G3TOF	570
302	G3YYF	560
	G4CWI	560
304	G4LWA	550
	G3ONO	550
	G4UUH	550
307	G4NFX	540
	G3ELZ	540
309	G4EYD	530
	GM3UU	530
	G4NCY	530
312	G3GN	520
	G3SGO	520
314	GM0FRT	510
	G0AFH	510
	G3JRC	510
	G4WCP	510
	G0DJF	510
319	G4FCO	507
320	G3CIK	500
321	GW4GXG	490
	GM3HGA	490
	G4BJU	490
	G3CJ	490
	GM4EJI	490
	G6SX	490
	G4UIP	490
328	G4WKJ	487
329	G8IB	480
	GM4BAG	480
331	G3WFM	460

Posn	Callsign	Checked score
332	G0AUQ	450
	G4SLE	450
334	G0ASA	440
	G4ZGA	440
	G3ZDM	440
	OZ4CB	440
	G4OPD	440
	G4SIY	440
340	G4OQR	430
	G4KIE	430
	G3KAU	430
	G3WP	430
344	G4NVR	420
	G4TQM	420
	G3ABU	420
347	G0ERE	410
348	G2CLN	400
	G3VCN	400
	OZ1CMC	400
351	G4UZK	397
352	G3KZJ	390
	G0AXE	390
	G4HSD	390
355	G4MRT	380
	G4FBS	380
	G3FOO	380
	G4JSN	380
359	G4PTE	370
	GM4BKV	370
361	G4WYN	360
	G3HJF	360
	G4FCH	360
364	G4ODS	340
	G4HXB	340
366	G4TJE	330
	G4IVJ	330
	G4TUO	330
369	G4PXA	320
	G3RFJ	320
	G4HON	320
372	G3SNU	310
	GW4ZUO	310
	G0EZN	310
	G2BCI	310
376	GM3WIJ	300
	G3VNG	300
	G4KXZ	300
	G0DCG	300
380	G0ATR	290
	G0CLY	290
	G4GOU/A	290
	G4ENA	290
384	G3RFS	287
385	G3KSK	280
386	G3EUU	260
	G4JDI	260
388	GM0CPQ	250
	OZ5IN	250
390	G4REH	240
	G4RAW	240
	G4FJZ	240

Posn	Callsign	Checked score
393	G3GAW	230
	G4VOB	230
395	G2HDJ	210
	G0AIZ	210
	G4LIW	210
398	GM4FGD	200
	G0ANN	200
	G3HRH	200
	GM4RTN	200
	GW4KVJ	200
	G3EAO	200
404	G4XUK	180
405	GW3QN	170
406	GW0CNK	160
	G3AUB	160
408	GM0COV	150
	G3RBL	150
410	G0FCF	140
	GM3ZBE	140
412	G3HZM	120
	G3VIW	120
414	G4VBC	114
415	GM0BWR	100
	GM4ZGB	100
	G4DIU	100
	G0BAI	100
	GM3FRI	100
420	G4SJZ	90
	G0AOU	90
422	G0BVW	80
	G4YGH	80
424	G2PA	60
	G4RSK	60
	G4PVB	60
427	GI3NQH	40
	G0CVC	40
429	GM0CSZ	20
	G4KJN	20
431	G0EAC	10

Checklogs: G4UJW, G4PGW

February 144MHz CW Contest results

Conditions were poor for this contest but there was an increased entry of 40 this year compared with 33 in 1986. More GM stations were on, but activity from the continent was low. There were few comments; the rules met with general satisfaction and the contest was as usual well enjoyed. No change is recommended for next year.

Certificates go to GW4MGR/P and G4WET/P.

G3FZL

Posn	Callsign	Score	QSOs	Loc	Best dx	km
1	GW4MGR/P	1,150	120	IO83JA	DF7DJ	756
2	G4WET/P	920	119	IO92CA	DF7DJ	654
3	G4BLX	825	97	IO90WV	GM4ZGB	634
4	G3XBY	777	100	IO92DG	DK0UKW	624
5	G4RFR	764	82	IO90AS	GM0FRT	699
6	G4ZEC	675	85	IO92MA	DF8VOK	633
7	G4WFR	639	75	JO01OV	DF1FI	579
8	G4ARI	603	89	IO92IQ	LX2GB	609
9	G4XEN	586	80	IO92PH	DF7DJ	582
10	G4ITR/P	573	78	IO84SA	ON7CC	583
11	G4WUS/P	560	62	IO94NL	G4RFR	419
12	G3XWZ	557	76	IO93JD	LX2GB	630
13	G4NOK	524	76	IO93FR	GM3WTA	393
14	GM0FRT	517	38	IO87WB	G4RFR	699
15	G3VIP	494	56	IO93XN	DK0UKW	549
16	G0FDX/A	492	68	IO83QO	GM0FRT	565
17	GM4ZGB	488	45	IO86BD	G4RFR	660
18	G3UKV	461	65	IO82RR	GM0FRT	482
19	G4EZA	456	67	JO01KU	LX2GB	429
20	G4VNR	445	68	IO91PO	DK0UKW	553
21	GM4DGT	438	39	IO86CD	G4BLX	693
22	G3TRF	434	64	JO01GG	G4VBG	430
23	G0EME	399	68	IO92NG	DK0UKW	568
24	G4RGK	393	65	IO91ON	DF7DJ	586
25	G4OTV	364	58	JO01CB	LX2GB	435
26	G4VXE	345	51	IO81WV	GM0FRT	574
27	G4OUT	344	60	IO92AT	F6CBH	443
28	G3NOH	340	68	IO91UM	DF7DJ	553
29	G4BZP/P	319	39	IO84KF	G4WHZ	404
30	G4VBG	271	27	IO94FW	G4RFR	465
31	G0ERE	269	49	IO92QB	GM4ZGB	501
32	GM4HAM	249	32	IO85JW	G3PTO	485
33	G0CWC	244	53	IO92AL	EI5FK	453
34	G4UZN	243	35	IO93FU	G4RFR	343
35	G5UM	211	35	IO92MP	LX2GB	510
36	G4XBF	137	24	IO91QD	G4WUS/P	371
37	G0ATR	135	28	IO92KP	GM0FRT	508
38	G2DHV	93	23	JO01BK	GW4MGR/P	286
39	G3WRJ/A	92	24	IO92UC	G0FDX/A	229
40	G3ILO	69	11	IO81VQ	G4WUS/P	322

432MHz Cumulative Contest 1986 results

Conditions were generally described as flat for all sessions of this event and some of the entrants also commented on the lack of activity. The highest claimed scores were in the first session but it is difficult to determine whether this is due to a larger number of stations being on the band due to better conditions or just to operator enthusiasm. Few logs contained any comments and in view of the drop in activity during this event over the past few years, I invite the views of not only entrants, but of those who participated but did not send an entry, so that these may be taken into account when formulating the rules for the next contest.

Logs were generally of a good standard although not all were clearly marked with the date or session number. One entry was marked with dates and session numbers that did not agree and a few entries did not include logs for the lower scoring sessions—all logs should have been sent. The best summary was received from G6HXU who very clearly itemized the scores for each session on a separate sheet.

The leading station overall and in the open section, was GW8TFI/P, operated by G8TFI and GW5NF. GW4MGR/P, operated by members of the Wirral & District ARC came second. The leading fixed station was the multi-operator entry by the Five Bells Group, G4SIV the runner-up in this section being G8HHI, who was also the leading single-operator. All are congratulated and will receive certificates.

G3LCH

FIXED STATION SECTION

Posn	Callsign	Loc	Scores achieved in session 1	2	3	4	5	Total of best three
1	G4SIV	IO92TR	884	293	367	477	336	1,728
2	G8HHI	IO91OH	477	316	333	373	390	1,240
3	G1DOX	JO84JC	—	240	252	498	389	1,139
4	G6XVV	IO93JK	463	—	172	253	—	888
5	G1KDF	IO83NN	291	259	—	256	—	806
6	G3GJL	IO82SI	—	236	216	—	206	658
7	G6IAT	IO91TV	305	—	—	—	209	514
8	G4DEZ	JO01IN	—	—	135	198	178	511
9	G8OHM	IO92AJ	166	—	144	132	—	442
10	G4ZNM	JO00BS	226	77	—	88	118	432
11	G1HLT	IO93JD	165	—	—	70	64	299
12	G0CZD	IO82QS	—	108	—	86	96	290
13	G6HXU	IO83RF	87	—	74	56	28	217
14	G1VTR	JO02KI	—	68	46	—	64	178
15	G4XOM	IO82WK	48	30	—	32	46	126
16	G0FKY	IO80XS	34	24	—	41	—	99

Check logs gratefully acknowledged from G0EHV and G4IDF.

ALL OTHER SECTION

Posn	Callsign	Loc	Scores achieved in session 1	2	3	4	5	Total of best three
1	GW8TFI/P	IO83JF	1,391	730	751	—	—	2,872
2	GW4MGR/P	IO83JA	980	548	428	593	479	2,121
3	G4KZY/P	IO91GI	258	—	404	520	407	1,331
4	G3CKR/P	IO93AD	450	296	231	444	327	1,221
5	G4THB/P	IO93AF	406	379	427	—	—	1,212
6	GW8ACG/P	IO83JF	456	132	312	400	109	1,168
7	G4YTQ/P	IO93VJ	398	146	146	308	281	987
8	G4CCC/P	IO91JL	285	230	236	217	138	751
9	G4JZF/P	IO92BN	281	148	189	193	179	663
10	G6CSY/P	JO01BH	228	—	182	228	—	638
11	GM4ZUK/A	IO87WB	99	101	—	16	17	217

Check logs gratefully acknowledged from G0EHV and G4IDF.

21/28MHz Telephony Contest 1987 rules

TRANSMITTING SECTION

1. The general rules for RSGB hf contests, published in the "Operating Guide" supplement, *Rad Com* January 1987, will apply.
2. **Eligible entrants**
   (a) British Isles. RSGB members only.
   (b) Overseas (including EI). All licensed amateur.
3. **Period.** 0700 to 1900gmt Sunday 11 October 1987.
4. **Sections**
   (i) British Isles single-operator
   (ii) British Isles multi-operator
   (iii) Overseas single-operator
   (iv) Overseas multi-operator.
5. **Frequencies/mode.** 21 and 28MHz, phone only. Entrants are requested not to operate in the bands 21·400 to 21·450MHz; 28·200 to 28·400MHz and 29·100 to 29·700.
6. **Exchange.** RS report and serial number starting at 001.
7. **Scoring.** (a) British Isles entrants: Three points for each completed contact with a station in the rest of the world. Multipliers will be countries on the ARRL Countries List except that VO1, VO2, VE, VK, ZL call areas and USA and Japanese call areas irrespective of prefix, will count as separate countries. Contacts with British Isles stations will not count for points or multipliers.
(b) Overseas entrants: Three points for each completed contact with a station in the British Isles. Multipliers will be British Isles prefixes which are: G0, G2, G3, G4, G5, G6, G8, GD0, GD2, GD3, GD4, GD5, GD6, GD8, GI0, GI2, GI3, GI4, GI5, GI6, GI8, GJO, GJ2, GJ3, GJ4, GJ5, GJ6, GJ8, GM0, GM2, GM3, GM4, GM5, GM6, GM8, GU0, GU2, GU3, GU4, GU5, GU6, GU8, GW0, GW2, GW3, GW4, GW5, GW6, GW8. Contacts with GB stations will not count for points or multipliers.
For all entrants the total score will be the number of points on each band added together times the number of multipliers on each band added together. Unmarked duplicate contacts will be penalized at 10 times the points claimed. Entries containing five or more such duplicates will normally be disqualified.
8. **Logs.** Log sheets to be headed: date/time gmt; station worked; RS and serial number sent; RS and serial number received; multiplier points claimed. Separate logs must be submitted for each band and a summary sheet showing the multipliers worked on each band must be included.
9. **Declaration.** Each entry must be accompanied by the following declaration, signed and dated: "I declare that this station was operated strictly in accordance with the rules and spirit of the contest and agree that the decision of the Council of the RSGB shall be final in all cases of dispute".
10. **Address for logs. (a) British Isles:** RSGB HF Contests Committee, c/o Mr D J Lawley, G4BUO, 220 Shipbourne Road, Tonbridge, Kent TN10 3EL; **(b) Overseas:** RSGB HF Contests Committee, PO Box 73, Lichfield, Staffs WS13 6UJ, England.
11. **Closing date for logs.** British Isles entries must be received by 2 November 1987. Overseas entries must be received by 7 December 1987.
12. **Awards.**
   (a) British Isles. The Whitworth Trophy will be awarded to the leading British Isles single operator entrant and the Powditch Trophy will be awarded to the leading British Isles single operator entrant on 28MHz, unless poor conditions drastically reduce the number of contacts on 28MHz. Certificates of merit will be awarded to those placed second and third overall and to the leading station in the multi-operator section.
   (b) Overseas. Certificates of merit will be awarded to those placed first, second and third overall, and to the leading station in the multi-operator section. Certificates of merit will normally be awarded to the leading station in each country.

