RADio COMmunication

May 1986

IN THIS ISSUE

PETER HART, G3SJX

TAKES A LOOK AT

TWO FROM TRIO

THE TS930S AND THE TS940S HF TRANSCEIVERS

Journal of the Radio Society of Great Britain

Where a good deal more costs a good deal less . . .

ICOM

IC 745

Call or telephone 01-992 5765 for latest prices and information plus full range of H.F. equipment and accessories.

IC 751A

- **Two year guarantee on many products**
- **Free finance on many lines**
- **Most mail order post free**
- **All securicor items carriage free**
- **Negotiable guarantees**
- **Factory appointed distributors with speedy spares**
- **Next day delivery**
- **Massive stocks of spares and various 'bits and pieces'**
- **Dedication to total service**
- **Door to door repair service free under guarantee**

FT 757 **YAESU**

Telephone 01-992 5765 for latest information on the YAESU value for money high performance equipment. Full range of accessories available.

FT 980

IC 02

IC 04 E

IC 2 E

IC 4 E

ICOM

Four exciting hand helds from ICOM for you to come and try . . . or call 01-992 5765 and we'll send you the proof.

FULL ICOM PMR RANGE IN STOCK.

CAPCO S.P.C. 300 ANTENNA COUPLER

We are now sole worldwide distributor of this remarkably robust unit. Will match anything from a piece of wire to a halfwave 160m through to 10m — up to 1kw P.E.P.

ICOM R71
General Coverage Receiver

Keypad entry, 32 memories SSB, AM, RTTY, CW & FM (optional) 0.1-30 MHz. Twin VFO's Scanning, Selectable AGC, noise blanker, pass band tuning and deep notch filter! Super value!!

YAESU

Voted the world's number one range of hand helds by the experts, available now from stock — or ask for literature. Telephone 01-992 5765

FT 209 RH

FT 209 R

FT 703 R

FT 709 R

YAESU FRG 8800 — Continuous Coverage Receiver

Twin VFO's plus keyboard/computer interface control — all mode SSB, CW, AM & FM. Memories, scanning, filters. Includes 2-dimensional LCD, graphical SIMPO.

YAESU FT 770

70 cms TCVR

NEW

Extremely rugged, yet highly compact. High visibility display LCD. Dual microprocessor design — two VFO's, 10 memories, flexible scanning, etc. Voice synthesizer option.

— 25W/3W FM

ANTENNA SALE

MASSIVE DISCOUNTS ON TET AND OTHER ANTENNAS THIS MONTH. BEAMS, VERTICALS, HF, VHF AND UHF — **ALL AT SUPER PRICES**, E.G. 3 BAND VERTICAL £39, 4 BAND £49. HUNDREDS OF ANTENNAS AVAILABLE. FIRST COME FIRST SERVED. CALL TODAY FOR BIG, BIG SAVINGS.

OUR BIG BUYING POWER GUARANTEES YOU EUROPE'S No. 1 DEAL ALL ROUND. SEND 90p FOR OUR BUMPER LITERATURE PACK!

AMCOMM – ARE — WHERE A GOOD DEAL MORE COSTS A GOOD DEAL LESS!!!

VISA

Access

FRG 9600
£449

ICOM 7000 £849

AR 2002 £425

Prices subject to currency fluctuations.

AMCOMM ARE

DON'T FORGET OUR OTHER AD-PAGE 319

HOURS: 9:30 – 5:00 *CLOSED MONDAYS.*

373 Uxbridge Road, London W3 9RN Telephone: 01-992 5765/6 Telex: 334312 *E. & O.E.*

MAY 1986

VOLUME 62 No 5

RADio COMmunication

All contributions and correspondence concerning the content of *Radio Communication* should be addressed to:

The Editor, RSGB,
88 Broomfield Road,
Chelmsford,
Essex CM1 1SS

Tel 0245 84938

Office hours: 0915 to 1715

ADVERTISING

Advertisements, other than Members' Ads, should be sent to:

M J Hawkins, G3ZNI,
RSGB Advertisement Officer,
PO Box 599,
Cobham,
Surrey KT11 2QE

Tel 037 284 3955
Prestel 372843955

Correspondence concerning the *RSGB News Bulletin* (including Members' Ads), the distribution of the journal, and all other Society matters should be addressed to:

RSGB Headquarters,
Lambda House,
Cranborne Road,
Potters Bar,
Herts EN6 3JW

Tel 0707 59015

Business hours: 1000 to 1600

Headline News
Tel 0707 59312 for a recording of the latest amateur radio news

RSGB Data Box (Prestel compatible)
Tel 0707 52242

CONTENTS

Technical articles on subjects of amateur interest are always welcome and should be sent to: The Editor, *Radio Communication*, 88 Broomfield Road, Chelmsford, Essex CM1 1SS.

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

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

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

Radio Communication **is published by the Radio Society of Great Britain as its official journal on the first Friday of each month and is sent free and post paid to all members of the Society**

ABC MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS 36,244 copies per issue average circulation in 1985

Closing date for contributions unless otherwise notified: five weeks before publication date

the **NEW** TRIO TS440S amateur bands transceiver plus general coverage receiver.

With the advent of the TRIO TS440S, the compact HF transceiver that we have known since the late seventies, has taken a major step forward. The new transceiver has provision for fitting an internal aerial tuning unit operating between 3.5 and 28 MHz. A front panel numeric keypad makes frequency selection and subsequent entry to one of the hundred memory channels or two VFO's a simple operation and, of course, frequencies can be quickly selected from memory and transferred to either VFO. The TS440S is also an excellent general coverage receiver tuning from 100 kHz to 30 MHz. Combined with TRIO's now well-known attention to ergonomics, the performance and facilities of the TRIO TS440S make this the transceiver for your shack.

The TRIO TS440S operates from 13.8 volts DC, 20 amps. Input power is 250 watts pep on all modes throughout the band except on AM where it is 110 watts. When using the TRIO PS50 power supply unit transmission time at full output with the TS440S transceiver can be up to one hour in any mode.

Operating on USB, LSB, AM, FM and AFSK the TRIO TS440S has full and semi break-in on CW. Rapid transmit/receive switching also makes the TS440S suitable for AMTOR use. FM is fitted as standard to the transceiver as is squelch which operates on all modes. Bandwidth selection manual or automatic. When the bandwidth switch is in the auto position the rig selects the IF bandwidth to match the mode. Of course, the rig's selection can be overidden. The TS440S has provision for four different bandwidths. The W (AM) and M2 (SSB) positions are fitted with 6kHz and 2.4kHz 455kHz ceramic filters, the M1 and N positions are for optional filters, eg. 500 or 250Hz CW (YK88C or YK88CN) in position N and a 1.8 kHz narrow SSB filter (YK88SN) in position M1. Alternatively a 2.4 kHz (YK88S) filter can be fitted in the M1 position resulting in an even better filter shape for SSB use. The TRIO TS440S has two switchable rates of AGC, fast or slow.

Careful appraisal of operating techniques has enabled TRIO to provide the TS440S with a comprehensive system of memories, search and scanning modes and keyboard frequency entry.

- The two VFO's, A and B can be used individually or when used together in split mode, for cross band and even cross mode contacts. Normally used on the same band, the system provides the same flexibility as if the operator were using a spearate VFO and is ideal for DX working. Whilst listening in split mode, the transmit frequency of the other VFO can quickly be checked by pressing the front panel switch, T-F SET. A front panel control, A = B instantly puts the "idle" VFO on the frequency of the VFO in use.
- The desired operating frequency can be arrived at by use of the tuning knob and megahertz up/down switches. On the TS440S frequencies can also be entered by means of a front panel numeric keypad.
- One hundred memory channels are available, each storing frequency and mode. Frequencies can be entered into any selected memory channel from either of the VFO's or by using the keypad, memories 0 to 89 are simplex, memories 90 to 99 hold split frequencies. Both frequency and mode can easily be transferred from memory to either VFO. When transferring a split memory channel (90 to 99) the receive frequency is entered into VFO A and the transmit frequency into VFO B. Memories are scanned in banks of ten, eg. 20 to 29, 40 to 49, 70 to 79 etc.
- Two search ranges are available, the frequency limits being user programmable. Two rates of scan can be set when in search mode.
- When set to memory channel instead of VFO, the entire contents of the one hundred memories can be swiftly reviewed by using the main tuning knob, the megahertz up/down switches on the front panel or the up/down buttons of the microphone.

Rapid selection of the required amateur bands is achieved by means of the front panel up/down switches. Alternatively the switches can be preset to step in megahertz units.

The TRIO TS440S is fitted with a speech processor which can be switched on to enhance transmittted audio when working DX. To improve receive audio the transceiver has both notch filter and IF shift.

An optional computer interface (IF232C) is available for the transceiver.

For the blind operator the TRIO TS440S is ideal. When fitted with the VS1 board (optional), a digitally encoded girl's voice will announce on request the operating frequency and as each mode is selected a tone gives the appropriate morse letter (F for FM, U for USB, etc).

With the TS440S, TRIO have produced a transceiver that combines excellent performance with unparalleled operating facilities in an extremely compact package. The result is a transceiver suitable for mobile and portable use as well as the shack.

TS440S.....**£950.00** inc VAT carriage £7.00.
AT440.....**£125.00** inc VAT carriage £7.00.
PS50.....**£192.60** inc VAT carriage £7.00.

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

send £1 for complete mail order catalogue.

remember the TR9000 two metre multimode, that revolutionized mobile operation, the TR9130, that improved the unimprovable,

now, better than ever, the NEW TRIO two metre multimode, the **TR751E**.

There has been a TRIO metre multi-mode mobile transceiver for the last six years. Beginning with the successful TR9000 and continuing with the TR9130, amateurs have always found the series to be reliable and above all easy to operate, especially whilst mobile. Advances in technology have enabled TRIO to further improve on the TR9130. Additional operating features have resulted in an even easier to use and smaller transceiver. However TRIO have not discarded the valuable experience gained over the last six years. The result is the TR751E, a new generation of multi-mode mobile transceiver.

The TR751E is the first multi-mode mobile transceiver that can be set to select the correct mode whilst scanning the band. By setting the rig to VFO and selecting AUTO mode before pressing SCAN button, the TR751E will move up or down the band changing both mode and step rate according to the band plan (5kHz/SSB, 12.5kHz/FM or 1kHz/SSB, 5kHz/FM depending on the selected frequency step).

The transceiver has two VFO's and 10 memory channels. Memory information is easily transferred to either VFO. Each memory holds information on frequency, mode and also the step rate to be set when transferring the memory information to VFO. Memory channel one is also the ALERT frequency, memories 7 and 8 relate to DCL and memory 9 programs the user defined limits of frequency scan.

The TR751E can be set to scan between user programmed limits or around them depending on the frequency set when the scan is started. When AUTO mode is set the transceiver will select the correct mode as it scans. In addition to scanning each memory, the TR751E can be set to scan those memories programmed with the same mode. Pause on an occupied channel is time operated but can be changed to carrier hold by an internal modification.

Operating on 13.8 volts DC, power output from the transceiver is 25 watts (high) and approximately 5 watts (low). The low power setting applies to all modes. When compared with the TR9130, the TR751E is smaller and lighter, TR751E (TR9130) 180mm (175mm) wide, 60mm (68mm) high, 213mm (253mm) deep, 2.1Kgs (2.4 Kgs).

The TR751E is perfect for base station use. When operating on SSB, signals can easily be found using the frequency step set to 5kHz, fine tuning quickly achieved by switching to the 50Hz rate. Operation is also ideal on FM, the rig stepping in either 12.5 or 5 kHz steps. Full repeater facilities are also available including Reverse Repeater. Receiver performance is excellent, our first sample amazed us, FM, 0.14μV for 12dB SINAD and SSB, 0.09μV for 10dB S+N/N.

As an option, the TR751E can be fitted with DCL. Compatible with the DCS system, DCL (Digital Channel Link) enables your rig to automatically QSY to an open channel. The DCL system searches for an open channel (checks the next eleven 25kHz spaced frequencies above the one stored in memory 7), remembers it, returns to the original frequency and transmits control information to the other DCL equipped station that switches BOTH rigs to the clear channel.

For the blind operator the TRIO TR751E is perfect. As each mode is selected a tone gives the appropriate morse letter (F for FM, U for USB, etc) and when fitted with the optional VSI board, a digitally encoded girl's voice will announce on request the operating frequency.

In addition, the TR751E has an illuminated analogue S/RF meter, all mode squelch, MHz select keys, a noise blanker, semi break-in CW with side tone, RIT, memory channel up/down keys and a frequency lock. TRIO's attention to detail can be seen in the design of the included mobile mount, a clamp system with rubber pads protecting the rig as it is slid in and out and for security, the clamp can be easily locked in the closed position.

Better than the TR9130 and at the same price, there is so much more to say about the TR751E, so why not ring us and let's talk about it.

LOWE ELECTRONICS LTD.

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

send £1 for complete mail order catalogue.

DAIWA meters.

Two SWR/POWER meters from DAIWA, each having the excellent crossed needle meter system for ease of operation.

NS448

First the NS448 with a range from 900 to 1300 MHz. Impedance 50 ohms. Power range forward 5/20 watts, reflected 1·6/6·6 watts. Coaxial cable connections are N type.
NS448 meter . . . **£75.00** carr £2.50

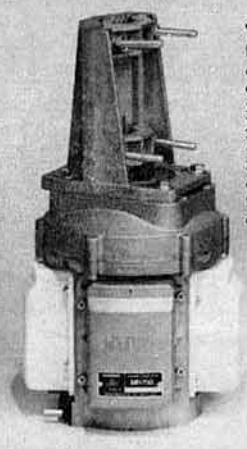
And the NEW NS660P
Frequency range of the new meter is 1·8 to 150MHz. Impedance 50 ohms. Power range is switchable, 15/150/1500 watts. Meter reading is also switchable, average, normal PEP and hold PEP. SO239 connectors.

As well as being able to connect the aerial and transceiver cables directly to the back panel of the NS660P, provision has also been made for the connection of a remote sensor head (U66V) which adds the frequency range 140 to 525MHz. The advantages of the remote sensor are that it adds UHF capability to the NS660P and can be placed directly in the coax run without the need for additional lossy RF cable. By using the optional extension cable (SC20) the sensor can also be located up to 20 metres away from the meter eg adjacent to the aerial. **NS660P meter . . . £90.50** carr £2.50

NS660P

Optional head (U66V).
Frequency range 140 to 525MHz.
Maximum 300 watts.
N type connectors.
U66V remote head . . . £48.00
carr £1.50

DAIWA rotators . . . . .



The new range of rotators from DAIWA, the MR series, are designed so that additional motors can be added around a central core, each motor increasing the rotators turn and braking capacity. The MR series will accept up to four motors being initially supplied with one. As the number and size of aerials increases, additional motors can be added, and both turning capacity and braking effort increased.

MR750E	Multitorque rotator (round controller).....	**£214.13** inc VAT,
MR750PE	as above but with preset controller.....	**£241.44** inc VAT,
MR300E	Higher speed version with round controller..	**£214.13** inc VAT,
LMC	lower mast clamp.....	**£15.55** inc VAT,
MR750U	additional motor for MR750E/PE.....	**£71.74** inc VAT,
MR300U	additional motor for MR300E.....	**£71.74** inc VAT,

Carriage on rotators £7.00, components £3.00

NEW from TRIO, a 45 watt fm mobile. . . . .

The TRIO TM2550E is a high power 2 metre FM mobile transceiver.

Power output from the TM2550E is 45 watts. Current drain is approximately 9.5 amps in the high power position (45 watts) and approximately 3 amps in the low power position (5 watts). Low power can be adjusted up to 40 watts. Power requirement of the transceiver is 13.8 volts DC.

Frequency selection is easy using the back-lit front panel keypad. The selected frequency is displayed on a backlit LCD together with additional operating information, eg priority channel, reverse repeater, simplex or repeater shift etc.

The TM2550E has 23 memory channels into which frequencies are easily written. The TM2550E automatically selects simplex or repeater mode in accordance with the band plan. This function is easily overridden by using the "OS" key.

Scanning operations are divided into keyboard, memory and priority scan. Frequency hold on an occupied channel can be either "time" or "carrier" operated.

As an option, the **TM2550E** can be fitted with the DCS system, DCL (Digital Channel Link) enables your rig to automatically QSY to an open channel. The DCL system searches for an open channel (checks the next eleven 25kHz spaced frequencies above a user designated one), remembers it, returns to the original frequency and transmits control information to the other DCL equipped station that switches BOTH rigs to the clear channel.

TM2550.....£399.00 inc vat, carriage £7.00.
MU1 DCL unit.....£26.78 inc vat, carriage £1.00.

LOWE ELECTRONICS LTD.

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

send £1 for complete mail order catalogue.

NEW from the Japan Radio Company, the NRD525

The enthusiastic short wave listener knows all too well the excellent performance of the NRD505 and NRD515 general coverage receivers from the JAPAN RADIO COMPANY. Building on the experience gained from the production of these outstanding receivers, JRC introduce a new model, the NRD525, combining advanced performance with the first class construction of the NRD505.

The NRD525 is a double superheterodyne receiver having a first IF of 70.45399/70.453MHz and a second of 455kHz. The receiver covers frequencies from 90kHz to 34MHz. An optional internally fitted converter (CMK165) will be available adding the following frequency ranges, 34 to 60MHz, 114 to 174MHz and 423 to 456MHz.

Modes of operation for the JRC NRD525 are USB, LSB, CW, AM, FM and RTTY. An optional RTTY demodulator (CMH530) will be available enabling a printer to be directly connected to the receiver. The receiver also has a squelch control which operates on all modes.

The NRD525 has been designed to perform when conditions for reception are far from perfect. To help copy weak signals on a crowded band both notch filter and pass band tuning controls are included. The receiver has, as standard, a 3kHz filter for USB and LSB (INTER)), a 6kHz filter for AM (WIDE) and in the AUX position on a bandwidth of 12kHz. If an optional filter is placed in the AUX position the 12kHz bandwidth ceases to be available. For CW and RTTY reception the NARR position can be fitted with the optional 500kHz filter (CFL232). In the FM mode (narrow band FM), BANDWITH and AGC switches do not function.

The NRD525 is extremely "user friendly" having an easy to use numeric keypad for frequency entry and memory selection. Whether you are entering a full shortwave frequency, Vatican Radio on 6185kHz, or the three digits of Radio Czechoslovakia's long wave transmission on 272kHz, entry is simple, key in the digits as read and press enter. A megahertz only frequency can also be easily entered into the NRC525, simply key in the required number, eg 6 and press the button marked MHz. Switch pads select mode and bandwidth whilst a large heavy knob makes fine tuning a pleasure. A quick tune up or down the band is easily achieved using the up/down pads conveniently located above the tuning knob.

Memory capacity is 200 channels. As well as frequency, each memory holds mode, bandwidth, AGC setting (slow, fast and off) and whether or not the attenuator (approx 20dB) is on or off. Frequencies can be easily transferred from memory to VFO.

The NRD525 has both memory scan and frequency sweep. The receiver can be quickly programmed with the START and END memory channel numbers. Pressing the run button initiates memory channel scan. Operation of frequency sweep is similar, START and END frequencies being entered before commencing sweep.

By pressing numeric key 4, the input RF filters are bypassed or inserted in circuit. When bypassed the display indicates PASS, an excellent feature when receiving very weak signals.

The NRD525 will operate from either 100/120/220/240 volts AC (selectable on back panel) or 13.8 volts DC so making it suitable for use at home or, when out, portable. Add to the above an audio tone control, a tunable BFO for enhanced CW operation, an adjustable level noise blanker, a dimmer switch for the fluorescent display, the ability to connect a high or low impedance aerial and switch between the two, a mute jack socket for use with a separate transmitter and the result is **the NRD525 from the JAPAN RADIO COMPANY, a first class receiver purpose built for the dedicated short wave listener.**

LOWE SHOPS

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

In the North East,
the shop manager is Don, G3GEA,
the address, 56 North Road, Darlington,
telephone 0325 486121.

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

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

In London,
the shop manager is Andy, G4DHQ,
the address, 223/225 Field End Road, Eastcote, Middlesex,
telephone 01-429 3256.

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

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.....**£435.00** inc VAT carriage £7.00
RC Pack.....**£221.00** inc VAT carriage £7.00
ARPROM (BBC).....**£10.00** inc VAT carriage £1.00

LOWE ELECTRONICS LTD.

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

send £1 for complete mail order catalogue.

The Best HF

The New ICOM HF Flagship.

IC-751A

ICOM are proud to launch their new flagship. The IC-751 was good, the new ICOM IC-751A is even better. With a general coverage receiver 100KHz – 30MHz it is a full featured all-mode solid state transceiver that covers all the WARC bands. The IC-751A has an excellent 105db dynamic range and features pass band tuning, notch filter, adjustable AGC, noise blanker and RIT. A receiver pre-amp provides additional sensitivity when required. On C.W. the electronic keyer is standard and 40 w.p.m. at full break-in is possible. The FL32 500Hz C.W. filter is fitted as is sidetone on receive mode. On SSB the new FL80 2.4KHz high shape factor filter is fitted.

The high reliability transmitter, full 100% duty cycle designed for SSB, CW, AM, FM, RTTY and Amtor, with a high performance speech processor to enhance the IC-751A transmitters operation. With 32 memory channels and twin V.F.O.'s, scanning of frequencies and memory are possible from the transceiver or from the HM12 mic supplied.
The IC-751A is fully compatible with ICOM auto units such as the AT500 automatic antenna tuner and the IC-2KL linear amplifier. Options available: PS35 internal A.C. P.S.U., PS15 external A.C. P.S.U., EX310 voice synthesizer, SM8 and SM10 desk mics and various filter options.

British TELECOM Approved Dealer for Cellnet Mobile Phone Division

Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Tha

ICOM

The ICOM Control System

If you have a BBC Micro (Model B) or Commodore 64 or 128, the ICOM control system can control up to four (or more) ICOM radios in the range: IC-751, 735, R71, R7000, 271, 471 and 1271 (and 745 with modification). The help menu shows the available functions.

	H = HELP	↔	Frequency Steps
F0	Frequency	↑ V	Up/Down (arrows)
F1	Select Mode	M	Memory Channel
F2	Freq/Memory Scan	,.	Memory Up/Down
F3	Mode Scan	/	VFO/Memory
F4	VFO → Memory	B	Bargraph Select
F5	Memory Write	@	Occupancy On/Off
F6	Memory Clear	:	Scan Stop Off/On
F7	Set 'SIG' Level	S	Change Set
F8	Memory File Read	DEL	Speech (If fitted)
F9	Memory File Write	Q	Quit

IC-735, The Compact HF Radio

The new ICOM IC-735 is ideal for mobile portable or base station operation. It has a general coverage receiver from 0.1MHz to 30MHz and transmits on all amateur bands from 160m to 10m. SSB, CW, AM and FM modes are included as standard. RTTY and Amtor are also possible. The IC-735 has a built-in receiver attenuator, pre-amp, noise blanker and RIT to enhance receiver performance. A 105dB dynamic range with pass band tuning and a sharp I.F. notch filter for superior reception. The twin VFO's and 12 memories can store mode and frequency. The HM12 scanning mic is supplied. Scanning functions include programme scan, memory scan and frequency scan.
The IC-735 is one of the first H.F. transceivers to use a liquid crystal display which is easily visible under difficult conditions. Controls that require rare adjustment are placed behind the front panel hatch cover but are immediately accessible. Computer remote control is possible via the RS-232 jack. Output power can be adjusted from 10 to 100 watts with 100% duty cycle. A new line of accessories are available, including the AT150 electronic automatic antenna tuner and the PS55 AC power supply. The IC-735 is also compatible with most of ICOM's existing line of HF accessories. See the IC-735 at your authorised ICOM dealer or contact Thanet Electronics Limited.

ICOM

IC-1271E, 1·2GHz Multimode Transceiver

ICOM, a pioneer in 1.2GHz technology are proud to introduce the first full feature 1240 – 1300 MHz base station transceiver. Features include: multimode operation, 32 memories, scanning and 10 watts RF output. The IC-1271E allows you to explore the world of 1.2GHz thanks to a newly developed PLL circuit that covers the entire band, a total of 60MHz, SSB, CW and FM modes may be used anywhere in the band making the IC-1271E ideal for mobile, DX, repeater, satellite or moonbounce operation. The IC-1271E has outstanding receiver sensitivity, the RF amplifiers use a low noise figure and high-gain disc type GaAs FET's for microwave applications. The rugged power amplifier provides 10 Watts which can be adjusted from 1 to 10 Watts. A sophisticated scanning system includes memory scan, programme scan, mode-selective scan and auto-stop feature. Scanning of frequencies and memories is possible from either the transceiver or the HM12 scanning microphone. 32 programmable memories are provided to store the mode and frequency in 32 different channels. All functions including memory channel are shown clearly on a seven digit luminescent dual colour display. The IC-1271E has a dial-lock, noise blanker, RIT, AGC fast or slow and VOX functions. With a powerful 2 Watt audio output the IC-1271E is easily audible even in a noisy environment. The transceiver operates with either a 240V AC (optional) or 12 volt DC power supply.

What's this? _ IC-28E, the very latest 2m. FM mobile transceiver from ICOM.

Contact us for the facts, NOW!

British TELECOM Approved Dealer for Cellnet Mobile Phone Division

Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Tha

ICOM

IC-3200E Dual-band

If you are a newly licensed or just undecided about which band to first operate, then the ICOM IC-3200E is just the answer. This is a dual-band (144-146/430-440MHz) F.M. transceiver ideally suited for the mobile operator. The IC-3200E has a built in duplexer and can operate on one antenna for both VHF and UHF, and with 25 watts of output power on both bands (the low power can be adjusted from 1 to 10 watts) you can never be far from a contact whether simplex or 2m/70cm repeater.
The IC-3200E employs a function key for low priority operations to simplify the front panel and a new LCD display which is easy to read in bright sunlight, 10 memory channels will show operating frequencies simplex or duplex, and four scanning systems memory, band, program and priority scan. Try this exciting set from ICOM the IC-3200E, when only the best will do.
Options include IC-PS45 AC power supply, HS15 mobile boom mic, SP10 external speaker, UT23 speech synthesizer and AH32 dual-band mobile antenna.

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.

You can get what you want just by picking up the telephone. Our mail order department offers you free same day despatch whenever possible, instant credit, interest free H.P., Barclaycard and Access facility, 24 hour answerphone service.

Listed here are just some of the authorised dealers who can demonstrate ICOM equipment all year round. This list covers most areas of the U.K. but if you have difficulty finding a dealer near you, contact Thanet Electronics and we will be able to help you.

Alyntronics, Newcastle, 0632-761002.
Amateur Radio Exchange, London (Ealing), 01-992 5765.
Amcomm, London (S. Harrow), 01-422 9585.
A.R.E. Comms, Earlestown, Merseyside, 09252-29881.
Arrow Electronics Ltd., Chelmsford, Essex, 0245-381673/26.
Beamrite, Cardiff, 0222-486884.
Booth Holdings (Bath) Ltd., Bristol, 02217-2402.
Bredhurst Electronics Ltd., W. Sussex, 0444-400786.
D.P. Hobbs, Norwich, 0603-615786.
Dressler (UK) Ltd., London (Leyton), 01-558 0854.
D.W. Electronics, Widnes, Cheshire, 051-420 2559.
Eastern Communications, Norwich, 0603 667189.
Hobbytronics, Knutsford, Cheshire, 0565-4040. Until 10pm daily.
Poole Logic, Poole, Dorset, 0202 683093.
Photo Acoustics Ltd., Buckinghamshire, 0908-610625.
Radcomm Electronics, Co. Cork, Ireland, 01035321-632725.
Radio Shack Ltd., London NW6, 01-624 7174.
R.A.S. Nottingham, 0602-280267.
Ray Withers Comms, Warley, West Midlands, 021-421 8201.
Scotcomms, Edinburgh, 031-657 2430.
South Midlands Comms. & branches, 0703 867333.
Tyrone Amateur Electronics, Co. Tyrone, N. Ireland. 0662-42043.
Reg Ward & Co. Ltd., S.W. England, 0297-34918.
Waters & Stanton Electronics, Hockley, Essex, 0702-206835.

ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet Electronics
Sea Street, Herne Bay, Kent CT6 8LD
Tel: (0227) 363859.
Dept. RC

AE LTD AMATEUR ELECTRONICS

RETAILER IN THE COUNTRY **TELEPHONE: 021-327 1497/6313**

ATTENTION, FREE POST SERVICE, KEENEST PRICES & EXCELLENT PART EXCHANGE

NORTHERN
Holdings, 45 Johnston St.,
Blackburn. Tel: 0254 59595

EAST MIDLANDS
R.A.S. Notts., 3 Farndon Green,
Wollaton Park, Nottingham. Tel: 0602 280267

YORKSHIRE
A.J. Hooker, 42 Nether Hall Rd.,
Doncaster. Tel: 0302 25690

YAESU ANTENNAS

M150-GSX	2m ¼ / whip	7.35
RSL-435S	70cm ⅝ over ⅝ / whip	28.50
RSM-4M	Mag mount for above	21.00

MICROWAVE MODULES

MML144/30LS	inc preamp (1/3w l/p)	
MML144/50S	inc preamp, switchable	
ML144/100S	inc preamp (10w l/p)	
MML144/100HS	inc preamp (25w l/p)	
MML144/100LS	inc preamp (1/3w l/p)	
MML144/200S	inc preamp (3/10/25 l/p)	
MML432/30L	inc preamp (1/3w l/p)	
MML432/50	inc preamp (10w l/p)	
MML432/100	linear (10w l/p)	

Ring for prices

B.N.O.S.

LPM 144-1-100	2m, 1W in, 100W out, preamp
LPM 144-3-100	2m, 3W in, 100W out, preamp
LPM 144-10-100	2m, 10W in, 100W out, preamp
LPM 144-25-160	2m, 25W in, 160W out, preamp
LPM 144-3-180	2m, 3W in, 180W out, preamp
LPM 144-10-180	2m, 10W in, 180W out, preamp
LP 144-3-50	2MN, 50W out, preamp
LP 144-10-50	2M, 10W out, preamp
LPM 432-1-50	70cm, 1W in, 50W out, preamp
LPM 432-3-50	70cm, 3W in, 50W out, preamp
LPM 432-10-50	70cm, 10W in, 50W out, preamp

FRG-8800 **£575**

TOKYO HY POWER

ATU's

HC-200	HF bands ATU 200W PEP	82.95
HC-400L	HF bands ATU 350W PEP	175.75

LINEARS VHF

HL-30V	30W 2m linear 0.5-3W input	45.00
HL-35V	VHF linear 0.5-5W (3W in 30W out)	69.95
HL-82V	85W 2m linear 10W input	144.49
HL-110V	110W 2m linear	199.00
HL-160V	160W 2m linear 10W input	244.52
HL-160V25	160W 2m linear 25W input	209.75

LINEAR UHF

HL-20U	20W 70cm linear	82.90
HL-30U	30W 70cm linear	119.00
HL-60U	60W 70cm linear 10W input	198.99
HL-120U	120W 70cm linear 10W input	356.85

PREAMPS

HRA-2	2m mast head pre-amp	94.99
HRA-7	70cm mast head pre-amp	103.29

MET ANTENNAS

NOW IN STOCK

70cms

432-5B	5 Ele	16.95
432-19T/ATV	19 Ele	35.60
432-17X	17 Ele Crossed	49.17
432-17T	17 Ele Long	39.20

2M

144-5	5 Ele	19.55
144-7T	7 Ele	24.15
144-8T	8 Ele Long	31.26
144-14T	14 Ele	46.71
144-19T	19 Ele	55.88
144-6X	6 Ele Crossed	39.75
144-GP	Ground Plane	14.41

4M

70/3	3 Ele	30.12
70/5	5 Ele	45.74

POWER SPLITTERS

70cms	2 Way	19.55
	4 Way	23.00
2M	2 Way	25.50
	4 Way	28.75

T.E.T. ANTENNAS

		SRP	Discount Price
AX210N	10 element crossed Yagi. 2 metres	74.94	59.00
HB15F2T	2 element 15 meter beam	60.66	48.50
HB15M2SP	2 element 15 meter mini beam	69.49	55.59
HB210S	10 element 2 meter beam	47.99	38.40
HB23SP	2 element tri-band beam 10, 15, 20m	172.50	138.00
HB23M	2 element tri-band beam (mini) 10, 15, 20m	169.50	135.90
HB32SP	3 element dual-band beam 10, 15m	168.64	134.99
MLA4	HF band 100p antenna	105.60	84.40
MV3BN	Vertical antenna 10, 15, 20m	45.95	36.79
MV3BHR	Vertical antenna 10, 15, 20m + trapped radials	78.00	67.00
Q7U10S	10 element 430 MHz Yagi	67.90	54.32
SQ007	Double quad 430 MHz	66.99	53.59
SQ10	10 meter quad mono band antenna	97.50	78.00
SQ15	15 meter quad mono band antenna	106.89	85.59
SQ22	Double quad 144 MHz	58.95	47.00
SQY06	Swiss quad/yagi 144 MHz 6 element	45.75	36.60
SQY08	Swiss quad/yagi 144 MHz 8 element	52.74	42.00
SSL218	Double 144 MHz slot Yagi 9 element	144.78	115.89
TE214	14 element long Yagi 144 MHz	74.39	59.50

New APPROVED YAESU Stockist in LEICESTER

Elliott Electronics
26/28 Braunstone Gate, Leicester
(0533) 553293

DATONG PRODUCTS

PC1	Gen. Cov. Con	137.40
VLF	Very low frequency conv.	29.90
FL2	Multi-mode audio filter	89.70
FL3	Audio filter for receivers	129.00
ASP/P	r.f. speech clipper for Trio	82.80
ASP/A	r.f. speech clipper for Yaesu	82.80
ASP	As above with 6 pin conn	89.70
D75	Manual RF speech clipper	56.35
D70	Morse Tutor	56.35
MK	Keyboard morse sender	137.40
RFA	RF switched pre-amp	33.90
AD270-MPU	Active dipole with mains p.s.u.	51.75
AD370-MPU	Active dipole with mains p.s.u.	69.00
MPU	Mains power unit	6.90
DC144/28	2m converter	39.67
PTS1	Tone squelch unit	45.00
ANF	Automatic notch filter	67.85
SRB2	Auto Woodpecker blanker	85.25

FT770RH IS NOW AVAILABLE

T30	30 Watt 3.5-500 MHz dummy load	8.05
T100	100 Watt 3.5-500 MHz dummy load	35.20
T200	200 Watt 3.5-500 MHz dummy load	42.55
BL40X	50 ohm-50 ohm 1-1 Balun 1kw pep	16.90
BL50A	50 ohm-50 ohm 1-1 Balun 4kw (pep) 2kw (cw)	19.84
SA450N	2 way antenna switch, 'N' connectors	18.40
SA450M	2 way antenna switch SO239 connectors	14.49
YM1X	3.5-150 MHz 120 Watt SWR/PWR meter	21.49

Insulators

AE/EGG	Ceramic egg insulator	0.40
AE/DOG	Ceramic dog bone insulator	0.60

TOYO

T430	144/432 120W	44.65
T435	144/432 200W	49.35

HI-MOUND MORSE KEYS

HK702	Up down keyer marble base	30.95
HK703	Up down keyer	29.35
HK704	Up down keyer	19.95
HK705	Up down keyer	15.49
HK706	Up down keyer	16.96
HK708	Up down keyer	14.95
HK802	Up down solid brass	86.31
HK803	Up down brass	82.64
HK808	Up down keyer	39.95
MK704	Twin paddle keyer	13.50
MK705	Twin paddle keyer marble base	25.65

KENPRO

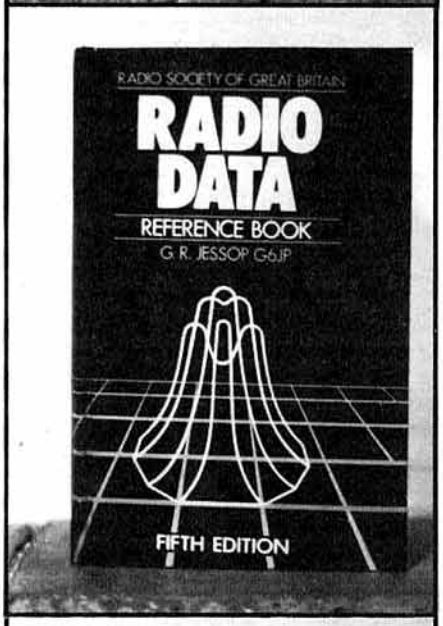
KP100	Squeeze CMOS 230/13.8v	82.50
KP200	Memory 4096 Multi channel	169.50

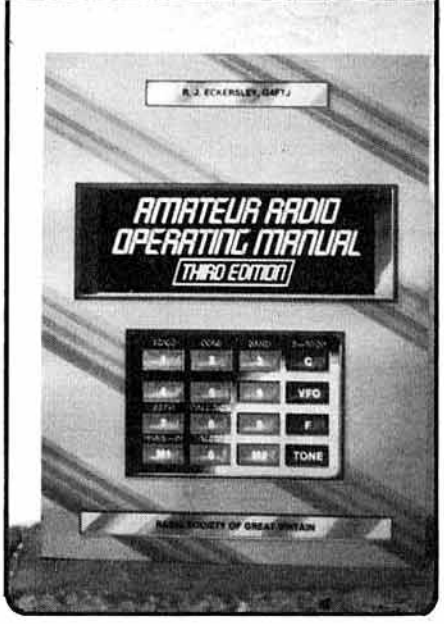
Prices are correct at time of going to press
Contact us now for immediate quotation

FREEPOST - MAIL ORDER ENQUIRIES

Amateur Electronics Ltd.
FREEPOST
Birmingham B8 1BR

504 ALUM ROCK ROAD,
ALUM ROCK, BIRMINGHAM B8 3HX





THE LATEST FROM RSGB

AMATEUR RADIO SOFTWARE by John Morris, GM4ANB. Designed to be a sourcebook for the radio amateur program. Contains 86 programs written in BASIC and 6 in assembly language. The introductory chapter describes the differences between various versions of BASIC so that the programs presented can be modified slightly in order to be used on as many types of computer as possible. The remaining 8 chapters cover: CW, sending and receiving; RTTY and Data including Amtor and packet; Antennas and Propagation, predicting path loss, propagation predictions; Distances, Bearings and Locators; Satellites, predicting elliptical and geostationary orbits; Sun and Moon; Circuit Design Aids, filters and matching networks; Miscellany, a simple data base system and network analysis package. Copyright 1985, 328 pages, £7.39 hardbound. First Edition.