RECEIVING SECTION

Rules as for the transmitting section except as varied below.
2. **Eligible entrants.**
(a) British Isles: RSGB members only.
(b) Overseas (including EI): all swls.
Note that holders of transmitting licences for frequencies above 30MHz may enter the receiving section.
7. **Scoring/multipliers.** British Isles swls should only log overseas stations in contact with British Isles stations taking part in the contest. Overseas swls should only log British Isles stations in contact with overseas stations taking part in the contest. Scoring and multipliers as the transmitting section.
8. **Logs.** Logs to be headed: date/time gmt; callsign of station heard; callsign being worked; RS and serial number sent by the station heard; multiplier; points claimed. A summary sheet showing multipliers heard on each band must be included.
Note: In the column headed station being worked, the same callsign may only appear once in every three contacts logged except when the logged station is a new multiplier for the receiving station.
9. **Declaration.** Each log must be accompanied by the following declaration: "I declare that this station was operated within the rules of the contest and I do not hold a transmitting licence for frequencies below 30MHz".
12. **Awards.** The Metcalf Trophy will be awarded to the leading British Isles entrant. The Powditch Receiving Trophy will be awarded to the leading British entrant on 28MHz, unless poor conditions drastically reduce the number of contacts on 28MHz. Certificates of merit will be awarded to those placed second and third overall and to the leading entrants in each overseas country.

VHF/UHF Listeners Championship 1986

No less than nine contests had swl sections in 1986, all of which were well supported by the regular vhf swls. Particular mention must be made of RS28198 who managed to enter every event, which is quite a remarkable achievement.

This year's scoring is based on the "normalization" system used in multiband contests. One thousand points are allocated to the leading station on each band in each contest, and the other stations score in proportion. The score for the Championship is calculated simply by adding up the normalized scores for all the bands in all the contests. Using this method, every band in every contest is equally weighted.

Considering the number of events, the difference in score of the leading stations was quite small. Subject to council approval, RS52543 will receive the Hansen Trophy.

As usual, thanks to all the listeners who supported us in 1986. The VHF Contests Committee hopes for your support again in 1987. Do please let us know if you have any suggestions for improving the swl events.

G4JLG

Posn	RS No	Mar 2/70	Apr 4	May 2	Jun 70	VHF NFD	Jul 2	Jul 70	Sep 2	Sep 4	Total
1	52543	—	1,000	1,000	872	2,060	541	383	530	1,000	7,386
2	32525	—	—	833	890	2,000	1,000	1,000	1,000	—	6,723
3	28198	1,683	441	468	502	466	177	95	214	350	4,396
4	25429	—	—	853	1,000	1,113	890	—	534	—	4,390
5	31976	1,000	—	331	—	—	265	—	—	—	1,596
6	88568	—	—	—	—	—	261	—	—	—	261
7	87779	—	—	131	—	—	—	—	—	—	131

RSGB Listener Contest 1987 rules

Object of the contest. To log as many stations in QSO as possible.
Date and times. 1400gmt 11 July to 1400gmt 12 July 1987.
Sections and bands. (A) SSB only. (B) CW only.
Only one section may be entered—mixed-mode entries will not be accepted. The 28, 21, 14, 7, 3·5 and 1·8MHz bands may be used. Please note that entrants from the British Isles must be members of the RSGB.
Scoring. For scoring purposes the station logged must be in QSO with another amateur station. It does not matter whether the station is taking part in a contest or not. **CQ, QRZ** or similar calls cannot be counted for scoring. One point to be claimed for each station heard on each band. A multiplier may be claimed for each different country heard on each band. In the case of the USA, Canada, Australia, New Zealand and Japan, each call area prefix may be claimed as a separate multiplier: for example, W1, W2, VE2, VE3, VK5, VK6 and so on. All other countries will be determined by the ARRL Countries List.
The final score is made up by the addition of the points scored on all bands *multiplied* by the total number of multipliers claimed on all bands.
Logs. Logs should show in columns, time (gmt), callsign of station heard, callsign of station being worked, an RS(T) report on *station heard* at swl's QTH, multiplier (if any), points claimed. If both sides of a contact are heard, they may be claimed as separate stations, and the callsigns are to appear in the *station heard* column. Each station heard can only appear *once* in the *station heard* column on each band. In the column for *station worked*, a callsign must only appear once in each three contacts (1 in 3) unless it is a new multiplier for the receiving station.
Logs should be submitted with each band listed on separate sheets, 28MHz on one sheet, 21MHz on another and so on. A separate sheet listing all multipliers for each band should also be included.
Duplicate loggings for which points have been claimed will be penalized at 10 times the contact value.
Address for entries. R A Treacher, BRS32525, 93 Elibank Road, Eltham, London SE9 1QJ, England. Entrants should ensure their entries arrive no later than 10 August 1987.
Awards. Certificates will be awarded to the leading three entrants in each section in the British Isles section provided there are a minimum of 10 entrants. A certificate will be awarded to the leading station in each country in the overseas section provided that station scores at least 50 per cent of that section winner's score.

Club News

The following is the latest information received by RRs from RSGB affiliated societies, clubs and groups in time for inclusion in this issue. Basic unchanged information on other affiliated organizations 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 **July** issue should reach them by **1 May** and for the **August** issue by **29 May.**

Club programmes are given in order of date, subject, time and place of meeting. All callsigns of club secretaries and other contacts are QTHR (correct in the current *RSGB Call Book*) unless otherwise stated.

All 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.

Accrington (NW Repeater Group)—18 Jun (Surplus equipment sale), 8pm. The Globe Bowling Club, Willows Lane, Accrington. Details G0DTI.

Barnoldswick (RRARC, G3RR)—6 May (Fox hunt, 7pm), 3 Jun ("The use of Scopes in amateur radio", G3YEE), Morse classes Mondays, 7.30pm. The Rolls-Royce Sports & Social Club, Barnoldswick. Sec G4ILG, tel 0282 812288.

Bolton (BARD,G0BWC/G1ONE)—31 May (Rally). Meetings 7.30pm every Tuesday, The Dean Sports Complex, New York, Junction Rd, Bolton. Details G1AEQ.

Bury (BRS)—12 May ("Maths with Maurice", G0BWN). Mosses Community Centre, Cecil St, Bury. Details G1VQE.

Crewe (SCARS)—11 May ("Clandestine Radio", G3BA). Crewe LMR Sports Club, Goddard St, Crewe. Details Chris, tel 07816 73185.

Darwen (DARC)—13 May (Visit by RIS). Highfield Working Men's Club, Ratcliff St, Darwen. Details G2AKK, tel 0254 73767.

Fylde (FARS)—5 May (Equipment sale), 19 (Informal with morse). 7.45pm. The Kite Club, Blackpool Airport, Sec G8GG, tel 725717.

Leyland (CLARC)—4 May (May Day hf operating event and barbecue), 11 (Committee meeting), 16, 17 (144MHz contest), 18 (Visit by RR), 1 Jun (NFD planning), 8 (Committee meeting). Morse classes 7.15pm, G0ASH. Priory Club, Bradfield Drive, Leyland. Sec G4ZYN, tel 0257 452287.

Liverpool (L&DARS)—5 May (RTTY demo), 12 (Minute waltz), 19 (Junk sale), 26 (Preparation for NFD), 2 Jun ("History of Aviation", G1VEH). Morse and RAE classes 7pm. The Churchill Conservative Club, Church Rd, Liverpool 15. Sec Lynn, tel 051-728 8811.

Macclesfield (M&DRS)—5 May (Construction evening), 12 ("Steam Barges", G1NOF), 19 (Committee meeting), 26 (Open meeting), 2 Jun (Construction evening). 8pm. The Fermain Club, Oxford Rd, Macclesfield. Sec G1NUS, tel 0625 24534.

Manchester (SMRC, G3FVA/G3UHF)—1 May (Talk by the winner of the home brew equipment contest), 8 (Visit RR1), 15 ("Radio Clinic", G3ZDM), 22 (AGM), 29 ("Oscar 10 orbits", G0AKF). 8pm, Sale Moor Community Centre, Norris Rd, Sale. Details G2AKR.

Rossendale (RARS)—20 May (Treasure hunt), 8pm. The Huntsman, Burnley Rd, Loveclough, Rossendale. Sec G4VVK.

Stockport (SRS)—13 May ("Op-amps and active filters", G8OMH), 20 (Natter night at the bar), 27 (Pre-NFD planning meeting), 10 Jun (NFD post-mortem), 8pm. The Blossoms Hotel, junction of Bramhall Rd and A6. Sec G4FFW, tel 224 7880.

Thornton Cleveleys (TCARS)—4 May (No meeting), 11 (Informal), 18 Bring and buy—radio books and magazines), 25 (No meeting), 1 Jun (Preparation for NFD). 7.45pm. 1st Norbreck Scout HQ, Carr Road, off Fleetwood Rd, Bispham, Blackpool. Club net Sundays 11am, G4ATH on 1·865MHz. Details G4BFH, tel 0253 853554.

Warrington (WARC, G4CDA/G6WRC)—5 May (Open forum), 12 (Five-minute lectures, G8HLZ), 19 (Junk sale), 26 (Open forum), 2 Jun ("Morse receiver Mk 2", G8HLZ), 8pm. Grappenhall Community Centre, Bellhouse Lane, Warrington. Sec G0CBN, tel 0925 814005.

Wyre (WARS)—13 May (Talk by G3FIF or G6LZZ), 27 (Visit by RR1), 8pm. The Breck Squash Club, Breck Rd, Poulton. Sec G4UHI, tel 854745.

Welcome to Bolton Amateur Radio Club who appear for the first time. My thanks to Wigan DARC and NARC for their kindness on my visits. If your club programme does not appear in this column it is because you have not bothered to send it to me. Thankyou to the clubs who do keep me informed. *RR1*

REGION 2—RR P R Sheppard, G4EJP, 9 Elvington Crescent, Leconfield, Beverley, N Humberside HU17 7LX. Tel 0401 50397.

Goole (GR&ES G0GLE)—1 May (DF practice session), 8 (Wireless revival night), 15 (HF operating night). Pavilion, West Park. Details G0GLZ, tel 0405 69968.

Halifax (H&DARS G2UG)—19 May (Dealer demonstration). Running Man ph. Details G0DLM, tel 0422 202306.

Keighley (KARS RS84851)—26 May (Annual fox hunt), 29-31 (Annual field event). Victoria Hotel. Details G1IGH, tel 0274 496222.

Leconfield (RCTARS G4GGD)—7 May (Open forum), 21 (On the air night). Normandy barracks. Details G4SMB, tel 0401 51200.

Maltby (MARS G4SKM)—1 May (On the air), 8 May (Visit by RR2). Hellaby Community Hall. Details G1PQW, tel 0709 814135.

North Wakefield (NWRC G4NOK)—7 May (Homebrew night), 14 (On the air), 21 (Bee keeping), 28 (Monthly meeting). White Horse ph. Details G4RCH, tel 0532 536633.

Pontefract (P&DARS G3FYQ)—7 May (Informal), 21 (DF hunt), 28 (Committee meeting). Carleton Community Centre. Details G6OJX, tel 0977 83792.

Scarborough (SARS G4BP)—11 May (RSGB morse testing), 18 ("FT 726", G4ZNZ), 25 (DF hunt). Scarborough Cricket Club, North Marine Rd. Details G4ZNZ, tel 0723 514767.

Spen Valley (SVARS G3SVC)—7 May (Visit), 21 (Advances in communication). Old Bank wmc. Details G4PHR, tel 0924 499397.

Greetings were exchanged between Scarborough, UK, Rotarians and Scarborough, Ontario, Rotarians when GB4BP was on the air from the Scarborough ARS's clubroom recently. Christopher Gray, the Scarborough Rotary president (with official collar of office) and behind him a Rotary International officer, are seen here with members of the Scarborough ARS. It is hoped that contacts with Rotary members in other Scarboroughs of the world will follow this first success. (*Photo:* Courtesy of *Scarborough District Newspapers*)

Todmorden (T&DARS G4WYT)—4 May (On the air), 18 ("Antique firearms", Harry Leah), 1 Jun (Car treasure hunt for G4HYY Trophy). Queen Hotel. Details G1GZB, tel 0706 817572.
UK FM GROUP (Northern G8KFM)—3 May (Monthly meeting). Royal Hotel, Barnsley. Details G4UNA.
Wakefield (W&DARS G3WRS)—5 May (Bring & buy sale), 12 (Quiz night), 19 (Film night; Sellafield), 26 (On the air). Ossett Community Centre. Details G4VRY, tel 0532 820198.
Wawne (RAYNET Group G4UWE)—11 May (Communication tests), 14 (County Raynet quarterly meeting), 18 (training). EP Cell, Meaux Rd. Details G4EJP, tel 0401 50397.
White Rose (WRARS G3XEP)—6 May (AGM). Moortown RUFC. Details G4ATZ, tel 0937 842790.
York (YRCA G4YRC)—12 May (Visit to York BR), 26 (Spring df hunt). Ashcroft Hotel. Details G3WQM, tel 0904 793672.

My thanks to North Wakefield and Sheffield Raynet Group for their hospitality at my recent visits. *RR2*

REGION 3—RR G Ross, G8MWR, 81 Ringwood Highway, Coventry CV2 2GT. Tel 0203 616941.

Birmingham (Midland ARS)—19 May (Junk sale). Unit 5 Henstead House, Henstead St, off Bromsgrove St. Sec G8BHE, tel 021-422 9787.
Coventry (CARS)—1 May (144MHz df contest), 8 (Morse tuition), 15 ("The earliest days of radio", G0AJB), 22 (Morse tuition and night on the air), 29 (indoor df game). 8pm. Scout HQ, 121 St Nicholas St, Radford, Coventry. Sec G3UOL, tel 414684.
Evesham (ERAC)—7 May (Satellite tv demo). Details G4UXC, tel Evesham 831508.
Halesowen (MEBRC)—12 May (General meeting). 8pm. MEB Social Club, Mucklow Hill, Halesowen. Sec G4RWH, tel 021-747 8784.
Malvern (Malvern Hills ARC)—12 May (Surprise lecture night). 8pm. Red Lion Inn, St Anne's Rd, Malvern. Sec G4BVY, tel 06845 66822.
Stratford-upon-Avon (S-u-AARC)—11 May (Packet radio), 25 (Visit to Daventry radio station). 7.30pm. Baptist Church, Payton St, Stratford-upon-Avon. Sec G8OVC, tel S-u-A 750584.
Telford (TARS)—6 May (Night on the air). 8pm. Dawley Bank Community Centre, Dawley, Telford. Sec G0CZD, tel 0952 770568.
Warwick (WARS)—12 May (Bring your scanner), 26 ("Starting on satellites", G4RDA). 8pm. St John Ambulance HQ, 61 Emscote Rd, Warwick. Sec G6VHI.
Wolverhampton (WARS)—5 May ("Packet radio", G1DIL), 12 (Activity meeting), 19 (Open forum), 26 (Night on the air). 8pm. Electricity Sports Club, St Marks Rd, Chapel Ash, Wolverhampton. Sec K Jenkinson, tel 0902 24870.
Worcester (WARC)—11 May ("Antennas for the small garden", G3BA), 18 (Informal). 8pm. Oddfellows Club, New St, Worcester. Sec G4RBD, tel 641733.
Wythall (WARC)—5 May (Committee meeting), 19 ("Operation Raleigh", G4AAL), 26 (Night on the air). 7.30pm. Community Centre, Silver St, Wythall. Sec G0EYO, tel 021-430 7267.

Thanks to all the secs who have listened to my plea for more news of club events. Still not enough! We have about 80 clubs in the region, check how many send in news. Come on fellows. *RR3*

REGION 4—RR M Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey DE3 2BJ. Tel Derby (0332) 556875.

Derby (DADARS)—6 Jun (Junk sale). 7.30pm. 119 Green Lane, Derby. Sec G3KQF, tel Derby 772361.
Leicester (LRS)—4 May (Activity night), 11 (Committee meeting & Activity night), 18 (Lecture), 25 (Activity night), 7.30pm. Gilroes Cottage, Groby Road, Leicester. Sec G4PDZ, tel Leicester 871086.
Mansfield (MARS)—1 May (AGM), 19 (tba), 8pm. Victoria Social Club, Mansfield. Sec G4AAH.
Melton Mowbray (MMARS)—15 May (Fox hunt for the G4RPS Trophy), 7.30pm, St John Ambulance Hall, Asfordby Hill, Melton Mowbray. Sec G3NVK, tel Melton Mowbray 63369.
Spalding (SDARC)—May meeting ("Computers", G4OZM), 7.30pm. The Ship Albion, Albion Street, Spalding. Sec G4NBR.
Sleaford (S&DARC)—20 May (Visit to fire brigade HQ), 23, 24 (GB0SSR, special event station at Sleaford Scout Rally), 31 ("Oscilloscopes"), Village Hall, Great Hale, Sleaford. Sec G2HHK, tel 0529 304454.

REGION 5—RR J S Allen, G3DOT, 77 Rosslyn Crescent, Luton LU3 2AT. Tel 0582 508515 or at work on 0582 21151.

Dunstable (DDRC)—1 May (Rig doctor visit, G6EES), 15 (Junk sale), 29 (TV show, a repeat). Sec G6EES, tel Dunstable 607623.
Leighton Buzzard (LLRC)—The club now meets at the Duncombe Arms, Great Brickhill, Bucks, each Monday evening. Sec Debbie Jones, 0908 649238.
Milton Keynes (MK&DARS)—11 May ("Airborne radar", GEC Avionics Ltd). Sec G0ERE, tel Bedford 750629.
Northampton (NRC)—14 May (Quiz night), 28 (VHF df hunt, walking). Sec G8EUX, tel 0327 51716.
Peterborough (GPARC)—New secretary, G1UGA, tel 0733 69822.
Shefford (S&DARS)—7 May (Grand spring junk sale), 14 (Mobile df hunt). 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)—6 May (speaker G3OSS), 20 (tba), 3 Jun ("Lundy Island expedition", Lionel Parker). 8pm. Hardwick village hall, 3 miles north of Aylesbury. Sec G6SIB.
Aylesbury (A Vale Repeater Group)—A well-attended AGM returned the same committee for 1987. If you use GB3VA, GB3AV or GB3BV, you may like to contribute to the running costs. Contact G8BQH, tel 0296 641783.
High Wycombe (Chiltern ARC)—27 May ("Within the chip", G8HBE). 8pm. Sir William Ramsay School, Rose Ave, Hazelmere. Details G4XVP, tel 0494 35275.
Maidenhead (M&DARS)—7 May ("VHF contest operating, planning and equipment", G4SVG), 19 (HF field day preparations), 4 Jun (Quiz vs Reading & DARC). 7.30pm. Red Cross Hall, The Crescent, Maidenhead. Sec G8RYW.
Oxford (O&DARS)—13 May (Natter night), 27 (tba). 7.45pm. Oxford Civil Service Sports Association Club, Govt Buildings, Marston Rd, Oxford. Sec G4PUU.
Reading (R&DARC)—12 May (HF field day discussion plus videos), 26 (tba). 8pm. Clubroom, White Horse ph, Emmer Green, Reading. Details G4YFB.
Slough (Burnham Beeches RC)—2-4 May (Bank Holiday picnic, no evening meeting), 18 ("Amateur Satellites" and meet RR), 1 Jun (Natter night and films). 8pm. Haymill Community Centre, 112 Burnham Lane, Slough. Details G6EIL, tel Maidenhead 25720.

REGION 7—RR R Sykes,G3NFV, 16 The Ridgeway, Fetcham, Leatherhead, Surrey KT22 9AZ. Tel 0372 372587.

Ashford (Echelford ARS)—11 May ("HF propagation", G3LTP), 28 ("Medical imaging", Ed Gowler). 8pm. The Hall, St Martins Court, Kingston Crescent, Ashford, Middx. Sec G4VAZ.
Bexleyheath (North Kent RS)—5 May (Natter night), 19 (tba). 8pm. The Pop-in-Parlour, Graham Road, Bexleyheath. Sec G4DIB, tel 01-467 2603.
Cheam (Sutton and Cheam RS)—15 May (AGM). 8pm. Downs Lawn Tennis Club, Holland Avenue, Cheam, Surrey. Sec G4FKA, tel Epsom 21349.
Coulsdon (CATS)—11 May ("DF experiments", G6MFM). 8pm. St Swithuns Church Hall, Grovelands Road, Purley, Surrey. Sec G6HC, tel 01-684 0610.
Croydon (SRCC)—4 May (Construction contest), 1 Jun ("Test equipment", Sound Technology). 8pm. TS Terra Nova, 34 The Waldrons, South Croydon. Details G1LKJ, tel 01-688 4075.
Dorking (D&DRS)—12 May (Informal. At the Falklands Arms), 26 (Social evening. At the Plough Coldharbour). 8pm. Sec G3AEZ, tel 0306 77236.
Eltham (Cray Valley RS)—7 May ("Propagation", G3LTP), 21 (Natter night). 8pm. Progress Hall, Admiral Seymour Road, Eltham, SE9. Details G3TAA.
Kingston (KDARS)—20 May ("The new collectors", G3IEE). 8pm. 3 Berrylands Road, Surbiton. Details G3IMK, tel 01-397 6924.
Thames Ditton (Thames Valley ARTS)—5 May ("Cellnet", R Todd), 2 Jun ("ITV", G3OGP). 8pm. Thames Ditton Library, Watts Road, Giggs Hill, Thames Ditton. Sec G3ENI.
Wimbledon (W&DRS)—8 May (Constructors contest), 29 ("The new collectors", G3IEE). 8pm. St Andrews Church Hall, Herbert Road, Wimbledon, SW19. Sec G3DWW, tel 01-540 2180.

REGION 8—RR M Elliott, G4VEC, 20 Haysel, Sittingbourne, Kent ME10 4QE. Tel 0795 70132.

Burgess Hill (Mid-Sussex ARS)—7 May (tba), 14 (Construction contest), 17 (Fox hunt), 21 (tba), 28 (Shack closed), 4 Jun (Informal). 7.45pm. Marle Place, Leylands Rd, Burgess Hill. Details G0GMC, tel 07918 2937.
Chichester (CARC)—2 Jun (Goodwood evening meeting). 7.30pm. North Lodge Bar, County Hall, Chichester. Details G4EHG, tel Chichester 789587.
Dartford (DDFC)—1 May (AGM, Scout House, Broomhill Rd, Dartford. 8pm), 10 (Club hunt. 2.30pm. Dartford Heath), 17 (Proposed RSGB event), 2 Jun (Pre-hunt meeting). Pre-hunt meetings after 9pm. Horse & Groom ph, Leyton Cross, Dartford Heath. Details G8DYF, tel Greenhithe 844467.
Hastings (HERC)—20 May (Cellphones). 7.30pm. West Hill Community Centre. Last Monday, Raynet. Thursdays RAE course. Friday, Chat night. Ashdown Farm Community Centre. Details G4NVQ, tel Hastings 420608.
Herne Bay (East Kent RS)—7 May (No meeting), 21 (Natter night at Bishopstone), 4 Jun ("144MHz dx", G8VR). 7.30pm. Cabin Youth Centre, Kings Rd, Herne Bay. Details G4RIS, tel 0227 262042.
Horsham (HARC)—7 May (RSGB presentation, RR8). 7.30pm. The Guide Hall, Denne Rd, Horsham. Details G4UDU, tel Hassocks 5517.
Maidstone (MYMCAARS)—8, 29 May (Natter night with RAE & cw), 15 (Test equipment), 22 (Rally arrangements), 24 (Maidstone Rally), 5 Jun (NFD arrangements). 8pm. YMCA Sportscentre, Melrose Close, Maidstone. Details G0BUW, tel 0622 30544.
Margate (Radio Club of Thanet)—12 May (Spring sale), 9 Jun (RSGB presentation, RR8). 7.30pm. Grosvenor Club, Grosvenor Place, Margate. Details G1HWG, tel 0843 42480.
Tunbridge Wells (West Kent ARS)—17 May (Visit to Amberley Chalk Pits Museum). 8pm. Adult Education Centre Annexe, Quarry Rd, Tunbridge Wells. Details G3XPX, tel 0892 48575.
Worthing (W&DARC)—6 May (RTTY evening, G3YSW), 13, 27 (Ragchew evening). 7.30pm. Lancing Parish Hall, South St, Lancing. Details G4SWH, WADARC, PO Box 599, Worthing BN14 7TT.