RADIO DATA REFERENCE BOOK by G. R. Jessop, G6JP. This handy publication is divided into 9 chapters: Units and symbols, Basic calculations, Resonant circuits and filters, Circuit design, Antennas and transmission lines, Radio and TV services, Geographical and meteorological data, Materials and engineering data, and Mathematical tables. You'll find hundreds of useful tables, charts and formulas. Fifth Edition, Copyright 1985, 244 pages, £7.76 hardbound.

AMATEUR RADIO OPERATING MANUAL by R. J. Eckersley, G4FTJ. Besides such chapters as Setting up a station, and Mobile, Portable and Repeater Operation, the reader will find information in the Appendices most useful. There are continental and regional maps which show the prefixes assigned to each area and listing of countries showing ITU callsign allocations, callsign systems for each country, notes on foreign amateur operation, addresses of licensing administrations and the names and addresses of National Amateur Radio Societies. Third Edition, Copyright 1985, 204 pages. Softbound £5.54.

1986 RSGB Amateur Radio Call Book now available

RSGB PUBLICATIONS (SALES)
LAMBDA HOUSE, CRANBORNE ROAD
POTTERS BAR, HERTS EN6 3JE

A.R.E. Communications Ltd.

38 BRIDGE ST., EARLESTOWN
NEWTON-LE-WILLOWS
MERSEYSIDE. TEL: 09252 29881

YAESU FT 290 AND FT-690

Probably the most popular multi-mode 2 metre transceiver ever made. Also now available for 6 metres.

OUR PRICE £349 FOR 2M £229 FOR 6 METRES

NEW ICOM ICR7000

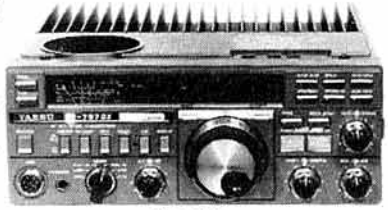
25MHz-2GHz THE PROFESSIONAL ONE

All mode. 99 Memories. Keyboard entry or UFO control. 6 tuning speeds. .1-1-5-10-12½-25KC. Dial lock. Optional infra-red control + voice synthesiser.

£849

YAESU FT-757GX

Another one of Yaesu's super stars. The ever popular HF transceiver that requires no extras. Complete with FM, SSB, CW, AM, General coverage for AF Speech processor Scan + memories



£799

ICOM IC3200

Dual band mobile or base transceiver. 2 metre + 70cm Built-in Duplexer.

LIST PRICE £495
OUR PRICE £399

NEW—TELEREADERS

We are please to announce two new telereaders for CW, RTTY and TOR. CW 4-40wpm. Baudot 45.5-50-57-74.2 TOR 100 baud. ASCII 75-110-330 baud. FR or video display and/or printer. Model 880 includes LCD display.

CWR-880 **£250.00** inc VAT
CWR-860 **£225.00** inc VAT

HAND-HELD TRANSCEIVERS

ALL POPULAR MODELS FROM STOCK

FT-203	**FROM £199**
FT-209	**FROM £225**
FT-209RH	**FROM £259**
FT-703	**FROM £225**
FT-709	**FROM £269**
TH-21	**£149**
Heavy Duty Battery PB21H TH-21 & TH-41	**£25**

THIS MONTH'S SPECIAL

FT9600 VHF/UHF SCANNING RECEIVER WITH HF CONVERTER

60MHz-905MHz plus 500kHz-60MHz

£449 inc VAT

YAESU FRG-9600

All mode scanning receiver, covers 60-905MHz. Tune by keyboard or central control. Variable step sizes. AM, FM or SSB.

The scanner with more functions than most and now available with HF converter. See opposite column.

Phone for our price. From £399

CONVERT YOUR SCANNER TO 1.3GHz OR HF OR BOTH

A.R.E. Communications have developed 2 converters to match most VHF scanners. If you own an AOR2001 the converter will tune to 1.3GHz or if you have an FT-9600 you can convert down to HF tuning from 100KC to 30MHz to make a truly general coverage receiver.

UHF £89 *Trade Enquiries Welcome* **HF £49**

Phone 09252-29881 for all mail order – Access & Barclaycard accepted

Trade enquiries welcome

Opening hours: Tuesday–Saturday 10am–5pm

All prices include VAT and are correct as we go to press

ICS

presents the brilliant

ALINCO

2 Metre Transceivers

ALR–206E — 25 watts — 2 metre mobile transceiver

- 144–146 MHz FM
- 25 watts output
- 10 memory channels, band scan
- All programming from key pad on microphone
- Back lit LCD frequency display with LCD 'S' meter
- Frequency selection from front panel or microphone
- Mobile mount included

The ALR–206E is an exciting new mobile transceiver from Alinco.
Micro processor controlled versatility and programming from the microphone in a compact package.

ALR–206E Price: **£295 inc.VAT (p & p £2.50)**

ALM–203E — 3/5 watts — 2 metre handheld transceiver

- 144–146 MHz FM
- 3 watts with NiCad, 5 watts with DC/DC converter
- 10 memory channels
- Programable band scan
- Switchable 150–160 MHz Rx (marine band)
- 'S' meter
- Toneburst
- NiCad, charger supplied as standard

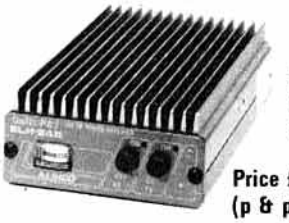
Options:

Spare NiCad	**£33.75**
Dry cell case	**£7.50**
DC/DC converter	**£13.50**
Case	**£14.50**
Cigar plug cable	**£4.50**
Mobile charger mount	**£26.50**
Speaker/microphone	**£18.50**

(prices do not include post & packing)

£239 inc.VAT (p & p £2.50)

ELH – 24B



Built in Ga As FET Pre-amp

Price £69. inc.VAT (p & p £2.50)

INCREDIBLE OFFER!

save over £58.00

Purchase the ALM-203E and ELH-24B together for just

£249.95 (p&p £4.00)

ICS

ICS Electronics Ltd.,
PO Box 2
Arundel
West Sussex BN18 0NX

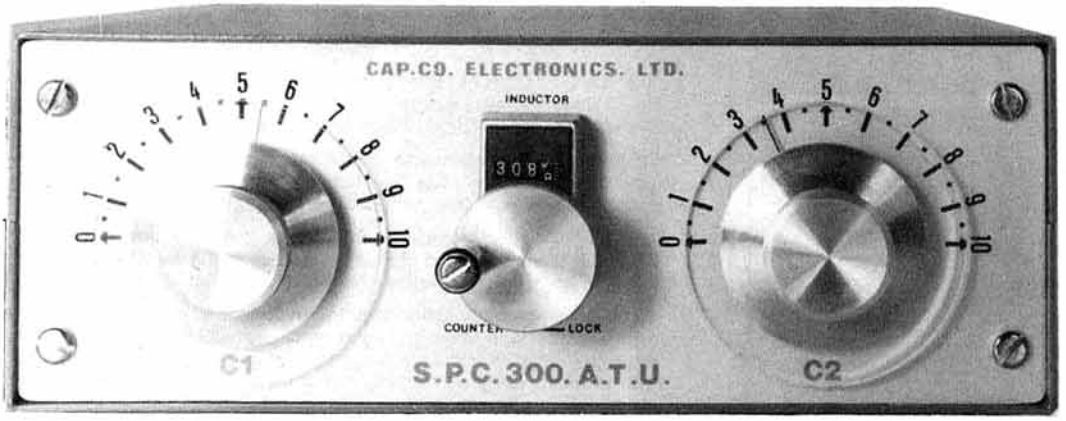
Telephone: 024 365 590

12 months parts + labour waranty
Dealers throughout U.K.
Prices may vary with exchange rate.
Callers by appointment

VISA

Access

Whichever Way You Look At It . . .



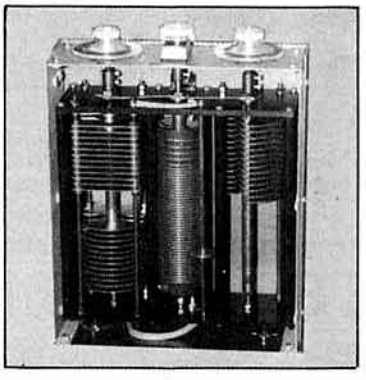
It's A Winner!

Hot on the heels of the new AMCOMM – ARE merger we are pleased to announce we are now sole Worldwide Distributors of the CAP Co. SPC 300 Antenna Coupler.

- **Versatile Circuitry that can be switched to seven different matching configurations**
- **Will match anything from a piece of wire to a halfwave — 160m to 10**
- **Robust steel cabinet — satin finish aluminium front**
- **Power handling: 1kw**
- **Input Impedance: 50 — 75 ohms**
- **Frequency coverage: 1.8MHz — 29.7MHz**
- **Size: 12in deep x 3½in high x 12¾in wide**

(MODULES HANDLING UP TO 3kw AVAILABLE)

This remarkable, robustly built Antenna Coupler is a must for the H.F. operator who wants maximum performance from his antenna — **whatever it is.** High quality ensures top performance and long life — as one reviewer put it, "I recommend it for those of you who decide to purchase an A.T.U. which will be used as long as you are licensed."



The circuit format provides **substantial harmonic rejection** and it is possible to match an extremely wide range of antenna resistances and reactances from any of the following configurations:

(a) 'Series L & C match'
(b) 'L & C match' (c) 'transmatch'
(d) 'Pi match' (e) 'L match'
(f) 'T match'

— Send for details now to:

DEALER ENQUIRIES WELCOME

AMCOMM – ARE

373 Uxbridge Road, Acton, London W3 9RN Telephone: 01-992 5765/6 Telex: 334312

Communications Ltd.

AUTHORISED YAESU

SO4 4DP, ENGLAND. Tel: (0703) 867333, Telex: 477351 SMCOMM G.

THE DX

FT757GX

The FT757GX is the latest in a long line of superb HF transceivers from Yaesu. The transceiver covers all the amateur bands with a full 0·5-30MHz continuous coverage receiver. Dual VFOs and eight memories all controlled by three microprocessors allow quick and accurate control of all the main functions.

All modes SSB, CW, AM and FM are included as standard along with a 600Hz CW filter, iambic keyer with dot-dash memory, 25kHz marker, noise blanker, AF speech processor and IF shift/width filters. Top panel switch selectable semi-break in or QSK is available for CW operation.

The Yaesu CAT (computer aided transceiver) system is fitted to enable external control of VFO frequency and memory functions from a personal computer via an interface unit for customised band scanning and control of the memories and VFOs.

The remarkable new heatsink design includes a quiet cooling fan with a new duct-flow cooling system incorporating the heatsink into the body of the radio. This gives forced air circulation allowing 100W PEP continuous output at 100% duty cycle in all modes.

The high performance General Coverage Receiver with Yaesu's unsurpassed IF shift/width system, switchable AGC and 20dB atenuator, combined with the switchable, RG preamp provides the FT57GX with a dynamic range in excess of 100dB in CW narrow.

The optional FC757AT is a fully microprocessor controlled antenna tuner which gives fast, reliable automatic tuning of a broad range of SWRs, with manual override for that particularly 'difficult' aerial. Also included is a dummy load, automatic SWR calculating system and meter and a duak range RF Wattmeter.

TOP PERFORMERS

FM 240
FM 740

Featuring:-
M. M. I.
Sixteen Memories
Voice Synthesiser (opt)
25W RF o/p FM 240
10W RF o/p FM 740
0·2μV for 12dB SINAD

FM 240 £329
FM 740 £339

YAESU'S TOP PORTABLES

FT290R

Never before possible from such a compact package, true multimode operation is yours to enjoy. With CW and SSB activity at an all-time high, you will not be left out of the satellite or DX action and you can still ragchew on FM simplex or even via a repeater.

Advances in microprocessor circuitry allows selectable synthesizer steps, up/down scanning from the microphone, priority channel operation, and ten memories (with memory scan), all called up with fingertip ease.

A large Liquid Crystal Display provides readout of the operating frequency. It is highly readable under conditions of bright sunlight and is backed up by a lamp for night-time operation.

The optimum synthesizer steps for SSB/CW FM operation are very different. That's why Yaesu gives you the flexibility of two synthesizer steps per mode: 100Hz or 1kHz per step on SSB, AM & CW, and 12½/25kHz on FM. When changing modes from SSB/CW to FM, you transceiver is automatically set to the nearest standard channel when you start scanning or tuning.

As many as ten frequencies may be stored into memory, for instant recall. The priority feature allows you to check a favourite frequency every few seconds, with automatic halting (FM mode) when the channel is clear or busy, as desired. Memory backup is provided by a built-in lithium cell.

Among the many features adding to the convenience of the transceiver is a supplied portable antenna, a high-performance noise blanker, a high/low power switch. A clarifier allows you to follow unstable or Doppler-shifted signals.

FT690R

These transceivers feature a digitally synthesized dual VFO system which provides tremendous flexibility in day to day operation. For example, one VFO may be set up in the SSB portion of the band, and the other in FM sub-band, for immediate QSY when changing modes.

WHY NOT TAKE ONE AWAY(!) TODAY

★ **FREE FINANCE**
On many regular priced items SMC offers Free Finance (on invoice balances over £120) 20% down and the balance over 6 months or 50% down and the balance over a year.
You pay no more than the cash price!
details on eligible items on request.

SMC SERVICE
Free Securicor delivery on major equipment.
Access and Barclaycard over the phone.
Biggest branch agent and dealer network.
Securicor 'B' Service contract at £5.00.
Biggest stockist of amateur equipment.
Same day despatch possible.

GUARANTEE
Importer warranty on Yaesu Musen products.
Ably staffed and equipped Service Department.
Daily contact with the Yaesu Musen factory.
Tens of thousands of spares and test equipment.
Twenty-five years of professional experience.
• 2 Year warranty on regular priced Yaesu products.

BARCLAYCARD VISA

AGENTS: JOHN DOYLE, TRANSWORLD COMMS, NEATH (0639) 52374 DAY (0639) 2942 EVE and JACK McVICAR, SCOTCOMMS, EDINBURGH 031-657 2430

SMC JUST BARGAINS

COLLECTION OF THIS MONTH'S SMC BARGAINS

JUST BARGAINS Why 'just', because all the items offered below are genuine. S.M.C. are the largest amateur company in Europe and are therefore able to buy at the best prices to provide you with the best bargains and support. S.M.C. the first and only Company who offers both 2-year guarantee and free finance of Yaesu equipment, supports this offer with £100,000 of spares and service engineers. We have more spares and back-up than most amateur companies' total stocks. Buy direct and be content that you have the back-up of the U.K's largest (and one of Europes leading) companies.

JAY BEAM

THIS MONTH'S BARGAINS
FREE DELIVERY SAVE POUNDS

TB3 hf 3 ele beam	£230.00
TB2 hf 2 ele beam	£155.25
TB1 hf rotary dipole	£83.38
CK1-2 conv. kit TB1-2	£79.93
CK1-3 conv. kit TB1-3	£155.25
CK2-3 conv. kit TB2-3	£87.40
UGP/2m ground plane	£14.84
C5 vert. 4.8dBd Eg	£86.25
LR1/2m vert. 4.3dBd	£34.62
LR2/2m vert. omni	£27.20
LW5/2m 5 el 7.8dBd	£16.68
LW8/2m 8 el 9.5dBd	£21.05
LW10/2m 10 el 10.5	£27.20
LW16/2m 16 el 13.4	£40.83
PBM10/2m parabm 11.7	£53.13
PMM14/2m parabm 13.7	£65.49
Q4/2m qd 4 el 9.4dBd	£33.98
Q6/2m qd 6 el 10.9dBd	£44.51
Q8/2m qd 8 el 11.9dBd	£55.60
D5/2m 5 over 5 10dBd	£29.67
D8/2m 8 over 8 11.1	£40.77
5XY/2m 5 el crossed	£32.14
8XY/2m 8 el crossed	£41.40
10XY/2m 10 el crossed	£51.92
10XY/137 Sat Xd yagi	£55.20
2XY/B7/G h/ness 137	£34.50
X6/2m/X12/70 2m/70cm	£47.55
C8/70 vert. 6.1dBd bg	£92.00
D8/70 8 over 8 12.3	£30.30
PBM18/70 parabm 13.1	£37.09
PBM24/70 parabm 15.	£49.45
LW24/70 24 el 14.8dBd	£33.35
MBM28/70 mult 11.5	£24.73
MBM48/70 mult 14dBd	£40.83
MBM88/70 mult 16.3	£55.78
8X7/70 crossed 10dBd	£48.24
12X7/70 crossed 12dBd	£59.28
CR2/23cm cn ref 613.5	£43.70

ICOM

ICV751 HF tcvr	£1299.00
IC745 tcvr	£899.00
IC735 HF tcvr	£839.00
PS35 PSU	£174.00
PS15 PSU	£145.00
PS55 PSU	£168.00
SM6	£40.25
ICR71 Receiver	£699.00
IC271E 2m base	£729.00
IC471E 70cm base	£829.00
Higher power units available	
IC290D All-mode	£479.00
IC27E 2m FM	£379.00
IC47E 70 cm FM	£469.00
IC2E 2m	£199.00
IC02E 2m	£265.00
IC04E 70cm	£275.00
BP3 Ni-cad pack	£27.00
LC3 Case	£5.50
LC11 Case	£6.80

MICROWAVE M.

ML144/30LS	£94.30
MML144/50S	£106.95
MML144/100S	£149.95
MML144/100HS	£159.85
MML432/30L	£169.95
MML432/50	£149.95
MML432/100	£299.00
MMG144V	£37.90
MMT144/28R	£236.90
MMC435/600	£35.65
MMC50/28S	£35.65
MMC432/28S	£39.90
MMC432/144S	£39.90
MMK1296/144	£129.95

OSCAR MOBILE

ELEMENT ONLY, BASE EXTRA

370F 4m 2dB¼	£18.50
2QW 2m ¼ λ	£2.96
2NE 2m ⅝ λ 3dB¼	£8.94
78F 2m ⅞ λ 4.5dB	£18.64
78B 2m ⅞ λ ball mt	£18.64
78SF 2m ⅞ short whip	£18.64
88F 2m 5.2	£24.10
258 70cm 5.5dB¼	£29.37
268E 70cm 6dB¼	£29.37
358 70cm 6.3dB¼	£33.73
70N2DX 2m/70 2.7/5.1	£25.90
2N6M 50/144	£10.47
72SM 2S 2m/70cm	£9.20
38F 2m mobile ele	£10.47
HS770 144/432 duplex	£21.30
GCCA Gutter 4m cble	£12.65
SOCA 4m cable + PL259	£6.90
SOCAL 6m cable + PL259	£7.20
SOCALLR 4m long reach	£8.60
TMCAS trunk mount 6m	£11.75
TMCA H.D. trunk mt	£16.10
SOMM magnetic mt 4m	£12.45
SOWM adj wing mount	£6.00
GCD gutter d/l adj	£6.45
BSD bumper strap	£11.50
HS88BK bumper mt ext	£23.35
CARRIAGE EXTRA £2	
BASES FREE WITH ELEMENTS	

OSCAR BASE ANTENNAS

GDX1 Discone 80-480	£51.00
GDX2 Discone 50-480	£64.00
GDXA Discone 100-440	£43.00
VHFL Discone Rx only 65-520	£21.00
GP23 2m vrt 7.8dB¼	£51.00
GP144W 2m vrt 6.4dB¼	£35.00
GPV144DX 2m vrt s/s 6.4dB¼	£46.00
GPV5S 2m vrt h duty 64 dB¼	£37.00
GP2M grnd plane 3.4	£24.00
SQ144 SWS quad vert	£67.95
GP432X 70cm vrt 13.4	£38.00
GP714 70cm vrt 10dBi	£90.00
70N2V 2m/70cm2.8/5.7	£38.00
HS770 144/70 duplxr	£21.55
LT606 log 50-500MHz	£163.00
OSCAR CARRIAGE PAID	

MET ANTENNAS

432/5B 40cm 5 ele	£16.95
432/17X 70cm crossed	£49.17
432/17T 70cm 15dB	£32.20
144/19T 70cm 14.2dBd	£55.88
50/5 6M 5 ele.	£59.90
CARRIAGE EXTRA £2.65	

JVL QUADLOOP

144-16QL 2m 16dBd	£
144-26QL 2m 18.5dBd	£
432-19QL 70cm 16.5	£45.00
432-27QL 70cm 18.5	£65.00
1296-26QL 23cm 18.5	£49.00
1296-47QL 23cm 22	£79.00
2320-44QL 13cm 21	£49.00
CARRIAGE EXTRA £2.50	

BNOS

25Amp P.S.U.	£149.00
40Amp P.S.U.	£296.00
2M 3/50 no pre-amp	£108.00
2M 10/50W no pre-amp	£108.00
2M 1/100W	£181.00
2M 3/100	£181.00
2M 10/100	£157.00
2M 25/160	£217.00
70cm 3/50	£235.00
70cm 10/50	£195.00
70cm 10/100	£335.00

COAX CABLE

LDF2/50A	£3.68/M
LDF4/50A	£4.43/M
UR4350R	£31p/M
UR7650R	£32p/M
UR6750R	£69p/M
UR7075R	£32p/M
UR3975R	£56p/M
UR5775R	£71p/M

CARRIAGE £1 UP TO 20 MTRS
£2.50 OVER 20 MTRS

COAX CONNECTORS

UHF COAX PLUGS:

PL259 UR67/RG8	£0.66
PL259P UR67 push fit	£0.93
UR175 reducer 50	£0.18
UR176 reducer 75	£0.18
PL259R reducer 50	£0.77
PL259A de luxe UR67	£3.25
PL259B de luxe UR43/76	£2.58
PL259E L angle 5mm	£1.05
PL259M metric	£0.88

UHF COAX SOCKETS:

SO239F 4 hole fix	£0.66
SO239F100 de luxe	£1.71
SO239T 2 hole fix	£0.62
SO239NI nut inner	£0.75
SO239NO nut outer	£0.75
SO239E free angle SM	£1.38
PL258 back/B female	£1.05
PL274 back/B chassis	£1.60
PL/PL back/B male	£1.71
M359 elbow m/f	£1.60
M358 T2F/1M	£1.92
M358AF T3F	£2.15
M458 3F/1M	£3.14

N PLUGS 50 OHMS:

UG536 small	£2.31
UG21 large	£2.27

N SOCKETS 50 OHMS:

UG58 4 hole	£1.51
NSNI nut inner	£1.55
UG1052 free small	£2.30
UG23 free large	£1.85

N ADAPTORS:

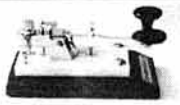
UG107 T2F/1M	£3.99
UG28 T3F	£3.45
UG57 double male	£3.52
UG29 double female	£2.58
UG27 elbow f/m	£2.81

INTERSERIES CONNECTORS:

UG255 uhfs-bncp	£2.04
UG273 uhfp-bncS	£2.04
UG146 uhfs-'N'P	£3.14
UG83 uhfs 'N'S	£3.14
SO/NF uhfs 'N'S	£3.14
UG201 'N'-bncS	£3.80
UG349 'N'-bncP	£3.80
UG606 'N'S-bncS	£3.80

POST AND PACKING 65p

MORSE KEYS



HK703 straight key	£29.35
HK704 straight key	£19.95
HK706 straight key	£19.35
HK707 straight key	£18.25
HK710 straight key	£39.95
HK808 straight key	£58.65
HK711 knee key	£34.50
HK802 straight key	£86.30
HK803 straight key	£82.65
HK804 straight key	£78.25
MHK831 st & squeeze	£189.00
BK100 mech. bug	£31.00
MK701 single paddle	£28.50
MK702 single paddle	£29.95
MK703 squeeze	£31.00
MK705 squeeze	£27.60
MK706 squeeze	£25.30

POST & PACKING £1.50

MORSE TUTORS

Datong D70 go anywhere battery powered	£56.65
M/M Morse talker	£115.00
M/M Morse Caller	£169.00

TELO MASTS

TELESCOPIC 10ft SECTIONS, GUYED

MAST ONLY

30ft	£39.10	carr £5.00
40ft	£63.25	carr £6.00
50ft	£78.20	carr £8.00

RIGGING KITS

30ft	£45.00	carr £5.00
40ft	£56.35	carr £5.00
50ft	£72.45	carr £8.00

HYGAIN

BUY NOW

There will never be a better time. We will not be able to repeat these prices with new stocks.

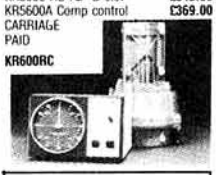
12AVQ 10-20m vert TD	£81.00
14AVQ 10-40m vert TD	£109.00
18V 10-80m tppd coil	£51.00
103BA 3 el 10m Yagi	£102.00
103BA 5 el 10m Yagi	£223.00
103BA 3 el 15m Yagi	£138.00
103BA 3 el 20m Yagi	£263.00
103BA 4 el 20m Yagi	£425.00
103BA 5 el 20m Yagi	£500.00
DB10-15 3 el 10-15m	£213.00
TH3JR 3 el 10-20m	£303.00
TH2MK3 3 el 10-20	£283.00
EX14 5 el 10-20m	£506.00
QK710 40M kit Ex14	£145.00
TH5MK2 5 el 10-20m	£655.00
TH7DXX 7 el 10-20m	£759.00
392S Mod kit TH6-7	£255.00
CARRIAGE PAID	

ROTATORS

S.M.C. search the world for only the best rotators. We are pleased to advise the most suitable for your installation.

FU200 Offset	£59.00
KR250 Small bell	£69.00
KR400 Popular bell	£119.00
KR400RC D/L bell	£147.95
KR600RC MD bell	£199.00
AR40 CDE bell	£115.00
CD45 HD bell	£189.95
HAM1V VHD bell	£379.00
KR500 Elevation	£139.95
KR5400 Az. & elev	£240.00
KR5400A Comp control	£285.00
KR5600 HD Az & elev	£349.00
KR5600A Comp control	£369.00

CARRIAGE PAID



KR600RC

COAX SWITCHES

S2U 2way vhf	£11.95
S2N 2way 'N'	£19.45
KP21N 2way 'N'	£24.15
AN2 2way slide	£4.60
AN3 3way slide	£5.00

POST AND PACKING £1.65

COAX RELAYS

CX120A Cable Entry	£16.90
CX520D 3 'N'	£46.00
CX540D 3 BNC	£46.00
CX600N 3 'N'	£46.00
CX600NJ 4 'N'	£68.00

ALL P&P £1.50

NEW – THE VHF HANDY RECEIVER SLIM AND MODERN

Due to special purchase of the professional hand held receiver, we are pleased to offer at very attractive price. Listen to amateur, marine, land mobile, and much more.
ONLY £99.00 + VAT
POST AND PACKING £2.50

2MTR POWER 1KW

One only New 2002A incorporating latest technical innovations; 3 cx 800A valves. Max drive 25 watts. £1150 + VAT.

SMC SP4

RF SPEECH PROCESSOR
Designed and built to our own specifications this RF speech processor is simple to use and easy to connect. Giveaway price, only £29 inc. VAT.

FHR1 HORN RELAY BOX used in commercial Yaesu radios to sound horn when squelch lifted. Also acts as a burglar alarm. Special price **£6.** Post and packing 50p.

POWER METERS
HANSEN + S.M.C.
IN LINE POWER/SWR BRIDGES
P.E.P., AVERAGE 1.8-440MHz

The Hansen range covers 30 quality models with top-of-the-line the FS710. This is a flat frequency response, peak envelope power and average in-line wattmeter with many novel features. Notable being the 'power independent' SWR scale – no forward power calibration knob, just direct reading SWR.

FS710V	50-150MHz	15/150W	Pep	£107.80
FS50HP	1.8-60MHz	20/200/2000W	Pep	£106.70
FS50VP	50-150MHz	20/200W	Pep	£106.70
FS500H	1.8-60MHz	20/200/2000W	Pep	£81.95
FS500V	50-150MHz	20/200W	Pep	£81.95
FS300V	50-150MHz	20/200W		£53.50
FS601M	1.8-30MHz	20/200W	Pep	£62.15
FS603M	430-440MHz	5/20W	Pep	£62.15
FS210	1.8-150MHz	20/200W	Auto/SWR	£65.50
FS301M	2-30MHz	20/200W		£42.25
FS301MH	2-30MHz	200/2000W		£42.25
FS711H	2-30MHz	20/200W	Head/Display	£43.65
FS711V	50-150MHz	20/200W	Head/Display	£43.65
FS711U	430-440MHz	5/20W	Head/Display	£43.65
FS5E	3.5-150MHz	20/200/1000W	HF	£42.75
FS5S	1.8-150MHz	20/200/2000W	HF	£42.75
SWR3E	3.5-150MHz	20/200/1000W	HF	£28.75
SWR50B	3.5-150MHz	Twin Meter		£30.50
FS20DL	3-150MHz	1/10W		£43.65
FS20D	3-150MHz	5/20W		£43.65

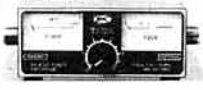
JD

JD110	1.5-150MHz	10/100W	£16.50

SMC

S3-30L	Mini (CB style)		£9.20
T3-170L	3.5-170MHz	Relative	Twin Meter £17.25

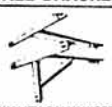
T3-170L



FS500

CARRIAGE PAID POST

WALL BRACKETS



QUALITY GALVANISED

W12"	£8.75	p&p £2.95
W18"	£11.17	p&p £3.75
W21"	£12.07	p&p £3.75
W24"	£13.88	p&p £3.75

MINI QUAD

HQ1 ~~£199~~ £189

6-20M 12ft ele
Boom only 4.5ft
Carriage £4.00
or G4MH mini beam
only **£88.50** carr £4.50

MAIL ORDER SMC or SHOWROOMS see previous pages

RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY REPRESENTING ALL UK RADIO AMATEURS

Founded 1913 Incorporated 1926 Limited by guarantee A member society of the International Amateur Radio Union

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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

Headquarters and registered office: **Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JW**
Telephone 0707 59015. Telex 25280 (RSGBHQ G)
Secretary and general manager: D A Evans, G3OUF

COUNCIL OF THE SOCIETY

PRESIDENT: W J McClintock, MSc, G3VPK
EXECUTIVE VICE-PRESIDENT: K E V Willis, BSc, ARCS, CEng, MIEE, G8VR
IMMEDIATE PAST-PRESIDENT: J Heathershaw, G4CHH (Mrs)
HONORARY TREASURER: P F D Cornish, FCA, G3COR
ORDINARY MEMBERS OF COUNCIL
E J Allaway, MB, ChB, MRCS, LRCP, G3FKM
D S Evans, PhD, FIM, CEng, G3RPE
J D Heys, G3BDQ
A McKenzie, MBE, CEng, FIERE, FAES, G3OSS
B O'Brien, G2AMV
N F O'Brien, FAAI, FSCA, ACIS, MIMI, G3LP
F S G Rose, G2DRT
ZONAL MEMBERS OF COUNCIL

Zone A	*(Regions 1, 2 and 18)*	D S Smith, G4DAX
Zone B	*(Regions 3, 4 and 5)*	H S Pinchin, BSc, MBIM, G3VPE
Zone C	*(Regions 7, 8, 16 and 19)*	J Greenwell, AMIEE, G3AEZ
Zone D	*(Regions 6, 9, 17 and 20)*	J N Gannaway, G3YGF
Zone E	*(Regions 10 and 11)*	E J Case, GW4HWR
Zone F	*(Region 15)*	J T Barnes, GI3USS
Zone G	*(Regions 12, 13 and 14)*	F Hall, GM8BZX

REGIONAL REPRESENTATIVES

Region 1 B Donn, G3XSN, tel 051-722 3644
(Cheshire, Cumbria, G Manchester, I o Man, Lancs, Merseyside)
Region 2 P R Sheppard, G4EJP
(Humberside N of Humber; N, S and W Yorks)
Region 3 G Ross, G8MWR, tel 0203 616941
(Hereford & Worcs, Salop, Staffs, Warks, W Midlands)
Region 4 M Shardlow, G3SZJ, tel 0332 556875
(Derbys, Humberside S of Humber, Leics, Lincs, Notts)
Region 5 J S Allen, G3DOT, tel 0582 21151
(Beds, Cambs, Northants)
Region 6 *(Post vacant)*
(Berks, Bucks, Oxon)
Region 7 R Sykes, G3NFV, tel 0372 372587
(G London S of Thames, Surrey including part of London N of Thames administered by Surrey)
Region 8 M Elliott, G4VEC, tel 0795 70132
(Kent, E Sussex, W Sussex)
Region 9 A H Hammett, G3VWK
(Cornwall, Devon)
Region 10 *(Post vacant)*
(Dyfed, Gwent, Powys; Mid, S and W Glam)
Region 11 B H Green, GW2FLZ, tel 0492 49288
(Clwyd, Gwynedd)
Region 12 M R Hobson, GM8KPH, tel 0796 2140
(Grampian, Highland, Island Authorities, Tayside)
Region 13 A J Scott, GM8BDX
(Borders, Fife, Lothian)
Region 14 T G Wylie, GM4FDM, tel 0505 22749
(Central, Dumfries & Galloway, Strathclyde)
Region 15 R R Parsons, GI3HXV, tel 0232 612322
(Northern Ireland)
Region 16 A Owen, G4HMF, tel 0473 51319
(Essex, Norfolk, Suffolk)
Region 17 T M Emery, G3KWU, tel 0703 812435
(I o Wight, Channel Is, Dorset, Hants, Wilts)
Region 18 I Gibbs, G4GWB, tel 0670 790090
(Cleveland, Durham, Northumberland, Tyne & Wear)
Region 19 R J Broadbent, G3AAJ, tel 01-989 6741
(G London N of Thames, Herts)
Region 20 *(Post vacant)*
(Avon, Gloucester, Somerset)

HONORARY OFFICERS

Aerial Planning Panel co-ordinator: (c/o MSO, RSGB HQ)
Audio Visual Library co-ordinator: R G Auckland, G2PA
Awards managers. HF: P Miles, G3KDB; **VHF:** Jack Hum, G5UM
HF manager: E J Allaway, G3FKM
Microwave manager: D S Evans, G3RPE
Observation Service organizer: R J Osborne, G4FJN
Slow morse practice transmissions organizer: *(Post vacant)*
Trophies manager: Mrs H Claytonsmith, G4JKS
VHF manager: K A M Fisher, G3WSN

Correspondence to RRs and honorary officers should be addressed directly to them (QTHR), not to RSGB HQ

ANNUAL SUBSCRIPTION RATES

Corporate member: UK and overseas (*Radio Communication* by surface mail): **£16.50.**
UK associate member under 18: £6.20. Family member: £6.60
UK students over 18 and under 25: £9.30 (Applications should give applicant's age at last renewal date and include evidence of student status)
Affiliated club or society/registered group (UK): £16.50 (including *Radio Communication*); **£9.90** (excluding *Radio Communication*)
(Subscriptions include VAT)

EDITORIAL

PACKET RADIO—A FUTURE

How many times have we been told that, with amateur radio, "the world is your oyster", and how many of us have that mental image of the ultimate amateur radio station with the large antenna farm spread over acres of ground in order to make worldwide communication possible. In recent years amateur communication satellites have helped to change this picture—with relatively low power and small antenna systems, anyone who wanted to could make contact with almost any other part of the globe through Oscar 10 and many of its predecessors; packet radio represents an equally important step forward.