REGION 10—D H Phillips, GW4KQ, 17 Pentre Gardens, Grangetown, Cardiff CF1 7QJ. Tel 0222 35648.

Bridgend (B&DARC)—6 May ("Fault finding", GW4XLE), 20 ("Power supplies", GW4YKL). 7.30pm. Bridgend Soccer Club, Coychurch Rd, Bridgend. Sec GW1OUP, tel 0656 723508.
Cardiff (CRSGBG)—11 May (Traffic Control HQ, Cardiff, 7pm). Sec GW0CUM, tel 04463 3212.
Powys (ARC)—14 May ("Antennas, Part 2", GW3KFE). 7.15pm. Cricket Pavilion, Lynmore Park, Montgomery. Sec GW4DWX, tel 0938 2068.
Rhondda (RARS)—14 May ("Aims and objectives of RSGB", RR10), 28 ("The Brecon repeater, GB3BB"). 7.30pm. NUM Club, Tonypandy. Sec GW4BUZ, tel 0443 432542.

REGION 11—RR B H Green, GW2FLZ, 1 Clwyd Court, Tan-y-Bryn Road, Colwyn Bay, Clwyd LL28 4AH. Tel 0492 49288.

Bangor (Dragon ARC)—4 May (Open air demo of radio control model aircraft, 7.30pm) 18 (Club station hf evening). 8pm. Four Crosses Hotel, Pentraeth Road, Menai Bridge, Gwynedd. Sec GW0EGF; phone contact via GW0ABL Llanfairpwll 713647.
Colwyn Bay (Conwy Valley ARC GW6TM)—14 May (Talk by GW3MZY) 18 Jun (AGM). 8pm. Green Lawns Hotel, Bay View Rd, Colwyn Bay. Sec GW4KGI, tel 0745 823674.
Deeside, (Alyn & DARS)—12 May ("Mountaineering in Switzerland", GW4RKX) 8pm. Shotton Social Club, Shotton Lane, Deeside. Sec GW1ILZ.
Porthmadog (P&DARS)—28 May (Talk by GW2HCJ), 25 Jun (Talk by GW3UTI). 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 the Welsh language, net controller GW2HFR.

REGION 12—RR M R Hobson, GM8KPH, 17 Well Brae, Pitlochry, Perthshire PH16 5HH. Tel 0796 2140 Prestel 107962140

Inverness (Black Isle Repeater Group)—At the recent AGM GM4OIJ was elected secretary, tel 0463 791122.

REGION 13—RR A J Scott, 2 Manderston Grove, Duns, Berwickshire TD11 3PP. Tel 0361 83221.

Kelso (KARS GM4KHS)— 3 May (Anglo-Scottish Rally), 4 (Operating night contest), 11 (RAE), 18 (Projects), 25 ("NOAA WX satellites", GM3VLB), 1 Jun (Operating night), 6 (Gliding outing, GM0BPH), 8 (High fly video, GM4UIB). Abbey Centre, Kelso. Sec GM4UPX, tel 0835 62656.

Would club secretaries please send me their latest programme details. *RR13*

REGION 14—RR T G Wylie, GM4FDM, 3 Kings Crescent, Elderslie, Strathclyde PA5 9AB. Tel Johnstone (0505) 22749.

Ayr (AARG)—1 May (AGM), 15 ("Field day planning"), 29 ("FSTV report", GM0AAJ). 7.30pm. The Community Leisure Centre, 24 Wellington Square, Ayr. Details GM4CUB, tel Ayr 262496.

Glasgow (WOSARS)—1 May ("Top band df", GM3WIL), 15 (Club quiz night), 29 (AGM). 8pm. 154 Ingram St, Glasgow. Details GM0EFH.

Motherwell (MLARS)—1 May (Visit by RR), 29 (Fausto Ferrari, Glasgow College of Food Technology, plus preparations for open day). 7.30pm. The Wrangholm Hall Community Centre, New Stevenston. Details GM1SSA.

Stirling (SADARS)—14 May ("QRP", GM3QXX), 28 (Junk sale). Also cw classes on Tuesdays. 7.30pm. Argyll Centre, Princes St, Stirling. Details GM0BFS, tel Alloa 217702.

Would all secretaries note that I am running out of programme details. Any changes of secretary should be notified asap for inclusion in the July edition. *RR14*

REGION 15—RR R Parsons, 27 Mandeville Avenue, Stratheden Heights, Newtownards, BT23 3XA. Tel 0247 818191.

Armagh (Armagh & Dungannon DARC, GI4ADD)—Meetings now held second Wednesday. 8pm. County Armagh Golf Club, Newry Road, Armagh City. Sec Mr J A Murphy, tel 0861 522153.

Ballyclare (East Antrim ARC, GI4KKK)—12 May ("May fair planning & film show"). 8pm. Fairview Primary School, Ballyclare. Sec GI4PRH, tel 096 03 41655.

Belfast (RSGB Group)—18 May ("CW operating"). 8pm. 90 Belmont Road, Belfast, AR GI6ATZ, tel 0232 795307.

Gilford (Mid-Ulster ARC, GI3VFW)—17 May ("Annual rally at Parkanour House, Dungannon, noon").

Lisburn (Lagan Valley ARS, GI4GTY)—11 May ("RIS"). 8pm. Harmony Hill Art Centre, Harmony Hill, Lisburn. Sec GI4TCS, tel 0846 682474.

Londonderry (North West of Ireland ARS, GI3CFH)—4 May ("Inter-club quiz"). 8pm. Broomhill House Hotel, Limavady Road, Londonderry. Sec GI4OUN, tel 0504 84 529.

REGION 16—RR A Owen, G4HMF, 102 Constable Rd, Ipswich, Suffolk IP4 2XA.

Bury St Edmunds (BStEARS)—19 May (Marconi Mk3). 7.30pm. County Upper School, Beetons Way, Bury St Edmunds. Details G1FUU, tel 0358 50271.

Chelmsford (CARS)—5 May ("How to work vhf dx", G8VR), 2 Jun (Constructors contest). 7.30pm. Marconi College, Arbour Lane, Chelmsford. Details G4KQE, tel 0376 83094.

Colchester (CRA)—14 May (The Calver St project). 7.30pm. Colchester Inst, Sheepen Road, Colchester. Details G3FIJ, tel 0206 851189.

Felixstowe (F&DARS)—18 May (Constructors contest), 1 Jun (Electricity Board Communications Centre). 8pm. The Scout Hut, Bath Rd, Felixstowe. Details G4YQC, tel 0473 642595.

Ipswich (IRC)—13 May (DF hunt), 20 (Planning ESWR), 24 (East Suffolk Wireless Revival). 8pm. Rose & Crown ph, Norwich Rd, Ipswich. Details G4IFF, tel 0473 44047.

Leiston (LARC)—5 May ("Very slow scan", G4RSZ), 2 Jun ('Satellite tracking on the beeb", G0CFB). 7.30pm. Sizewell Sports & Social Club, King George's Avenue, Leiston. Details G0CJX, tel Saxmundham 3222.

Vange (VARS)—14 May (Film: "The catch that nobody wants"), 21 (HF station on air), 28 (Problem night). 8pm. Barstable Community Centre, Basildon. Details Mrs D Thompson, tel 0268 552606.

REGION 17—RR T Emery, Wilverley, Old Lyndhurst Road, Cadnam, Southampton SO4 2NL. Tel 0703 812435.

Basingstoke (BARC)—4 May (Junk sale), 7.30pm. Forest Ring Community Centre, Sycamore Way, Basingstoke. Sec G1OQV, tel 0256 59644.

Blackmore Vale (BVARS)—12 May ("Weather Satellites"), 26 (Project night) 7.45pm. The Bell and Crown, Zeals, (on the A303). Sec G4YXX, tel 0963 32389.

Bournemouth (BARS)—1 May ("Raynet Update", G3JAU). 15 ("A radio amateur in today's Royal Navy", Lt Cmdr Biddlecombe). 8pm. Kinson Community Centre, Kinson, Bournemouth. Sec G4DJG, tel 0202 526793.

Devizes (D&DARS)—29 May ("The RSGB", G3KWU) 8pm. Devizes Town FC, Nursteed Road, Devizes. Sec G4VUO, tel 0249 651471.

Eastleigh (Itchen Valley ARC)—8 May ("Reminiscences", G3KWU), 22 ("Trials and tribulations of a tourist guide", G1IPQ) 7.30pm. The Scout Hut, Brickfield Lane, Chandlers Ford, Eastleigh. Sec G1IPQ, tel 0703 736784.

Fareham (F&DARC)—6 May ("28 to 50MHz", G4JCC), ("I did it my way", G3CCB), 7.30pm. Portchester Community Centre, Portchester, Hants. Sec G3CCB, tel Fareham 288139.

Farnborough (F&DARS)—13 May (Natter night), 27 (HF NFD preview) 8pm. Railway Enthusiasts Club, Access Road, off Hawley Lane, Farnborough.

Guernsey (GARS)—8 May ("The non-contest operator's guide to contest operating", GU4NYT), 15 ("How to build a ZL special for df", GU8HT). 8pm. The Lodge, La Corbinerie, Oberlands, St Martins, Guernsey. Sec GU0FYR, tel 0481 26392.

Horndean (H&DARS)—7 May (Visit to Collingwood Museum), 7.30pm. Murchiston Hall, London Road, Horndean. Sec G4RLE, tel 0705 755274.

Liphook (Three Counties ARC)—13 May ("Portsdown Hill Repeater", G8PGF), 27 ("Crofton Beam Engines", G1CEI) 8pm. The Railway Hotel, Liphook. Sec G0BTU, tel Petersfield 66489.

Lymington (L&DARS)—Results of recent AGM. Chairman G3BFC; Treasurer G2HCG. 16 May (meeting at QTH of G3FBC.) 11am. Sec G2AIV, tel Lymington 72844.

New Forest Repeater Group (GB3NF)—For information or to join the group and help support the repeater, please contact G6DLJ, tel 0703 847754.

Portsdown 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)—Advanced notice that RSGB DF qualifying event is to be held at Salisbury on 2 August. Sec G4LDR, tel 0980 22809.

South Dorset Repeater Group (GB3SD and GB3DP)—For information or to join the group, please contact G0EVW, tel 0305 771517.

Swindon (S&DARC)—7 May (Rally planning night), 14, 21 (Natter nights), 28 (AGM). 7.30pm. Oakfield School, Marlowe Avenue, Swindon. Sec G4YQZ.

Trowbridge (T&DARC)—13 May (Crime prevention), 27 (Natter night). 8pm. Territorial Army Centre, Blythsea Road, Trowbridge. Sec G0GRI, tel (daytime) 0380 6656.

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.

Waterside (WSWC)—26 May (Project night). 7.30pm. Community Centre, Blackfield, Southampton. Sec G0BPA, tel 0703 893937.

Winchester (WARC)—15 May (Three mini-lectures, G2DBT, G4CEW, G4NBU) 8pm. Durngate House, Winchester. Sec G1XCT, tel Winchester 880605.

I have been told that the RAIBC picnic will be held in the Fair Ground, Broadlands Estate, Romsey (by kind permission of Lord Romsey) on Sunday 12 July 1987. *RR17*

REGION 18—RR Ian Gibbs G4GWB, 61, The Gables, Widdrington, Morpeth NE61 5QZ. Tel 0670 790090.

Newcastle (NER&CC G4YPT)—Please note new club secretary. Each club night there is morse tuition and work on the club project. Monday evenings, Village Hall, Hazelrigg, Newcastle. Sec Mr T Chilton, tel 091 2855107.