What is so fascinating and intriguing about packet radio is that error-free data messages can be sent around the world and back again from a station using just a few watts and a very modest antenna system; plus, of course, the right hardware and software. If you can make contact with your local packet radio repeater, or digipeat into it, you are into the network.

There has in fact been an explosion—a quiet revolution—in data communication during the last decade, and for many tens of thousands of amateurs around the world, packet radio is already being hailed as one of the most exciting steps forward in amateur radio for a very long time. Since the introductory editorial, *Rad Com* September 1984, packet radio activity in the UK has grown by 10 times and is about to explode in a very big way—why? There are probably many answers; there is always a fascination about something new, and there are always, thank goodness, radio amateurs who want to operate on the fringes of technology. Perhaps one of the attractions of packet radio is that the systems and networks can be seen to develop right in front of one's eyes—we can all be part of it if we wish. No out-of-the-ordinary equipment is involved, and many amateurs will want to make contacts with other stations a long way away either by means of hopping from station to station, called digipeating, or by sending their transmissions around the UK through a structured repeater network. Perhaps another fascination of packet radio is that it is highly dependent upon software. Writing your own software at home can be challenging and great fun, and once you have your computer you can experiment, make mistakes and develop your software—all you need is time, not money.

In wishing to provide the framework in which packet radio can flourish in the UK, the Society has been addressing many of the licensing aspects which will need to be changed. For example, digipeating allows one station to pass an error-free message to another via an intermediate station. Some might consider this to be a third-party message; however, in other countries, including, for example, West Germany, the passing of a message via another licensed radio amateur is not considered to be a third-party message. This is not to be confused with phone-patching or handling third-party messages on behalf of unlicensed persons.

Packet radio digipeaters can, of course, be operated unattended, and provided that there are adequate safeguards, the Society believes this type of operation could form an integral part of a well-established network of packet radio repeater stations linked together using one or more of our microwave bands. In fact the Society envisages a packet radio repeater network linking some 40 major UK cities and towns with a large number of smaller towns and villages having access to the network at intermediate points or with an input to these points provided by digipeaters.

Relaying messages between licensed amateurs and unattended station operation are among the topics which have been raised with the DTI recently. Subject to the agreement of the DTI, the Society plans to establish a number of experimental packet radio repeaters, initially at vhf with message store and forward facilities and high-speed microwave links, in order to provide packet radio facilities throughout the UK. In addition, the Society will be looking into ways of linking the UK packet radio network with similar networks in other countries, either through direct vhf, uhf or microwave links, or at hf or by means of satellites.

All of this represents a very exciting prospect and one which, being computer-based, will inevitably attract many new people to this aspect of what is the most diverse hobby in the world.

David Evans, G3OUF

Amateur Radio News

Regional representation

Region 10. No nominations for a new representative have been received.

Region 6. The following nominations for a new representative have been received:

D J Chislett, G4XDU
C M Clark (Mrs), G1GQJ
R Ray, G3NCL
N Taylor, G4HLX

Region 20. The following nominations for a new representative have been received:

C Hollister, G4SQQ
B M Woodcock, G4CIB

Ballots will therefore be necessary in regions 6 and 20, and corporate members resident in those regions are invited to vote for one of the candidates in their respective region. Region 6 comprises Berkshire, Buckinghamshire and Oxfordshire. Region 20 comprises Avon, Gloucester and Somerset.

Votes should be recorded in the form prescribed below, and must be sent to: The Secretary (Regional elections), RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE, to arrive no later than 31 May 1986.

FORM OF BALLOT PAPER

I, ...
being a fully-paid-up corporate member of the RSGB residing in Region ..... wish to record my vote in favour of
Mr .....
as representative for Region .....
Signed .....
Callsign or BRS No .....
Address .....

SKE 86

The fifth annual Straight Key Evening organized by the Edgware & DRS will take place on 29 May 1986, commencing at 7pm, around 3,550kHz. SKE is for all cw operators, and is intended to be a friendly relaxed non-contest style event. Electronic wizards are urged to dig out the old hand pump and return to their cw roots.

The Edgware club hopes to have a special SKE GB callsign, and looks forward to meeting old friends and making new ones. Reports and comments would be welcome by G3SJE, QTHR, tel 01-204 1034, from whom further information can be obtained.

Watch Channel 4

Mr R A Loveland, G2AU, draws the attention of members to the tv transmission put out on Channel 4 on Tuesdays at 9.15am and repeated at 12.15pm. Although intended for the radio and tv trade, details of new stations, changes in power and frequency etc are usually prefaced by an item of general technical interest. Pat Hawker, G3VA, contributes to this, and a wide variety of topics has been covered recently.

G4V-series award

Mr N J Ludlow, G4VJM, of 5 Laburnum Avenue, Laffak, St Helens, Merseyside WA11 9DZ, who is manager of this award has sent us the following details. To obtain the award, claimants must work or hear 30 G4V callsigns (15 outside the UK); a maximum of half the total claimed is allowed within the G4V-net. Send log extract, countersigned by two others, and 75p (£1 outside UK) to G4VJM.

Merrylee Ranger Unit scored a "first" for Glasgow when they invited Ronnie, GM4SRL, and Robert, GM3ZDH, to set up a station for Guide Thinking Day. This photograph shows Robert with some of the Ranger Unit and two members of the Guide company at the station GB2MRU. It is hoped that other Glasgow Guides will take part in "Thinking Day On The Air" next year. *Photo:* GM4SRL

Mobile Rallies Calendar

All information for inclusion in this column must be sent to the editor, not to RSGB HQ.

4 May
3rd Anglo-Scottish Rally, Tait Hall, Kelso. Ideally situated for G/GM/GI (GW also welcome!). 11am to 5pm. Talk-in on S22. Details GM4UIB or GM3VLB, tel 0573 24654 or 0573 24664.

5 May
Mid-Cheshire ARS Rally, Winsford Civic Hall. Open 11am. Talk-in on S22. Details D Card, 7 Glebe Green, Winsford, Cheshire, tel 0606 594719.

11 May
Drayton Manor Rally, Drayton Manor Park, nr Tamworth, Staffs (on A4091 one mile south of A5/A4091 junction). Open 11am to 5pm. Talk-in on 144 and 432MHz, G3MAR/A. Details G8BHE, tel 021-422 9787 or G8GAZ, tel 021-357 1924.

11 May
Swindon Rally, Oakfield School, Marlowe Ave, Swindon, Wilts. Open 10am. Talk-in on S22 and SU8/GB3TD. Morse tests, refreshments. Details G8SFM, tel 066689 307.

18 May
Cambridge & DARC Rally and Boot Sale, Coleridge Community College, Radegund Road. Open 10.30am (disabled 10am)-5pm. Talk-in on S22, G2XV. Admission 50p, children 25p. Free car park. Car boot pitches £4 advance booking, £5 on day. Details G4TRO, tel 0223 353664.

18 May 1986
29th Northern Mobile Rally, Great Yorkshire Showground, Harrogate. Details G3CQQ, tel 0943 602118.

18 May
Mid-Ulster ARC Annual Radio Rally, Parkanaur House, (six miles from Dungannon on the main Ballygally Road). Opens 12pm. Talk-in on S22 fm 144·550MHz. Details GI1BIW, tel 076-22 22855.

25 May
Plymouth Mobile Rally, Plymstock Comprehensive School, Plymouth. Open 10am-5pm. Talk-in on S22. Details G0BNT, tel 0752 777777.

25 May
10th Annual East Suffolk Wireless Revival, Civil Service Sports Ground, Bucklesham, nr Ipswich. Open 10am. Free parking. Admission 80p. Details J Toothill, tel Ipswich 44047. Stand space from Colin Ranson, G8LBS, 100 Stone Lodge Lane West, Beacon Hill, Chantry, Ipswich.

1 June
Southend & D RS Mobile Rally, Rocheway Centre, Rochford, Essex. Opens 10.30am. On site parking. Talk-in on S22. RSGB morse tests to be advised. Details G6SOH, tel 0702 713211 or G4RDS, tel 03745 50494.

1 June
Spalding & D ARS Rally, Springfields Gardens, Spalding. Opens 10am. Talk-in. Details G4OO, tel 0775 86382.

8 June
Elvaston Castle Mobile Radio Rally, Elvaston Castle Country Park, five miles south-east of Derby on B5010. Talk-in by GB2ECR on 144MHz and 432MHz. Details G4PZY, tel 0332 767994, G4CTZ tel 0332 799452 or club HQ 0332 755900. Trade enquiries to G4HIJ, tel Ashbourne 43241.

15 June
RNARS Mobile Rally, *HMS Mercury*, Leydene, near Petersfield, Hants. Details G4DIU.

29 June
29th Longleat Amateur Mobile Radio Rally, Longleat Park, Warminster. Organized by the City of Bristol RSGB Group. Talk-in on S22 and SU8 by GB4LMR. Camping and caravan site. Details G4FRG, tel 0272 848140.

13 July
Sussex Mobile Rally, Brighton Racecourse. Opens 10.30am. Talk-in via GB2SMR on 145·550MHz and 3·5MHz. Details from G8JVE or G4UAW, evenings.

13 July
Worcester & DARC Droitwich Rally, High School, Droitwich. Bring and buy, and events for all the family. Details G8ASO.

20 July
Anglian Mobile Rally, Highwoods Sports Centre, Colchester. Open 10am. Talk-in on 144MHz. Details G6HQI, tel 0206 862403 after 7pm.

20 July
Cornish Radio Amateur Club Rally, Camborne School, Camborne. Open 10am-5pm. Talk-in on S22. NB new QTH. Details G4MSV, tel 0736 763549.

20 July
McMichael Mobile Rally, Haymill Centre, Burnham, Slough. Open 11am. Talk-in on S22 and SU8. Enquiries to G0BTY, tel 0494 29868.

27 July
Scarborough ARS Rally, The Spa, Scarborough. Open 11am. Talk-in 144MHz (S22), and 432MHz (SU8) and RB0-GB3NY. Details G4UQP.

3 August
RSGB National Mobile Rally, Woburn Abbey.

3 August
Rolls-Royce ARC Mobile Rally, Rolls-Royce Sports & Social Club, Barnoldswick, Skipton. Access from A59 and A56. Open 11am. Morse tests available. Enquiries to G4ILG, tel 0282 813271 ext 337, daytime, or 0282 812288 evenings.

10 August
29th Annual Mobile Rally celebrating the 75th anniversary of the Derby Wireless Club, Lower Bemrose School, St Albans Rd (off Derby Ring Road A5111) Derby. Open 10.30am. Talk-in by GB3ERD. Details G4EYM, tel Derby 556875.

10 August
Hamfest '86, Flight Refuelling Sports & Social Club grounds, Merley, Nr Wimborne, Dorset. Details Ashley Hulme, G0CDY, 71 Victoria Gardens, Ferndown, Wimborne, Dorset BH22 9JQ, tel 0202 872503.
17 August
West Manchester RC Red Rose Rally, Haydock Park Racecourse, Newton Le Willows (one mile from M6 junction 23). Open 10am. Talk-in on S22. Details G1IOO, tel 0204 24104 evenings.
24 August
1986 BARTG Annual Mobile Rally, Sandown Park Racecourse, Portsmouth Road, Esher. BARTG Kits Components. Car boot sale. Free car park. Open 10.30am-5pm. Talk-in on S22. Details G8VXY, tel 021-453 2676.
24 August
Preston ARS 19th Annual Rally, Lancaster University. Details G3DWQ, tel 0772 53810.
31 August
Telford Mobile Rally, Telford, Racquet & Fitness Centre, Telford Centre, Shropshire. Details G3UKV, tel Telford 55416 or G8UGL, tel Telford 584173.
7 September
Lincoln Hamfest, Lincolnshire Showground. Further details to be published at a later date.
7 September
Vange ARS Rally, Nicholas School, Basildon. Open 10am-5pm. Talk-in on 144MHz. Details Mrs D Thompson, 10 Feering Row, Basildon, Essex SS14 1TE, or G4OJN.
13 September
Wight Rally, Wireless Museum, Arreton Manor, Nr Newport, IOW. Details G3KPO, tel 0983 67665.
13 September
Ballymena ARC 12th Annual Rally, Ballee High School. Opening address given by RSGB President, G3VPK. Talk-in S22. Details GI4HCN, tel 0266 3044.
21 September
Harlow Mobile Rally, Harlow Sports Centre, Hammarskjold Road, Harlow, Essex. Open 10am. Talk-in on S22. Details G4KVR, tel 0279 22365, day, or G3UEG, tel 0279 27788 evenings.
21 September
National ARC Car Boot Sale, The Shuttleworth Collection, Old Warden Aerodrome, nr Biggleswade. Open 10am-5pm. Talk-in on S22, GB4SC. Aircraft and motor museum. Free car park. Admission 20p. Details and advance bookings G6EES, tel 0582 607623 evenings.
21 September
Peterborough R&ES Mobile Rally, Wirrina Sports Stadium, Bishops Road, Peterborough. Open 10.30am to 5pm. Free car parking. Food in the adjacent Tropicana Restaurant. Bar until 3pm. Details G4PNW.
5 October
Great Lumley AR Rally, Community Centre, Great Lumley, Chester-Le-Street. Open 11am (10.30am for disabled). Talk-in S22 and RB0 (GB3NT). Details G4MSF, tel 091 4693955.
19 October
South Bristol ARC present the Second Bristol Radio Rally at Hartcliffe Youth Centre, Hareclive Avenue, Hartcliffe, Bristol. Open 10am-5pm. Talk-in and special event station, GB2BRR. Details G1LDJ, tel 0272 667179.
23 November
West Manchester RC Mobile Rally, Pembroke Halls, Walkden, Worsley, Gtr Manchester. Details G1IOO, tel 0204 24104 evenings.
7 December
Verulam Christmas Rally, The City Hall, St Albans. Open 11am-5pm. Talk-in on S22 and SU8. Details G4JKS, tel St Albans 59318.
14 December
Leeds & DARS Annual Christmas Rally, Pudsey Civic Centre, Dawsons Corner, Pudsey. Open 11am (10.30am for disabled). Talk-in on S22. Trade enquiries G4WYD, tel 0274 685039, details G1EBS, tel 0274 665355.

Special Event Stations

All information for inclusion in this column must be sent to the editor, not to RSGB HQ.

1 May-26 October, GB4NGF, GB8NGF, GB2NGF
North Staffs ARS are operating three special events stations, for the National Garden Festival, Stoke-on-Trent. GB4 and GB8 will be on the Festival site, GB2 is located at the QTH of G4XEE. Open 11am-8pm. Transmission on all bands using cw, rtty and tv. Special QSL cards. Details G6MLI, tel 0782 332657.
3 May, GB2BHS
Part of school's spring fair, Balshaw's High School, Church Road, Leyland, Lancs. Activity on 3·5MHz hf and 144MHz fm. Special QSL cards and swl reports acknowledged if accurate. Details G4BEE, tel 0254 831605.
3, 4, 5 May, GB2HAM
Part of Portchester Community Centre's Arts & Crafts Exhibition, Portchester Community Centre, Westlands Grove, Portchester, Fareham, Hants. Station and radio stand run by Fareham & DARC with special theme "Data transmission" and all band operation from 2MHz-432MHz phone and cw transmissions. Details G4ITF.
4, 5 May GB4LF
Celebrates 5th Annual Llantrisant Festival. Operation on ssb and cw on hf, 3·5, 15 and 144MHz from 10am-6pm. Special QSL cards and swl reports welcomed. Details GW3POM, tel 0443 224532.
8-11 May, GB2WAF
Meopham Parish RC will be operating from the tower of the ancient parish church of St George, Wrotham, Kent during the 3rd Wrotham Arts Festival. Activity will be on hf and vhf amateur bands. Details G4XNU and G1KEY, tel 0732 822541.
10, 11 May, GB4HSC
Operated by Dudley ARC from Himley Hall, Dudley, in connection with sponsored sail by Himley Sailing Club, in aid of the RNLI. Transmission on all modes, rtty, hf, vhf, and Fast Scan tv. Details G4NRA, tel 0384 278300.
10-17 May, GB4LI
Six members of the Nene Valley RC will activate GB4LI from the Old Lighthouse, Lundi Island (WABSS14). Operation on all hf bands; limited facilities for 144MHz and 432MHz. Special QSL cards. Details G4NWZ.
17 May, GB2RGS
Held in conjunction with the bi-annual show day at the Royal Grammar School, High Wycombe, Bucks. Station open 1-5.30pm and manned by Chiltern ARS. All QSOs receive QSL card and special QSL cards for the following: six most distant stations worked; six stations worked closest to 3pm; old boys of the school. Details G8ZNH.
17, 18 May, GB2WEC
Celebrates the anniversary of the Wedgewood Electrical Collection. The station will be operated by the Bournemouth & D RAIBC from The Museum, The Old Power Station, Christchurch, Dorset. Open 10am-5pm. Transmission on hf and vhf/fm, with talk-in available. Unique QSL cards. Reports via QSL Bureau or direct to G6DUN.
18 May, GB6STJ
St John's Middle School "Mayfair", St John's Middle School, Kenilworth. Locators I092EI, ZM53h, SP27. Operation on 144 and possibly 432MHz. Details and QSLs from G1HGD.
23-26 May GB4IOS, GB8IOS
Cornish radio amateurs operating in aid of the RNLI from the Island of Great Ganilly. Looking in particular for sponsors. Operation on 3, 7, 14, 144, 430MHz and as many other bands as is possible. Details G4ZUI, tel 0209 860572.
24 May-1 June, GB4GWR
Celebrates the 25th anniversary of the Great Western Society. The Vale of White Horse ARS will be running the station from a former Great Western Railway saloon coach, Didcot Railway Centre, S Oxfordshire. Operation on hf 3·5MHz, vhf (ssb and fm) and uhf (ssb atv). CW contacts arranged. Special QSL cards. Personal callers can exchange cards between 11am and 5pm. Details G4PFY, tel Wantage 66458.
25, 26 May, GB2FCL
Celebrates 150th birthday of Fleetwood (F:C-100:L-50). Exhibition of amateur radio and special event station with operation on all bands. Special QSL cards. Details G4BFH, tel 0253 853554.
25-31 May, GB2HI
Members of Royal Signals ARS operating from Holy Island on hf and vhf. Activate as many of the Farne Islands as permissible. Special QSL cards. Details G0DIR, High Wathcote Cottage, Richmond, N Yorks.
June, GB4OH, GB0IOW
GB4OH will be operational from Osborne House, East Cowes, Isle of Wight and GB0IOW will be operational from the Royal Needles Complex, Isle of Wight in commemoration of the 89th anniversary of Marconi Early Experiments 1897, 1898. Both stations will operate for one week in the first week of June. Details V G Scambell, 50 Park Ave, Widley, nr Purbrook, Hants.
7 June, GB4LAD
Station run during Luton and Dunstable's Hospital Fete by Dunstable Portable ARG in conjunction with Dunstable Downs RC. Operation on 3·5, 14 and 144MHz, 8am-6pm. Details G0COQ, tel 0582 508259. The group is being sponsored on the number of contacts made, and all proceeds will go to the hospital.
14-15 June, GB2GF
Operated on behalf of the Greenwich Festival by the Cray Valley RS. Activity on hf and vhf. Special QSL cards. Details G4DFI.
20-22 June, GB8MM
Celebrates the 200th Anniversary of the Methodist Missionary Society, Trentham Gardens, Trentham, N Staffs. Operated by WACRAL on hf and vhf. Special QSL cards. Details G4NPM, tel 0795 873147.
21 June, GB0PGD
Station operated on Plessey Gala Day, Plessey Sports Ground, Beeston. Organized by the Plessey (Beeston) ARC. Operation on hf and 144MHz. Special QSL cards. Details G4VFK, tel 0602 226321.
12 July, GB2RAF
Operating from the RAF Digby fete for 24h nonstop. Activity on hf and vhf. Special QSL cards. Reports from swls welcomed. Local volunteers especially welcome to come and help operate the station. Details G4ZYR, tel 0529 306089.
23, 24 July, GB2WAD
Celebrates the Annual Great Western Air Days, from Beach Lawns, Weston-super-Mare. Operated by members of the Weston-super-Mare RS, 10am-6pm. Transmissions on hf, 144 and 432MHz. Details G1DJW, tel 0934 514429.
23-25 August, GB2RSG, GB1RSG
Saga 86, Star & Garter Appeal run by West Middlesex RG. Operational 9am-7pm. Looking for sponsors. Details G1DDR, tel 01-579 7860.
1 September, GB2STC
Celebrates the centenary of the official opening of the Severn Tunnel, at Pilning Railway Station. Operational 10am-6pm on hf, 144 and 432MHz. Details G1DJW, tel 0934 514429.
13 September, GB2WMF
Celebrates Annual Winscombe Michaelmas Fair, Winscombe, Somerset. Operated by Weston-super-Mare RS on hf, 432 and 144MHz. Open 10am-6pm. Details G1DJW, tel Weston 514429
15-22 September, GB2GAF
Commemorates Battle of Britain Week. The station will be operated by the Gloucester ARS from the RAF Association Club, Gloucester. Activity on hf and vhf. Special QSL cards. Details G3MA, 40 Calton Rd, Gloucester GL1 5DY.
25, 26 October, GB2EMR
On the occasion of the International Endurocross Motor Cycle Races, from Beach Lawns, Weston-super-Mare. Operated 10am-5pm each day by members of the Weston-super-Mare RS. Transmissions on hf, 144 and 432MHz. Details G1DJW, tel 0934 514429.
3-9 November, GB4PW
In remembrance of Poppy Week. Station operational from The Royal British Legion HQ, 49 Pall Mall, London SW1. Open 10am-8pm on 3·5, 15, 144MHz, cw, ssb and fm. Operators required from Services & Royal British Legion Members, class A or B. Contact G4PSH, tel 01-446 0266, giving name, callsign and day/s you wish to attend. SWLs welcome to assist in keeping log and QSL cards up to date.

Other Events

All information for inclusion in this column must be sent to the editor, not to RSGB HQ.

10 May
Radio Boot Fair, Whitfield, Nr Dover. Opens 10am. Entrance 20p. Room for 30 pitches. Details G3ROO, tel 0304 821588.
5, 6 July
Wembley '86 Amateur Radio & Electronics Hobby Fair, Wembley Conference Centre, London. Details tel 021-421 5516.
20 July
RAIBC Picnic, Broadlands, Romsey, Hants. Talk-in on S22. Details G4COM, tel 0703 693017.
28 September
RSGB HF Convention, Belfry Hotel and Conference Centre, just outside Oxford on the M40.
11 October
RSGB Midlands VHF Convention, Madeley Court Centre, Telford, Shropshire. Details G3UBX.

W K ALFORD, AMIEE, RSA, FRAeS, G2DX

A PERSONAL TRIBUTE

His many friends in the worlds of amateur radio and science will be sorry to hear of the death of a man who has lived through almost the whole history of radio communication.

Ken Alford was born in 1893, and grew up in Kendal. He was early interested in scientific matters, and in 1912 obtained an experimental wireless licence with the call TXK. The station was a spark transmitter and a crystal detector, from Gamage's store in Holborn; cost £5. I remember seeing it in the Gamage catalogue, something beyond my wildest dreams. He had a friend who owned an aeroplane, and they actually flew the gear over Lake Windermere, and signals were received on the ground; probably a "first".

Mr Gamage was very keen on the new science, and his store was one of the few places where apparatus could be purchased; the catalogue contained a "callbook" of 700 experimenters. He provided a room where amateurs could meet, and in 1913 Ken, now at Imperial College, met Leslie McMichael and was taken there; it contained one table and a crystal set. Ken was present when the Wireless Society of London (which later became the RSGB) was founded in that room.

His first job was as a draughtsman with Vickers at Barrow, where he spent a year on the design of the tail-fin of an early airship. Because he had actually flown and knew a bit about airships his next job was as an "experienced aerodynamicist" among leading scientists of the day at the Royal Aircraft "factory" at Farnborough. There he learned a great deal more about radio, and apart from a period at Woolwich designing the Army Nr2 set, he spent most of his working life at the "factory".

Ken Alford, G2DX

After the first world war, after pressure from the WSL and its affiliated societies, experimental licences were again granted, and by 1920 the air was full of two-letter calls. This great company of young enthusiasts did not fit comfortably into what was essentially a scientific society, and they formed the "transmitter and relay" section—with 2UV, 2NM and 2DX as prime movers—which was eventually incorporated with the WSL as the Radio Society of Great Britain.

Ken was active in the transatlantic tests of 1921-3 and the "dawn of international dx". After seeing the superhet receiver brought over for the ARRL by Paul Godley, he mastered the principle, published articles and helped friends such as 2NM and 2OD to acquire such receivers. In the later 'twenties he made one of the first contacts with Australia, with A3BQ of Melbourne.

In those years he served on the Council of the RSGB, and was once nominated for President, but could not take the office, though for his early work he was later made an honorary member of the Society. He was for many years president of the Radio Old Timers Association.

He leaves behind a great quantity of historic material which will be preserved; his early logbooks contain two classic entries:

Aug 4 1914. POZ (Nauen). *"Krieg ist erklaert gegen Frankreich und Russland".* (The people of Kendal thought he was mad, until the papers came next day.)

Nov 11 1918. FL (Paris). *"La guerre est fini"* (They believed him this time.)

In 1924, as a visiting consultant to Igranic Electric of Bedford, he interviewed and fixed jobs for two young hopefuls: the late Ham Clark, G60T, and the prospective G6CJ.

Finally, after 73 years of continuous activity on the air, with failing sight and mind, he could no longer operate his station, and after a short while in care, my old friend signed off.

G6CJ

OBITUARIES

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

Mr M Abrahams, G1GPP
Melvyn Abrahams died on 26 January aged 33, and will be remembered by the North Westers. His sharp wit and his enthusiasm to help others on 144MHz will be his lasting memorial.

Mr W K Alford, G2DX
Ken Alford died on 4 March. He was first licensed in 1912, and in the following year was a founder member of the Wireless Society of London and hence of the RSGB. He was well known for his activities on and off the air throughout his active life. A large number of radio amateurs attended the funeral, including representatives of the Farnborough club which he founded; the Bournemouth, Wimborne and Salisbury clubs; the Bristol RSGB Group and RAOTA.

Mr C J Austen, G1LHA
John Austen died on 10 February aged 37. He was well known in the Epsom area, and was always willing to help his fellow amateurs. He was very interested in antenna development and research.

Mr B Cook, G3IYG
Brian Cook died on 12 February aged 56. He was first licensed while living in Andover. He was very active on rtty, phone and cw, both on hf and 144MHz, and was the holder of many dx awards. He was highly respected for his help and encouragement to both new and long-standing amateurs and was a member of the Society for many years.

Mr E Dacre, G4ERL
Earl Dacre, who died on 18 January, was a founder member of the caravan net. Severely disabled by arthritis, he was grateful for assistance from amateurs in Shipley and Morecambe, which enabled him to continue on the air until shortly before his death.

Mr D R Doughty, G3FLS
Mr Doughty was a regular hf operator and keen on cw since his days as a war-time RAF wireless operator. He had for many years taught the cw and RAE classes at Loughborough Technical College. While working as a teacher, he held the Garendon School Club's licence, G3MKX, and featured in many NFDs in the 'sixties and 'seventies.

Mr C R Pill, G5CX
Cecil Roberts Pill died on 9 November. Professionally involved in radio throughout his life, he served as a Marine radio officer on a variety of ships, surviving the wreck and total loss of the *SS War Puffin* in the Moulmein River in 1919. Licensed in the early 1900s, he was an enthusiastic radio amateur and enjoyed building his own equipment. His house was a veritable "Aladdin's cave" of homebrew, surplus equipment and components. He operated mostly cw on the hf bands, although latterly he enjoyed monitoring the 144MHz band.

Mr C E Shaw, G8NLA
Eddie Shaw died on 13 January, aged 79. His interest in radio and communications dates from the 'thirties, when he was involved in the development of radar and television in the Cossor laboratories. During the war he took a major role in the local defence organization, and was also responsible for training many signals personnel. He was president of the local amateur radio society, and gained his licence in October 1979, becoming very active on 144MHz, through which he had a wide circle of friends.

Mr W A Sparks, G8FBX
Bill Sparks died on 6 January. A keen swl in his youth, he was a founder member of the Warrington and DARS in 1946, always taking a keen interest in club affairs and activities. He took part in numerous field day and portable outings, being especially interested in vhf and uhf. Keen on home-construction and design, he was the author of many contributions to amateur radio periodicals, and will be remembered by many as an RAE instructor in the S Lancashire and N Cheshire area. A member of the RSGB and Raynet, he was always willing to help the newcomer to amateur radio.

Mr J Tovell, G5LQ
Jim Tovell died on the 26 February aged 88. He was a radio operator during the first world war, initially with the RN and then with the RFC. He personally made the first-ever air-to-ground contact while with the RFC over Constantinople. He was a founder member of the Acton, Brentford & Chiswick club. Essentially a cw and a QRP operator, he had many successes in early QRP contests.

Also:

Mr D J Everson, RS39215, on 13 February
Mr D P Ferguson, G4TVF, in May 1985
Mr E J Green, G3EYD, on 27 February
Mr W H C Jennings, G2AHB, in January
Mr N G Kramer, RS88131, in February
Mr J Leach, G8VWQ, on 27 February
Mr N Norman, GJ5MI
Mr O Richardson, RS31167, on 15 February
Mr S D Shaw, W7AOL, on 21 January
Mr A J Shawcross, G4BSZ, on 24 February
Mr R G Stuart, RS48677
Mr J Udale, G8VRF, on 21 October 1985
Mr K Wilking, RS86047
Mr S B Wilson, RS43924
Mr J Wolstenholme, RS86687

Members' Mailbag

G4RS SLOW MORSE

Sir—Can you or any reader please shed any light on the station broadcasting "O" in morse code repeatedly on 3,567kHz in the evenings. It is strength 9 in SE London, and completely swamps the G4RS slow morse broadcasts.

If the transmissions have anything to do with amateur radio can they be stopped—if not, can the G4RS broadcasts be moved away so that they may be heard more widely?

Andrew Woods, G1MPM

Transmissions of this type generally originate from commercial or military stations who have no traffic to pass at a particular time but who wish to maintain their occupancy of a frequency or channel. The 3·5MHz band is, of course, shared with other users. A copy of Mr Woods' letter has been passed to RSARS for their comments.

WITHHOLDING "PARTICULARS"

Sir—After 16 years as an active swl with 318 DXCC countries heard and confirmed, it is with growing dismay that I find the RSGB *Call Book* decaying into little more than a list of callsigns and no other details. I refer of course to the current trend of "particulars withheld" entries. I can appreciate the logic behind this in terms of today's high crime rate, despite the fact that one local entry of this type has a mass of antennas on view at his QTH, so he is kidding no one with his *Call Book* entry.

My own feelings on the subject are that as a compromise the town should be the least minimum entry allowed, ie G4ABC—RUNCORN, CHESHIRE; no postcode of course, as this is as good as giving the full QTH. Certainly the whole aspect is contrary to QSLing other than by the bureau, which leaves much to be desired as is common knowledge, though in my own experience I find a figure of 30-35 per cent return is average, by this method, against 90-95 per cent by direct methods.

B Russell, BRS33915

Any comments?

DATA COMMUNICATIONS

Sir—It is interesting to note an increasing interest in data communications, and I am prompted to write after seeing Ian Wade's column in your December issue in which he asks for input on the subject.

Briefly, my contribution to data comms is the result of a keen interest, some know-how obtained from literature, and experience gained using rtty, ascii, amtor and packet. I find the packet mode most promising for the future of amateur communications, and although activity has been low in this area I have used the Cambridge system on vhf. The maximum number of terminals I have been able to assemble has been four, but even that showed its promise, if only for frequency conservation! Local interest was too low to exploit much though. A lot must depend on the availability of a BBC micro of course.

The hf amtext system was tested during last year. The tests are discontinued now, but again the possibilities were obvious. Transceiver bandwidth proved to be a little critical using the BBC computer internal tones, and it could be that Bell tones are preferable for standard transceiver equipment.

I would like to experiment with AX.25 but have not so far had the opportunity; there is surprisingly little local activity in the Cheltenham area. I hear the extensive use of packet on hf, so it seems that I shall have to find out what I can in that sphere. Prices are high though. I note the news item in *R & EW* December 1985, p59, which refers to the Sydney packet group; that could be an interesting project in this area, but the world modem chip AMD7910 is of particular interest. These are quite cheap now. I have one available which can be configured for Bell tones, and could be an ideal base for experiment.

A lot is on offer for the future. Consider the present way of disseminating information by the RSGB. Sunday morning news broadcasts using out-moded wideband voice occupy much of the time with out-of-area items, often of historical value. I often have to wait tediously for an item of particular interest while the newsreader wades through a mass of data. There was some comment made about association by the RSGB with Marconi Research. Good, but surely in real-time or it is useless. The news service has been of immense value, providing an excellent service, but I feel that a re-think is necessary if the Society is to maintain impetus in development of radio communication for the amateur.

The Databox public telephone service has been introduced. For anyone outside the London area it is an expensive source of on-line information. Who wants to go to that expense when an amateur data network can be set up. Simply, for instance, node controllers, each within range, could adopt commercial practice and dissemble incoming data into the various modes for local consumption. Not everyone has computers or modems. Modes could even include sstv for document reproduction.

I have been following and detailing the Mailbox developments. Not all agree with its activities, but a tremendous amount of information is available. Only today I was listening to an hf broadcast of propagation information from a mailbox, similar to that of WWV, which is an hourly update of ionospheric value to a communicator. There has been mention of the Marconi Research information being made available for this area, but it needs to be near real-time.

It seems to me that efforts should be made not to criticise the Mailbox system, but to regularize the whole of data communications and assign a better band plan than is presently available for Data Comms. Think of the narrow band of frequencies competing for packet, amtor, rtty and cw which alone allow for bandwidth conservation, and the massive area available on most amateur bands which use bandwidth expensive 2-3kHz speech for each individual terminal. Unfair . . . out-moded?

Food for thought.

B Cannell, G3CZX

The Society does intend to introduce other data modes for news dissemination.

CARDS AND MANNERS

Sir—May I be permitted to air my two-pennorth on a couple of points, one of which has been given considerable airing recently in *Radio Communication*.

1. QSLs, that bane of our hobby. I write on this point as secretary and QSL manager of the club station ZC4ESB. In the 1984 RSGB 21/28MHz Contest, the club made 157 contacts with G stations, within a week after the contest all cards had been made out and posted to the RSGB QSL Bureau. To date (16 January 1986) the return is three cards of which two were received "TNX QSL"!

This is not a moan, as the club really is not bothered about cards, only a point of fact which has resulted in the policy now of no card in, no card out. So please, no more complaints about poor returns.

2. There has been a considerable increase in extreme bad manners over the last few years on the cw end of the bands, which for me has become more noticeable since ZC4 became a separate country. For long-path contacts to Australasia and the Pacific we have to beam over Europe, and CQ Pacific seems to mean CQ Europe as well, even when contact has been established and "KN" is used no one heeds it. Remarks such as "calling VK/ZL" result in a carrier being rammed down the headphones, or those frustrated policemen making QSY, LID, QAP *et al*, plus of course the various obscene remarks in several languages (one soon becomes a linguist in this field).

Is there nothing that we can do about it? I have a black list of stations that have caused deliberate interference and they do not get a card if worked accidentally, but what we need surely is stricter control by the various national bodies and revocation of licences where necessary so that those who love this hobby for what it is may be allowed to enjoy it.

Glynn Burhouse, ZC4CZ

PIRATE SEARCH

Attention. To anybody who has worked G8UBG in the period 1980-85. I have received a QSL card from YU4EDO, a club station in Odzak for an ssb QSO on 9/7/81. This is not possible, as I have only operated fm since 1979. My station was largely inactive from 1981-85 due to university commitments.

I have been non-QTHR since 1980, and have moved since the 1980 *Callbook* entry. The QTH then was at ZM57j: stations may have worked me in Northamptonshire, and a few in Bristol or London.

Although it is inconvenient, could I ask any stations who have sent QSL cards via the bureau from October 1979 to August 1985 to send a duplicate card, so that I can trace any pirate. All cards sent via the bureau will be answered as received.

This came to light only because I was advised that some cards had been disposed of as unclaimed.

G8UBG

THAT CONSPIRACY AGAIN

Sir—I was delighted to see in *MM* February 1986, G4LMI and G6CJ taking up the amplitude modulation conspiracy again, because one of the most intriguing aspects of our hobby is, to me, the appeal to the fundamentals of its science. You have assured me in your October issue that there is no information in the a.m. carrier, and G6CJ says that it is difficult for newcomers to accept "ideas which have been conventional for so long". I am very keen on all such theory as I can understand, and especially in the processes of its practical application. However, as a sceptic, I cannot accept an idea simply because it has become conventional.

I have read G6CJ's splendid letter several times. Some of the theory he referred to gets picked up over the years and, while I cannot reproduce the development of, say, de Fourier's harmonic analysis, I can accept its results along with the evidence of the crt that sidebands exist. May I please be allowed to ask my question again, slightly differently? If so, it is this.

At what frequency of modulation and according to what mathematics does the modulation of the carrier stop making the amplitude of the carrier fluctuate and start making sidebands? (Let us imagine the lowest modulating frequency being generated by hand so that we can *see* the carrier fluctuating from maximum to zero on a crt.)

If there is no way of calculating this point (notwithstanding G6CJ's flywheel!) then perhaps the carrier continues to fluctuate at any modulating frequency at the same time as producing sidebands (and perhaps G6CJ's differential equations show this). The question is then, how do we detect this fluctuation in the absence of the sidebands which we have filtered off at the transmitter? The clear advantage of being able to do so is being able to get far more simultaneous transmissions into the bands. (Is there, for example, such a thing as a wide-band local oscillator which could beat at af with the fluctuating carrier? Sounds something like direct conversion).

I shall not be surprised when, under all this pressure, a member confesses to having known all about this all along. What surprises me is that he has been able to keep his secrets so long!

Gordon Lines, RS86997

(*See* Technical Topics, *p340*—Ed)

Equipment Review

TRIO TS930S and TS940S HF TRANSCEIVERS

Peter Hart, G3SJX*

Introduction

The Trio TS930S was introduced during the summer of 1982 as a feature-packed hf base station of advanced design. Since then it has gained a reputation among dxers worldwide for its high performance and ease of use. Three years later, during 1985, Trio unveiled the TS940S, architecturally similar to the TS930S but incorporating many additional facilities. Both transceivers are mains-only operated base stations with built-in power supply, incorporating general coverage receivers and many features.

Principal features

Both transceivers combine the functions of an amateur bands transceiver with a general coverage receiver tuning 150kHz to 30MHz. Note that the TS930S will, in fact, tune down to 100kHz, and the TS940S down to 30kHz, with perfectly acceptable results. CW, ssb, a.m. and fsk modes are provided, with fm only on the TS940S. FSK is only intended for use with terminal units using 2,125/2,295Hz tones. Both transceivers employ a 10Hz/step frequency synthesizer controlled from a 55mm diameter weighted flywheel tuning knob at 10kHz/revolution. The tuning rate increases when the knob is spun fast. This is particularly effective with the TS940S, and allows rapid changes in frequency. The TS940S tuning rate on a.m. and fm is 100kHz/revolution in 100Hz steps. A blue fluorescent display indicates frequency digitally to 100Hz resolution (TS930S) or 10/100Hz resolution (TS940S). In addition, a linear pseudo-analogue sub-display is also provided together with digital readout of rit/xit frequency. A second display is provided with the TS940S indicating a number of additional functions. These functions will be revealed in the following paragraphs. Amateur bands are selected individually by push-buttons with additional up/down buttons stepping in 1MHz intervals for selecting general-coverage frequencies. The usual synthesizer-related functions are provided, including twin vfos, split frequency and band operation, memories, etc. Back-up batteries retain the frequencies in the memory when the power is removed. The TS930S has eight switched memory channels; but the TS940S has 40, organized as four banks of 10, and stores mode as well as frequency in each memory location. The TS940S also includes frequency and memory scanning facilities, memory preview via the second display, and direct keyboard entry of frequency. A particularly useful facility for cw operation is the pitch control which allows the pitch of the received cw note to be varied to suit individual preferences. The monitor note on transmit also varies accordingly.

Receiver functions include rit in 10Hz steps to ±9·99kHz, i.f. notch filter, adjustable cw audio peak filter, two fully adjustable noise blankers (for "woodpecker" and ignition noise), two speed agc plus off, four-position switchable rf attenuator and all mode squelch (TS940S only). Extensive control of the i.f. selectivity is provided in both transceivers through the use of variable bandwidth (vbt) on cw, and independent control of the upper and lower i.f. skirts on ssb (slope tuning). The TS940S displays graphically, in bar format, the i.f. bandwidth and position relative to the centre frequency on the second display.

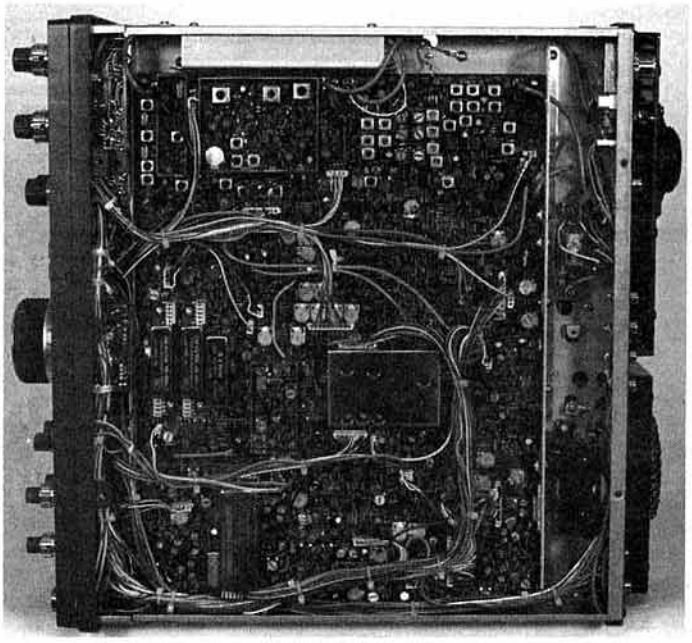
Transmitter functions include rf speech processor with fully-adjustable input and output levels, vox, variable power output, cw full break-in, monitor, xit (transmitter independent tuning), metering of compressor level, alc, power output, pa collector current, supply voltage and vswr. The vswr position indicates true vswr irrespective of power output. Twin thermostatically-controlled fans are employed. These seem tolerably quiet in operation.

Additional functions provided only on the TS940S are largely associated with a second display which uses a dot matrix panel. These include a 24h clock, a timer with one on and one off time setting, i.f. graphical displays, frequency display to scroll through vfo and memories, and friendly announcements associated with the optional automatic atu.

Connectors on the rear panel provide for antenna, antenna to external receiver, external receive antenna (via transverter socket), key, external speaker, i.f. output, interfaces to transverter and linear, ptt, audio input/output etc. The TS940S has two additional accessory connectors for computer interface (undocumented) and data terminal unit connection also allowing the microphone input to be muted.

Options include 500Hz and 250Hz narrow i.f. filters for cw, 6kHz wide filter for a.m., automatic antenna tuner and temperature-compensated reference oscillator. The TS940S may be fitted with a voice synthesizer which announces the frequency in a synthesized voice. This feature, together with the mode being reported by the initial letter in morse code when selected, will be most appreciated by the sightless amateur.

An RS232C interface is shortly to be available for the TS940S which will allow control from an external computer. This interface will be common to the TS940S, TS711E, TS811E and TS440.



Bottom view of the TS930S with cover removed

*42 Gravel Hill, Addington, Croydon, Surrey.

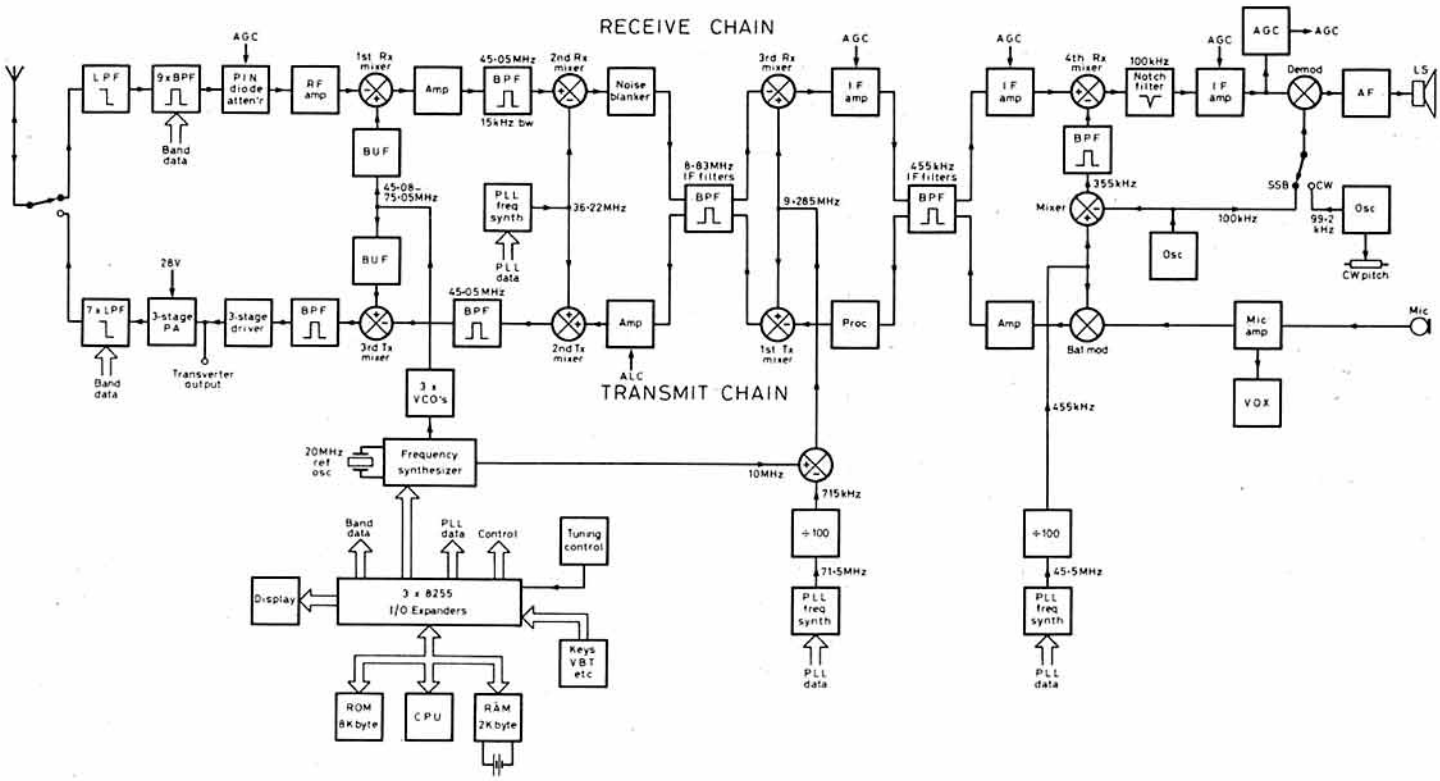


Fig 1. Block diagram of the TS940S on ssb

The TS930S comes with a 44-page instruction manual, and the TS940S with a 60-page manual. Both are excellent at describing how to use the equipment, the TS940S manual in particular. Installation of options is described, and brief details on circuit description and maintenance are included. Circuit diagrams are given but are difficult to follow.

Description

Both transceivers are quite large, requiring plenty of table space. The TS930S measures 37·5 (w) by 15·5 (h) by 38cm (d) and weighs about 17kg. The TS940S measures 41 (w) by 15·5 (h) by 39cm (d) and weighs about 19kg. Construction of both transceivers is similar, based around a steel chassis. On top of this chassis, a number of modular sub-assemblies are mounted, and underneath are the main pcbs, a single giant board in the TS930S, and three boards in the TS940S. The front panel is a separate detachable sub-assembly containing all controls and displays. An 8·5cm-diameter upward-facing speaker is mounted to the left of a sliding hatch in the top of the case. This hatch gains access to a number of lesser-used controls such as vox levels, preset gains etc, and, for the TS930S, three AA-size back-up batteries—a life of one year is claimed for these. Back-up batteries are not mentioned in the TS940S manual, but two 3V lithium button cells were located on the rear of the second display.

Fig 1 shows a block diagram of the TS940S on ssb. The rf architecture and circuitry of the TS930S is virtually identical, principal differences lie in the frequency synthesizer and control parts. The receiver is quadruple conversion with i.fs of 45·05MHz (TS940S)/44·93MHz (TS930S), 8·83MHz, 455kHz and 100kHz. On fm, the 100kHz i.f. is not used. Balanced 2SK125 junction fets are used extensively in the rf amplifier and first and second mixers, and balanced 3SK73 dual-gate mosfets in the third mixer and all transmitter mixers. The 3SK73 is also used for most rf amplification functions. The transmitter is triple conversion with ssb generated at 455kHz. The pa uses a pair of beefy Motorola MRF422s operating from a 28V supply.

Three phase-locked loops are used to generate the first local oscillator signal tuning approximately 45 to 75MHz in 10Hz steps. Oscillator injection for the other mixers is derived from mixing crystal oscillators in the TS930S, or from single-chip synthesizers in the TS940S. A total of five MN6147 single-chip frequency synthesizers are used in the TS940S, and by providing them with relevant data from the digital control unit, all frequency setting and variable i.f. bandwidth functions can be achieved. The heart of the control unit comprises an eight-bit microprocessor which provides output data for all frequency synthesizers, memories, switches to select filters and other functions, displays etc from input data provided by the tuning knob, rit, slope tuning and variable bandwidth digitally-encoded controls, memories, pushbuttons and keyboard. All these input/output functions are routed via i/o expanders. The tuning knob and rit both use optically-chopped shaft encoders.

Measurement technique

The reader is referred to references [1–4] for details of the measurement procedure. All signal input voltages are given as pd across the antenna terminal, and two-tone intermodulation products are quoted with respect to either originating tone. Unless stated otherwise, all measurements were made on ssb, with the automatic atu switched out and confined to the amateur frequency allocations only.

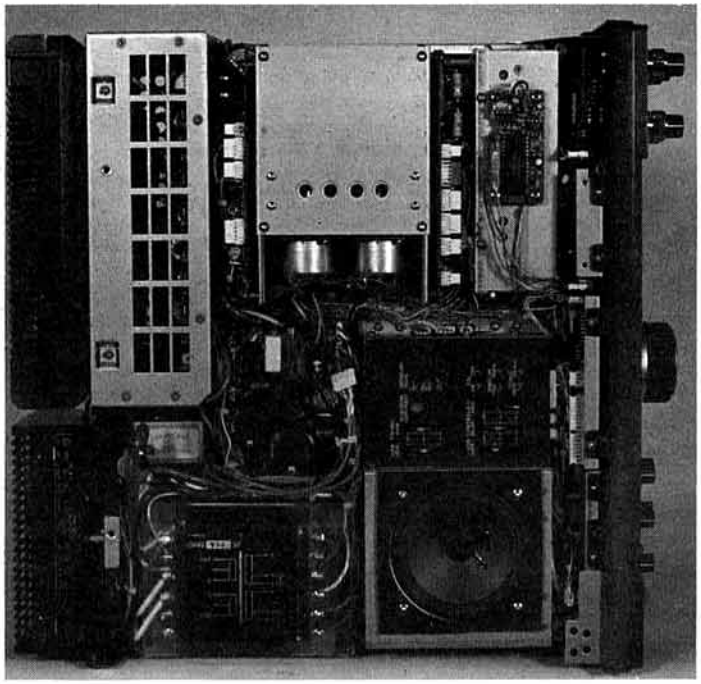
Receiver measurements

SENSITIVITY

Table 1 shows the sensitivity figures on ssb. These indicate a noise floor of −133 to −135dBm for both transceivers, or a noise figure of about 6 to 8 dB. The a.m. sensitivity on 28MHz for 10dB s+n:n at 30 per cent mod depth was 1·0μV for both transceivers, and the fm sensitivity for 12dB sinad and 3kHz peak deviation was 0·35μV for the TS940S. The switched input attenuator was accurate to within 1dB.

Table 1. Receiver measurements

Frequency	SENSITIVITY ON SSB FOR 10dB s+n:n TS930S	TS940S	INPUT FOR S9 TS930S	TS940S
1·8MHz	0·13μV (−125dBm)	0·13μV (−125dBm)	14μV	63μV
3·5MHz	0·14μV (−124dBm)	0·14μV (−124dBm)	16μV	63μV
7MHz	0·16μV (−123dBm)	0·14μV (−124dBm)	18μV	56μV
10MHz	0·14μV (−124dBm)	0·11μV (−126dBm)	18μV	56μV
14MHz	0·14μV (−124dBm)	0·14μV (−124dBm)	22μV	80μV
18MHz	0·13μV (−125dBm)	0·16μV (−123dBm)	25μV	50μV
21MHz	0·14μV (−124dBm)	0·14μV (−124dBm)	32μV	56μV
24MHz	0·14μV (−124dBm)	0·14μV (−124dBm)	28μV	56μV
28MHz	0·16μV (−123dBm)	0·18μV (−122dBm)	28μV	50μV



Top view of the TS940S with cover removed

S-METER CALIBRATION

Table 1 also shows the input signal level required to give an S9 meter reading. On 14MHz the calibration was as follows:

S-reading	TS930S Input signal	TS930S Relative increase	TS940S input signal	TS940S Relative increase
S2	0·8μV		2μV	
		5dB		2dB
S3	1·4μV		2·5μV	
		5dB		10dB
S5	2·5μV		8μV	
		8dB		11dB
S7	6·3μV		28μV	
		11dB		9dB
S9	22μV		80μV	
		19dB		19dB
S9+20	200μV		700μV	
		19dB		18dB
S9+40	1·8mV		5·6mV	
		19dB		21dB
S9+60	16mV		63mV	

The linearity is generally reasonable, particularly above S9, but, as received, the TS930S was rather over-generous at low frequencies, and the TS940S slightly pessimistic on some bands. Presets are provided to set the S-meter calibration.

SPURIOUS RESPONSES

Primary image rejection and first i.f. rejection was measured as follows:

Frequency	IMAGE REJECTION TS930S	IMAGE REJECTION TS940S	I.F. REJECTION TS930S	I.F. REJECTION TS940S
1·8MHz	118dB	101dB	98dB	83dB
3·5MHz	113dB	99dB	106dB	81dB
7MHz	123dB	98dB	103dB	87dB
10MHz	114dB	101dB	91dB	90dB
14MHz	105dB	99dB	110dB	93dB
18MHz	100dB	99dB	112dB	90dB
21MHz	104dB	102dB	113dB	87dB
24MHz	92dB	102dB	112dB	88dB
28MHz	88dB	100dB	110dB	84dB

Half first i.f. rejection was 75–85dB on 14MHz and above, and greater than 100dB at lower frequencies. Rejection of the 8·83MHz i.f. was in excess of 110dB, except for the TS930S on 7MHz (89dB) and 10MHz (83dB). There was no detectable response at the 455kHz or 100kHz i.fs.

Only two internally-generated spurious signals were noted on either receiver with the antenna terminated in 50Ω, both at insignificant strengths.

A few additional spurious responses were found on most bands, mostly requiring 25–100mV input level to be detectable. The TS940S was a little better than the TS930S in this respect.

The spurious response performance of both receivers is perfectly acceptable.

AGC PERFORMANCE

Both receivers exhibited a fairly soft threshold at about 1–2μV. A 110dB increase in signal level above 2μV resulted in a 1·5dB increase in audio output. The attack time was 5–8ms with some extended overshoot, and the decay time 0·2–0·7s (fast) or, in the slow position, 2·5s (TS940S) or 1·5–4s (TS930S) depending on signal level.

SELECTIVITY

The only difference between the standard filters fitted to the two transceivers is that the TS940S has a narrower bandwidth 8·83MHz i.f. filter. The additional filters fitted as options are common to both transceivers. The two reviewed samples were both fitted with the full complement of additional filters, YK-88A-1 a.m. filter and YK-88C-1 (8·83MHz)/YG-455C-1 (455kHz) 500Hz bandwidth cw filters. Measured bandwidths were as follows:

	Response	BANDWIDTH SSB/CW(W)	CW(N)	AM(W)	FM
TS930S					
	−6dB	2·80kHz	410Hz	6·06kHz	—
	−50dB	3·71kHz	680Hz		
	−60dB	3·98kHz	see text	9·31kHz	—
TS940S					
	−6dB	2·49kHz	420Hz	6·00kHz	7·30kHz
	−50dB	3·53kHz	760Hz		
	−60dB	3·72kHz	1·34kHz	9·40kHz	13·5kHz

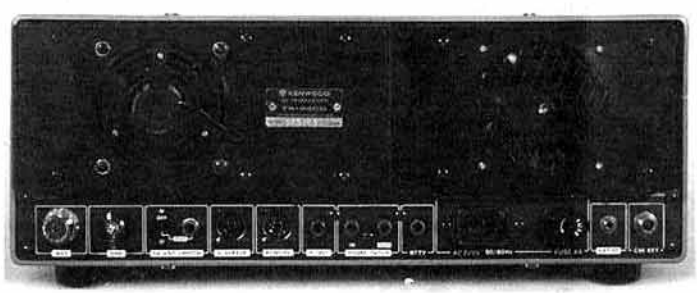
Reciprocal mixing limited measurements to about 60dB down the filter skirts. For the TS930S, it was not possible to measure the narrow cw filters at this level, as a form of agc pumped microphony resulted. This is due to slight pulling of the synthesizer vco, probably due to insufficient supply regulation, resulting in p.m. to a.m. conversion greatly magnified by the extremely steep skirt of the filter characteristic. Although the cw filter widens substantially between -50 and −60dB, this is still a very good filter.

RECIPROCAL MIXING

Measurements made at 21·4MHz on ssb were:

Frequency offset	LEVEL WITH RESPECT TO NOISE FLOOR TS930S	TS940S (see text)
2kHz	72dB	79dB
3kHz	77dB	83dB
5kHz	83dB	89dB
10kHz	89dB	98dB
20kHz	97dB	105dB
30kHz	101dB	110dB
50kHz	108dB	115dB
100kHz	116dB	120dB

These figures indicate an oscillator noise sideband performance at 10kHz off-tune of −122dBC/Hz for the TS930S, and −131dBC/Hz for the TS940S. After carrying out the measurements, it was discovered that the review TS940S had been fitted with the Lowe modification to improve the reciprocal mixing performance. It is reputed that this results in an improvement of up to 12dB at offsets from the carrier of less than 50kHz (see [5]). A standard TS940S will exhibit worse reciprocal mixing performance than the TS903S. However, the Lowe-modified TS940S figures are much better than most other synthesized transceivers available at the present time.



TS930S rear view

TS940S rear view

BLOCKING

Blocking levels varied with on-tune signal level due to the action of front-end agc. At frequencies offset from the carrier by greater than 15kHz, blocking occurred at about +7dBm (500mV) for S9 on-channel signals or −3dBm for S3 signals. At lower levels, reciprocal mixing prevented measurement. Within 15kHz of the on-tune frequency this figure was degraded by up to 20dB by signals passing through the 45MHz first i.f. filter and blocking the second mixer. Both transceivers gave similar results. Fig 2 summarizes the single-tone dynamic range measurements.

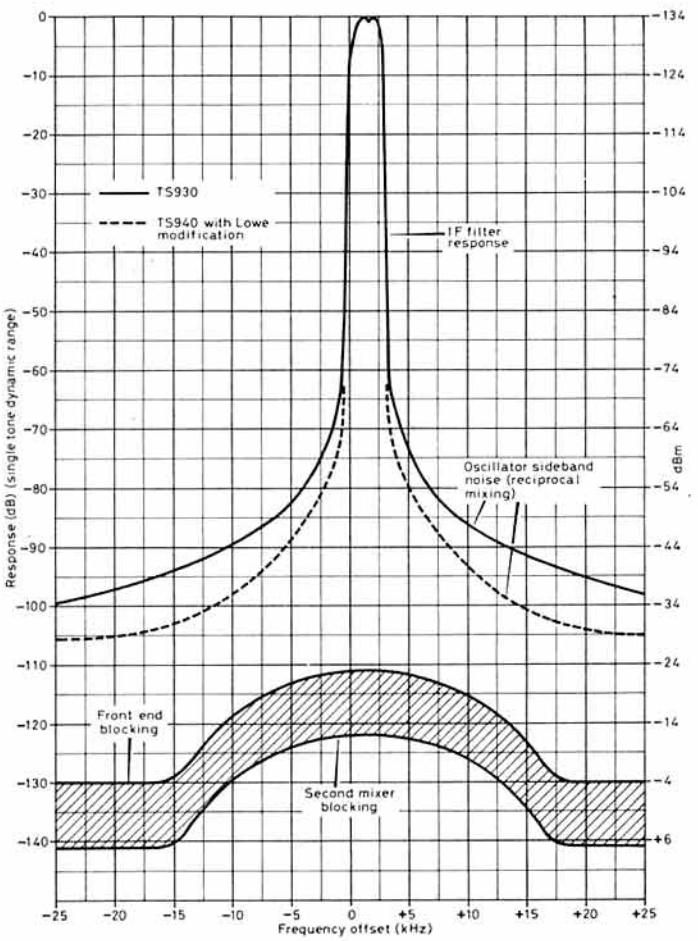


Fig 2. TS930S/TS940S effective selectivity curve on usb

THIRD-ORDER INTERMODULATION

The intermodulation performance was evaluated at 7MHz on ssb as follows:

	THIRD-ORDER INTERCEPT		TWO-TONE DYNAMIC RANGE	
Tone spacing	TS930S	TS940S	TS930S	TS940S
<5kHz	−17dBm	−20dBm	77dB	76dB
10kHz	−2dBm	−12dBm	87dB	81dB
20kHz	+4dBm	−2dBm	91dB	88dB
30kHz	+5dBm	+3dBm	92dB	91dB
40kHz	+8dBm	+3dBm	94dB	91dB
>50kHz	+10dBm	+7dBm	95dB	94dB

The third-order intercept and dynamic range was about 1 to 2dB higher on the higher frequency bands and a decibel or so lower on 1·8MHz. The close-in TS930S figures may be somewhat inaccurate due to the presence of reciprocal mixing noise. As with other up-conversion transceivers with relatively wide roofing filters, there is a significant degradation in close-in dynamic range. It is, however, rather better than the TS430S or FT757GX.

Overall inband linearity as measured with 200Hz signal spacings [2], differed substantially between the TS930S and the TS940S. With the TS930S, the limiting factor was the audio amplifier for inputs up to 3mV and at low audio levels, a very low −40 to −50dB ip level could be achieved. With the TS940S, intermodulation in the i.f. amplifier increased from −35dB at 20μV to −20dB at 7mV.

AUDIO

The maximum power output into an 8Ω load before the onset of clipping was 2·1W (TS930S) or 2·3W (TS940S). Up to this level the distortion was less than one per cent. Maximum audio output could be achieved with an input signal of 0·35μV (TS930S) or 1·1μV (TS940S).

Transmitter measurements

CW POWER OUTPUT AND HARMONICS

	POWER OUTPUT		HARMONICS	
Frequency	TS930S	TS940S	TS930S	TS940S
1·8MHz	117W	120W	−48dB	−56dB
3·5MHz	116W	120W	−48dB	−54dB
7MHz	115W	120W	−52dB	−56dB
10MHz	114W	118W	−59dB	−59dB
14MHz	114W	113W	−55dB	−56dB
18MHz	114W	112W	−52dB	−56dB
21MHz	114W	112W	−53dB	−58dB
24MHz	113W	110W	−53dB	−52dB
28MHz	112W	108W	−56dB	−58dB

These transceivers give a few more watts than the average rig, which can be useful. Other spurious outputs were generally few and far between and below −60dB (TS940S) or −54dB (TS930S). On both transceivers, sidebands appeared on either side of the carrier at ±455kHz at a level of −70dB on all bands.

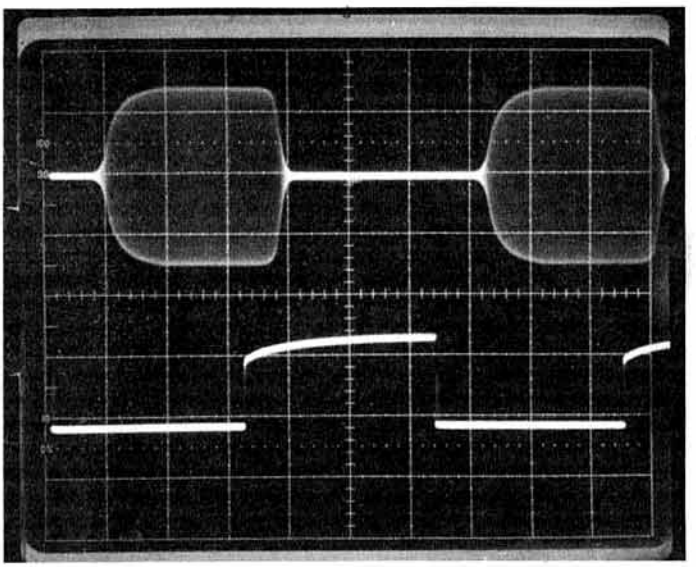


Fig 3. CW keying waveform (bottom) and rf envelope (top) at 40wpm. Horizontal scale: 10ms/division

Fig 3 shows the keying envelope when keying dots at 40wpm. This is ideal, nicely rounded with negligible distortion. Both transceivers gave identical results. There was no difference between full and semi-break-in operation.

SSB POWER OUTPUT AND DISTORTION

With maximum two-tone audio drive set to the top of the alc range, the following results were obtained with the processor off:

	POWER OUTPUT (P.E.P.)		INTERMODULATION PRODUCTS	
Frequency	TS930S	TS940S	TS930S	TS940S
1·8MHz	118W	120W	−28dB	−26dB
3·5MHz	118W	125W	−34dB	−30dB
7MHz	118W	123W	−38dB	−32dB
10MHz	117W	120W	−30dB	−30dB
14MHz	117W	118W	−34dB	−31dB
18MHz	116W	115W	−35dB	−32dB
21MHz	116W	115W	−30dB	−32dB
24MHz	113W	111W	−32dB	−31dB
28MHz	113W	110W	−30dB	−30dB

The intermodulation product level at ±10kHz was −60 to −70dB, and at ±20kHz lower than −80dB. These distortion levels are much better than average.

With 10dB speech compression, in-band intermodulation products were degraded but the wideband products were the same.

The carrier suppression was 60dB, and the sideband suppression with a 1kHz audio tone was 70dB.

AUDIO

The TS930S required 0·7mV audio input at the microphone, and the TS940S 1·2mV for full output. Audio distortion was very low at around 0·3 per cent. The audio bandwidths differed somewhat between upper and lower sidebands as follows:

	6dB BANDWIDTH	
	TS930S	TS940S
LSB	430-2,880Hz	93-2,510Hz
USB	300-2,660Hz	480-3,030Hz

The carrier position appeared to be inadequately aligned in the TS940S and this was confirmed with on air tests.

TRANSMITTER NOISE OUTPUT

Noise measurements at full output on cw at 21·4MHz (see [2]) were:

	NOISE OUTPUT WITH RESPECT TO CARRIER IN A 2·5kHz BANDWIDTH	
Frequency offset	TS930S	TS940S
5kHz	−79dB	−72dB
10kHz	−83dB	−72dB
20kHz	−85dB	−72dB
50kHz	−88dB	−74dB

These are relatively high levels, particularly the TS940S, and somewhat worse than predicted by the receiver reciprocal mixing figures for unexplained reasons.

OPERATION INTO MISMATCHED LOADS

On 28MHz with full cw power output, the TS930S delivered between 56 and 85W into a 2:1 load vswr, and between 34 and 71W into a 3:1 vswr. The TS940S delivered between 52 and 94W into a 2:1 vswr, and between 26 and 58W into a 3:1 vswr. Power levels could be restored to the fully-matched condition, less about five per cent, using the internal automatic atu.

LOW POWER (TRANSVERTER) OUTPUT

Both transceivers gave 40mW cw output on all bands, and 60mW p.e.p. on ssb at acceptable levels of harmonics and distortion. It is possible to drive to higher power output levels, but distortion and spurious outputs rise very rapidly to unacceptable levels. There is no alc protection on this output. Fig 4 shows the TS930S output spectrum, and Fig 5 the TS940S output spectrum, both on 28MHz at 30mW output power. Note that the noise measured on the full transmitter output is also present on the low level output.

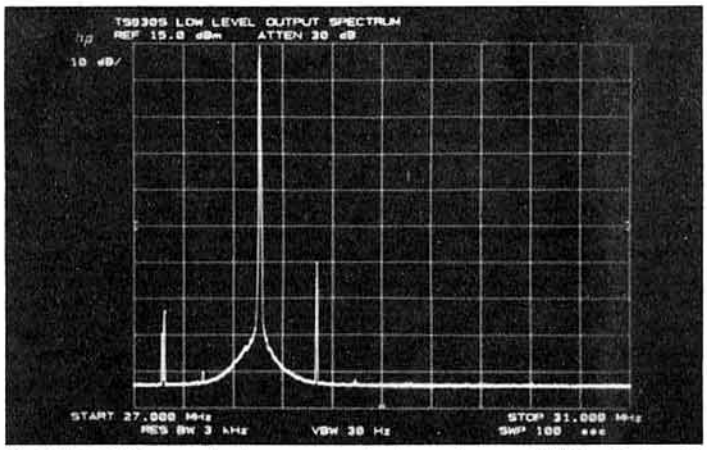


Fig 4. TS930S transverter low power output spectrum on 28MHz. Horizontal span: 27 to 31MHz. Vertical scale: 10dB/division

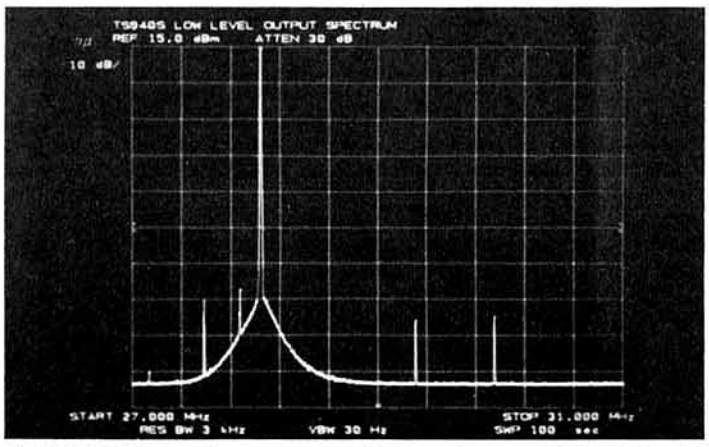


Fig 5. TS940S transverter low power output spectrum on 28MHz. Horizontal span: 27 to 31MHz. Vertical scale 10dB/division

Other measurements

TRANSMIT-RECEIVE SWITCHING SPEED

This parameter was measured on ssb as a direct result of switching the ptt line. This parameter is important for amtor operation.