Newcastle (Tyneside ARS—G3ZQM)—6 May (Informal), 13 ("Forum on feeders, sockets and rf connectors etc" G0BEV), 20 (Test equipment and measurements), 27 ("The world above 144MHz", G8CYW). Scout Centre, Harbottle St, Byker, Newcastle. Sec G4KOT, tel 091 234 1148.

REGION 20—C R Hollister, 34 Battersby Way, Henbury, Bristol BS10 7SU. Tel 0272 508451.

Bath (B&DARC)—13 May ("Meteorology", John Mattock), 27 (Preparation for Longleat rally). 7.45pm. Englishcombe Inn, Englishcombe Lane, Bath. Details G3FIH, tel 0225 837539.

Bristol (BRSGBG)—18 May ("Beginners hf receivers", G4BWE), 24 (Mobile picnic, Ashton Court). 7.30pm. Small Lecture Theatre, Queens Building, University of Bristol, University Walk, Bristol. Details G4SQQ, tel 0272 508451.

Bristol FMTV Group—Constructing proposed Bristol 1·3GHz tv repeater. Details G4ZQF, tel 0272 699947.

Bristol (NBARC)—1 May (Committee meeting), 8 (Inter-Club darts competition), 15 (Home brew wine tasting), 22 (Live satellite tv demo), 29 (HF activity evening). 7pm. Self Help Enterprise, 7 Braemar Crescent, Northville, Bristol. Details G4YQQ, tel 0272 690404.

Bristol (SBARC)—6 May ("Packet radio", G8IMB), 13 ("DX broadcast tv", Ron Gardner), 20 ("Radio exchange and mart", G4WUB), 27 (10GHz activity evening, G6PJS). 7.30pm. Whitchurch Folk House, East Dundry Road, Whitchurch, Bristol. Details G4RZY, tel 0272 834282.

Bristol (UoBARS) — Term time net on S5 most evenings. Details G6TGN, c/o Students Union, University of Bristol, Queens Road, Clifton, Bristol BS8 1LN.

Gloucester (GARS) — 6 May (Chairman's surprise). (RAE & Morse classes 7pm), St John Ambulance HQ Heathville Road, Gloucester. Details G6AWT, tel 0452 504515.

Weston-super-Mare (WsMARS) — 11 May (Visit to system x telephone exchange), 25 (Constructors night). 7.30pm. The Bristol Hotel, Locking Road, Weston-super-Mare. Details G1DJW, tel 0934 514429.

Yeovil (Y&DARC) — 14 May ("The two element Yagi", G3MYM), 21 ("A Cascode j fet rf amplifier", G3MYM), 28 (Natter night), 4 Jun ("How to use a Smith chart", G3MYM), 7.30pm. The Recreation Centre, Chilton Grove, Yeovil. Detils G3GC, tel 0935 75533.

I am anxious to visit all the Region 20 clubs and societies, so secretaries please write and give some possible dates. *RR20*

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 •••••••

ICOM 271E muTek'ed 25W/2m base, £600 ono; Icom 471H 75W/70cm base, £700 ono. Both boxed, vgc, take dualbander (pref Yaesu 2700R) p/exch. Contact Peter, G6SJU, QTHR (Tyneside) tel: 091 4385812 OR John, G4WJV, QTHR (Durham), tel: 0385 853552.

ICOM 751E hf gen/cov all modes c/w ssb/wide filter voice synth, freq control keypad. Also SM8 desk mic, ex condx, £950 ono. G0DXC, QTHR, tel: 0734 596485 after 8.30pm or w/ends.

SONY CRF320 32-band rx, am/fm/ssb/cw, noise blanker, xtal controlled synthesizer, clock, cover handbook, service manuals. Cost £860, accept £350. Heathkit HW100 tcvr, £125; Datong morse tutor, £40 tel: 01-851 7403 evenings.

YAESU FT980 hf tcvr with SP980 spkr and keyer unit £950; G4RHL, QTHR, tel: 091 584 6435 OR 0385 41840 office hours.

ICOM 271H 2m 100W tcvr with muTek front-end; plus AG25 masthead preamp, £775. G4RHL, QTHR, tel: 091 5846435 OR 0385 41840 office hours.

LATTICE TILTOVER minitower 10m with miniquad rotator and all fittings, £325. Buyer collects. tel: Thetford (0842) 2875.

FT708R 70cm multimode. Never been used mobile, £300. G4VPR, QTHR, tel: Tunbridge Wells 28947 after 6pm.

ALUMINIUM MAST 32' in 8 substantial 2" diameter sections. Complete in case with all guys, stakes, base plate. New, unused, £50. Buyer collects. Datong speech processor, £40; HW8, £85; Eddystone 898 dial, £15. G4DPY, tel: 077 784 560 (Retford).

TRIO 940S WITH AUTO ATU. Just returned from Lowes for mods and alignment, £1500. MuTek 2m tvtr, £170 G4YBR, tel: Southend on Sea 552729.

STANDARD MULTIMODE 2m, vgc. Nearest offer £140. tel: 0252 874380, Yateley, Surrey.

ICOM IC4E 70cm handheld. Ex condx, plus chgr, £200 Datong morse tutor, £40. Chris, G4NCS, QTHR, Watford, tel: 0923 662266.

TRIO TR-50 1200MHz tcvr nicads chgr 13.8V, perfect £250; Sony Air 7 40-memories nicads chgr, new, boxed, £180. G4ZCQ, tel: Chipping Sodbury 315542.

TS670 QUAD BAND TCVR incl 6m. Gen/cov rx option available. List price new (Aug 1986), £843. Mint condx, boxed, £495. Microwave modules 70cm linear 50W, MM432/50, mint, boxed, £95. G2FZU, QTHR, Notts, tel: Southwell 813847.

DATONG FL2 MULTIMODE audio filter. Little used and in mint condx, boxed with instrs, £65, carr pd. Ex-WD 27ft telescopic mast c/w guys, stakes and canvas valise, £10. Buyer collects. G4PTY, QTHR, tel: Bracknell 0344 50359.

YAESU FT101E with 10MHz and 24MHz fitted. 600Hz filter, ex condx, boxed with manual and spare 6JS6C valves, £330 ovno. Homebrew atu, with roller coaster, £30. G0AQM, QTHR, tel: Bodmin 77550 evenings only please.

TR2300 complete, £95. SB620 Spectrum analyzer, £50 buyer collects. G8HNN, QTHR, tel: Worcester (0905) 58306.

TRIO TS780 2m-70cm multimode base tcvr, as new, mint condx, £725. Yaesu FP757HD 1yr old from new, little used, £175. Martin, G1WCF tel: 061 688 8789 (Oldham).

YAESU FT707, FTV707, 2m tvtr FC707 atu, vgc, £575. Liner 2 2m tcvr, £40. GM8VXZ, NOT QTHR, tel: Richmond (Yorks) 3722 evenings.

A COMPLETE HF STATION. TS830, SM220 with B58 pan adaptor, Welz SP250 vswr bridge, SEM transmatch and MC50 mic. All in ex condx, boxed and c/w all handbooks, £1,000 ovno. G4VKR, QTHR, tel: Ridgmont 543.

ICOM IC-25E, 25W, 144-146MHz synthesized mobile tcvr, memories, scan, etc, £145; microwave modules MML432/50 70cm 50W linear amplifier, little used, as new, £125; Tonna 432MHz 21-ele, £15. Tony Jay, G8JAY, tel: 0242 578914.

PAIR USED 813 PA valves, pair new boxed 866A rectifier valves, £35, 12V psu parts, trans caps. WANTED: Accessories for WS.C12 plus info. Also instr book AVO valve characteristic meter Mk4, photocopy OK. Jim, G4XWD, tel: Kidderminster 3674 evenings.

MARCONI TF801D sig/gen 10-480MHz, £45; AMT2 terminal unit, £150; Creed 444 teleprinters 2off, £25 pr; AMT1 terminal unit software for CBM64, £125; Com-in-64 computer i/face for CBM64 gives rtty cw sstv text modem mailbox AFSK, £55. G8WYT, QTHR, tel: 0444 450265.

YAESU FT726R with 2m, 70cm, sat boards fitted, immac condx, £860 ono. Tokyo HL160V 2m linear amp, £150 ono. Tony, G0EAV, QTHR, tel: 0753 868567, Windsor.

TEN-TEC CENTURY 22 QSK cw hf tcvr, 20W, reluctant sale, £300. Also Philips FCH series DTL ICS for disposal nominal cost; sae for list. G4FUI', QTHR, tel: Penrith 0768 66728.

PAIR OF 813 VALVES, tested and in gd wkg order, buyer collects or local delivery possible. Being sold by Stafford and District ARS for club funds, £25 ea ono. Contact: Secretary, G6DAT, QTHR tel: Rugeley 2453.

TELEPRINTERS: Baudot, two Creed 7B believed wkg, £7 ea. Two Teletype ASR33 ASCII one wkg?, £10 and £3. Olivetti TG300 U/L case ASCII minor fault?, £10. Offers? Buyer collect. (Some info). G3IMW, QTHR, tel: 01-340 0789.

FT709R STILL UNDER WARRANTY. FNB-3 batt pack, small and large soft cases, carrying strap, aerial slow chgr, NC15 quick chgr and dc pwr supply, £300 ono. G3TFM, tel: Somerton (0458) 73967 evenings.

FT290 WITH CASE AND NICADS, vgc, £235; Heathkit HW8 with outboard digital read-out, £80. G0DRT, QTHR, sorry no phone.

TRIO TS830S, mint condx, 1yr old, little use, orig pkg, any trial, £775; muTek GFBA 144e masthead preamp, very little used, £100; Kopek AR1002 rotator, £28, 9-ele Tonna, £15. Pete, G0EDU, QTHR, tel: 0386 858829 evenings.

IC2E HP/LP BATTERIES, leather case, extended freqs £150; Clegg variable 25W o/p 143/149 fm set, £150; Dawe o/p meter 610B, £20; 28/144MHz tvtr, hardly used, £100; Yaesu SP901, unused, £20. WANTED: 500W hf linear amp for TS430S. G4YUG, tel: 0473 830147.

SINCLAIR QL, boxed with manual, joystick, Dixon's 8056 serial printer. CST assembler, Q-jump monitor many asstd games incl Psion chess, Flight and Zkul adventure, six QL text books. Will not separate, must sell, £165 ono. G4RKO, QTHR, tel: Thatcham 0635 60263.

FT290R AS NEW, case, nicads, chgr, £230. Matching Daiwa 30W linear with preamp, £50. Welz RS-1100 11A psu, £45. Welz SP10X meter, £20. Light-weight rotator, £30. Met 7-ele Yagi, £15. All boxed with orig manuals. G6LIS, QTHR, tel: Newbury 60263.

QRT SALE: Comp FT102 stn +accessories. Offers invited. Yaesu FT102 hf/tcvr am/fm cw/ssb filters, SP102 spkr, FC102 atu, FV102DM dig vfo, FTV107R tvtr 2m/70cm modules, YD844 & MH1B8 mics, ST5MC rtty terminal, Tokyo hi-pwr HL160V 144 MHz lin/amp 3/10-200W, MML432/50 70cm lin/amp 50W, dum/load 0-1.2GHz, T435 144/432 watt/meter 0-200W, Hitachi monitor+ i/face-Spectrum+ progs cables connectors, all ex condx, boxed, sell comp stn, £1,700 ono. Will split. Sensible offers please. Peter, G4SVO, QTHR, tel: Farnham Common 3669 home OR 01-900 7594 work.

COLLINS R/E 51S1 gen/cov rx am cw filters, mint, immac, sale or exch similar immac 30LI linear or poss px immac 75A4 rx. G3YFK, tel: 0743 884858.

ATLAS 210X with psu, hf mobile rig, ex condx, not used for 2yrs. Simple to use - will load into dipole in front room! £300 ono. Richard, tel: 01-381 6501 evenings.

SX200N SCANNER, little used, c/w psu, leads, discone antenna, £160, Datong AD270 active indoor receiving antenna, c/w psu covers 100KHz 70MHz, unused £25, Datong D70 morse tutor £25, Sony PS515 turntable unused £35. G0CMU, tel: Cowfold (Sussex) 0403 864 625.

YAESU FT980, keyer, filters, fitted, £950. Yaesu FC757 atu, and coupling lead for FT980, £225. SP980, £60 OR £1200 comp set-up. 'A' licence holder changing to higher pwr valve set-up, tel: 0386 832233.