	TS930S	TS940S
Time to mute rx	<2ms	<2ms
Time to activate rx	50-60ms	20-30ms
Time to mute tx	28ms	10ms
Time to activate tx	10ms	10ms

The TS940S times are barely acceptable for amtor, a receiver activation time of 20ms maximum is more appropriate. For the TS930S, on switching to receive, the ptt line rises relatively slowly. The receive activation time may be reduced to 35ms (still too long) and transmit mute time to 10ms by connecting a 150Ω resistor from ptt to +12V.

On-the-air performance

Both transceivers gave a most impressive performance when used on the air. This encompassed operation in several taxing contests such as 7MHz ssb and cw, CQ WW 160m and ARRL. The receive performance was excellent in all respects, giving clean results with no trace of overloading on the lower frequency bands. The synthesizers were the best that I have ever used, both tuned like analogue vfos with no trace of steps at low tuning speeds, and clicks were virtually non-existent. Tuning a quiet band, the TS930S produced "holes" rather than clicks every 2kHz but these were not objectional. Tuning cw at moderate to slow rates, the TS930S sounded purer, steps could be heard on the TS940S. Synthesizers generally produce a forest of noise and clicks when tuning near strong carriers. Weak clicks occurred every 2kHz on the TS930S, and every 10kHz on the TS940S, but these disappeared completely when the signal moved out of the i.f. passband. The automatic speed-up facility on the TS940S when the tuning knob is spun fast was really useful and allowed very rapid frequency changes from the cw to the ssb sectors of the bands without losing slow-tuning resolution. The basic filters were excellent and the adjustable selectivity features worked well. Personally, I tend not to use variable bandwidth or slope tuning very often, on cw I prefer really good performance switchable narrowband i.f. filters. The notch filter was very useful and the pitch control a real boon to cw operation. A.M. performance on the broadcast bands with the 6kHz a.m. filter was good, particularly on medium waves which is usually very disappointing on modern receivers due to overload problems from the sheer strength of signals.

On ssb transmit, with the TS940S, excellent quality reports were received with the MC42S microphone. The speech processor added real punch to the signal without distorting. Reports were equally complimentary on the TS930S. The cw note was perfect, with a total absence of clicks on both semi and full break-in. Full break-in worked perfectly up to fairly high speeds, with the TS940S producing somewhat less "thump" than the TS930S on returning to receive between characters.

Ergonomically, these transceivers also excelled. The easy tuning characteristic with weighted flywheel knob, simple use of split frequency and memory, ease of general operation, band change etc all add to the operating enjoyment.

The TS940S reviewed had two small faults. Both of these would have been repaired by the supplier had there not been some urgency to complete this review. The 455kHz carrier generation/insertion frequency had been inadequately aligned, resulting in unequal tonal balance between usb and lsb, and the received cw signal did not fall on the nose of the narrow cw filter. The second fault was a non-functioning audio peaking filter. There were no faults on the TS930S.

The TS940S was fitted with the optional AT940 automatic antenna tuner. This is a motor-driven unit which covers all bands 1·8 to 30MHz and matches up to about a 3:1 vswr. Tuning time is from about 1 to 10s, and the insertion loss appeared to be very low. As with all such atus, it should be regarded more as a "line flattener" to achieve maximum pa efficiency and output power, and not for directly end-feeding lengths of wire.

Conclusions

It is easy to see why these transceivers are popular with the discerning dx operator. The electrical performance is excellent, with a receiver achieving 95dB dynamic range in ssb bandwidths and a low distortion transmitter giving a generous output power. The ergonomics are good and there are all

the features which anyone could desire, particularly on the TS940S. Both receivers suffer from the degradation in dynamic range close to the carrier, but this problem is common to all up-conversion receivers. These two transceivers suffer less from this problem than most others. The Lowe modification to the TS940S frequency synthesizer results in a reciprocal mixing performance as good as or better than the best synthesized rigs around at the present time, although this parameter can still be significantly bettered with a non-synthesized rig.

These top-class transceivers unfortunately command top-class prices. The TS930S costs £1,395 and the TS940S £1,795. The auto atus are the AT940 at £210 and AT930 at £177. Optional filters cost £41.25 for the 8·83MHz i.f. filters, and £96.63 or £113 for the 455kHz cw filter. These are good filters but at a staggering price! The Lowe modifications to the frequency synthesizer combined with wide a.m. filter are sold as a package for £98 fitted.

Acknowledgements

I would like to thank G3UFY for critical comments on the transmission quality, and Lowe Electronics Ltd for the loan of the equipment.

References

[1] "The Icom IC720A hf transceiver", P J Hart, G3SJX. *Rad Com* February 1982, pp129–33.

[2] "The Yaesu Musen FT102 hf transceiver", P J Hart, G3SJX. *Rad Com* January 1983, pp32–36.

[3] "The Yaesu Musen FT77 hf transceiver", P J Hart, G3SJX. *Rad Com* June 1984, pp482–6.

[4] "The Yaesu Musen FT757GX hf transceiver", P J Hart, G3SJX. *Rad Com* May 1985, pp351–5.

[5] "Trio TS940S Multimode Transceiver", A McKenzie, G3OSS. *Amateur Radio* July 1985, p23. □

ENHANCEMENTS TO THE HF BAND TRANSCEIVER

Lorin Knight, MIEE, G2DXK*

OVER THE LAST TWO MONTHS I have described a complementary linear amplifier unit for my hf band transceiver [1]. This month several enhancements are looked at which can be made to the original transceiver unit. These include: (*a*) a narrowband af filter which can be fitted within the transceiver to improve cw reception; and (*b*) several modifications, resulting from the experiences of constructors over the last two years, which will give some other improvements.

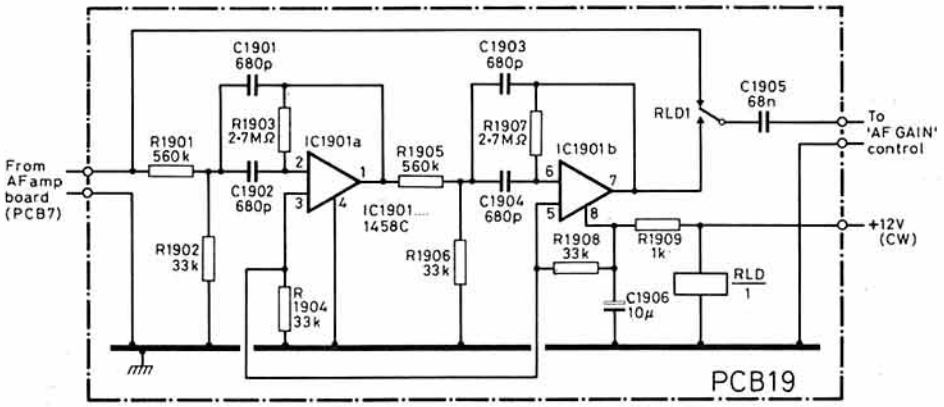


Fig 1. Circuit of the cw filter

CW filter

The addition of a narrowband af filter enhances considerably the reception of cw signals. In particular it filters out noise which has been introduced after the 4,433kHz filter.

That described here is a simple but quite effective two-stage active RC filter, tuned to approximately 800Hz. It has been designed to provide the extra gain which can be utilized when the noise bandwidth is reduced—plus a little extra gain to compensate for the passband loss of the 4,433kHz filter in the cw position. It is built on an additional board, PCB19, which goes in the spare pcb position next to PCB10 and PCB11. Electrically the filter is fitted between the output of the af amplifier/agc board PCB7 and the af gain control. The circuit is given in Fig 1. The filter is brought into operation by the + 12V (cw) line which powers the ic and which operates the relay RLD to switch in the filter. Figs 2 and 3 give details of the pcb.

(This filter could be usefully fitted to many factory-built hf transceivers.)

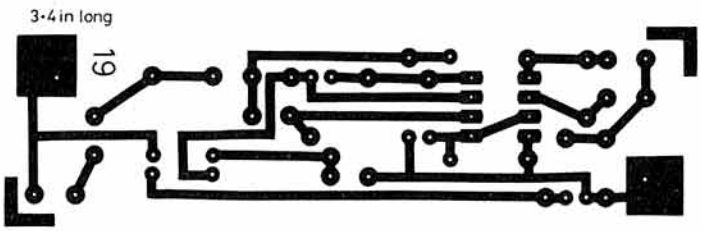


Fig 2. Etching pattern for the cw filter module PCB19

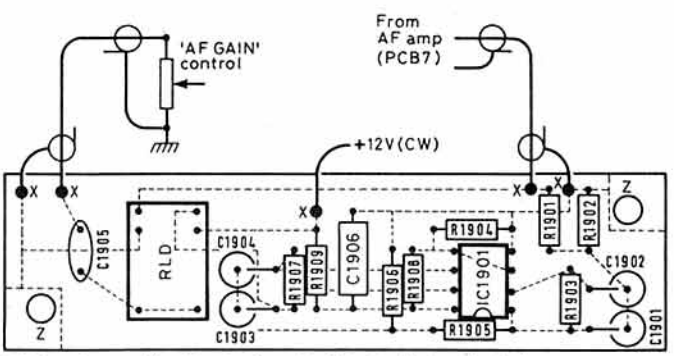


Fig 3. Drilling and assembly of PCB19

*123 Baldock Road, Letchworth, Herts SG6 2EQ.

Components list for cw filter

R1901, 1905	560kΩ 0·25W
R1902, 1904, 1906, 1908	33kΩ 0·25W
R1903, 1907	2·7MΩ 0·25W
R1909	1kΩ 0·25W
C1901–1904	680pF polystyrene
C1905	68nF mylar
C1906	10μF 25V axial electrolytic
IC1901	1458C
RLD	Ultra-miniature relay, spdt, 12V coil, 1A contact (Maplin Cat No YX942)

VFO converter for 3·5MHz

In the 3·5MHz vfo converter the fifth harmonic of the crystal oscillator falls at 8,175kHz, which is within the range of wanted frequencies (7,933 to 8,233kHz). Some constructors found that, with their converters, the 8,175kHz output was a little less than 40dB down on the wanted frequencies. Apart from giving an undesirable spurious output at 3,742kHz (8,175 – 4,433) on transmit, it meant that on receive a strong 3,742kHz signal could break through, regardless of the frequency to which the vfo was tuned.

The most satisfactory way of overcoming this problem is to use a crystal frequency of 1,735kHz rather than 1,635kHz. This still gives full coverage from 3,500 to 3,800kHz but, instead of tuning from 3,500 to 3,900 kHz, the transceiver now tunes from 3,400 to 3,800kHz. The advantage of the change is that the fifth harmonic now falls at 8,675kHz. Not only is the harmonic now attenuated a little by the tuned circuits in the vfo converter; the equivalent frequency at the antenna is now 4,242kHz, and this is attenuated somewhat by the 3·5MHz bandpass filter.

If required, still further attenuation at 4,242kHz can be obtained by replacing C605 in the 3·5MHz bandpass filter by the rejector circuit shown in Fig 4. This should be tuned to 4,242kHz where it will then look like a low resistance. Over the 3·5MHz band, however, it will look like a capacitance of several hundred picofarads. The rejector unit is mounted above the bandpass filter on two 22swg wires which are cut as short as practicable. After fitting the rejector it will be necessary to readjust slightly the tuning of the bandpass filter.

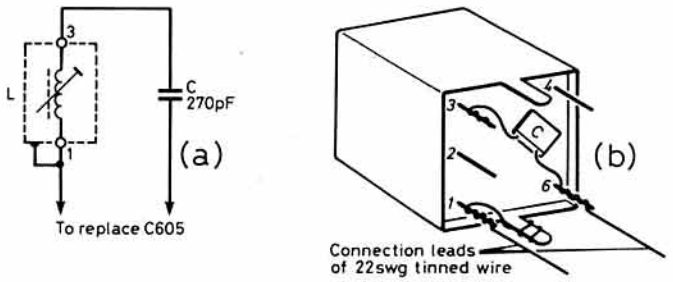


Fig 4. 4,242kHz rejection circuit for use with the 3·5MHz bandpass filter (*a*) Circuit. L: Toko type KANK3334R, nominal 5·5μH (Cirkit). C: 270pF sub-min ceramic plate. (*b*) Construction

CW tone envelope

With the original design, some people found the decay characteristic of the tone envelope following key-up to be a little unpleasant. This is because, after the initial decay, the tone hangs on for a while at a low level before becoming completely inaudible. The following changes to the tone generator board PCB11 overcome this problem:

(a) Change R1414 from 470Ω to 33Ω and add a 1N4148 diode in series as shown in Fig 5. (After key-up, as the current through the diode dies away, the ac resistance of the diode progressively increases, causing the gain of TR1402 to decay in a more desirable way.)

(b) Increase R1408 from 33kΩ to 150kΩ (to reduce the input to TR1402 which now has a higher gain).

(c) Reduce R1412 from 3·9kΩ to 1·5kΩ (because TR1402 now takes more current).

(d) Increase C1407 from 2·2μF to 10μF.

Smoother t/r switching

The following modification has been devised to give smoother switching between transmit and receive and to remove the switching noises which can be a little unpleasant when receiving very weak signals. Circuit details are given in Fig 6.

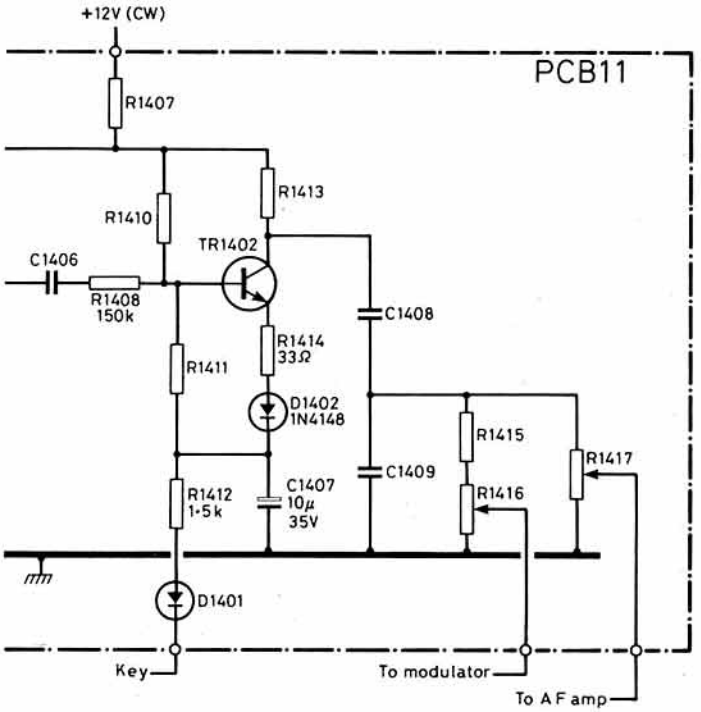


Fig 5. Modifications to tone generator PCB11. Changed components: R1408, 150kΩ 0·25W; R1412, 1·5kΩ 0·25W; R1414, 33Ω 0·25W; C1407 10μF 35V. Additional components: D1402, 1N4148

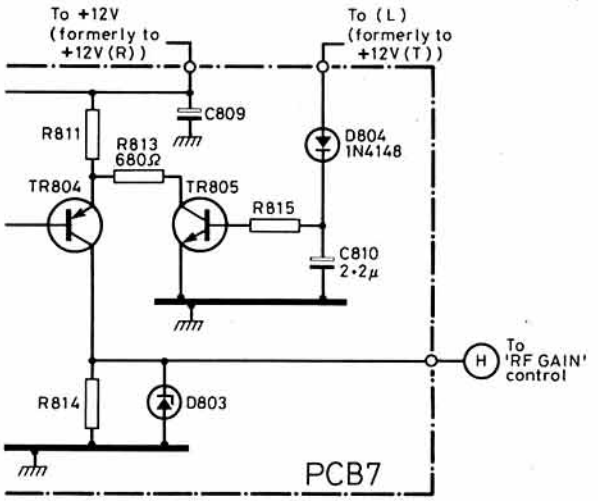


Fig 6. Modifications to af amplifier/agc board PCB7, to give quieter t/r switching. Changed components: R813, 680Ω. Additional components: D804, 1N4148; C810, 2·2μF 50V

The essence of the modification is to drive the agc clamp TR805 from the line (L), which energizes the changeover relays, instead of from the +12V(T) line, which comes from the points of one of the relays. This means that the agc clamp mutes the receiver 1ms or so earlier. We then need to make the clamp hang on a little longer when switching back to receive, and to release more gradually. This is done by the addition of D804 and C810. D804 and R815 can be mounted vertically on the board with their top ends soldered together. The positive end of C810 can be soldered to this junction, and a 1mm diameter hole drilled in the board to take the other end through to the earth track. R813 is decreased in value from 1·5kΩ to 680Ω to make quite sure that the agc is completely clamped.

Having made these changes it is better to operate PCB6 and PCB7 from the +12V line rather than the +12V(R) line. (The +12V(R) line is then only used to illuminate the green l.e.d.)

Reference

[1] "A transceiver for the hf bands", Lorin Knight, *Rad Com* June-October 1984. □

The 3·5MHz Dipole — Practical Aspects

*N H Sedgwick, G8WV**

AS IS DEMONSTRATED by the many nets on 3·5MHz, this band offers the best opportunities for those amateurs who use their hobby to keep leisurely contact with their friends of many years scattered about the UK. It is a band of 300kHz width, where the amateur can hold his own without the sort of frustrations one encounters on the narrow 7MHz band, with all its high-powered broadcasting intruders, and the propagation characteristics of the frequency are particularly suited to such use.

The amateur using the band principally for dx, faces the difficulty that low-angle radiation necessary for such use requires a very large and high antenna if horizontal types are considered. Even the vertical monopole, which will probably give the best low-angle radiation, requires to be some 66ft high with many long earth radials set around it. Shortened monopoles may still give low-angle radiation but actual radiation efficiency suffers greatly. If we accept that we do our dx elsewhere in the spectrum, and use this band for regular UK and near-European contacts, we can optimize our antennas for the purpose, and stop hankering after low-angle radiation and the difficulties it involves with the antenna.

To communicate over distances not greatly in excess of groundwave reach, high-angle radiation is clearly needed, which solves the height problem for the antenna. The normally accepted fact that a dipole should ideally be at least half a wavelength high (around 130ft on 3·5MHz!) can be forgotten and the height fixed at around 33ft, which is a convenient height for an antenna suspended between two wooden poles, or a chimney on a house and a tree in the garden. Few gardens in a residential area could accommodate a straight run of 130ft of wire, but in practice, because the radiation is at its maximum at the highest current point of the antenna (ie the centre in the case of the half-wave dipole), the low current ends can be turned down for 20ft or so without significantly affecting performance. It would not be desirable to have the high impedance ends of the antenna running parallel and close to a metal mast, so use of wooden poles is recommended, together with terylene stays and halyards. Thus we may accommodate a 3·5MHz dipole in a distance of 90ft, which is within possibility for quite a few suburban dwellers.

Radiation characteristics

At 33ft, or one-eighth wavelength on 3·5MHz in height, the upwards aperture of radiation from the dipole will extend reasonably flatly over 60° centred on vertical. In daylight, when most of the 3·5MHz ssb QSOs take place, the height of the reflecting E-layer averages 70 miles, and the maximum one-hop reflected signal may be expected to reach earth at a distance of 70 miles from the transmitter, and lesser one-hop propagation should extend to around 200 miles. The strong and steeply-angled reflection striking the earth around 70 miles from the transmitter will result in random scattering of the wave in all directions so that further hops are much less sharply defined. Normally in azimuth one expects the radiation from a dipole to be directional at right-angles to the run of the antenna, and no radiation to take place in direct line with the antenna run. Because the low antenna discussed radiates all its power in a cone straight up to the E-layer which reflects it down again, the usual skip area is far less pronounced than it is with an hf antenna having low-angle radiation, and the scattering of the wave at both E-layer and earth reflections will mask the azimuth directivity so that the antenna will be more or less omni-directional. There will, of course, be steeper angle reflection from the E-layer too, depending on its capability to reflect the waves striking it in the arc between 30° from and up to perpendicular, and such reflection will come to earth within the usual skip area.

Norman Sedgwick held an artificial aerial licence while still at grammar school, and obtained his full callsign G8WV in 1937. He entered the Post Office Engineering Department in 1936, and in 1943 he enlisted in the Royal Signals. He served then in cypher machine engineering until his discharge in 1946, when he entered the Diplomatic Wireless Service. This brought him immediately into the sphere of worldwide hf radio communication. During 1957–9 he operated from Cyprus as ZC4WV.

In the early 'seventies he was appointed head of the Communications Group in the Radio Engineering Department of the Foreign & Commonwealth Office, and held this position until his retirement in 1977.

*77 Lakes Lane, Newport Pagnell, Bucks MK16 8HT.

Feeding the antenna

While it appears from the above that a dipole supported one-eighth of a wavelength above ground is ideally suited to general coverage within the country, it must be noted that the radiation resistance of a dipole at this height is normally about 40Ω, rather than the 75Ω one thinks of in connection with dipoles.

As the dipole requires a balanced feed, the most likely feeder to be used from ground to antenna will be twin 75Ω cable. The transmitter output will almost certainly be unbalanced, and the best arrangement will be to run the output through suitable-rated coaxial cable to a post set in the ground directly under the antenna feedpoint. A toroidal balun can then be mounted on the post and used to connect the feed to the 75Ω twin line.

While it should be possible to make an efficient impedance transformer which also acts as an unbalance-to-balance device, my experience is that it is easier to use two separate units so that each can be optimized for best performance in just one function. In general it has been found better from a practical point of view to keep impedance matching transformers either balance-to-balance or unbalance-to-unbalance types, and to use one of the balun configurations for changing from unbalanced to balanced terminations. Thus, if a 50Ω coaxial cable is used to connect the rig to the 75Ω balanced feeder from the short feeder pole up to the antenna connection, it will be advisable to use two toroidal transformers consisting of a 50:75Ω unbalance-to-unbalance device followed by a 1:1 balun to permit connection to the twin balanced feeder. The loss in such transformers is very slight at 3·5MHz, and such an arrangement is quite feasible. Both toroid devices can be contained in the same plastic box. If, as in my case, the coaxial feeder can be run in 75Ω cable and an swr bridge matched to 75Ω is available, the impedance matching transformer will be unnecessary and the connection will be made directly into the 1:1 balun.

As a point of interest, the *Radio Communication Handbook* (4th edn, p 19.26) gives details of an excellent reflectometer for measuring swr, which can be set for 50 or 75Ω by specified variation of two small resistors. Most amateurs should be able to make this with the aid of the common tools any handyman will have in his home, and I bought one last year to the identical circuit but using a small pcb, from a supplier of cb equipment.

One needs the 75:40Ω balance-to-balance transformer at the actual feedpoint in the antenna, and set in a sealed plastic box it can serve as the terminating unit for the two halves of the dipole. The 75Ω twin feeder is much lighter than adequately rated coaxial cable and will not cause the sag in the antenna that would happen if the coaxial cable was attached at the antenna feedpoint.

There has been some suspicion of the effectiveness of toroidal transformers in hf transmitting service. I have heard the suggestion that

saturation of the core during power peaks using ssb causes speech distortion, and this will indeed be the case if the core is under-rated for the power in use. Since many amateurs will be using more than 10dB of speech clipping quite deliberately, this deep concern about distortion of a lesser order seems overdone. In any case, one can easily guard against it by using a core of liberally adequate rating, and it should be noted that iron dust-cores are less tricky to use than ferrites. The Amidon T-200-2 dust-core is for transformer use up to 1kW, provided swr is good. I use these cores for 400W p.e.p. service without trouble, but if there is any doubt about the matching or internal losses one can always use two cores stuck together.

Design and construction of the toroidal transformers

The 1:1 balun may be the usual trifilar-wound device described in a number of handbooks, but it will be expedient to check that the number of turns suggested is adequate for use at 3·5MHz.

Alternatively, a cored variety of the old bifilar choke coils can be used very simply. This will need two cores and will double the power handling capacity. The Amidon T-200-2 core has a K figure of 12 which can be used in the formula:

$$n = \sqrt{\frac{L \times 10^3}{K}} \quad \text{.....(1)}$$

Where n is the number of turns for each winding and L is the required inductance of each winding in microhenries.

L should be such that the inductive reactance X_L is at least 3·5 times the circuit impedance in ohms. For a 75Ω balun the circuit impedance is 37·5Ω for each coil, as they are effectively in series. X_L then is 131·25Ω and L is thus six microhenries at 3·5MHz as the operating frequency. Substituting the figures in equation (1) we find the coils should be 23 turns each. One can use small flat 75Ω twin feeder cable for the bifilar windings; 23 turns of this should be wound on each core, filling it, and the windings tied in place with thread. Fig 1 shows the connections, drawn for simplicity as straight coils rather than as toroids. The two coils may be mounted in line or one above the other. There should be no coupling between them as each has its own closed magnetic circuit.

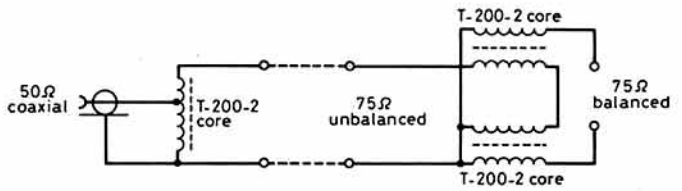


Fig 1. Cored 50:75Ω unbalance-to-unbalance transformer connected to choke balun 75Ω unbalance to 75Ω balance. The cores are toroidal but are drawn straight to simplify illustration of the connections. See text for winding details

If the coaxial feeder is a 50Ω type, the matching transformer shown in the left-hand part of Fig 1 will need to be added as shown. This too should be wound on an Amidon T-200-2 core and will consist of 32 turns of 20swg enamelled copper wire, spaced to fill the core and tapped at 26 turns. The start of the winding will be the common earth connection, the 26 turn tap will be the 50Ω coaxial centre conductor connection, and the 32 turns finish of the winding will be connected to the unbalanced "hot" input terminal of the balun.

The 75:40Ω balance-to-balance transformer at the feedpoint of the antenna should consist of one T-200-2 core wound with 32 turns of 20swg enamelled copper wire spaced to fill the core. The ends of the winding are the 75Ω connections to be joined to the twin feeder. The antenna connections are tapped down four turns from each winding end. This is illustrated in Fig 2. The total inductance of the winding will be 12 microhenries and the turns ratio is 1:0·75 giving an impedance ratio of 1:0·5625.

Checking the toroidal transformers

If possible the transformers should be checked before putting them into full power service. An rf voltmeter fitted with a diode probe will be necessary. If one is not available it can readily be improvised by adapting a multimeter having 10,000Ω/V characteristic or better, with the home-made probe shown in Fig 3. This will read peak volts, and the readings should be multiplied by 0·707 to convert them to rms readings for use in power calculation. The connection between the probe and the meter should be screened to prevent rf pick-up falsifying the readings, and the meter should be set on its 50 or 100V range.

Do not leave the transmitter power on for longer than the few seconds required for each reading.

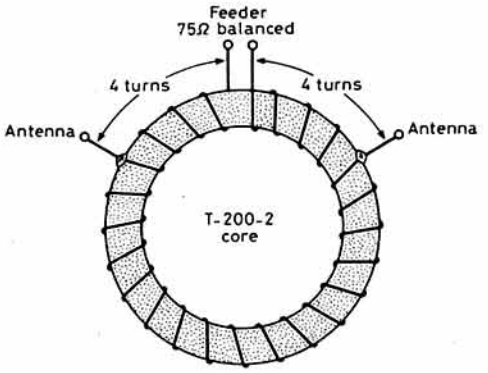


Fig 2. Toroidal matching transformer, 75Ω balanced to 40Ω balanced. See text for winding details

The 50:75Ω unbalanced transformer, if used, should be checked as follows. Terminate the 75Ω side with a non-inductive resistor, or a combination of resistors giving a total of 75Ω with 10W rating. Connect the 50Ω side to the transmitter output set to "tune" position at low output. Clip the probe of the rf voltmeter across the 50Ω input and adjust the transmitter power to give a reading of 15V rms or 21V peak, ie about 4·5W. Next, transfer the probe to measure voltage across the 75Ω resistor. With the same input, the voltage should now measure 18·4V rms or 25·7V peak, showing a step up of 1·225 ratio.

The balun should be checked as follows. Terminate the balanced side with the 75Ω 10W rating load. If a 75Ω output is available from the transmitter, connect it to the unbalanced input of the balun. If it is only possible to take a 50Ω output from the transmitter, insert the already tested 50:75Ω transformer between the transmitter output and the balun input to perform the matching function. Connect the earthed side of the probe input to the earthed side of the unbalanced input to the balun. With the transmitter in "tune" mode and power turned well down, measure the voltage between earth and each side of the balanced load across the balun output. Both readings should be identical, and their sum should be the same as the voltage measured across the input to the balun. The test should be carried out at 3·5MHz, and the voltage across the input should not be set in excess of 25V rms or 35V peak, which would represent 8·3W dissipation in the load.

The 75:40Ω balance-to-balance transformer should be tested as follows. Install the feed system up to the transformer without the antenna connected. Terminate the transformer with two 20Ω non-inductive resistors in series and of about 5W rating each. Apply low power with the transmitter in "tune" mode at 3·5MHz. Using the junction of the resistors as the "earth" terminal, measure the rf voltage between the junction and end of each resistor. The readings should be identical. Put their sum in place of V in the expression:

$$\frac{V^2}{40} = \text{Power}, \quad \text{.....(2)}$$

and that will give the power available at the terminals, which should closely approach that being delivered by the transmitter. If the probe is being used with a multimeter remember to reduce the peak voltage reading to rms by multiplying it by 0·707 before using it in the power formula.

Setting up the antenna

The antenna should be initially set up as in Fig 4. Since it will have to operate over a bandwidth of 300kHz at around 3·65MHz, the Q should not be high, and the thicker the wire used, the better. Either 7/19 stranded or 12 swg hd

(Continued on page 343)

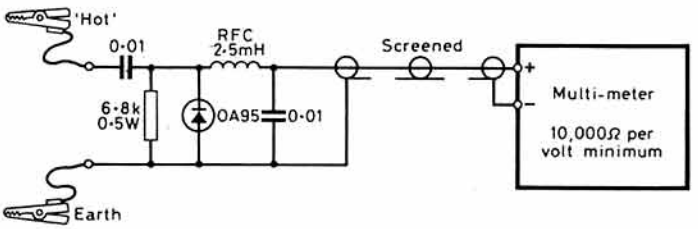


Fig 3. Probe to convert multimeter to read rf volts. The 0·01μF capacitors should be 250V wkg. The OA95 germanium diode has a piv of 115V. The meter reads peak volts

Technical Topics *by Pat Hawker, G3VA*

TT HAS ALWAYS DEPENDED on the efforts of others: the authors of the hundreds of articles published in overseas journals, both amateur and professional, plus the writers of the many letters that reach me, sometimes only a trickle, but sometimes in a flood. These include many useful ideas and comments, and no columnist in his right mind would wish to discourage such correspondence. But it can present the difficult problem of finding the space to do them justice; current economic restraints have meant that *Radio Communication* is often a little thinner than it was a few years ago. Inevitably the selection process results in the holding over of items that thoroughly deserve publication but cannot readily be condensed into the limited space available. I try to select a balance of items of interest to the majority of readers, though I realize not all readers share my particular prejudices and concerns.

My purpose in making this confession is primarily to apologize to those whose letters and drawings are still "on file" rather than in print. Quarts just do not go into pint bottles, even when spelt quartz.

But before getting down to business, I must pay a tribute, on behalf of us all, to Dick Thornley, G2DAF, who died in early March. It was Dick's designs of high-performance hf receivers and ssb/cw transmitters in the 'sixties that did so much to keep alive, at least for a time, the concept of home-construction as a means of achieving true "excellence". Even by today's standards, G2DAF designs are capable of a basic performance that is seldom equalled, let alone surpassed, by the black boxes. Dick was the "Collins" of the home workshop! It is sad that he has left us.

Morse, Shannon, eme and audio filtering

Recent items on the reduction of the noise bandwidth of a receiver to match the transmission bandwidth and the consequent theoretical advantage of reducing the bit-rate of morse or data transmissions "when the going gets tough" (see, for example, *TT* December 1985, p940) has brought in several pertinent comments.

Dr Ian White, G3SEK, seeks to destroy the myth that moonbounce (eme) communication takes place using extremely slow morse: "The plain fact is that moonbouncers use quite 'normal' speeds of 15 to 20wpm.

"The myth became established in the early days when just a few amateurs, using receiver, transmitter and antenna technology not available to the average experimenter, were involved. One of the blind alleys explored in that period was the detection of inaudibly weak signals buried in noise using integrators and pen recorders, for which extremely slow morse would have been appropriate. However, the technique never got anywhere, primarily because it did not provide the operator satisfaction of a normal, audible contact.

"With modern technology, moonbounce signals can be audible, though most are so weak that they are off the bottom of the normal RST scale! So why has the optimum speed been found to be 15 to 20wpm? With very slow morse a human operator loses the rhythm of the characters. Furthermore on eme the characters tend to get broken up by rapid fading. It needs concentration merely to copy the signals, without the extra effort of trying to copy signals that are either too slow or too fast. Fast morse has the advantage that individual characters are less likely to be chopped up by fading, and one technique is to send characters at the rate of 30wpm but spaced out to keep the average speed within the optimum 15 to 20wpm rate.

"The concession of Shannon's theory is that the basic message (callsigns, report, rogers, 73 etc) is repeated many times, so that in a sense moonbouncers do 'integrate' the signals over several fragmented repeats to extract the information."

This comment highlights the difficulty of interfacing the human operator into general theory—a problem that extends also to reception of morse in conditions other than eme. For example, the use of narrowband audio filters can sometimes prove disappointing simply because the human hearing process can provide a filter with an effective "noise" bandwidth of around 50 to 100Hz. However this characteristic cannot be relied upon to the same degree when it is a question of separating two or more audio tones with a spacing of less than about 15 to 20 per cent. This is one reason why many experienced operators prefer a beat note of, say, 400 to 500Hz rather than, say, 1,000Hz. You can separate a 500Hz note from either 300 or 700Hz far more readily than between 1,000Hz and 800 or 1,200Hz.

Wonders of morse

In the December "Members Mailbag", *TT* (February) and in my "Communications Commentary" column in *Electronics & Wireless World* (January), attention was drawn to the remarkable and unique value of morse code in enabling badly handicapped people to communicate *on equal terms* with those more fortunate than themselves. The degree to which this is truly the case is well illustrated in correspondence from Bob Smith, G6TQ, and B J Frost, G6UTN.

G6TQ describes a project in which he, RAIBC and the West Kent ARS have been involved over the past two years, and which has been described in a new book *Computer help for disabled people* by Lorna Ridgway and Stuart McKears (Human Horizons series, Souvenir Press, £5.99 paperback, £8.95 casebound).

This project has centred on a young man, Mark Brown, 22 years old, confined to a wheelchair, blind, profoundly deaf and, due to his deafness from birth, with a severe speech impairment. Yet he has achieved a "fantastic ability" to copy morse. G6TQ writes:

"We talk to him at 25 to 30wpm, but he can read at virtually any speed. He is unable to write and just reads it in his head like a book. This is achieved by a wheelchair-borne microcomputer which is programmed to translate plain language typed on the keyboard into fast morse. This he reads through earphones by bone conductivity, as he can sense the vibrations.