ICOM 471H 70cm 75W tcvr, plus AG35 masthead preamp £800. G4RHL, QTHR, tel: 091 5846435 OR 0385 41840 office hours.

PHILIPS G11, 22" colour tv, £50; Tandberg Series 3041 R-R tape rcdr, £25; psu 200V, 150mA 6V 3Ax2, £5; RCA TE149 wavemeter, made in 1943, Offers? Buyer to arrange collection. Bob, G8SAS, QTHR, tel: 0732 351361.

FT290R C/W NICADS, spkr/mic, case, strap, 0.25wave whip, £240; MML 144/100-LS 100W linear, 1/3W drive £100, both mint condx, c/w manuals/boxes, used little, £330 pr; MTV-435 tv tx, 25W psp o/p, mint condx, £80. Errington, G4YGF, QTHR tel: Washington 4173483 after 6.30pm.

23CM PA BY PARABOLIC c/w psu and valve but unboxed £95 ono. Peter Crosland, tel: 0905 620041 anytime and leave message if I am out.

BOOKS/MAGAZINES ON RADIO (PW) etc, 20yrs plus, vintage books 20s/30s; other hi-fi motoring video 60s/70s/80s, vgc in polythene bags; dozens car radios, boxes radio bits, sell/exch Braun radio audio equip. G6RXM, QTHR (Kent), tel: 0227 264850.

FT290R WITH muTek BOARD nicads, chgr, £270; FRG7700, FF5, £250; Kenwood R599D rx, £125; FRA7700 active antenna, £25. G4WBW, QTHR, tel: Kidsgrove 6656 evenings and w/ends.

2m ICOM 290E all mode; 100W microwave modules linear; KR400RC rotator; 10-ele crossed Yagi; polar phaser; c/w measured feeder lines; Welz swr pwr meter; slimjim wavemeter, £450. Can be seen operating. G0EJV, QTHR, tel: 0522 683113.

YAESU FT726R FITTED 2m 70cm modules, sat unit and cw filter, SP102 matching spkr, £1,100 ono; 70cm 88-ele multibeam, £40; 2m 10-ele XYagi, £35; polar phaser2 (2m), £30; BBC modem software, £40. Kevin, G1EVP, QTHR, tel: 061 480 1933.

HF LINEAR homebrew 2x813s, gd condx, demo available, £175. GW4ODN, QTHR, tel: 06462 3991.

1296MHz TVTR, 'uhf units', 144MHz i.f, 3W rf old but works well, £80; ssb electronics DX1296 preamp £30; MM 432-28S tvtr, £95; Dressler VV200 144MHz gasfet masthead preamp, £45. John, G4ZTR, NOT QTHR tel: Colchester 0206 860238 evenings.

YAESU FT780R 10W 70cm multimode tcvr, vgc, little used, £320. G6IEY, QTHR, tel: 0272 652116.

YAESU FT208 HANDHELD plus PA3, £165; FT707 10-80m tcvr, £325; FC707 atu, £85; DNT M40 10m with repeater shift, £45. All with manuals. Peter, G0BAG, tel: 0705 595739.

3-ELE TRIBANDER BEAM, brand new. Neighbours would have a fit! Hence sale. Cost £300, offers around £175? Brand new Yaesu PA blocks MS7719, £15; MS7716, £25; MS7713, £25. Phil, NOT QTHR, tel: 0270 761978 after 6pm.

FT203 HANDHELD 10.4V, nicad, chgr, case, small service manual, users handbook and spkr/mic, all in makers boxes, £150. No offers. Buyer collects or pays carr. P W Hall, G6XRB, QTHR tel: Leeds 0532 524108 evenings preferable.

KW VICEROY TX plus psu and connecting cables, manual and mic, vgc, £50. G0AZM, QTHR, tel: 0533 886957.

HEATHKIT SB100 hf ssb, cw tx/rx, mic, fan, manuals matching psu/spkr unit and swr meter, £115 incl carr within UK or can deliver up to 40 miles. GM4SVM, QTHR, Stirling, tel: 0786 75834.

G2DAF TX AND PSU, professionally built, in as new condx £65; Honeywell Termi net printer/teleprinter plus stand and approx 2000 sheets paper, £65. Prefer buyer collects. G3EXV, QTHR, tel: 0772 616929.

YAESU FRG7 RX, fm 2m cvtr, hf atu, £150; Daiwa SR9 2m rx, £30; Zygal daisy-wheel printer terminal, £200; swap or p/exch any for 2m mobile rig. G6VCI, Towcester, tel: 0327 52866 evenings or w/ends.

ICOM COMPLETE HF AND VHF STN, IC751+ HM12, £900; ICPS15, £110; ICAT100 unused, £250, sold together £1,100. IC271E+ HM15, £550; ICPS15, £110, sold together, £600. ICSP3, £19, TET HB33D 3-ele 10m/15m/20m unused, £179, all with manuals and boxed as new. Wall-mounted tiltover cradle carrying Kenrotor 400RC and 25ft 2in dia mast supported by stay bearing KS065 incl control unit, £150. 2m antennas 9-ele Tonna 8-ele Yagi with offset mount for vertical J-pole slimjim 40m/80m Sagant EL40X trap dipole with 3 masts for correct angle support. Offers? Centronic 701 printer BI-directional 5x7 dot matrix parallel i/p 60 char/sec tractor feed up to 17.3" wide with i/p cable, £100. Maplin modem 300 baud, £25. Sale on behalf of old timer G3DFB. Enquiries please to G4ZVA, QTHR, tel: 0477 37190.

HAMMOND ORGAN 126JM3, immac, 2-manuals, Leslie sound simulator, cost £2,000, accept £875 ono. G3NZY, QTHR, tel: 0904 410385.

ICOM 251E with muTek front-end, £395, ex condx, very rarely used. G4PYQ, QTHR, tel: 061-366 0927

QTH CLEVELYS NR BLACKPOOL P40 wid ants det 3 bed dormer bungalow, gas cent, fttd kit, bath wc 3 beds, one en-suite, gdns, brick gge, caravan space, indoor shack, £48,500. G4FRK, QTHR, tel: 0253 852027.

IMMAC PAIR DE LUXE SEPARATES, FR101 solidstate 21-band rx covers 6m and 2m; FL101 tx valve driver and PA, plastic face covers, spare valves, little used, perfect, £500. G3IAI, tel: 0604 846945.

STANDARD C58, 2m multimode c/w mic, carrying case, nicads, chgr, whip antenna, telescopic 0.25wave whip, 30W Alinco linear, mobile mount, cables, etc Clean condx, £279 ono. G1LDP, QTHR, tel: 0625 532886.

45ft TUBULAR MAST IN 5ft sections c/w metal base, 12 guyropes, halyard, and all fittings, in canvas bag, £45, tel: Coventry 613488.

YAESU FTV107R tvtr c/w 2m module and FRB707 relay box, £130. G4ZKI, QTHR, tel: 0235 814120 evenings or w/ends.

TRIO TS120V with car mount brkt, £295. G4JFE, QTHR tel: Newbury 41613.

2m 9-ELE BEAM, gd condx, £13; 100FDOT UR67 coax, £10; 2m Daiwa SR9 rx with five xtals, £20. Haydn Jones, Porthmadog, tel: 0766 3767.

TRIO 201A, 2m fm 25W, memories, scanning, priority etc, very compact, mint condx with orig box and manuals, £235. Also Yaesu FT223 2m fm 10W 23-chann 10-chann fitted, £70. Both carr pd UK.
WANTED: Dual-bander, any make considered. G4WXC, tel: 0476 77708.

MUTEK 6m TVTR 10m i.f incl all leads, manuals, etc plus Tonna 5-ele 50MHz beam. Both for £195, might split. G4SBK, NOT QTHR tel: 050 841 8231 after 6pm

6ft FIBREGLASS DISH, £75; MM4000 rtty terminal, £110; MTV435 tv tx, £100; STC Novatel Prestel set, £40; Tektronix 849 storage scope, £150; Shure 444 as new, £20; GEC Viewdata set with full keyboard, £15; 2m BNC flexi, £2. G8AYN, tel: 045 55 57790.

SWAP: FRG9600 vhf/uhf scanner, brand new condx, for top quality gen/cov rx, must be mint. G4WNG, QTHR, Northumberland, tel: 0670 822172.

FDK MU11 70cm fm mobile tcvr, £80, 10W 23-chann 4 scanning 6 repeaters 5 Simplex fitted. Excellent mechanics, needs respray. GODLP, QTHR.

GELOSO 209R rx, surplus to requirements. 80/40/20/15/11/10m bands, 4-position xtal filter, some new valves fitted. Nice condx, suit new swl, £45 ono. Keith, GOCCB, QTHR, tel: Dartford 70073.

YAESU FT-ONE little used in mint condx, plus dc cord and cw filter, £1,200 ovno. G3SUV, QTHR, tel: 07875 2519.

FT101Z EX CONDX, with handbook, orig pkg, incl Welz swr/pwr meter, atu and full size G5RV antenna all leads etc, comp stn ready to go. Separate if required, £395. G4RWU, tel: Maldon (Essex) 893067.

HEATHKIT HW100 TCVR with spkr and psu in matching case, many spare valves, £100 ono; Storno Viscount fm tcvr with details for 2m conversion, £20; Pye tcvr with control unit, old valve model, possible 4m conversion, £10; Wayne Kerr LCR bridge, ex-ministry in wkg order with instrs, £20; Codar CR70A gen/cov rx, £10; Powerful 240V ac centrifugal blower, £5. G4KPI, QTHR, tel: 0249 654235 evenings OR 0836 249185 or 0452 507433 daytime.

LINEAR 20-30W solidstate 2m, £35 N.O; 16-ele Tonna aerial, £15 N.O; Eddystone 730/4 gen/cov rx, gc, £85. Mark, tel: 01-847 3122.

HONEYWELL 132-column 150-cps RS232 dot matrix printer, £125; ICL termi printer keyboard 118-column RS232, £65; Scotch DC300A cartridges, £15; AMD9511 arithmetic processors, £95. WANTED: Counter plug-in adaptor HP10536A cvtrs HP5254B and HP5255B, tel: 07842 51409 after 7pm.

TRIO 7500, £95; Yaesu 480R, £180; FT221 fm/am/ssb tx/rx, £280; Mirage B108 10/80W amplifier, £55; IC251 2m fm/ssb/cw rx/tx improved front-end fitted by muTek, immac condx, £400; CDE rotator, £70; Oscarblok swr/pwr, £25; FRG7700 fm/am/ssb 0.15-30MHz rx, £260; FP107E spkr/ps 20A/50%, £100; Microdot cw/rtty rx/tx, £200; Realistic DX160 am/bfo 0.15-30MHz rx, £60; Video Genie with cw reader prog and many others, £80. Dave, G4NIP, QTHR, tel: Eversley (Nr Reading) 0734 733626.

ZYCOM Z5800 2m synthesized handheld, 5W o/p incl spkr/mic, base chgr, helical aerial, ex condx, £125; Burndept BE470 uhf handheld on 70cm, fitted SU8, RB10, £65. Walters, G8JGF, QTHR, tel: Ripley (Derbyshire) 0773 862289 after 6pm.

TWENTY-TWO PHOTOSTAT NEGATIVES of manual for HROS (R106) dated 1954. Offers please. EI5CF, QTHR.

YAESU FT757GX with h/duty pwr supply, 3yrs old, hardly used. Offers? Delivery for trial possible in South, South West or South Wales. G4TEK, tel: 0725 21730.

G4CKJ SILENT KEY SALE: FT101B, £290; Shure mic model 444, £30; FT290R nicads chgr, £270; pwr/swr meter, KW Ezeematch, £50; dummy load wattmeter Yaesu Musen TP150, £65; 144MHz wavemeter, £10; pwr pack 250V o/p 12V+5V, £20. G4CFU, QTHR, tel: 0705 256026 anytime.

PAIR INSULATED "BASES" for whip antenna, see Rad Com Jan '87, £3; pair Eddystone miniature 4-pin coil sockets, £2; Morganite solid 1500ohm carbon resistor, 6"x0.75", £2; 500 micro-amp meter, Ferranti, 2.5" dia, £3; 6A7, £2.50. G3MBL, QTHR, tel: 0284 60984.

F-TONE WITH FM and all optional filters, desk/mic MD1. Reluctant sale. Will cost over £2,000 new today with above options. Accept £1,250. G6VVK, Norfolk, tel: 05088 752.