"With the help of WKARS, representing RAIBC, we have tutored Mark to the stage where last December he passed the RAE. Already, as a result of his new interests, he has put weight on his frail body, become more alert and lively. Via his keyboard he can talk with anybody. Feedback comes from him either in distorted speech or, for those who can read morse, he uses an auto-key (iambic type). He has mastered this keyer to perfection; an amazing performance, as he has such little use of his hands."

G6TQ adds that tuition was carried out with the equipment described, based on weekly visits together with morse instruction tapes. To me this seems a marvellous combination of the oldest and newest in communications—morse and computers yet with the emphasis on personally acquired skills.

The utterly-isolated world of those born both deaf and blind can be imagined. This condition is most often simply the unhappy result of the mother catching rubella (German measles) during pregnancy, and is all the more poignant in that the individuals concerned are often of high or at least average intelligence and are well capable, as the case of Mark Brown shows, of acquiring skills that can open the world to them.

B J Frost, G6UTN, similarly reports successful work for the deaf. He writes:

"A certain amount of successful work has recently been undertaken by the Great Yarmouth and Lowestoft branch of REMAP—a panel of engineers within a nationwide network who construct various kinds of mechanical and electronic aids for the disabled.

"This particular project commenced with my development of an aid for the family of a totally deaf girl to enable them to call her from within the confines of a house and garden. A very low-power receiver was developed (27MHz, 2V, 1mA) and used in conjunction with an indicating device mounted on the girl's spectacles. Her mother was then able to call her from a simple base transmitter using either simple pre-arranged codes or their pre-existing knowledge of morse.

"Due to the interest this caused, work has continued with a two-way aid intended either for a similar application or for use by two totally deaf persons. This consists of identical transceiver-type units in conjunction with a wristwatch-mounted indicator and push-button. When one person wishes to call the other, a single press of the button causes a motorized vibrating device to be actuated. Then two-way communication can continue using the indicators and buttons based on either pre-arranged or morse codes.

"A working prototype has been tested by the local social services and is attracting considerable interest. Unfortunately there are problems in licensing even these low-power units. 'Low-power non-speech devices' are only permitted to operate on specific frequencies and must obtain typed-approval from the DTI and require payment of an annual licence fee. This situation will ease later this year when such devices are due to become exempt from licence fees.

"At present the major difficulty is that the lowest available frequency for commercially-manufactured units is 173MHz, complicating the design of low-power circuitry. The DTI may allocate a new frequency at 49MHz, but up to late January it has still not issued technical characteristics for this band.

"While the DTI is gradually moving towards a more relaxed approach to such aids, the semiconductor manufacturers are also assisting in the greater integration of receiver circuitry. Plessey have helped with ics developed for their pocket radiopagers."

While clearly this type of equipment is aimed at short-range person-to-person communication of a fairly limited nature, it is easy to see that once the users have come to appreciate the value of morse it would be a very short step indeed to interest them in the wider horizons of amateur radio.

Optimizing coaxial traps

The use of coaxial to form resonate traps (eg VK5BI's WARC trapped dipole, *TT* January, pp34–5) has the unique advantage of providing an in-built high-voltage capacitor and offers other useful advantages. Geoff Roberts, G3ENY, points out, however, that they need to be carefully resonated and that cut-and-try methods can be tedious, time consuming and can result in an extravagant waste of expensive cable. He writes:

"It has been shown by Robert Sommer, N4UU (*QST* December 1984) that there is an optimum way to use this material to form an inductor, the whole acting as a parallel resonant circuit. The trick is to use the shortest length of cable (minimum capacitance) which can be closewound (maximum inductance) on a former of such a diameter to make a coil of correct inductance having a length to diameter ratio to give a good value of *Q*. Not so simple but very effective if it can be achieved. Final adjustment to resonance is done by stripping back the outer at the pig-tail (correcting the 'C') using a gdo and calibrated receiver.

"Eliminating the cut-and-try from construction requires the use of a computer to solve, by an iterative loop, the cubic equation which ties together the LC and diameter variables to obtain resonance. I have devised such a program in Sinclair Basic which gives results within a few per cent of design specification and has proved to be very useful. Coil diameters given in the VK5BI notes seem to be rather on the large side.

"As an example, the following are two designs of trap for 7,010kHz, one using standard coaxial cable and one miniature coaxial cable, which incidentally is quite satisfactory for most UK stations running legal power levels.

	RG-58/U	RG-174/U
Length of coaxial cable	61·6in	52·7in
Diameter of former	2·125in	1·6in
No of turns	7·8	9·6
Length of former	2·5in	2in
Coil inductance	3·35μH	3·78μH

"Knowing the coil inductance is useful in working out the length of wire in the next leg, another task for the microprocessor! As there is a limited range of pvc pipe sizes available from builders' merchants, the constructor would be well advised to choose a diameter which gives a length-to-diameter ratio of about 0·6, certainly less than one, or a square coil.

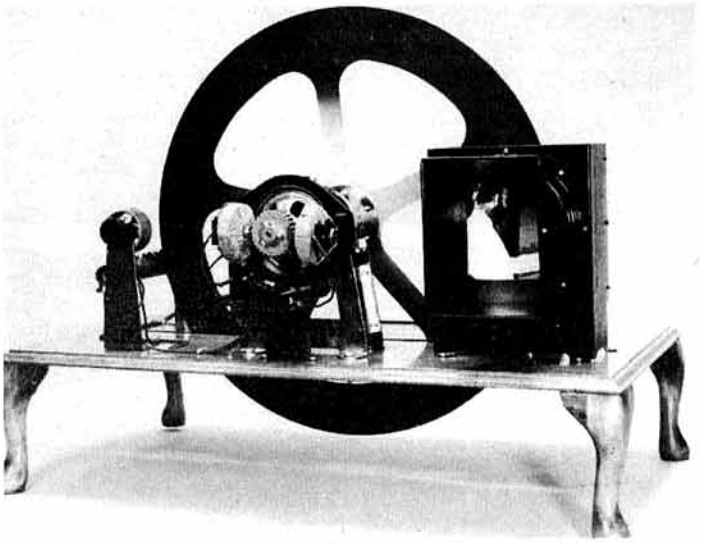
"The program listing is available, giving suggested pipe sizes for all amateur bands. It is quite long, but I would be glad to supply a listing or tape to interested enquirers; sae please. My address is 6 Highfield Road, Bridgnorth, Salop WV16 5AU."

The first transatlantic tv

This year sees the 50th anniversary of the formal opening of the Alexandra Palace television service (originally using alternatively 405- and 240-line systems) on 2 November 1936 as the world's first regular public high-definition tv service. There are many plans being made to mark this golden jubilee and to note also the earlier work on 30-line mechanical systems which, in the UK, stemmed from the work of the controversial John Logie Baird.

Baird in his early work had the lively assistance of a number of British radio amateurs, including Ben Clapp, now well into his 90s but then licensed as 2KZ. The pioneering work of Baird and his assistants deserves to be remembered. Unfortunately, many exaggerated claims on their behalf have been—and still are being—made, with the unhappy result that the real contribution they made in arousing interest and showing possibilities is in danger of being dismissed by the more serious students of the history of the technology.

Elsewhere I have been very critical of the claims made for a new book *The secret life of John Logie Baird* by Tom McArthur and Dr Peter Waddell (Hutchinsons, 1986, 274pp, £16.95). The publishers suggest that the book "radically rewrites the entire acknowledged histories of television, radar and secret signalling". Personally I find it impossible to accept most of the sweeping claims made in this book. A few years ago I spent several days



Simple, but unfortunately not very effective! A Baird 30-line disc receiver of the low-definition tv era

consulting the original files in the Post Office archives, and wrote the following notes on Baird's early attempts to put low-definition tv "on the air":

"Baird made many misleading claims about his early work, often giving the impression that his pictures were transmitted, if only between adjacent rooms, by radio. Yet all the evidence suggests that the very first time that the Baird signals were transmitted was about July 1927 when he persuaded H L Kirke of the BBC unofficially to let him put out signals on a BBC mf transmitter after the close of programmes. Three transmissions were made with no known record of successful reception, and then the Post Office realized what was going on and persuaded the BBC to stop the tests abruptly. It was not until September 1929, this time with the backing of the Post Office, that Baird gained "official" access to a BBC transmitter. Well before then Baird had obtained "experimental" licences 2TV and 2TW for use at Monograph House, near Leicester Square, and "Green Gables" at Harrow. There is, however, no reliable evidence that any transmissions actually took place from either of these locations, as the transmitters do not appear to have been completed.

"Baird, however, did transmit his signals by radio in February 1928 on about 7MHz from the home of Ben Clapp, one of his first assistants, who held the amateur experimental call 2KZ at Warwick Road, Coulsdon, Surrey. With this transmitter, modulated by tv signals sent over telephone lines from Monograph House, Baird staged his famous London/New York "demonstration" and subsequently a demonstration on the liner *Berengaria* during the return voyage. Fairly reliable records show that on the liner a few (barely) recognizable and fleeting pictures *were* achieved, even in the absence of any effective synchronization. In New York the "demonstrations" made front-page news, were extensively written up on the basis of what Baird told reporters, but there is little firm evidence about the quality or duration of the pictures actually achieved. The evidence of *successful* reception is far from convincing.

"The Post Office officials read with some alarm of the 2KZ transmissions and, on 26 April 1928 hastily and secretly arranged for a surprise inspection of the station. One suspects that they were not entirely pleased when their inspector duly reported that when he called at 7pm on 29 April 1928 he could find no evidence of any infringement of the terms of 2KZ's licence! For the period, 2KZ had a well-equipped hf station with two 60ft poles spaced 35ft apart and a five-wire cage counterpoise at a height of 12ft. The house was on the highest part of Coulsdon Down, with power taken from the public *dc* supply mains using an ht generator capable of providing 4,000V at 750mA (ie 3kW), although the two large Mullard valves in the power amplifier were run at about 1kW input, the licensed power of 2KZ. (The idea that all amateurs pre-war were restricted to 10W is one of those myths that have crept into the public domain.)

"Baird and 2KZ certainly made tv history in the first long-distance transmission by radio. Fair enough as long as we accept that the results were extremely crude and we discount the exaggerated claims made at the time by Baird.

"Later in the 'thirties, a well-known south London amateur, Don Price, G6HP, joined the Baird company's laboratories at Crystal Palace in charge of the experimental vhf transmitter. This had tragic consequences as he was electrocuted when he got across the eht."

Let's encourage beginner's rigs

The, to my mind, long overdue resurgence of interest in morse could hopefully lead to a renewed demand for simple hf transmitters having an rf power output of say 10 or 20W on 1·8, 3·5, 7 and 10·1MHz. Such rigs would, in effect, provide not only a valuable educational tool but they are still capable of providing effective contacts for those wishing to gain operational experience on cw without immediately plunging into highly-competitive "contest" or country/square-chasing working. A separate transmitter, possibly even crystal controlled, would suit those who have become interested in amateur radio by listening on a reasonably good receiver, and thus do not immediately require a high-performance transceiver.

John Roscoe, G4QK, puts it thus: "Obviously somebody will have to re-invent the B-2 transmitter! Actually that 1943 hf transmitter-receiver suitcase set had a lot going for it. The oscillator circuit would fire up just about anything, and the pa capacitors were fine compact devices. The chief snag for amateur operation was the inability to net. I built a small vfo with a stabilized psu. The other disadvantage was that the receiver was switched off completely on 'send' and did not always come back dead on tune. But at its post-war surplus price of £10!"

In practice, as I suspect John Brown, G3EUR, who designed that SOE equipment might agree, for its time the B-2 was relatively sophisticated and by no means a "simple" set, representing almost state-of-the-art miniaturization! The final version of that family of compact transmitter-receivers based on valves, but still very much in the B-2 tradition, was the Mark 123. I suspect that the unit manufacturing cost of that model, which was used well into the 'sixties or 'seventies, must have been higher than many "black boxes" when inflation is taken into account.

But certainly single- and two-valve transmitters had a lot going for them. One of the very first transmitters made expressly for clandestine operation in western Europe was designed for the German Abwehr (military intelligence) by the "Geheimer Funkmeldedienst" in 1936. It consisted simply of an adapter unit that plugged into the audio output socket of a domestic "all-wave" broadcast receiver (or preferably one of the low-cost communications receivers such as the "Sky Buddy" or "Sky Champion"). The original output valve was then plugged back into a socket at the top of the adapter where it functioned both as audio output and keyed crystal oscillator! No special psu, and all concealed in a standard receiver.

A much more potent German equipment was the SE90/40 used primarily on their military intelligence networks that were so assiduously listened to by the many British pre-war amateurs acting as "voluntary interceptors" for the Radio Security Service. Rudolf F Staritz, DL3CS, has recently published several detailed articles describing the German equipment which generally depended on "straight" 1-v-1 or 1-v-2 receivers, unless used with a commercial communications receiver. But even from the other side of the hill, he accepts that the B-2 design was technically in advance of what they were building even in 1944 or 1945. Though the models that I have seen were notably well constructed mechanically!

Based at Berlin-Stannsdorf, the Funkmeldedienst designed and built almost 100 different models of portable receivers and transmitters for use by the German Abwehr and RSHA police networks, ranging from battery-operated transmitters (sometimes used without a receiver) of up to 3W output, single-stage co transmitters using AL4, AL5, EL3, EL12, 6V6 and 6L6 valves for up to 14W output, and more powerful two- or three-stage compact transmitters of 10, 20, 30, 40, 80 and even 250W output, using simple variable oscillators (some a bit chirpy). Several models used the useful German RL12P50 valve, a bit larger than an 807, as shown in Fig 1 for model SE90/40. The most powerful transmitter, requiring two suitcases, had an RL12P50 driving an RS383 (Model SE93/250). DL3CS points out that they used the best existing degree of miniaturization and were invariably built for suitcase or canvas containers. Ruefully, he admits that many were carried in very elegant red-brown leather suitcases that could be recognized at a distance of 100m, and that this sealed the fate of many who were intended to use them until the wiser instructors and spy-masters changed them for cases that could be readily bought in the shops. The more powerful sets, that were in fact the main concern of the British VIs, were used primarily not as agent-sets but in the Abwehr offices in occupied countries (Asts) and in neutral countries (KOs). But certainly sets like the SE90/40 provided reasonable signals in the UK, but not being crystal-controlled they could come up several kilohertz away from their scheduled frequencies and required careful searching on the part of the interceptors!

DL3CS's articles appeared in *cq-DL* 6/83 and *Funk* 7/85 and 8/85. The *Funk* articles were kindly brought to my notice by Andy Emmerson, G8PTH/G9BUP.

The emptiness of "ten"

Ray Cracknell, G2AHU, is one of the increasing number of people deeply concerned at the lack of use being made of the 1·7MHz-wide 28MHz allocation during these sunspot-minimum years. He draws attention to an article by Z21GH in the *QUA Newsletter* of the Zimbabwe ARS which starts:

"I wonder how many stations have been listening on ten metres recently? With the sunspot cycle being what it is and at the very bottom of what is going to be a few years of minimal sunspot activity, I think that a lot of amateurs treat ten metres as a dead band.

"Far from it. With the return of our summer months (ie UK winter) there are, although infrequent, very good openings on ten metres on both the North-South and East-West paths. Good signals have been heard over the past two months from both Europe, mainly in the afternoons, and North and South America in the evenings up to as late as 1800gmt. The most disturbing aspect of the openings though is that the minority of signals heard are amateur.

"It looks as though the prediction made by some amateurs a few years back that ten metres was going to be inundated by non-amateur stations during the sunspot cycle lull has in fact happened. The band is full of pirate traffic, in all languages, right through from 28·0 to 29·7MHz. The most disturbing feature of all though is that amateurs themselves seem to be largely ignoring the band. Once amateurs "re-discover" ten metres, they may be sadly disappointed to find that they no longer have exclusive, or any, use of this very good dx band.

"It is a fact that in the recent past radio licensing authorities in a number of countries have been coerced into legalizing radio operation that was previously illegal due to the commercial and lobbying pressure of the illegal operators themselves. The precedent seems to have been set that if you have a problem with a large number of persons breaking the law, the easy way

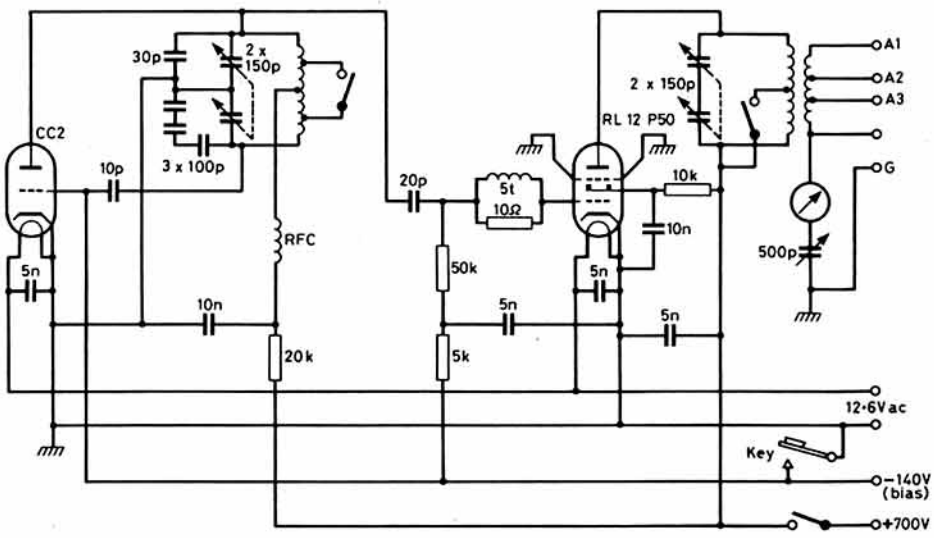


Fig 1. The wartime German suitcase transmitter type SE90/40, a simple 40W output hf transmitter used with a 1-v-1 receiver comprising three EF12 pentodes. The fixed capacitors in the oscillator tuned circuit provided temperature compensation

around it is not to prosecute the offenders but to legalize what was previously illegal. The problem then magically disappears.

"It is a consistent story you hear from amateurs in QSO on ten, they all bemoan the fact that most amateurs don't believe that ten metres is ever open, so very few are even taking the time to listen."

There are a number of ways of re-populating 28MHz for its assigned use. It is easy (some would say regrettably so) to convert low-cost cb rigs. It's a good band for mobile operation. But most of all it's open for long-distance F2 paths in a southerly direction (Africa, South America) far more often than seems to be generally believed. Like 50MHz, it is a band offering many odd modes, including meteor scatter, sporadic-E etc. With the legality of crossband operation now established in the UK, it could help reduce the pressure on 144MHz. One thing is certain, it is a part of the spectrum that other users would like. Use or lose!

Implementing "Project 6L6"

Several readers, including G2RX and G3KSU, have drawn attention to an article in *The Guardian* "Progress in a vacuum" that suggests that the US Naval Research Laboratory, Stanford Research Institute and possibly other establishments are currently hard at work developing new microminiature thermionic devices in order to provide greater protection of military equipment against nemp (nuclear electromagnetic pulses) though the sparse details given seem confused and, indeed, near unbelievable. But as has been noted before "if the valve had been invented *after* the transistor it would have been hailed as the answer to all our problems". For amateur radio it still has many attractions.

For those who wish to implement "Project 6L6" in the form of a duplication of the simple one-stage rigs of yesteryear, Roy Oliver has dug out an article by W8QBW from *QST* September 1939 (the design also appeared I recall in several editions of the *ARRL Radio Amateurs Handbook*): Fig 2. This described a "Runt 60" 6L6G co transmitter claimed to provide 60W *output* (surely stretching the poor old valve rather too much!) on 3·5 or 7MHz and with a component cost (excluding valve, crystal and key) of only $3.86 which, in 1939, would have been well under £1!

Mike Shepherd, G8YZW, lists many publications that described simple valve transmitters, and provides the circuit diagram of a 6L6G rig with pi-network matching that appeared in *Practical Wireless* as late as June 1961 as "A 10-watt single-valve transmitter": Fig 3.

It should be noted that the American circuit includes a 60mA pilot bulb in series with the crystal to provide a warning against excessive crystal current when the tuned circuit is brought too near resonance. With power oscillators, even the physically large crystals of the 'thirties could be damaged in this way, especially when using the tritet harmonic oscillator. One would need to watch this carefully with small modern crystals.

Louis Varney, G5RV/CX5RV, whose amateur radio activities began as a schoolboy in the 'twenties, mentions that he still occasionally sets up and uses or demonstrates a Hartley self-oscillating transmitter he built in 1927

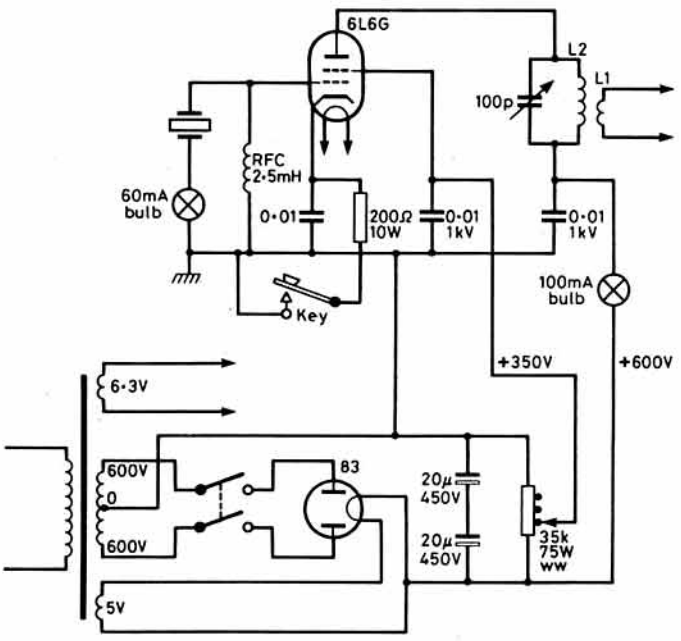


Fig 2. Circuit diagram of the 1939 "Runt 60" 6L6G transmitter. But watch crystal currents at high power

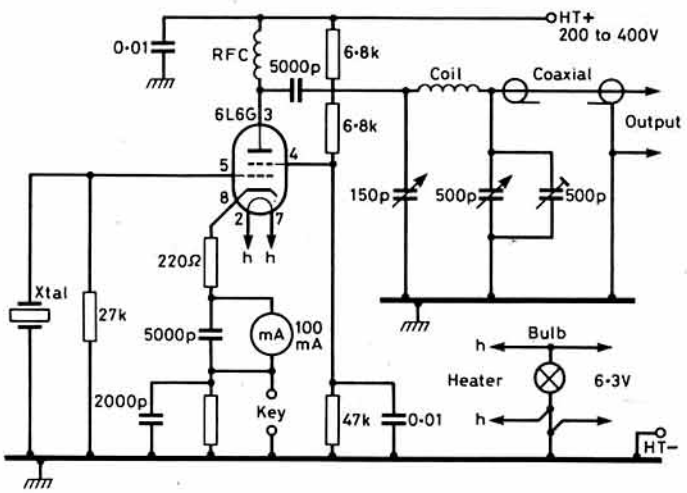


Fig 3. *Practical Wireless* 6L6G transmitter (10W) of 1961

that has its original DE4b dull-emitter af triode valve. This continues to oscillate on 3·5, 7 and 14MHz with a power input of about 3W that now comes from a 150V stabilized psu with 4V smoothed dc for the filament. Originally he used a 4V accumulator and 120V ht dry battery. When he could "touch" his father for the money for a second ht battery he could QRO to 6W.

Today, the note is a slightly chirpy T7 that provides a change from the ubiquitous depersonalized T9 of the black boxes. There is, however, no difficulty in copying it even on modern narrowband receivers. G5RV has demonstrated this "antique" transmitter in the course of many of the talks he gives to clubs when in the UK. He is currently building an exact replica of an O-v-1 Reinartz receiver with "original" components of the period for use with this transmitter. He may even, for complete authenticity, exchange his "G5RV" antenna for a Zepp!

Those steady carriers—the a.m. debate

The recent letters in *Members Mailbag* questioning how can it be (or confirming) that there is absolutely no information in the "carrier" of an amplitude modulated transmission underline a very real problem for newcomers, and for some who are not newcomers. For unless the concept of the steady carrier, contributing no information except that it is there, is firmly grasped, then it is virtually impossible to understand the principles not only of a.m. but also of ssb!

Much of the confusion arises, I suggest, from the many introductory books that still explain and illustrate "amplitude modulation" in terms of the "envelope" waveform. Such diagrams appear to show that the output of a fully-modulated a.m. transmitter is continuously varying between zeros and peaks. This makes it all the more difficult to appreciate that in reality the carrier of an a.m. signal remains at a constant amplitude in the presence or absence of modulation. It is essential to recognize this basic fact to grasp how ssb (which is in reality a form of a.m.) works.

It is all much easier once it is appreciated that the process of *amplitude modulation* is in reality the same process as *mixing*. An a.m. transmitter mixes the audio frequencies with a steady radio frequency in a non-linear stage. Mixing is the fundamental process of the superhet receiver, and newcomers are soon taught that mixing f1 with f2 results in outputs of f1, f2, f1 − f2 and f1 + f2. When af is "mixed" with (ie modulates) rf, the output contains f1 (rf) f2 (af) and f1 + f2 (upper sidebands) and f1 − f2 (lower sidebands). The f2 output, being af, is not developed in the tank circuit and vanishes, but we are left with the steady carrier, f1, and the upper and lower sidebands. Even if the audio frequency were only 1Hz, we would still have the pure f1 with the information carried in sidebands 1Hz away from the carrier.

Some years ago I explained this in *A Guide to Amateur Radio* as follows: In a.m. transmission the radiated power is contained in a steady carrier (representing the basic output of the power amplifier) plus, whenever there is speech, in two sets of sidebands, equally placed on either side of the carrier: see Fig 4 (c). All the power represented by the steady carrier is wasted, in the sense that it conveys none of the actual speech information. The sole use of the carrier is its value in making it easy for the receiver to recover the original speech information from the incoming signals (ie by providing a signal of the correct frequency and phase for demodulation, which again is essentially a *mixing* process). Yet during typical a.m. telephony, some 80 per cent or more of the power is in the carrier.

By eliminating the basic carrier from the transmission (and replacing it locally in the receiver) all the transmitted power can be used to convey the actual speech information. We can do this with a *balanced* modulator (ie balanced mixer). If the output signal from this is radiated, it is known as double-sideband suppressed-carrier transmission (dsbsc). However, correctly to demodulate such a signal, the local inserted carrier needs to be in phase with the suppressed carrier; by no means a simple operation although possible using phase-locked-loops etc. In ssb we go one stage further and eliminate not only the carrier but also one or other of the two identical sets of sidebands which emerge from the balanced modulator.

What should be gleaned from Fig 4 is that there is no difference in the information-providing sidebands between a.m., dsbsc and ssb. Hence it is perfectly feasible to receive all three modes on an ssb receiver so long as the characteristics of the selectivity filter provide the necessary filtering. It may also serve as a reminder of a technique that can be very effective on a.m.—known as exalted carrier detection—in which we enhance the incoming carrier, which will often be fading badly and hence be producing bad distortion since the fades may not coincide with those of the sidebands.

All this, of course, amounts to the A, B, C of a.m. and ssb, but it is clear that for historic reasons, and those envelope waveforms, misunderstandings still arise—particularly among those content to regard transmitters as black boxes to be plugged in and switched on rather than understood. In view of the complexity of current ssb transmitters it may be worth going back to basics with Fig 5.

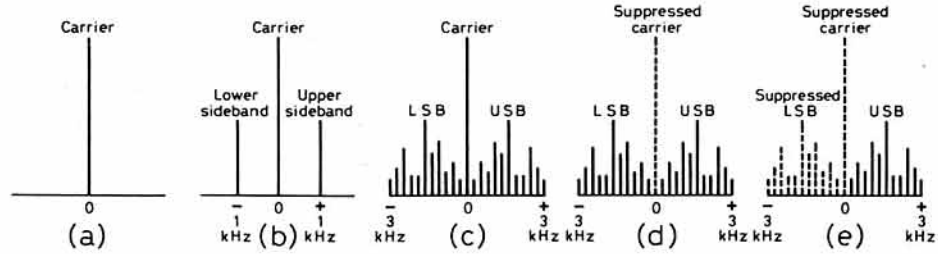


Fig 4. RF spectrum diagrams of various forms of transmission. (a) Basic unmodulated carrier, occupying only bandwidth of carrier. (b) Same carrier fully modulated with a 1kHz audio sine wave. Note that two exactly similar sideband signals are generated 1kHz away from carrier frequency. (c) A.M. speech transmissions contain many audio frequencies simultaneously, up to about 3kHz for communications, and corresponding sidebands appear on either side of the carrier frequency, each set of upper and lower sidebands forming a mirror image of the other. The total rf bandwidth is thus at least 6kHz. (d) DSB speech transmission is similar to a.m. except that the carrier is suppressed (unless received as "ssb" by filtering in the receiver, a synchronous demodulator must be used). (e) An ssb speech transmission with the carrier and the lower sideband suppressed. Note that the total bandwidth occupied is now less than half that for (c) or (d)

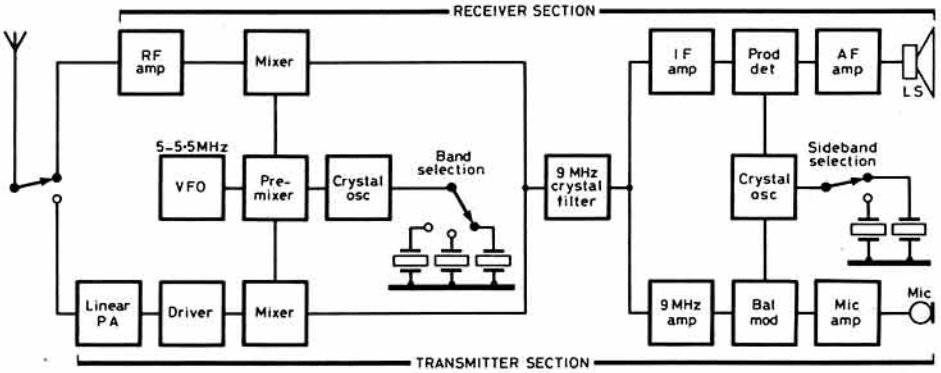


Fig 5. Block diagram of a basic ssb transceiver. Simplicity of this type can be found in early 1970 models, but modern black boxes are usually very much more complex. But once a newcomer can grasp Fig 4 and this block outline he or she can come much nearer to understanding how ssb is generated and works

Safety and the mains

Letters on safety and the fusing of ac mains supplies continued to arrive long after I had prepared the April *TT* item "Don't fuse the neutral" and the March item on "Multiway 6A adapters". These included items from Peter Poole, G3ENN, electrical advisor to the DTI's Consumer Safety Unit; D J Keston, G8FMC, of the BSI Testing Services; Dave Ackrill, G0DJA, who is concerned with safety of "grid" voltages up to 132kV; Harold Genton, G8GG; Bob Bastow, G3BAC; and Ivan James G5IJ. I have to admit to belonging to that generation of radio amateurs who, when we worry about safety in the shack, tend to think primarily in terms of the ht supplies rather than the frequently more dangerous 240V ac supplies. Some of us fell into bad habits!

G3ENN writes: "Apart from the very few countries in the world which use the BS1363 13A fused plug system, the vast majority, if not all, of the plug and socket systems for domestic use use unpolarized plugs. For this reason international standards work on the basis that the supply to appliances will not be polarized. Although BS415 is not yet a harmonized CENELEC document, the basis for the standard is IEC65, and the finalized CENELEC document is unlikely to differ greatly from the present standard.

"Equipment complying with the standard will be fitted with a supply cord of adequate dimensions to be protected by the BS1362 13A fuse or, as is likely to be the case elsewhere in the world, a 16A mcb (miniature contact breaker). Within the appliance, if the manufacturer is to satisfy the needs of the 'Low Voltage Directive' or, in Britain, the 'Electrical Equipment Safety Regulations', sufficient protection must be provided so that a short circuit occurring between any two points within the appliance, irrespective of the polarity of the supply, will not lead to a hazard. It is possible that one way in which this could be achieved would be by fusing both poles of the supply; however, there are many other ways of achieving this objective, and I am not aware of any cases in which this measure has been thought necessary.

"May I take this opportunity of making the following safety points:

- Always ensure that 13A plugs are properly wired and that the cord clamp is used, and remains effective.
- For Class 1 appliances never disconnect the protective earth connection; for radio amateurs, Class 2 appliances are to be preferred for a variety of safety and functional reasons.
- Never use tools and equipment in the garden without an rcd, and consider the use of a sufficiently sensitive rcd on all supplies.
- Never open up a piece of equipment without first disconnecting the supply main.
- When working on equipment, particularly live-chassis equipment, always use a safety isolating-transformer (double wound)."

G8FMC makes a number of the same points but adds:

"Double-pole mains fusing is certainly not illegal in the UK and is a requirement under some British standards, generally those harmonized with IEC standards.

"My own experience is with BS5724: part 1: 1979 *Safety of Medical Electrical Equipment* (IEC 601) and the requirements are briefly as follows:

(1) 'Fixed equipment', ie hard-wired from a fused spur outlet etc, shall have only one fuse and this must be in the line conductor.

(2) Portable Class 1 equipment (ie utilizing an earth) shall have a fuse in both line and neutral conductors.

(3) Portable Class 2 equipment (ie double insulated) shall have at least one fuse and this may be in either conductor. Mains switches where fitted must always be double pole and approved to BS or IEC Standards.

"Incidentally it is worth a mention that in this Standard, reversal of the mains 'line' and 'neutral' is considered a 'normal' rather than a 'fault' condition. (Presumably because it is so commonly found in practice—*G3VA*).

"The predecessor to BS5784 was a DHSS document called *HTM8*, and this required the 'line' only to be fused, and 'outlawed' double-pole fusing. Hence with medical Class 1 equipment we have had a complete 180° reversal of the requirements, the change having taken place in 1980.

"My personal opinion is that where one can be *certain* that your sockets have line (phase) and neutral the correct way round, then fusing line-only is possibly safer, but in any case one should always remove the plug before opening up any equipment.

"Many amateur radio equipments, particularly those imported a few years ago, have only single-pole on-off switches and a single fuse, sometimes in the neutral lead, both highly undesirable. Use of Class 1 equipment without an earth (or with an inadequate earth) is also a common but very dangerous practice.

"Finally it makes my blood run cold to encounter, primarily on the older

valve or hybrid hf rigs, the main supply (switched and unswitched), ht (say 800V), low voltages and protective (!) earth all carried from one part of an equipment to another in a single multi-way connector. This can easily fall out, losing the earth connection: invariably it has totally inadequate separation between the pins to cope with the peak voltages encountered which are likely to be of the order of 1,150V."

G8GG points out that some modern equipment does not even switch the mains supply, merely switching the low voltage output. An example is the Trio R600 (and possibly associated models such as R1000 and R2000) where the *power* switch breaks the dc output from the rectifier system. While he admits that equipment should not be removed from its protective cover with the mains supply *on*, this may often be done when making adjustments, fault-finding etc.

G3BAC noted the March *TT* item on the problem of providing the large number of sockets needed in some shacks. He writes:

"I have just done a count and found 16 items plugged in and four adapters in use. We badly need something to replace the 13A plug, which is far too big for most purposes and yet inadequate for anything drawing large currents. These cause overheating of both fuse and socket, with the attendant risk of fire. Unless the socket blades are exactly parallel, poor contact results, as can be verified by taking a new plug and pushing it in and out of a socket a few times: the resultant score marks show the poor contact area.

"The old two and three-pin round plugs were much better in this respect. The original purpose of the three-pin 13A plug has been lost. People do not fuse according to the load, and earthing is becoming obsolete with many appliances that are plastic bodied. The only person I knew to be electrocuted was killed because of the provision of a large area of earthed metal.