YAESU FT221 vhf multimode base c/w YC221 digital display and matching spkr. Also Sota 10/100W linear with SEM psu, prefer not to split. Offers around £500 for the lot? Buyer inspects/collects. G1GLJ, QTHR, Swindon, tel: 0793 874614 after 6pm.

MMT 432/144R 70cm tvtr 10W o/p manual, £90; Farnell SSE 8-10A pwr supply, £12; collectors item superb 1947 model T19A Marconi 5-valve table model sw 16.5-52m. Offers? WANTED: HF linear TL120, FL110, etc. Ray, GOGXJ, QTHR, tel: 0742 848310 (ex G8VPV).

EDDYSTONE 940 RX, 500KHz-30MHz, gd condx, £95. Buyer to collect. G8SNX, QTHR, tel: 091-488 6608.

FDK MULTI PALMSIZER 11 2m/fm PLL tcvr, nicads, helical, gd condx, £80. G4RQC, QTHR, tel: 0282 22782 after 6pm.

DRAKE TR7+PS7 gen/cov hf tcvr c/w manuals £800 ono Racal RA17L rx, vgc with manual, £125; B41 LF rx with manual but needs attn, £20. G4YXX, QTHR, tel: 0963 32389 evenings.

FT902DM, £500 ono; FC902, £90; converted s/star 360 10M freq readout, £100; TR2200 tatty, offers? Datong ANF, £50; TB3 jaybeam, £199; ADOIS compressor mic AM802, £30; 10M Spectrum preamplifier, £15; pwr amplifier KLB110DX tuned 10m, £50 ono. Jim, GOBGY, QTHR, tel: 01-942 7094.

TRIO TS430, vgc, hardly used, 500Hz cw and am filters fitted, £700 ono, tel: 061-344 5733 after 6pm.

IDEAL FOR FT290 OWNERS!! WPO communications tvtr 2m set, will operate QRP on 20/15/10m, £70. Also 70cm tvtr TV144-432 2m set will operate 70cm, £60. Disk drive Lingo5 and Prism 132 printer, need attr Offers? G4YBU, NOT QTHR, tel: 01-393 9691.

FT726R 2m-70cm+ sat, £900; TW4000A 2m-70cm, £300; TR8400 70cm fm+ psu, £200; FT208R+ NC8 chgr, £200; TS830S never used on transmit, £650; AT230, £125; AOR2001 scanning rx, £265; MML144/100S, £100; SP102 matching spkr for FT726R, £35. All boxed as new. G6INU, tel: 01-309 1615.

70cm MBM48, £20; CB colinear jaybeam, £35; microwave modules MTV435 atv tx, £100; modified FRG7700 Cranleigh Electronics broadcast rx, £500; Yaesu FT290 less than 1yr old, all the bits, £750. G4PYU, Seaford, Sussex, tel: 0323 893650.

ICOM IC22A, 1 and 10W 2m fm, xtalled R1-R7, S0, S20-24. Orig box and fittings, gd condx, £115. Dave, G3XZK, QTHR, tel: High Wycombe 718213.

WERSI COMET ORGAN, two 4-octave manuals and pedals drawbars, orchestrals, guitar/piano sections, synth, phasing, chorus, wah, transpose, octave-coupler, etc, etc. Many effects, 100W o/p, £3,500 new, home use only, £2,200. Serious enquiries please. G3VMQ, QTHR, Cirencester, tel: 0285 83642.

YAESU FT980, not many about but must sell this superb rig, fitted all filters, electronic keyer, mint condx and very fair price, £875; consider exch Icom 751A 740. G0CJU, QTHR, tel: 0342 312374.

AOR2001 SCANNER RX, new condx, boxed, £200; Discone+ cable, £15; Heathkit HI-Z desk/mic HDP-121A, £20; unused 12"/18" spun aluminium parabolic dishes, £15 ea; Well-built HB rf speech processor, needs aligning, £10. Buyer pays carr. GM4GTU, QTHR, tel: 0224 743039.

AR2001 SCANNER WITH PSU, antenna, ex condx, £250 ono; IC02E 140-150MHz fm portable, boxed as new, £200 ono; Sony ICF2001 portable hf vhf synth rx, psu, manual, £75 ono; PF2FM 2m, case, batt, mic, £25. GM4EZJ, QTHR, tel: 0875 53450.

USED FOR 2m ANTENNA ONLY. Channel Master 9502B rotator, £35 ono; also dx-5V vertical antenna, was £89 new, accept £25. Buyer collects. Mike, G0BKV, tel: Pelsall 682511.

KW2000B TCVR 10-160m psu/spkr, £160; Inoue IC700R/ 700T tcvr 10-80m psu/spkr, £90; Belcom LS102 10m multimode tcvr, £180; Trio 7010 2m ssb/cw 144.1-144.35 matching psu, £100; manuals. Collect or carr extra. G4LWB, QTHR, Grantham, tel: 0476 870404.

WRASSE SC-1 late red sync version, £550; Robot 450C, £600; AMT-1, £110; Pac-Comm AX25 TNC-200, £120; Eddystone EC-10, £50; Centronics Ascii printer 730-4, £60; Hal RVD1005 vdu, needs new chip, and DKB-2010 keyboard rtty system, £175; Watford BBC video digitizer, £75; KW109 supermatch £135; Scarab sstv for BBC computer uncased, £30; Nascom 1 68k expanded system in Vero mount, £125. Buyer collects or delivery by arrangement. G3EFP, QTHR.

YAESU FT202R 6-chann xtal handheld with nicads and case 2m, £65; b/w ex cctv camera recon lens, £50; 48k Sinclair Spectrum with Amrad and other software, £50; all vgc. Harry, GODQL, NOT QTHR, tel: 0388 834270.

TRIO R2000 gen/cov rx plus fitted Trio VC10 cvtr, as new condx, c/w manual, orig pkg, QRT on hf otherwise would be keeping, £490; BNOS 12A psu, new condx, £65. G4LTM, tel: 061-338 3787.

80/40 TRACK d-sided d-density fast settling BBC disk drive cased, £80; also various BBC ROMS incl Wordaid, 17=50 toolkit plus, £22.50, tel: 863 6641 evenings.

NEC CQ110E TCVR, 160m thru 10m incl jjy/wwv, usb, lsb, am, cw, fsk, 280W pep, dig readout, valve PA and front-end, very clobber-proof simple to use rig, vgc, £375 ono; Yaesu NC15 base chgr, £40. G8LBS, tel: Ipswich 688204.

YAESU FRG7700 comms rx 0.5-30MHz with memory, also manual. FRA7700 active antenna, FRT antenna tuner, FRV vhf cvtr type E. All vgc, £300. Dave, tel: 0602 724505.

70cm ICOM 490E, mint, £350; Tokyo HL-45U 45W, mint £100, both together £425. G6BJP, QTHR, tel: 0284 4649.

YAESU FT207R 2m synthesized handheld tcvr in orig pkg, ex condx, plus h/b 14hr chgr, £120 ono; also VIC20 computer, datacorder, 16k RAM, monitor ROM,

morse programs, £40; VIC20 RS232 board, £10; two-ROM board, £15. G4LWU, QTHR, tel: 0584 72508.

TONNA 19XY, 70cm, little used, £18. WANTED: Daiwa CN630 meter and Icom SM8 mic. Must be good. G1DDS, QTHR, Bedlington, tel: 0670 824788 after 5pm.

TRIO TS700 multimode tcvr, all xtals fitted matching mic swr meter external spkr manual, mint condx, £250, buyer collects; 2m antennas available WANTED: Racal MA79 exciter. G4LW, QTHR, tel: Trowbridge 3166.

ICOM 240 SYNTHESIZED 46-chann 2m tcvr, new logically reading dial fitted, vgc, mobile mount, manual, boxed, £110; hb psu for above, £20; FRG7700 all mode synthesized rx, ex condx, boxed, £225. G4GBN, QTHR, Somerset, tel: 0935 862505.

SILENT KEY: Yaesu 290R nicads case strap, pwr/swr meter, pwr supply chgr, antennas base 8-ele X Yagi base colinear rotator, needs attn, £300 the lot. Will not split. Contact Peter, G1EQF, tel: 0380 818585 evenings OR 0380 71643 office hours.

MB2 MOBILE MOUNTING BRKTS, 2off, sold separately for TR2300 and VB2300. Offers? G3JAU, QTHR, tel: 0202 514078.

YAESU FT290R, muTek front-end, nicads, chgr and carrying case, ex condx, £255. G4TIN, QTHR, tel: 0623 36381.

40FT TRIANGULAR STEEL MAST in two 20ft sections+ 4ft walk around at top, vgc, never used, £150. Drawing on request. G2DGA, tel: 0533 450 310

MICROCRAFT CODESTAR cw/rtty reader with test cassette, unused, £65; Heil SS2 comm spkr, unused, £45; Bach-Simpson multimeter model 256, £20; disco mirror ball, USA, 16" dia with ceiling motor and spotlamp, £75. GW4KYN, tel: Swansea 360503.

YAESU FT101 Mk2 with top band and am new valves, fan mic manual, £210; Panasonic DR31 gen/cov rx 32 bands and fm, £75. G0ELH, QTHR, Basingstoke, tel: 0256 473508.

TRIO TS120S with matching AT120 atu, ex condx, £350; KW top band atu, £40; caravan 10ft, ideal shack or contest, £120. G3XXN, Worksop, tel: 0909 732113 OR 730128.

SHACK CLEAROUT: KW2000B c/w psu/spkr, Ten Tec 228 atu/swr/dummy load, Codar AT5 tx c/w mains psu, Eddystone 840c gen/cov rx, h/b top band tx with supply, h/b 0-20V psu with meters, morse osc, soar freq counter, Altai KDM-6 TR dipmeter, filters, mics, headphones, morse key, spare valves, manuals connecting leads, plugs, etc, h/b atus/coils, wire coax, bits and pieces. All must go, prefer no split, £350 ono. G4FTL, QTHR, tel: 058 283 3767.

FT101ZD 6-BAND, mic, fan, manual, vgc, unmarked, orig pkg, £425 incl carr. Dave, G0AWZ, York, tel: 0904 424817.

STANDARD C5800 144MHz multimode tcvr, ex condx, boxed c/w mic, cables, m/mount and manual, £325; MML432/100W 70cm linear, boxed with accessories, £190; JIL SX200N scanning rx, 26-88, 108-180, 380-514MHz am/fm gd condx, boxed with accessories, £182; many smaller items for sale also! What do you require? Ned, G8GZZ, QTHR, Woking, tel: 04862 23506 OR Prestel MBX 219995418.

FT102 AM/FM UNIT UNUSED c/w mod and fitting instrs £30, purchased before tx which had one fitted. G4ZBH, QTHR, tel: 0983 298579 after 7.30pm.

HALLICRAFTERS HURRICANE comp stn comprising tcvr, psu, external vfo unit, vswr bridge and Hallicrafters keyer, all finished in matching black wrinkle, 1kW o/p. Many spare valves incl 6 PAs. Unique chance, £1,250. G4GEN, QTHR, tel: 082 571 2205.

TEMPO 2002 144MHz amp 2x 8874, TS120V hf tcvr, 10W o/p, VFO120, PS20, DFC230, 5-ele Tonna 50MHz. Offers? Ian, G4YUZ, QTHR, tel: 0992 463478.

SILENT KEY SALE: Trio AT230 tuner, £75; psu regulated 7.5A 13.8V, £20; Juki 5510 dot matrix printer, £100; 12" green vdu, £40; Sony 2001 gen/cov rx, £95; Hitachi video c/w camera rcdr, £600; BC221 freq calibrator; much more. G3XMA, QTHR, Coventry, tel: 0203 410208.

YAESU FT790R 70cm multimode c/w nicads, chgr, etc. £270; BNOS LPM 432-1-50 linear, works well with 790, £195. Both together to good home, £450. G0EHV QTHR, Tyneside, tel: 091 4820909.

SOMMERKAMP, FR100B, FL200, 80-10, am/cw/ssb/fm, £200; minibeam HQ1, £75; fet-dip oscillator 1-25MHz, £20; 16ft telescopic mast, £10; Pye 2m Cambridge, £10; 2m 5/8 wave, magmount, £10; Sinclair QL 128k, software, £75; Pye Motafone, £10 G4MTG, tel: 021 430 6764.

TRIO AT940 auto tuner, almost new, £190. G4BXR, QTHR, tel: 0908 566266.