"For a long time I used the old three-pin 2A plugs but, on moving QTH, changed to long strips of 'chocolate block connectors" tediously linked to provide LNE LNE etc, but these proved a chore when moving gear about.

"I like the American system of long parallel slots into which you can push large numbers of their small two-pin (albeit flat) plugs. I believe that a proposal for providing such slots around the skirting boards of new houses in the UK was rejected on grounds of high cost.

"Both the shack and the rest of the house need a new system . . . but what?"

G4COL's simplified rf power meter

In the February *TT* I was tempted to suggest that, while greatly admiring the ingenuity of G4COL's "Accurate rf power meter for the hf bands" (*Rad Com* December 1985) it was not exactly "kiss" equipment. As alternatives, I included several simple arrangements based on measuring the voltage across a matched dummy load and a unit based on measuring the electrical output from a solar cell.

Ian Braithwaite, G4COL, has taken my comments with refreshingly good spirit even though he feels that readers may have concluded from my notes that (1) his power meter was grossly over-complicated; and (2) an accuracy of ±10 per cent can be obtained relatively easily using diodes to measure voltage across a load or by using the brightness of lamps. He writes: "The first point is, I feel, quite fair comment, and one which I take up later. In my defence, most of the circuit complexity arose because I was attempting to make an instrument which gives a direct reading of power, rather than requiring frequent calculation by the user. The signal change detector is optional and was included after I decided on a digital readout after finding out how linear the prototype was, and to improve its usefulness as a 'peaking indicator' when one wants to search quickly for peaks and dips.

"On (2) I believe one should not be too glib about accuracy. As pointed out in the December article, a signal source with a harmonic 20dB lower than the fundamental gives a reading that is uncertain by ±10 per cent when measured with a peak rectifying meter based on diodes, as in the February *TT*. A transmitter output should be much better than this, but a driver stage may not be, since it would precede the lowpass filter. The major source of error in lamp systems, if the lamp brightness is allowed to vary, is likely to be the uncertainty of the match, since filament resistance varies greatly with temperature. This is the case with professional power meters which these days have very low internal or 'instrument' uncertainties indeed, and where great pains are taken to provide a very low input vswr. This (within the context of amateur use) is less likely to be a problem in the diode-based meters than in the lamp type since, in the former, the match can be made to be excellent.

"Ordinary lamp meters are subject to a variable input vswr as the filament brightness (and therefore its resistance) changes. Where a signal source with a 2:1 vswr is measured (surely by no means an extreme case for a transmitter) a power measuring device with a vswr of 1·35 would have a mismatch uncertainty of about ±10 per cent. With a 1·1 vswr power meter, this would drop to around ±3 per cent. With a perfect power meter (ie one

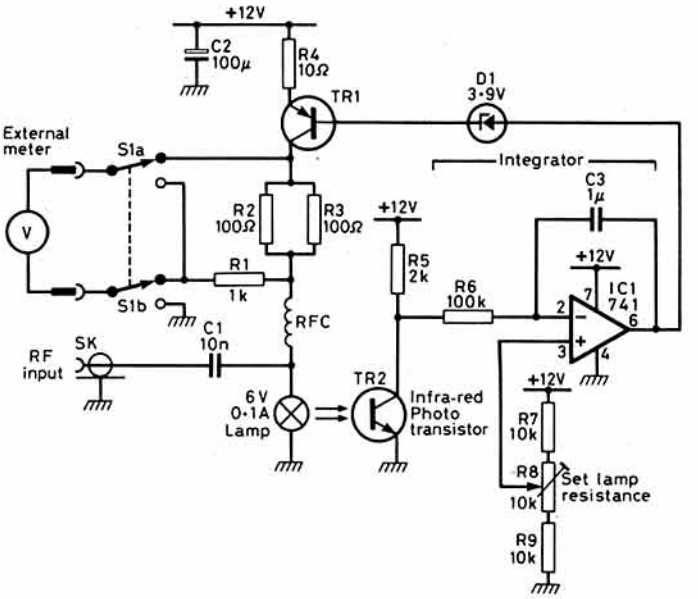


Fig 6. G4COL's simplified power meter capable of good accuracy

perfectly matched to the system impedance of, say, 50Ω) there would be no mismatch uncertainty, even though there may be mismatch loss if the source is not also perfectly matched to the system impedance.

"Running the lamp at constant brightness overcomes the variable mismatch problem of the simplest lamp method. It is also less sensitive to harmonics than a peak-rectifying diode since it responds to total power and not voltage. This is in essence a dc substitution approach widely used in instrumentation, and my aim was to show that relatively accurate measurements can be made with easily-obtainable lamp bulbs.

"However, on reading the comments in *TT*, the idea occurred to me that by dispensing with the facility for producing a direct reading of power, and instead asking the user to do a little calculation (much as for the diode meter), I could radically simplify the circuitry. I quickly set about building such a meter housed in a small diecast box. It proved a 'first time' success and now hardly offends against the 'kiss' principle!

"As shown in Fig 6 the optical feedback loop has been retained. The voltage across the lamp and the voltage dropped by the current source (TR1), monitoring resistors R2, R3 are both read on an external meter, preferably of reasonable accuracy. Because the current into the lamp flows through 50Ω, all that is necessary to achieve a good 50Ω match from the lamp is to adjust R8 until both readings are the same. As rf power is fed to the lamp, less dc power is required to keep it at its constant brightness, and the voltage readings drop. Since they are still equal (constant filament resistance) either can be used for calculating the power.

"If Vo is the reading with no rf input, and Vr the reading with rf applied, then rf power is given by $Vo^2/50 - Vr^2/50$ or $(Vo + Vr)(Vo - Vr)/50$. Since Vo will be constant (or very nearly so) for one sample of lamp, a look-up table, similar to that given in *TT* for the G3EIW diode meter, could easily be prepared.

"Two drawbacks still remain: the need for a power supply (12V at 100mA) and the fairly limited dynamic range. The latter can be overcome reasonably easily by adding attenuators (three 10dB attenuators would extend the range from less than 10mW to 400W).

Table 1. Measurements on simplified QRP power meter

RF power applied (dBm)	Voltmeter readings Vo	Vr	Calculated rf (dBm)
10·2	4·42	4·36	10·2
13·3	4·42	4·29	13·55
16·5	4·42	4·15	16·7
19·9	4·41	3·81	19·9
23·0	4·41	3·11	22·9
25·5	4·42	0·73	25·6

Notes: Measurements were made by first measuring the source on a Marconi Instruments 6960 Power Meter (using a calibrated 10dB attenuator), then transferring the source to the QRP power meter under test. The dc meter used was a Beckman RMS 3030 digital multimeter set to the 20volt range.

Vo = Voltage reading with no applied rf power

Vr = Voltage reading with applied rf power

The term dBm refers to decibels relative to one milliwatt. For example, 1 watt = 30dBm, 0·5 watt = 27dBm and so on.

The instrument's maximum power reading is given by $Vo^2/50$. In the case above, this would be 25·9dBm.

"Table 1 shows measurements made on the simplified meter and indicates reasonable accuracy.

"I would add that I have considerable sympathy with the 'back to basics' approach of *TT*, and regret the apparent passing of the 'surplus' or junk-box era when useful components could be obtained so very cheaply. One has to be careful these days when writing constructional articles to stick to fairly 'mainstream' components etc readily available to constructors, even if at some expense."

James Watt, G6ZC, draws attention to what must be an error in the circuit diagram of the long-established G3EIW dummy load/power meter (Fig 3, February *TT*, page 105), although curiously the identical diagram has appeared both in *TT* and *ART* over many years without adverse comment. But G6ZC is clearly correct when he writes:

"The circuit as shown would not work correctly on either hf or vhf. In theory we are entitled to assume that the first rfc has infinite impedance at all radio frequencies. It would therefore prevent the rf voltage at the hot end of the dummy load resistor from appearing *across* the diode(s). Accordingly, the diode(s) would produce no rectified output.

"In practice, what would happen would depend upon the precise characteristics of the rfc and upon whatever stray capacitance happens to exist between the junction of the diode(s) and the rfc and earth. Performance would thus vary greatly over the frequency range, and on some bands is likely to be extremely inaccurate. It is for the same basic reason that in a psu a half-wave rectifier can never be followed by a choke-input smoothing filter.

"Can it be that, over the years, a by-pass capacitor of, say, 100pF connected between the output side of the diode(s) and earth has become lost?"

Checking back to the early diagrams it would appear that the necessary by-pass capacitor has been missing since the very beginning. If inserted the unit should work as intended.

Tips and topics

Dick Hawkins, G4XKO, adds to the saga of low-cost spreaders for open-wire or zepp feeders. He uses black plastic water main piping which is very slightly flexible and intended for use underground, under floors, in lofts etc. He writes: "It can be held in a vice and cut longitudinally with a Stanley knife, then cut to length with a "v" notch at each end corresponding to the required spacing. Holes are drilled near the notches so that a short tee can be made to hold the feeder wires in place. All spacers are mounted curved side up to shed rainwater etc. I feel confident such half-piping spreaders look and last a lot better than plastic pens or syringes." □

THE 3·5MHz DIPOLE—PRACTICAL ASPECTS

(Continued from page 366)

and the thicker the wire used, the better. Either 7/19 stranded or 12 swg hd copper wire are suitable. Wooden masts 33ft high may present a problem. Many years ago I was able to buy and have delivered four newly-felled spruces, each 35ft long from a forestry firm, and three of them are still in service. One suspects that such an exercise would now be very expensive. However, A-frame masts can be constructed from sawn square-section timber and, suitably stayed, will be entirely adequate for the job. If a tree is used, do not tie the halyard to anything fixed, because high winds cause trees to sway, and the force exerted on a fixed antenna can be enormous. Keep the antenna taut by hanging a concrete weight on the end of the halyard so that the rope can move through its pulley as the tree sways. A concrete block measuring 43 by 18 by 15cm, consisting of four parts of coarse sand mixed with one part of cement, was found to weigh about 22kg. This is the sort of weight that will be needed.

A simple bow and arrow is a great help in getting a draw-string over a high branch of a tree, but the job is best done on deciduous trees during the absence of foliage!

Adjusting the antenna length

This is done so that the best swr appears more or less centrally in the band. One needs a reflectometer swr meter matched to the feeder at the transmitter end.

There has been some concern about use of swr meters recently, and there seems to be an assumption that all users require great accuracy in their swr readings and deep insight into their mode of operation. In fact, all that the radio amateur needs is an swr meter set to the impedance in which he is interested, accurately balanced to give zero reading when the swr is 1:1, and reasonably calibrated to show when the swr is 2:1. It does not have to be a power meter as well, nor does one need an extensive understanding of vector quantities to use it. One just wants to see if the swr is getting better or worse as one steps the transmitter through the band, and it is useful to know if it is too bad for the antenna to be used at the frequency indicated, ie greater than 2:1. If the amateur uses a rig which is very fussy about swr and will not stand for much above 1·5:1, it is unlikely that the antenna can meet this over the full width of the 3·5MHz band. An atu is probably the simplest way around it. I regard atus as rather sneaky devices which conceal the antenna's shortcomings from the operator, but in the case in point it will also conceal them from the transmitter, which is the important thing!

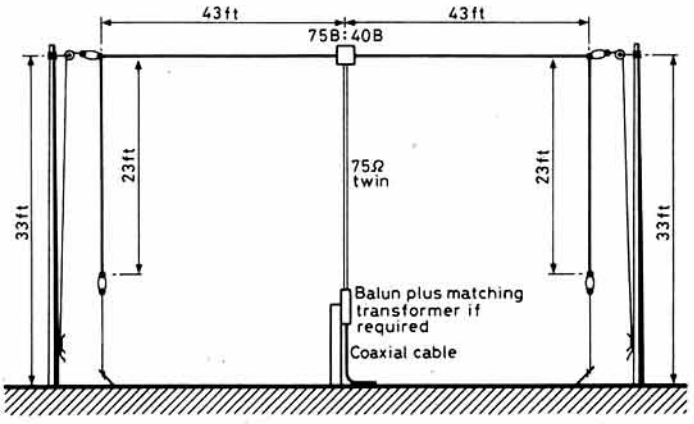


Fig 4. The dipole set up ready for "cut and try" adjustment. See text for detail

With the antenna as shown in Fig 4, the first step, using just enough power to fully deflect the reflectometer in the "forward" setting, is to proceed up the band from its low frequency end taking swr readings every 30kHz or so. A best frequency should be found when the swr is very near, if not quite 1:1. If the swr starts above 1:1 at 3·5MHz and increases all the way up the band, the antenna is resonating below 3·5MHz. Cut off 1ft from each end of the antenna hanging down and have another go. If it still has not brought the antenna resonant point into the band, repeat the shortening until it does.

Once a clearly-defined minimum has been found, note the wavelength, which can be calculated by dividing 300 by the frequency in megahertz. Suppose it is 84·5m and it is desired to place antenna resonance in the middle of the band, ie at 82·2m; halve the difference between these two wavelengths (it is a *half-wave* antenna!) which is 1·15m, and reduce the length of the antenna by this amount by cutting *half* of it from *each* end.

It remains to check through the band at regular intervals of frequency to ensure that swr does not exceed 2:1 at any point. If it does at both ends of the band the antenna Q is too high. If it does at one end of the band only, the resonant point of the antenna can probably be shifted a little by the "cut and try" method (treating both ends of the antenna the same way each time) to push the bad point just out of the band.

All this may be a bit tedious, but it is a "once and for all" adjustment and brings the reward of knowing that the antenna will radiate practically all the power put into it, hopefully not require the complication and cost of an atu, treat the transmitter output valves gently (assuming it has such things!), and put the signal down to earth among one's fellow Gs where one wants it.

Sources

[1] Amidon cores are available from SMC (TMP Electronics), Unit 27, Pinfold Works, Pinfold Lane, Buckley, Clwyd.

[2] Antenna wire, rf cables, plugs and sockets, and antenna insulators are available from W H Westlake, Clawton, Holsworthy, Devon.

[3] Ropes and rigging accessories are sometimes available from hardware stores, but suppliers catering for sailing club members are very useful in this respect. Look for advertisements in the relevant journals!

[4] Enamelled copper wire is available from The Scientific Wire Co, 811 Forest Road, London E17. □

NEWS & VIEWS

VHF/UHF

*Ken Willis, G8VR**

Meteor scatter

At the March meeting of vhf managers in Vienna, some matters affecting meteor scatter operation were discussed and there was general agreement on certain issues. Firstly, it was felt that with the current sophistication of meteor scatter operation, especially the higher cw speeds being used, the 5min period which has been the norm for cw skeds should now be reduced to 2·5min. Many operators are already using this shorter period, but it is suggested that it now be adopted as the standard period for this mode. Procedures for random-channel operation were also the subject of much discussion at the meeting, and a detailed contribution from John Matthews, G3WZT, formed the basis of the input from the UK. As a result, some recommendations will emerge in due course. It was agreed that a new "missing information" procedure should be adopted with the introduction of the letter "U", to be sent repeatedly when the copy being received is unreadable due to a keying fault. This is a very useful addition, since as keying speeds increase, one sometimes hears signals which are unintelligible because the transmitter is unable to follow the high-speed keying being attempted.

No changes were recommended for the standard 1min period for ssb skeds, though the use of "break" procedure should be standard practice, say every 15s during the period. Finally an alternative net frequency for vhf of 3,645kHz was agreed upon to be used when propagation favours that part of the spectrum.

In recent issues I have questioned the mechanism by which a meteor burst can be very strong yet quite short, and last month Alastair McBeath gave an astronomer's interpretation of this effect. Further input has come from John Worsnop, G4BAO (Cambridge), who suggests that it is an example of "end-point phenomenon", mentioned a few years ago by Chris Bartram, G4DGU. The argument is somewhat mathematical. John comments that since I observed the effect of using a dipole, this would tend to favour overhead or near-overhead bursts. Looking at the geometry of the situation (Fig 1), as the angle of incidence A becomes smaller, the duration of the echo will diminish at a rate proportional to the square of the secant of the angle ($\sec^2 A$). Put into numbers, a change in angle of incidence from 80° to 2°, which is 40:1, produces a change in secant² of 33:1. For a trail to be usable, it must brush the surface of (be tangential to) a volume of space the shape of a rugby ball, within which the stations working lie at the two focii. The diagram shows the case of an almost overhead trail at the receiving end of the path, when A is very small compared with a trail which forms near to the midpoint between stations. John says that it can be shown mathematically that as the reflection point moves from the mid-point of the path, the burst amplitude increases slightly to a maximum of +4dB, while the duration falls off at a much more rapid rate. This 4dB improvement is a maximum for transmit-receive spacings of around 1,100km. It reduces on each side of this distance, the duration being a minimum for end-point

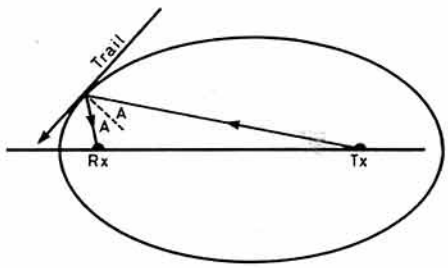


Fig 1. The geometry of a meteor burst

*6 Lerryn Gardens, Broadstairs, Kent CT10 3BH.

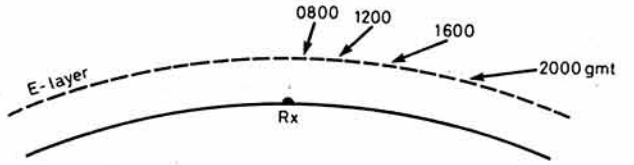


Fig 2. The approach path of meteors seen from a particular station

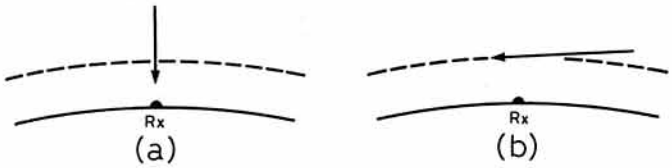


Fig 3. Meteor trail when radiant is (a) high-elevation, and (b) low level

reflection. Since John is studying this phenomenon in some depth, any information which gives the range of any short but strong bursts would be helpful.

John Branegan, GM4IHJ, also wrote on this topic and dealt with it in a different way. He suggested taking a look at a side view of the radiant (in this case it was the Quadrantids) to note the approach-paths of meteors as seen from a particular station (Fig 2). When the radiant is high-elevation, meteor trails are observed which enter the atmosphere almost vertically (Fig 3a). Deep penetration right down into dense atmosphere nearer the earth's surface produces intense initial ionization, but recombination is swift since the presence of much air makes the process an easier one. The result is short but intense pings. When the radiant elevation is low with respect to the receiving station (Fig 3b), the trail may skim along the top of more rarified atmosphere, producing a relatively weak but very long reflection before the meteor burns up. John suspects that the reason why the Geminids are said to be noted for slow, bright trails is that most people observe them (visually) when the shower is low in the evening sky.

Not everyone will be interested in the mathematics of meteor trails, of course, but don't be put off using them because they are "too technical". Motoring is a good analogy; you don't need to know everything that goes on under the bonnet to be a good driver, though probably the more you know the better you perform. Further "driving practice" may be possible during the Eta Aquarids (30 April to 11 May), the Piscids (2 to 11 May), the Nu Piscids (10–13 May) and the Arietids (21 May to 17 June). Don't forget also the activity periods on random channels on 10 May (2200–2400gmt) and 25 May (0600–0800gmt). May your reflections be both long *and* strong.

Jussi, OH5LK (and others in LA and OE) has written to say that he wants skeds on meteor scatter with AK square (JO00) which seems to be poorly represented in this mode. I am hoping that we might rectify this during the summer with the co-operation of the Hastings Electronics & Radio Club, but meanwhile anyone wanting to set up skeds from this square, please write to me.

Kevin Piper, G0CHE, who was previously G8TGM (Bognor Regis) wants ms skeds with northern Scotland, Norway and Poland, initially on ssb until he has sorted out his tape recorder. He is equipped for 50MHz.

To encourage the use of meteor scatter on 50MHz, Paul, G4IJE, suggests the following activity periods *every* Sunday on 50·350MHz, with 1min ssb periods:

Session 1. For UK-LA contacts. 5–7 a.m. LA stations to transmit first (on even minutes).

Session 2. For inter-UK contacts, G-GI, GM, GD etc. 7–9 a.m. GM, GI etc stations to transmit first (on even minutes).

In these activity periods, the use of normal-speed cw to call CQ on the ssb ms frequency is regarded as acceptable, especially if activity appears to be low. If this catches on, Paul suggests an additional activity period on Saturdays, same time and frequency. Operators should note that the Norwegian stations have to close down around 7 a.m. UK time when their tv starts to come on the air. Paul can be contacted on 027989 482 (overseas callers use 44 27989 482) or via Prestel mailbox 027989482. If you haven't tried 50MHz ms you may be very surprised at the reflections, even using the lowest powers and simple antennas. The 50MHz band has been very quiet at this location since an early flurry of activity when the band was released, so anything which maintains activity on the band is to be encouraged.

Expedition news

Tim Kirby, G4VXE, informs me that the Square Bashers Expedition Group plans a visit to the Peterhead area of Scotland between 2 and 8 August, which will coincide with the peak of the Perseids meteor shower. They plan operation on 70, 144, 432, 1,296, 2,320MHz and 10GHz, and, if approval can be received, 50MHz. In any case they will be ready for 50MHz

crossband. More details nearer the date. The group members were much in evidence at the VHF Convention, identifiable by their T-shirts, and they looked young and healthy enough to stand the rigours of a Scottish summer in Peterhead, so if you need ZR (IO97) square, here's a chance to work it.

Dave Bushell, G4WAD (Worcs), plans to be active from squares WQ and WR between 25 May and 7 June while on holiday. He says he will send further details later, but meantime will arrange skeds (what he calls "real QSOs, *not* meteor scatter") if you care to contact him QTHR. *Real* QSOs, indeed! There's nothing more real than getting up at 3am and hearing only a handful of pings in two hours.

Shetland

The suggestion in *VHF/UHF* March that Shetland should have its own prefix and be regarded as a separate country for "radio" purposes certainly hit a nerve, and correspondence received clearly illustrates the depth of feeling for the situation. At the time of going to press, a large number of Shetland amateurs have submitted relevant comments, while Council member Frank Hall, GM8BZX, has drawn attention to the fact that this matter has been raised before.

John, GJ3EML, comments: "Most people still do not realize that Jersey and, for that matter, Guernsey and dependencies, although in the British Isles, are not part of the UK, *hence the different prefix*. Brian Bower, G3COJ, feels that there is no more reason for making Shetland a separate country than, say, the Isle of Wight, since Shetland does not meet ARRL criteria for "separate country status". He goes on to say that the reason why Shetland counts separately for WAE is purely historical. During the final years of the Stalin regime, Russian amateurs were forbidden to work stations in the west. This deprived the *Worked All Europe* award of a number of countries (eg UA, UB, UC, UD etc) so, to bolster the total of workable countries several substitute ones were made eligible—Shetland being one of them. When contacts across the Iron Curtain were again permitted, these "extras" were never deleted.

My own view is that even if a separate prefix cannot be justified for Shetland, it could be regarded as a separate country for award purposes for all the reasons stated in the March issue. Meanwhile I will forward all of the correspondence to the Licensing Advisory Committee with the request that they consider whether there is sufficient justification for the subject to be raised again. It would be up to contest organizers, in the meantime, to set their own rules and allow Shetland to count separately if they so desire, since at least one body (WAE) has already taken this step.

Dave, G4FRE, would support this course of action since he says "DARC uses the current WAE list, as I experienced when claiming the EU-UKW-D Award". He does not favour a separate prefix, however, but he introduces a very interesting topic supporting separate country status in this case. He says that on 70MHz there are only 10 countries which can be worked, *viz* G, GM, GW, GD, GI, GU, GJ, EI, ZB2 and 5B4. The award categories are (squares/countries) 20/4, 25/6, 30/8, 35/10, 40/10, 50/10. There is some doubt as to the status of 5B4, and in any case it has been worked only twice, to his knowledge, both times during contests. Even though ZB2BL can be worked "regularly" at certain times of the year, it is virtually impossible for any UK station to get above the half-way mark in 70MHz awards. Whereas on 432 and 144MHz the highest levels have been reached by a few operators, on 70MHz nobody has even reached level two! Dave thinks the levels may have been set too high, but Shetland as a country would help considerably. It is a very interesting point.

Repeater news

A number of newsletters have been received, too many to deal with in detail, but they all maintain the high standards which seem now to be taken for granted, yet involve an enormous amount of work on the part of those responsible for their publication. Notable among them were Lens No 1 1986 (Leicester Group), Kent Group No 43, Sudbury (Suffolk) No 12, Central Scotland and Borders No 56 and GB3WI (North Cambs) Issue No 8. The North Cambridgeshire Group has reduced the type size in its newsletter to reduce publication costs, and encloses a questionnaire aimed at identifying just what members would like to see in their newsletter. They are also investigating the possibility of their members writing articles which might provide funds for the group's running costs.

In a letter, G4RNF, secretary of the Preston Repeater Group, said that GB3PP was put back on the air on Saturday 15 February and it appears to have very good coverage; it is on RB15, located two miles north of Preston. Those interested in joining this group should contact Dave Hamm, G6KHP, QTHR, who is treasurer.

Barry Titmarsh, GM8AU, writing from his Western Isles outpost, bemoans the fact that repeater licences are taking so long to come through. He is in charge of project GB3NU, located on Benbecula (actually on the air control tower), and the equipment being assembled for this installation includes Wood & Douglas transmitters and receivers (HTU2 & HRU2), the transmitter with a 10W amplifier, and GB3US Mk2 logic with Mk3 software. The repeater has battery-powered back-up, while homebrew cavities are being tuned. Due to the departure from the site of GM4CXF and GM6UNJ, Barry is the only licensed amateur on the project, but is being assisted in the build-up stage by swls Miss Malloch and I Ross. I enquired of the RMG about this situation, and understand that the paperwork is with the licensing authority, so hopefully it will not take much longer to be processed.

Andrew Jeffery, G8SIG, sent a copy of the UK FM Group (Western) publication *Talkthrough*, marked up where it referred at some length to the Isle of Man repeater GB3GD and the interference problems which have arisen since it became operational. This is a very involved situation which has been the subject of much discussion by both the RMG and the RSGB Council, and I am reluctant to comment further since I do not know the details sufficiently well. I took the opportunity of bringing Andrew's letter to the attention of Chris Young, G4CCC, in a brief meeting at the VHF Convention, and I will now send a copy of the relevant documents to him in his capacity as RMG publicity officer. One thing which this situation surely indicates, however, is that we are reaching (or have already reached) saturation point on the matter of repeaters in the UK since there are not unlimited frequencies for them, at least on the 144MHz band. In fact, Andrew Jeffery in his letter says: "Please, no more on 144MHz (unless 12·5kHz spacing) and certainly not on 28MHz or any frequency below 144MHz." He says that if we must have fm channels, then why not 10/12·5kHz spacing, and "I still have a Pye with a 50kHz rx filter in it—I could listen to four stations for the price of one crystal!". Incidentally, he says he is not a member of any repeater group so has no axe to grind on that score.

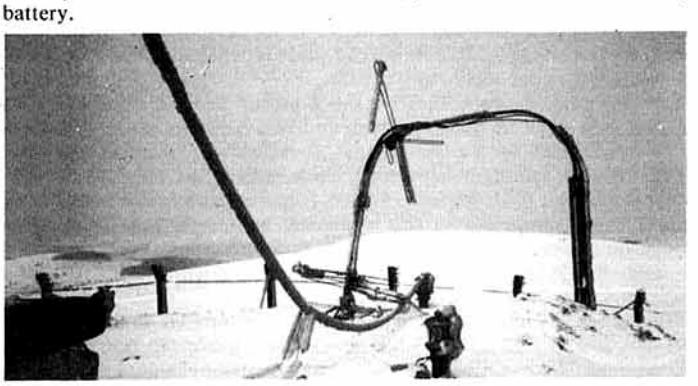
Beacon notes

Tommy Goodlad, GM4LER (Shetland), reports that beacon GB3LER is still off the air. A new section of coaxial cable was installed during the autumn but, after a week or so, water found its way back in, so a new antenna and feeder is needed. Tommy mentions the fact that local amateurs are not over-fond of this beacon as when QRV it beams directly over the town in a northeasterly direction, so when locals beam south it is too strong for weaker beacons to be heard. I had the same problem with GB3VHF at my previous location. One man's propagation indicator is another man's source of QRM!

Paul Turner, G4IJE (Essex), is building a 50MHz beacon transmitter which it is hoped might be installed in Malta if a permit can be obtained. The proposed frequency is 50·085MHz. Paul originally planned to send this transmitter to Norway, but it seems that it will be some time before permission to operate one in that country on 50MHz is forthcoming. Alan, GW3LDH, is in charge of the UK arrangements. Paul mentions the poor reports of GB3RMK during the big February aurora, and puts this down to the fact that this beacon was (and is still) faulty, producing only 2W output. It also has only a dipole antenna 20ft above ground, yet Paul copies it very well via meteor reflections using his five element at 25ft height.

Dave Butler in his *VHF/UHF Newsletter* draws attention to a new Italian beacon, IX1A (DF27g-JN35OQ) on 144·845MHz. It is a special beacon for the purposes of studying propagation, and runs 20W to an 11-element Yagi beaming 240°.

If you have wondered why 70MHz beacon GB3BUX was a bit off-colour during the winter weather, the photograph will perhaps provide the answer. Its site, two miles south of Buxton, was one of the worst-hit areas in England, and besides the damage to antennas, electricity was cut off for 36h on one occasion, plus several shorter-duration cuts. Throughout, GB3BUX and repeater GB3HH remained on the air, powered from a 12V standby battery.



70MHz beacon GB3BUX after suffering some heavy weather

In a long letter Jussi, OH5LK, mentions that there are no beacons currently in operation on 144MHz in Finland, but there is a scientific beacon on 143·800MHz, if your rig will tune down that far. It is operated by the Max Planck Institute for Ionospheric Studies, and transmits pulses with quite high power (maybe a Tempo 2002). Jussi says it uses "quite a lot of antennas pointed in different directions, northwest to northeast". It sounds as if it could be very interesting for auroral indication.

Do you find that the 50MHz band is very prone to electrical noise, thermostats and the like? Dave, G4WAD, suffers from it, and some other readers have mentioned how they find it much more troublesome than on 144MHz.

Six News reports that CT1WW has plans to build beacons for 28, 50, 144 and 432MHz and wants circuit diagrams, logic system board layouts etc. All beacons would use the same logic, and modulation would be F1, the identifier being "de CT1WW IN61GE". Tiago also has permission to operate on 50MHz on a 24h/day basis.

From the postbag

Gary Taylor (Lancs) has received planning permission for a mast, and is proposing to spend as much time as possible on 70MHz, using a four-element beam at 40ft height. He also has a provisional "booking" to operate GB4MTR from 13 August to 9 October. Keep an ear open for him from his location in YN (IO83).

Apologies for a misprint in reporting the 432MHz award for the couple G1NRA and G6XND of Dartford. The call printed was G6NXD, which is that of G N Kent of Nuneaton.

Jack Toothill, G4IFF, who is secretary of the Ipswich Radio Club, noted my comments in March on the lack of antenna-measuring ranges at UK rallies, and says that his club regularly provides such facilities, described in the past by one American visitor as the "best he had seen anywhere, including the USA". Anyone in the general area wanting to sample what they have to offer is invited to attend the East Suffolk Wireless Revival, Civil Service Sportsground, Bucklesham, Ipswich, on 25 May. Contact Jack telephone 0473 44047 for further details.

If you get a card from a certain UB5 saying he heard you on 144 or 432MHz, keep your cool. Jussi, OH5LK, says that there is at least one of them who listens on the vhf net to get details of skeds between European stations, then sends a bogus report based on the dates and times of the sked, and no doubt giving you a flattering report of your signals! Some people will go to amazing lengths to prove something or other to themselves.

The annual vhf/uhf/shf meeting in Geilo, Norway, is scheduled for 6-9 June this year. Details from LA9BM, N-3580 Geilo, Norway, though time is short for this. Don't go unless you can hold your liquor; most alarming reports filtered back from last year's event when a large UK contingent attended and, *inter alia* (as we say in the trade) discussed matters relevant to their hobbies.

Steve Lawrence, G4EOF, is contest manager for the Worked All Britain awards group. These awards are offered, based on the ngr system of Great Britain and Northern Ireland, for hf, vhf and microwaves. The group's contest dates for 1986 are 22 June 0900-1200gmt (vhf/uhf QRP), and 22 June 1400-2100gmt (vhf/uhf QRO). Rules for the contests from G4EOF, QTHR, and for the awards from G4KSQ, also QTHR.

Dave, G4FRE, thinks that G5UM is quite correct when he says that the French are the worst offenders when it comes to getting QSL cards to support an award. Dave has worked 123 squares on 432MHz, and has 94 confirmed. This leaves 29 still not accounted for, and the breakdown is one each from EA, DL, LA and GM, two from OZ, three each from SM and HB9, but no less than 17 from French stations. Dave has also worked 25 countries on the band and only needs a card from GJ (three years after working it) to have them all confirmed. Dave also rose to my bait when I asked if PA0QHN (worked in aurora) was not in fact a 1,296MHz beacon callsign. It is, also a 2,320MHz beacon, and the personal call of an amateur, who Dave says previously signed PI2RGK.

A new award is available from the Amateur Radio & Computer Club (AMRAC), open to both members and non-members (though separate awards are given for the two groups). Details can be obtained from Dick Hill, G1NIM, 157 Highbury Grove, Cosham PO6 2RL, tel 0705 381062.

A suggestion from Andrew, G8SIG (Cheshire)—why not hold the vhf and hf conventions during NEC weekend, one on the Saturday and the other on Sunday? Actually, the RSGB Exhibitions & Rally Committee is considering all the event dates, since in recent years the VHF Convention has been very close to the NEC event.

Robert Coleman, G4RJC, says "Calling channels are the biggest curse in vhf, and should be abolished as soon as possible". He thinks they discourage initiative. Certainly rigid adherence to the calling channel during major openings makes little sense, though many do it. □

HF

*John Allaway, G3FKM**

A VERY INTERESTING proposal has arrived from G3ZPF, and it may interest the increasingly large number of dxers who have some concern for their fellow amateurs located in "rare" locations. He writes as follows:

"**Proposal.** That the requirement for QSLs be dropped for awards in favour of verified examinations of logs, or simply "honour", in view of: the workload presented to dx stations; the man-hours involved in distributing vast amounts of paper around the globe; the cost of ircs; and the fact that QSLs give no guarantee of a contact having actually been made. The exception to this would be that where no indigenous amateur population exists, or indeed no population at all, then the dxpedition should send log copies to all award bodies so that contacts may be verified.

"**The justification.** Consider firstly the general case of the QSL. Suppose I were to need a QSL for a 1·8MHz award. Since the amateur population of VK is quite large it is an easy matter for a "fraud" by simply printing your own QSL for the contact because the award body is unlikely to have seen the QSLs of all VK amateurs. As long as the date/time etc are reasonable then the phoney card would be accepted at face value.

"Now consider the claims that "honour roll" status would be a meaningless award. As far as I understand, the requirement for the honour roll is to have worked within 10 of the maximum number of countries currently available. To do this surely means that an amateur would need to work rather more than 10 countries which are only available as the result of expeditions—hence the requirement for dxpeditions to submit log copies to the major award bodies. Even if a station submits a QSL there is no reason to suppose that a contact had to be made to get it. Simply get the design of a real one and copy it, or use the "old pals act" if you know the operator of the expedition. Granted that this is unlikely, but if the need for QSLs is to avoid fraud, then the attitude of the award bodies is obviously guilty until proved innocent and not vice-versa".

Jerry, K2QEY, has recently retired and offers his services as QSL manager—please write direct to Gerald Hartenstein, 3567 Center View Av, Wantagh, NY, 11793, USA.