NRD515 rx gen/cov 100KHz-30MHz synthesizer, mint condx, £525. Adams, tel: 01-876 2070.

YAESU FT480R 2m tcvr, gc with box, £200. GM0CUW, tel: 05574 627.

PORTABLE OR MOBILE? 12V 10A/H accumulator fitted to Honda 125cc "Lead" scooter, silver/red A-reg, 6000m only. Stored since 1986. Delivery arranged or drive away, present price £998 - to you £450 one ancient owner who is G3IES tel: Bristol 500742 anytime.

YAESU FRDX400, FLDX400 tcvr pr, rx cw/ssb/am/fm 160-10m, 6m and 2m all filters and xtal calibrator fitted, tx cw/ssb/am 80-10m, 240W pep, ex condx, manuals, circuits, mic, £220; Datong rf speech processor, £15; Eimac 4CX350A, less than 1yr in use, £20. David, G0DTC, QTHR, tel: Norwich 868375.

HOMEBREW FAX DECODER mains driven similar to ICS FAX-1, requires Epson compatible printer and ssb G/C rx, full documentation, £55 post paid. G3RDG, QTHR, tel: 01-455 8831.

WANTED••••••••••

DECENT SCANNER. Will swap Racal 17 rx in Racal case, plus Icom IC240 fm tx, both gd condx. Contact Bob Walmsley, G0DKW, 36 George Avenue, Skegness, anytime.

WARTIME SUITCASE RADIO A Mk3 (B2 minor) or any other clandestine and resistance type radios for collection. Any condx welcome. Manuals and accessories. G4OFO, QTHR, tel: 01-949 2317.

CRT TYPE 3AZP31 for Solartron d/beam scope, would consider defunct unit if tube OK. Dash mount fm Cambridge working on 2m. All letters answered. G4MNB, QTHR.

ROTATOR KR600RC, KR400RC, KR400 or similar. G3MVK, QTHR, tel: Newport (Shropshire) 0952 811529.

QUALITY COMMN RX hf only gen/cov. Electronic aviation computer Avstar, B6B or similar. Headset high imped. David Clark, Roanwell, or telex possibly airlite to CAA.WR 603. GM4AGS, QTHR, tel: 0382 543113.

RACAL MA79 exciter unit in gd wkg condx. G4LW, QTHR, tel: Trowbridge 3166.

'JRC' NSD505 tx c/w interconn cables. G0DIZ, QTHR, tel: 0271 65180.

MANUALS, CIRCUIT DIAGS ETC for BC348L comms rx. Will pay copy/p&p etc. Have various manuals for Pye, Dymar vhf equip. Please telephone for details John, G1ODY, QTHR, tel: 09277 68253 evenings OR 0442 3233 extn 247 days.

ICOM 730 or 735, R7000. Details, G3IMW, QTHR, tel: 01-340 0789.

ONE KENWOOD R2000 rx, must be in gd condx, about £360 and one Sony ICF 7600D rx, about £100/£120. Wood, tel: Clochan 378.

VACUUM VARIABLE/fixed capacitors. Module 11 for Plessey PR1551 rx. Bird thruline equipment. CDE rotator with/out control unit. Drake hf equipment for repair/rebuild. Vacuum relays. tel: 03306 613 after 7.30pm and weekends.

SERVICE MANUALS FOR YAESU TCVR FT902DM and Kenwood rx R1000, also useful hints and kinks for these models. I can photocopy and return the documents. Your price p&p? Thank you. F5DE, Bernard Delage, Lotissement Beauregard, Touvre, F-16600 Ruelle, France.

MAST TELESCOPIC PNEUMATIC Clark type or similar, free standing or trailer mounted, must in wkg order. G1DER, J R Hacker, The Bungalow, Willows Riverside Park, Maidenhead Road, Windsor, Berks SL4 5TR.

IC22 OR SIMILAR. If you have one please contact me Looking for 2m fm rig, robust but simple. G4EUW, tel: 0206 30 3071 (Brightlingsea).

2m BASE STATION; FT22S, IC211E, IC251E, etc. Gd price pd for gear in perfect wkg order. G4OBK, tel: Chorley 63772 office hours. Ask for Mrs Catterall and leave message.

LINEAR AMP FOR 10m, solidstate or valve, anything considered, Curtis keyer complete or just the chip

Also 160m tx/tcvr, homebrew or otherwise. Replies to G0AHI, Orpington, tel: 0689 39410.

IC22A, condx immaterial. G4DDI, QTHR, tel: 0205 52664 anytime.

70-CHANN LINEAR AMPLIFIER type 2x4CX250B with pwr supply or similar. Glyn, G8WXU, QTHR, tel: 02774 3019 evenings.

TRIO TL922-VFO 120-230 with instr booklet, vgc. Ivor, G4YIT, Turves, tel: 9820 268 evenings.

YAESU FC902 ATU. Your fair price paid. G3RDA, QTHR tel: 0329 42699.

FT707 FP707 or FT101ZD Mk3. FV101ZD, spkr FP101. Must be mint, no mods, cash waiting. G3NXD, QTHR, tel: 0562 850570.

AT230 SP230 TRIO/Kenwood. George, G0GNW, tel: 0507 603012 evenings. QTHR G6ERO.

MANUAL FOR COSSER MODEL 339B double beam oscillograph or copy to photostat. All costs covered. GW4ZUW, QTHR.

VTVM OR EQUIVALENT fet r/f voltmeter c/w r/f probe Must be in gwo. GM0AYW, QTHR, tel: 0592 890 837.

MANUAL OR CIRCUIT DIAG for standard C828m 2m fm tcvr to purchase or photocopy. Tranter, G4FBT, QTHR, tel: Walsall 613410 after 6pm.

PLEASE: PURCHASE OR LOAN of handbooks for Airmec valve voltmeters 314A and 301, also for Racal dig freq meter 836. Also two EA52 diodes for probes. Phil Pardey, Epsom, tel: 03727 25564.

BAROGRAPH - Must be in case and in wkg order. Details please. G1UUG, QTHR, Tyne & Wear, tel: 091 252 7141.

PYE WESTMINSTER W15fm/b/v A-band 146-174MHz 10-chann, must be c/w control box, all cables, mic and spkr, be in mint, unmodified, condx with serial no. plate intact. Will pay gd price for right equip. No rubbish please. G3MOE, QTHR, tel: 0242 524217.

MONITOR SCOPE URGENTLY. Any model considered, eg SB610, SB614, KW108, YO901 or WHY? Also scrap SB610 for txfmr, else selling SB610; txfmr requires EHT rewind, £25. Your help appreciated. GM4GTU, QTHR, tel: 0224 743039 evenings OR 0224 646464 extn 251 daytime.

TRIO TR7400A, Icom 245E, any "green" Racal tactical items, wkg or not. Have Epson PX-8 portable micro, Technics professional portable cassette rcdr, hf vertical, some Racal tactical items for exch or sale. Bob, 120 Birmingham Rd, Redditch, Worcs B97 6EP.

703 I.F AMP CHIP for old Trio KR77 tuner amp, fair price paid. Lou, G3VKO, QTHR, tel: 08444 5209.

CAN YOU HELP??!! I am looking to purchase a Fortop TVT435/R tv tcvr. G0DAI, QTHR, tel: 01-309 0311 evenings, w/ends.

KEMPSTON CENTRONICS i/face "E" to suit Spectrum to Brother printer; modulator driver board "B" AT26826/2 for Pye Westminster; info to copy for Solartron scope with units 1441, 1442, 1443, all postage refunded, early return of info. G2BCY, QTHR, tel: 091-265 4780.

TELESCOPIC TOWER hf beam and rotator separately or together. Please write giving desc and price to G4XMK, New QTH: Magpies, Stocks Farm, Crowhurst, Surrey RH7 6LR, tel: 0342 893065.

EXCHANGE MANNLICHER SSG 308 rifle fitted with ZFscope new, value £1500 for Trio TS940S or TS930S Cash adjustment, tel: 04712 594 anytime.

AR88D IN GD WKG ORDER AND CONDX with any extras. R Williams, G0DNX, QTHR, tel: 0709 862231.

SWAN 600R CIRCUIT DIAG to buy or borrow; also 600Hz cw filter for 600R and VX-2 Vox unit for Swan 600T, or circuit diags; also Shure 444 mic. Paul, G0DJF, QTHR, tel: 0432 850643.

BEARCAT THINSCAN MODEL BC-AC OR Tempo single-chann uhf rx MR-3U OR any uhf rx or tcvr covering 453-456MHz. Contact EI2CR, QTHR, tel: 0001 557606 (Dublin).

405 LINE PATTERN GENERATOR and 1950s 9" tv, would prefer Pye or Ferguson; also Weco valve type 215. Pete Smith, G4JNU, tel: Reading 477573.

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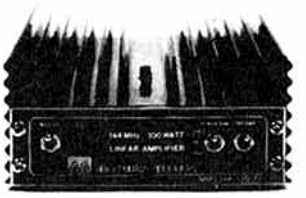

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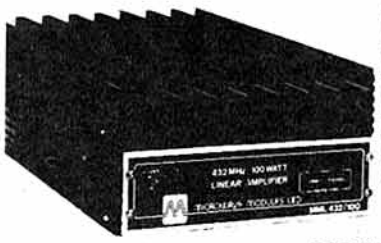

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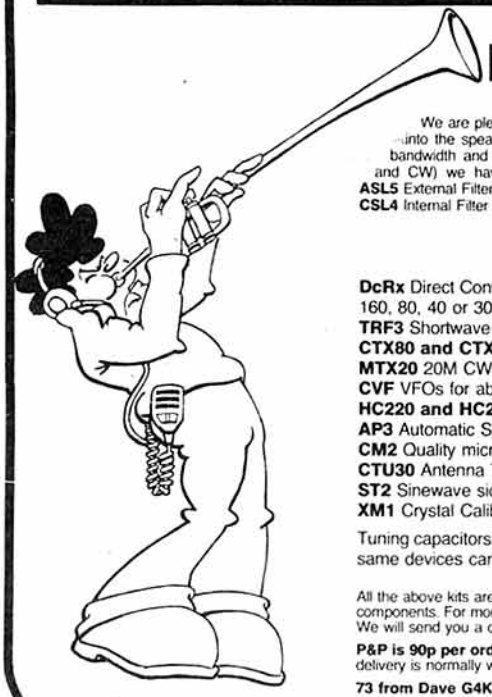

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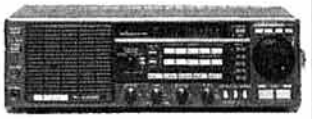

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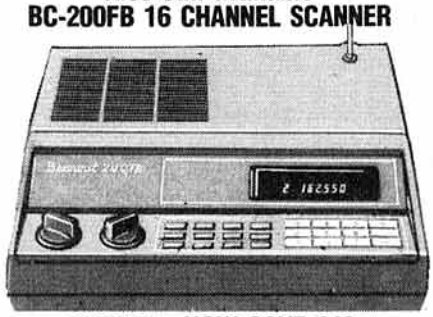

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More new books . . .

Several new titles have recently been added to the list of books sold by the RSGB. The ***SLOW SCAN COMPANION***, published by the British Amateur Television Club, contains a wealth of information for the sstv enthusiast and anyone thinking of starting with sstv. Chapters cover sstv standards, transmitting and receiving sstv, studio techniques, colour sstv, commercial equipment, computer-derived slow-scan, scan conversion, and a whole host of constructional projects and circuits. Containing 100 pages in A5 format, *Slow Scan Companion* costs just £3.44 to members by post.

The second new book is ***ALL ABOUT VERTICAL ANTENNAS.*** Its eight chapters cover how and why vertical antennas work, the effects of the radio ground on vertical antennas, practical dx antennas for the lower frequency bands, matching systems, groundplane antennas for hf and vhf, phased vertical arrays, multiband vertical antennas, and a final chapter detailing a number of sloper systems and ancillary items. Published by Radio Publications Inc, this book contains 192 pages and costs £10.95 to members by post.

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And finally—for everyone who has been waiting for the much-delayed shipment of ***SOLID STATE DESIGN FOR THE RADIO AMATEUR***, these should have arrived at RSGB Headquarters by the time you read this. The book costs £9.99 to members by post—but please telephone Headquarters first to confirm availability.

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For further information turn to pages 314/5 and 316/8

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