Overseas news

Dave Saul, G4EKZ, is in Botswana and has been on the air as A22KZ since November 1985. He remarks that obtaining a Botswana licence was an uncomplicated and pleasant experience, and that he will remain there in his capacity of science teacher until Autumn 1987. He has an FT101ZD and dipoles for 7, 14 and 21MHz but has plans for a quad. Favourite frequencies are 14,150 and 21,233kHz, particularly on weekend afternoons and evenings, and he also appears on 7,075kHz at 1645 daily to work other A2 stations. QSL to the address in "QTH Corner".

As part of the "II Congres de la Llengua Catalana" the Andorran RAA is organizing a special QSL card to be used between 0000 1 May and 2400 11 May 1986. The object of the congress is to further the use of the Catalan language. Stations participating in the QSL will use the new prefix C39 and a special certificate will be issued. In order to obtain this please send your QSL card for a C39 QSO to: Unio de Radioaficionats Andorrans, PO Box 150, Andorra la Vella, Principality of Andorra. There is no charge, but a contribution towards postage cost would be much appreciated.

As mentioned earlier, K2QEY is offering his services as a QSL manager. In his letter, Jerry tells me that he suffers from a rare nerve disease which causes weakness of his muscles, but that when his voice becomes weak he changes to cw! He has an Extra class licence and a TS930S with TL922A amplifier, and two-element quad plus an inverted-Vee for 3·5 and 7MHz. He is alternate net control for the W7PHO Family Hour DX Net.

G1FAK is licensed as VP8BGX until August 1986 and is located at Mount Pleasant airfield in the Falkland Is. He usually operates around 14,243 or 14,275kHz between 2300 and 0100, and tries to give priority to contacts with the UK. His QSLs should be sent to the address in "QTH Corner".

Expeditions

NVRC chairman G5LP has written to say that the club made about 2,000 QSOs from Lundy Is last year, and that this year the operators hope to return. Activity will be mostly on hf, and a visit to Rat Is—just south of Lundy—will be attempted. No exact dates or times of this can be given in advance due to the difficult access, but the 1986 Lundy activity from

*10 Knightlow Road, Birmingham B17 8QB.

GB4LI will be from the old lighthouse between 10 and 17 May. QSL via the bureau or G4XBN.

Bill, K1LLN of K1LLN/VP2M fame, has reported on his return to the USA. His wife Laurel, KA1NTM, was also given full operating permission, and the two managed to make some 3,000 QSOs during the week—including the VP2MO activity during the ARRL DX Contest. Both enjoyed working UK amateurs, whom they consider to be ladies and gentlemen with always something interesting to say!

Iris and Lloyd Colvin made 8,000 QSOs during their visit to Zimbabwe, where they operated as W6QL/Z2 and worked 135 countries. They express their appreciation of the help given to them by Molly Henderson, Z21JE. They operated from a Harare hotel and had a TH3 and long-wire antenna on the roof and were delighted to find that they had no interference problems in the hotel. This was the first country visited by Iris and Lloyd where the communications department of the government had sent to them a licence to possess a radio transmitting station in advance of their entry. A permit to operate the equipment was issued after they were in Zimbabwe. The expedition's last call was scheduled to be in Zambia as 9J2LC before a return to the USA.

DX News Sheet quotes W5KNE, who says that W6SZN has announced that an expedition to Clipperton Is will commence on 2 May and continue for five or six days. Efforts by the Clipperton DX Club have meant that the landing permit and licence have been issued. The callsign will be FO0XX and the operators W6SZN, W6OAT, W6RGG, N7NG, AI6V, and possibly one more. Special effort will be made to work into areas which received few contacts last time—including Europe.

Possibly only a rumour, but according to the *Long Island DX Bulletin* Czech stations have been saying that OK2RZ and a team of five other OKs "have the green light" for a 10-day operation from Albania which will commence on 20 September.

Top band

Regular users of 1·8MHz are very aware of the chaotic state of the band at the present time. The final position as regards allocations in a number of countries is still not known, but two decisions have been taken to try to create some temporary relief. In Region 1 the HF Working Group has determined to recommend the following interim band-plan which is:

1,810–1,840kHz	**CW only**
1,840kHz plus/minus 2kHz	**(rtty)**
1,840kHz and above	**CW and phone**

It was appreciated that the telephony allocation in a few countries is officially confined to the 1,832–1,835kHz segment, and bearing this in mind the interim plan notes that *"Those societies which have an existing ssb allocation below 1,840kHz may continue to use it."* It is hoped that the administrations in these few countries will see their way clear to allow this segment to be moved as soon as possible.

By fortunate coincidence, the ARRL board of directors at its January meeting also discussed the problem and decided that 1,800–1,840kHz should be for cw, rtty and other narrowband modes, with 1,840–2,000kHz for cw, ssb, rtty, sstv and other wideband modes. At the same time it was recommended that 1,830–1,850kHz be reserved for intercontinental QSOs. The board did not agree that these proposals should be incorporated into the FCC rules at this stage.

Neither the Region 1 or ARRL proposals are mandatory, but they are useful guidelines and all would benefit if they were followed, at least until a final plan is drawn up.

IARU Region 1 HF Working Group meeting

As mentioned above in connection with 1·8MHz, a number of matters of interest to hf band users were discussed by this group, which consisted of representatives from ROARS (Oman), NRRL (Norway), EDR (Denmark), SSA (Sweden), IARC (Israel), VERON (Netherlands), RKDDR (German Democratic Republic), RSF (USSR), ARI (Italy), CRCC (Czechoslovakia), UBA (Belgium), URE (Spain), USKA (Switzerland), SRAL (Finland), MRASZ (Hungary), DARC (FR Germany), PZK (Poland), OeVSV (Austria) and RSGB—a very representative selection of societies from the region. Although not having the authority of the triennal conference, such meetings are a very good place at which to discuss matters of mutual concern and perhaps suggest interim remedies. Besides 1·8MHz, this meeting reached an important agreement on field days, and a recommendation emerged which may promote our own June cw field day to become an IARU event. The current phone field day in September will continue as a national event. It is also proposed that a section for listeners should be added to the June competition.

The possibility of arranging for the transmission of propagation information was discussed. The previous transmission of Ursigrams from Meudon has now ceased, and hopefully this information will in the not too distant future be transmitted from an amateur radio source. The RSGB is investigating this in collaboration with UBA and DARC, and considerable progress has already been made.

Packet radio is creating a great deal of interest just now, and the group confirmed that it is welcome on hf. It was agreed that the AX.25 protocol should be followed, with signals no faster than 300 baud, and with a bandwidth of no more than 200Hz. It had already been agreed to recommend that packet radio should operate within the segments set aside for rtty. Mailboxes were discussed and some misgiving expressed about their presence on hf. It was decided to recommend that unmanned stations should always be activated under operator control.

The question of repeaters on 29MHz fm was discussed at some length and it was clear that a considerable difference of opinion exists. A vote was taken which resulted in a majority in favour, but not of the sufficient two-thirds in favour required for a recommendation to be made. This does not mean, however, that any society wishing to organize individual experiments should be prevented from doing so.

The ARRL petition to the FCC requesting the downward extension of the US Novice band into the present beacon band on 28MHz was roundly condemned. It was pointed out that most other classes of licence holder may also use any frequency permitted to Novices. The need to continue with at least some 28MHz beacons transmitting on a continuous basis was emphasized in spite of the recent AC and Region 3 decisions to confine the beacons to the 28,190–28,200kHz band segment, with all operating on a sequential basis similar to the present NCDXF network on 14,100kHz. The HFWG expressed its grave concern and asked for further action to try to modify these proposals.

1986 ALL BAND TABLE NO 1

	1.8MHz	3.5MHz	7MHz	14MHz	21MHz	28MHz	Total
G4OBK	52	14	57	33	12	16	184
GM3YOR	45	57	46	—	—	—	148
G4ZCG	—	20	15	5	—	—	40

Next deadline: 1986 Table No 2 to reach G3GIQ no later than 15 May.

Welcome . . .

. . . to the following non-UK new members who joined the Society during February: DK3LN, EI3BBB, EI3CGB, EI6BUB, F6AFU, H44JU, I5MMC, LA8GE, N6CHL, VK3AMQ/OZ, VK3ZWC/OZ, SP1MHV, TF3TT, ZS6BBY and 9H1GP.

DX news

D68CF may sometimes be found on the low end of the 14MHz ssb segment in the area often occupied by Francophone stations—this in the late afternoon. ET3PS seems to be active irregularly on 14MHz ssb being operated by different personnel, but QSOs are not at present recognized for DXCC credit. 3C1MB has been heard from Equatorial Guinea and is reputed to operate near 7,185kHz at 2330 according to USA sources.

Those looking for Malagasy will like to know that 5R8AL is to be found sometimes from 1800 on 14,160kHz, but most frequently on Mondays and Fridays.

DF5IW has applied for permission to operate from Crozet Is, but no further information is available at the time of writing. 5H3CE was expected to appear from Pemba Is at the end of February, and 5H3HM is due to return to Canada in July. N0ZO is in Tanzania for a two-year stay and has the callsign 5H3ZO. He is at the USA embassy in Dar es Salaam and is planning activity on all bands.

VQ9RB is usually in the 14,025kHz area after 1700, and VQ9QM is often near 21,025kHz for an hour from 1500 until he moves to 14,025kHz.

Richard, formerly VP8ANT, has undertaken a six-month contract in Nigeria. During this time he hopes to visit some of the neighbouring countries. A new Nigerian station is 5N4TME who has been on 14MHz ssb around 1800.

Operation Raleigh

A note received early in March from G6CSY detailed the state of play with regard to callsigns to be used by Nick, G4TAW. At the time of writing he was operating as G4TAW/CE7, following this he was expected to become G4TAW/CE0 from Juan Fernandez and Easter Islands. GB0SWR/MM will be used in Pitcairn territorial waters, and VR6HI has been requested from Pitcairn Is itself. No Cook Is call has been issued to date. From American Samoa he will use G4TAW/KH8, but a call for Tonga was also awaited. There will be no operation from Fiji, but GB0SWR/MM will be used again from Fijian territorial waters. Application for VK and ZL calls is to be made later. At the time of writing, G4TAW/CE7 was keeping a schedule with G4AAL (the next "Gannet") on 14,150kHz at 1100 daily, but the letter of variation authorizing the GB0SWR/MM call had still not been issued.

QTH CORNER

A22KZ	D Saul, Maun Secondary School, Private Bag 5, Maun, Botswana.
C30LDF	G0AMG, 19 Cloverland, Hatfield, Herts AL10 9ED.
D68WS	via DJ6QT, W Skudlorek, an der Klostermauer 3, D-6476 Hirtzenheim 1, FR Germany.
J28EG	BP 2417, Djibuti
KP2AH	WA2YMX, 3465 Carrollton Av, Wantagh, NY, 11793, USA.
PY7PO/PY0	Box 557, Recife, Brazil.
SV1RP/SV7	G Vlakopoulos, Emm Xanthou 6, Dasos-Haidari, Athens, Greece.
SV0AH	Box 66, GR 851-00 Rhodes, Greece.
TJ1AF	(correction) Z Adamski, PO Box 21, 25-324 Kielce 25, Poland.
TV5SDP	R Lieder, 11 Rue Belle d'Argent, F-13300 Salon, France.
VP8BGX	via J Flegg, G4OYY, "Oaklea", Ham, Axminster, Devon EX13 7HL.
VP8PTG	G4PTG, J Simpson, 93 Ayresome St, Middlesbrough, Cleveland TS1 4PF.
VQ9RB	WA6SXL, 16290 Palomino Drive, Porterville, Cal, 93257, USA.
5T5SL	via DL8DF, R Schoeneberger, Graacherweg 10, D-6600 Saarbruechen 2, FR Germany.
6T2MG	Box 49, Khartoum, Sudan.
9J2LC	Yasme Foundation, Box 2025, Castro Valley, Calif, 94546, USA.

28MHz activity days

A series of 28MHz activity days has been arranged by the White Rose ARS to coincide with the bottom of the present sunspot cycle. The RSGB HF and Propagation Studies committees will be monitoring the results. The tests will take place on the last Sunday of four consecutive months—25 May, 29 June, 27 July and 31 August—and will cover a period of 8h commencing 0900gmt. All amateurs and listeners are asked to participate. All modes will be used, but segments suggested are 28·0-28·1MHz for A1A, 28·5-28·6MHz for J3E, and around 29MHz for F3E.

The activity days will act as a propagation research exercise for the RSGB, and participants are asked to report any strange effects their signals may have. It will be useful to know how signals are being propagated: ie groundwave, skywave, tropospherically, by sporadic-E, or even by meteor scatter. All these modes are possible at this stage of the cycle. Reports of signal strengths of beacons heard will be valuable—but please, no satellite reports!

To encourage participation, the WRARS will award prizes to: (1) the entry including the most useful information for use by the RSGB; (2) to the station working the most WRARS members (entries must come from outside a 50-mile radius of Leeds)—it is hoped that club station G3XEP will be active on each Sunday; and (3) to the listener with the log showing the largest number of different stations and countries heard. Details of both sides of QSOs must be shown.

Please send all entries to the White Rose ARS, PO Box 73, Leeds LS1 5AR, to arrive no later than one week after each activity day. Please note that all logs should show callsign of station worked/heard, time and RS/T.

Contests

In the **1985 UBA Contests, G4IQM** was listed fourth in the 3·5MHz ssb section with 3,519 points, and G4ZFE eighth with 648. There were no UK entrants in the cw section, **RS52868** was the only participant in the listener section and made 3,744 points.

CQ WW WPX CW Contest

0000 24 May to 2400 25 May

1·8MHz to 28MHz. QSOs with own continent count two points on 14, 21 and 28MHz, and four on the other bands. With other continents they count three and six points respectively. Own country may be worked for multiplier credit only—no QSO points may be claimed. The multiplier is the number of different prefixes worked—each counts once only, however many bands it is worked on. Exchange RST and serial QSO number (from 001). There are single-operator, single- and multi-band, and multi-operator, multi-band, single-transmitter classes. The last must have one transmitter only and stay on each band for at least 10min at a time, during which changing band to work a multiplier is forbidden. There is a QRP section which is for stations running no more than 5W output, and in this case entries must be marked "QRP" very clearly. Single-operator entries may only operate for a maximum of 30h, and may take up to five rest periods. To qualify for an award, single-operator entrants must take part for at least 12h, and multi-operators 24h. The score is the total number of QSO points multiplied by the number of different prefixes worked. Logs must show date, time, station worked, numbers sent and received, if new prefix, and points claimed. A prefix check list must be included and entries must be posted before 10 July to *CQ* Magazine, WPX Contest, 76 N Broadway, Hicksville, NY, 11801, USA.

The ARI Contest

1600 17 May to 1600 18 May

1·8 to 28MHz single-operator cw, ssb or mixed modes, multi-operator single-transmitter all modes, and listener sections. Work stations in Italy, San Marino, Vatican and SMOM. Europeans gain two points per QSO. The multiplier is each province, T7, HV or SMOM worked on each band. Exchanges consist of RS/T and serial QSO number from 001. Italian stations will give two letters to indicate their province. Use separate log sheet for each band and enclose summary sheet showing scoring from each band and other essential information (including name and address in block letters). Certificates go to top scorer in each country in each category. The Worked All Italian Provinces Award may be claimed by those who have worked 60 or more provinces—in this case enclose a list of provinces worked during the contest with the log and include 10 ircs to cover cost. Mail before 30 June to: Contest Manager, c/o ARI, Via Scarlatti 31, 20124 Milan, Italy. Note that Italian stations may be found between 1,830 and 1,850kHz, 3,613 and 3,627, and 3,647 and 3,667kHz.

Awards

The Romania Award

This is issued for working at least 30 different YO stations, each of which is in a different YO county, capital city Bucharest included. The YO districts are: (YO2) AR, CS, HD, TM; (YO3) Bucharest; (YO4) BR, CT, GL, TL, VN; (YO5) AB, BH, BN, CJ, MM, SJ, SM; (YO6) BV, CV, HR, MS, SB; (YO7) AG, DJ, GJ, MH, OT, VL; (YO8) BC, BT, IS, NT, SV, VS; and (YO9) BZ, CL, DB, GR, IL, PH and TR.

The YO-Danube River Award

For working on two bands different stations located in countries along the Danube (DL, OE, OK, HA, YU, LZ, YO and U). European applicants need five contacts with each country, and at least three of the total must be with cities located on the Danube.

YO-DX-C Award

For working YO DX Club members (or honorary members). Europeans need five, others only two. Membership list will be sent on request accompanied by one irc. Taking part in the YO DX Contest and working members may earn membership.

YO Large Cities Award

For working YO stations located in large Romanian cities. Class 1 requires 30; Class 2, 20; and Class 1 only 10.

Bucharest Award

For working 10 different Bucharest stations. A special version—the "Jubilar Buchuresti" Award—is issued annually between 20 August and 30 October, in which case application must be made by the end of the relevant year.

All these awards are issued for different modes and/or bands, and all QSOs since 23 August 1949 are valid. Send certified list plus seven ircs to: Romanian Amateur Radio Federation, PO Box 22-50, R-71100, Bucharest, Romania.

Around the bands

At the time of writing, conditions on the hf bands were just beginning to improve, as is to be expected in early spring. Several contests (like the Commonwealth Contest) have shown just how it is possible to work rare dx on the lower frequency bands.

Thanks go to the following for supplying logs: G2HKU; G3YY; G5JL; GM3CSM; G3s GVV, KSH, LPS, PJT, YRM; G4s EHQ, JBR; GW4KGR; G4s LRS, MUW, OBK, SFU; GW4UKU; G4s UOL, UYR, VDX; G0s AEV, AGP; and RSs 10906,25429 and 84869.

Stations listed in italics were using A1A.

1·8MHz 0500 J3/K4LTA. **0700** WB9HAD (III), *W0RT* (Kan). **2200** *W2ZZ/CT3, T77C, UB0YW, VK6HD.*

3·5MHz 0000 KP4CD, PJ0B, *VQ9QM, ZB2EO, 6Y5HN.* **0100** AP2ZA. **0400** 4U1UN. **0500** D44BC, F6HMG/FM, V47M, *VE3HO/VP2M, ZL3GQ.* **0600** *HK3YH,* HV3SJ, *KL7Y,* TI2CCC. **0700** J6HLY, J88AG, *SM5DGW/KP4,* K2KTT/PJ7, *PY1MAG,* KC2RS/VP5, XE1ALH, ZF2FI, 4U1UN, 6W1CK. **1800** *C30LDF,* DU6BG. **1900** JW0A. **2000** LU2FFD, VK7GK. **2100** D68WS, TL8CK. **2200** *VQ9RB,* 9H1EU. **2300** FG/W2KN/FS, W2KW/KV4, J73LC, TA1D, TZ2XN, V2AO, *VP2VI,* YB0GM, 5B4GA, 6W1CK.

7MHz 0600 C6ANX, HV3SJ, *3D2JA, ZL3GQ, DL0MAR/9G, 9Y4GR.* **0700** *A35EA,* AL7FG, *H44IA, HB0/DF2PI, J34HN,* KL7XD, *N7BG, P4/KQ2M,* PY, PY0FG, RZ1OWA, *VE6UX,* VK, VR6YL, VY1CW, YJ8RC, ZL7AA. **0800** H44IA, *J34LTA, JA, KL7,* KP2J, *TV5SDP, VK2, VK3, VU2BQQ,* WP4EA, ZK3RR, *ZL.* **0900** *CP8AKK, VE6UX.* **1500** *UA9, UH, UI.* **1800** *UI8TAE, VK2, VK4XA, VK5, VK6RU, VQ9QM, ZL1AIZ, 5N0BRJ.* **1900** *ZS6QU, 9V1TL.* **2000** *D68WS.* **2100** *J28EG, VK3MR,* WB8YUC/VP2M. **2200** *FM5BW, FY4EE,* TA1C, *UA0WW,* VK6LK, *VE3HO/VP2M, VP9BY, VQ9QM, VU2BK, OE7RKH/YK, 5N0BRJ, 6Y5HN.* **2300** AP2ZA, D68WS, *J28EG,* V47K, *YV7QP, ZS1HV,* 9U5JB.

10MHz 0000 *KY9L.* **0600** *VK4, VK5.* **0700** *VK2BKH, VK3BXN, ZL3AAM.* **0900** *VKs 2DWY, 3DQ, 3XB, ZLs 2AGY, 4RD.* **1000** *FG5AM.* **1100** *VE1QM, VP2VA.* **1200** *C30LBV, W2FJ.* **1500** *OY1R.* **1700** *SM7AST/CT1.* **1800** *W1, WP4L, VE3, 9J2BO, 9M2FZ.* **1900** *GD3LSF/ZB2, ZL2ADX.* **2000** *CT3DJ, FM5WD, W1,2,3,4,8,9,0,ZC4CZ.* **2100** *G6ZY/EA6, FG5s AM, XC, FY4EE, PZ1DV, VK3MR, ZS5BH, J6LAD/9Y4.* **2200** *W8VSK, WC7S/MM* (off TI), *VP2VA.* **2300** *SV0AH.*

14MHz 0000 *ZL4AW.* **0700** KL7NT, **0800** AH9AC, *J3MAG,* JA, JH5EES/JD1, SU1AH, *TA2J, VK2-VK5,* VK9s ND, NS, 5Z4EV. **0900** BY1QH, BY5RA, FW4AF, H44MA, *JT1BJ, KX6DS, SU1AN, ZL.* **1000** *7J3AA.* **1100** *P29FJ, K4FW/V4, 3V8PS.* **1200** *VK6s HD, WT, VU2SU, YA1AO* (?), *6Y5HN.* **1300** *VS6s DO, FI, VU2s GTG, ISV, 3D6AK, 5H3ZO, 9J2LC.* **1400** BY1QH, W6, 8Q7PA, 9K25s MT, MQ, 9M2FZ. **1500** A71BJ, G4DUW/DU1, V47K, *VS6FI,* W6-W7, *9V1TL.* **1600** DV9DAN, FR4ZD, JW5E, W6-W7, *9V1TR.* **1800** ST2RA, W6-W7, ZD7CW, VU2BOY, VE2PAB/4U, 9L1IS. **1900** D44BC, D68WS, W6QL/Z2, 9X5DH. **2000** K6DXJ, KP2AH, 5H3HM. **2100** HP1XTR, LU. **2200** FK8FI, VP8BGO, XT2BR. **2300** VP8QB.

21MHz 0800 JA, YC6LD. **0900** *JA* (to 1100), *OD5LX,* TR8SA, *OE6RKH/YK.* **1000** *A4XZG,* D68WS, *HL9CW, JA,* VK3,5,6, VU, *DL0MAR/9G.* **1100** AP2MQ, DU7DJ, JY5ZM, YC. **1200** AP2P, *CP6IB,* 6T2MG, YB, *ZS3PQ, JR4QZH/4S7, 5N4JCN,* 9V1WO. **1300** OD5YU, VQ9RB, VS6UA, YB, 9K2KA. **1400** HK0BKX, SV9PR. **1500** ET3PG,VP9JY. **1600** VQ9s QH, SK, ZD7CW. **1700** TZ6FS, 7P8CM. **1800** V47M. **1900** CO, CP, CX, LU, PY, *PY7PO/0,* V44KAC.

28MHz 1100 J28DN, Z21GN. **1200** YC0DLG. **1300** D68WS, ZS5MY. **1400** 9J2LC. **1500** *CE4IDY,* ZS1DL, 4Z4JW. **1600** *FM5WD,* HH2HA, *PY1VOY,* PY5TT, V47K, VE1BNN, 3B8FP, 5N3RTF, 9Y4BA. **1700** CX1DTT, EA8, HK1GAD, LU1BJW, S79CW.

Thanks are also due to the following for items extracted: *CQ Magazine* (W1WY), *DXNL* (DL3RK), *Long Island DX Bulletin* (W2IYX), *DX News Sheet* (G4DYO), *the Ex-G Radio Club Bulletin* (GI3OEN/W6), *Long Skip* (VE3IPR), *Lynx DX Group Bulletin* (EA2JGO), The *DX Family News Letter* (JH1KRC), and *DX'press* (PA0GAM).

Please send all items for the **July** issue **to reach G3FKM** no later than **22 May.** □

HF f-layer propagation predictions for May 1986

Using the table

For each route, the **bands** appear vertically and the **time** horizontally, as indicated in the left-hand **KEY** blocks of the top two rows.

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

KEY TO BANDS	MOSCOW	MALTA	GIBRALTAR
28 MHz .	.....	.....	.....
21 MHz .	.....1...11.	....11..122.	.....1.
14 MHz .	..1456556772	...566556883	...155344782
10 MHz .	435555455788	534655556798	4.1666556798
7 MHz .	764222223578	987432223578	866543333589
3.5 MHz .	53.....24+	++4.....25+	++52.....25+

KEY TO TIMES GMT	ICELAND	OSAKA	HONGKONG
000001111122	.....	.....	....11..1...
024680246802	13333352	...243333131	..1234335421
.....	3.1355555687	1..132113363	1...11113564
.....	756543333467	241	253
.....	5542.....34	.....	.....2.

BANGKOK	SINGAPORE	NEW DELHI	TEHERAN
.....	.....	.....	.....
...1111.....	...1121.....	...1121.21..	...22211342.
..12343332..	..1234332...	..2323335751	..3433345783
1....1113453	21..1111332.	321..1113576	5331.1113588
1.....256	1.....251	41.....257	731.....267
.....23	23	2.....24	4.....34

COLOMBO	BAHRAIN	CYPRUS	ADEN
.....	.....	.....1..	.....1...
...12211....	...22322452.	...33432464.	...2233355..
..2224344...	1.3333345784	214666667896	1.2423446743
121..1113.11	6431..113588	866433334689	7441..113578
41.....246	841.....267	873111111368	851.....267
2.....34	5.....34	+4.....4+	52.....34

SUVA/S	SUVA/L	WELLINGTON/S	WELLINGTON/L
.....	.....	.....	.....
.....	.....	.....	.....
...12321.231	...3.....43	..12...1..41	1.....4
..233211.431	111411...242	113421111252	2223.....33
..12.....21.	..12.....21.	..12.....22.	.122.....121
.....	.....	.....	.....

SYDNEY/S	SYDNEY/L	PERTH	HONOLULU
.....	.....	.....	.....
....1.....	.....	...221.....	.....
..2551..12.1	2.....4	..2454.....	....22..3321
112431..2453	21.31.....34	311231..1341	.1233211231.
...1.....252	...21....151	2.....265	..221.....
.....2.	.....2.	34	.....

SEYCHELLES	MAURITIUS	NAIROBI	HARARE
.....1...	.....1...	.....122..	.....132..
...2233353..	...2233451..	...2234577..	...1224677..
..2433446752	..2434446711	1.1533345763	2..543345712
3231..113587	3.4211113556	7142...13588	7.431.112567
741.....267	711.....267	863.....267	8541.....267
52.....34	52.....34	55.....34	552.....34

CAPETOWN	LAGOS	ASCENSION Is	DAKAR
.....2....	.....235..	.....241.	.....132.
....32463...	....3136783.	....2124787.	....3124687.
...5543452..	.1.55333578.	54235796	1..254334696
22.4311124..	56342..12575	3...31..2478	763431..1378
7712.....225	8852.....257	71.....257	8852.....157
552.....24	+52.....24	55.....24	552.....24

LAS PALMAS	Sth SHETLAND	FALKLAND Is	R DE JANEIRO
.....11.	.....	.....12..	.....22.
....32123661	.....241..	.....13573.	2134771
3..476666898	.....124563.	.....234568.	2....4333588
854654334589	213111112464	.1321111246.	853.21111368
886421111368	7752.....247	56521....135	88521.....37
++4.....3+	552.....24	552.....4	552.....4

BUENOS AIRES	LIMA	BOGOTA	BARBADOS
.....12.	.....	.....	.....
.....124671	11252	11142	.....1.11252
3....3344578	5...1.333357	5....2333347	5...14332357
8533.2111258	84122111..25	83122211..15	8412221...26
8852.....26	77421.....2	67421.....2	87421.....3
552.....3	452.....	452.....	552.....

JAMAICA	BERMUDA	NEW YORK	MEXICO
.....	.....	.....	.....
.....1132	.....1.31	11	11
4....2332246	4....4332256	3....2333245	3.....232224
7311.211..14	731.1211..25	631..2111124	421...111..2
5742.....1	67421.....2	47411.....1	2642.....
252.....	352.....	.42.....	.32.....

MONTREAL	DENVER	LOS ANGELES	VANCOUVER
.....	.....	.....	.....
.....11	.....	.....	.....
3....2333245	1.....112223	1.....22222	11122
621.12111124	3211..111112	2121...12111	212211112111
47421.....1	1442.....	.342.....	.2421.....
.42.....	..2.....	..2.....	..2.....

The provisional mean sunspot number for February 1986 issued by the Sunspot Index Data Centre, Brussels, was 23·6. The maximum daily sunspot number was 58 on 4 February, and the minimum was 0 on 16–19 February. The predicted smoothed sunspot numbers for May, June, July and August are respectively: (classical method) 7, 7, 6 and 5; (SIDC adjusted values) 0, 0, 0, 0 (–9).

SWL

*Bob Treacher, BRS32525**

VHF—looking forward

At about this time of the year we tend to anticipate vhf happenings for the coming months, looking forward to a long hot summer with its expected tropospheric propagation, and, more excitingly, to a good season of sporadic-E propagation. In general, 1985 was disappointing for the average vhf enthusiast, with all the tropo coming very late in the year, and the sporadic-E occurring during early afternoon hours when many were at work. We can but hope that 1986 will bring better luck for most. June is traditionally the *Es* month, when anything can, and usually does, happen —9H, SV, UB5, ZB2 all heard in G in the last couple of years. It is not difficult to get on 144MHz. Basically, all that is needed is a 28 to 144MHz converter and an antenna—something like a nine-element Yagi; the package should not be too expensive—less than £50. This will open up the world of vhf communication to many listeners who believe that radio stops at 28MHz!

VHF in the summer can be extremely rewarding, interesting and, when the *Es* appears, exciting. It will also enable you to take part in the Society's vhf contests. In 1985 the number of swl entries to vhf contests declined. This is unusual, because the general trend, especially at hf, is for greater participation. In the last couple of years Martin Parry, BRS52543, has mostly had his own way, winning the Hanson Trophy for the leading vhf swl by handsome margins. Dave Whitaker, BRS25429, is starting to give Martin a run for his money, with Mick Toms, BRS31976, and I hopefully finding more time this year to partake seriously in most events.

There is an extensive programme of events with swl sections this year. They are 17/18 May (144MHz), 1 June (432MHz), 5/6 July (VHF NFD), 2 August (432MHz), 3 August (144MHz), 6/7 September (144MHz), 21 September (70MHz). The swl with most points from all these events wins the Hanson Trophy which he/she keeps for a year. Having, hopefully, whetted a few appetites, all that remains is to wish everyone a fair crack at the dx—once it appears!

DXCC

Congratulations are due to Dave Whitaker, BRS25429, who achieved two fine landmarks in March. He became possibly the first swl to achieve DXCC on 1·8MHz ssb. A QSL from VU2GDG provided Dave's 100th country confirmation on the band. I would like to draw up a table of swls around the world who have heard at least, say, 80 countries on 1·8MHz, noting whether ssb, cw or mixed, together with the number of countries confirmed. We have at least five swls in G-land who would figure in the table. Let's hear from any others so that I can compile what would be a most interesting table for publication later in the year.

Secondly, Dave completed the ultimate aim of any swl, to receive a QSL card from each of the current countries on the ARRL DXCC list, and he has an swl to thank for being able to achieve the grand slam. The last elusive country was Tokelaus Is (ZM7, now ZK3). In 1970 4X4TT went to ZM7, and many readers will recall that it was extremely difficult to obtain QSLs from him. Dave sent a never-ending supply of ircs in search of the card, but nothing materialized, until he remembered a 4X4 swl who entered one of the White Rose RS swl contests. Dave wrote to the swl, who in turn telephoned 4X4TT, and the last card finally arrived. It had taken Dave 24 years to achieve his aim. He stands at 339/341, the two missing ones having long been deleted—ZC6 (Palestine) and AC3PT.

DX review

A spark of life rejuvenated the bands towards the end of February following the wipe-out caused by the aurora earlier that month. The 28MHz band had also shown signs of life as we got into March, while 1·8MHz,

1986 HF COUNTRIES TABLE

Station	DXCC	28	21	14	7	3·5	1·8	Total
BRS8841	188	9	66	125	115	131	41	487
BRS25429	—	6	50	71	96	129	58	410
BRS32525	156	4	18	63	109	115	64	373
BRS1066	131	0	51	99	97	56	57	360
BRS87156	131	2	48	70	65	91	27	303
BRS52543	—	0	14	31	70	62	35	212
BRS31976	99	0	0	31	51	74	45	201
BRS44984	90	1	16	56	37	58	0	168
BRS20249	74	1	7	50	31	35	8	132

*93 Elibank Road, Eltham, London SE9 1QJ.

however, had been poor. February is the month when it has been usual, in the last couple of years, to bag a few new ones on top band, but only the fortunate had anything new to report. DJ6QT had been on his travels again —this time to D68—and had been heard on all six bands. The Pacific had been showing a little more regularly on 7MHz, with A35EA, ZL7AA and 3D2ER mentioned in reports. Several mornings in early March saw 59 signals from VK and ZL and good signals from KL7, particularly KL7XO and AL7FG. The top end of 80 had seen many strong signals from the Caribbean at around midnight, including FM5CD, FG5DL/FS, J37AH, J6LB, W2KW/KV4, PA0FM/P4, WB8YUC/VP2M and 8P6GG.

On hf the Colvins had moved from 3D6 to Z2 and on to 9J2LC and were reported on 21 and 14MHz. Other notable dx on 21MHz included a good USA opening to coincide with the ARRL SSB contest, together with good openings to Africa. Some reporters mentioned A25KY, TJ1AF, 7P8CM and 9U5JB. The 14MHz band had been in useful shape, with good signals from the USA and Canada, including a good number of the rarer VE4, 5, 6 and 7s below 14,150kHz. Other calls worth noting, compiled with the help of BRSs 8841, 20249, 44984, 62088 and 87156, were D44BC, FR4DN, KC6CM (W Carolines), KH6WU (1831z), S79CW, VE3OFS/9G1, V47K, VQ9SK, WH8AAJ, 3B8FP, OH8MA/5B4 and 5H3ED. Even 28MHz had shown signs of life: D68WS, LU1BR, several YC0s and some short skip to SM had been reported.

Finale

News, views and table scores for inclusion in the July column should reach me by Saturday 10 May, with late copy by Tuesday 20 May. August's deadlines are 10 and 18 June, while September's are 8 and 16 July. □

MICROWAVES

Mike Dixon, G3PFR*

From another publication

Dubus 1/86 has just arrived and, as usual, has a number of technical items of interest to microwave operators. The construction of cylindrical resonator cavity filters using copper central-heating pipe is discussed, with designs for 2·3, 3·4, 5·7 and 10GHz. Construction is very simple, and input/output coupling is by means of adjustable loops mounted on suitable coaxial sockets.

A complete, single-board (146 by 72mm) 2·3GHz transverter described uses a high-quality microstrip circuit on double-clad ptfe board. The performance claimed is: receive, 25dB gain with 3 to 3·3dB noise figure; transmit, output 400mW with a spurious rejection of 50dB or better. The required input is 100mW to 3W at 144 to 146MHz, and kits of parts will be available from the designer, Harald Fleckner, DC8UG.

A further use for copper central heating pipe—this time standard 22mm od tubing—is described in the third article of interest. This is on the use of such pipe as waveguide at 10GHz. Using a simple SMA-mounted probe as a "launcher," DK2UO found it possible to attain losses as low as 0·2dB/m, which is comparable with the more conventional rectangular WG16 at these frequencies and, at the same time, overcomes the need for rectangular to circular transitions. A suggestion is made that standard "Yorkshire" bends (45° and 90°) and T-pieces can also be useful in designing a real "plumbing" (feeder) system. Now I know where the association between microwave construction and plumbing comes from!

Next there is a comprehensive article on the design of horn feeds for parabolic dishes. This describes optimum gain, sectoral and conical horns, and predicts the performance to be expected with dishes of different profiles.

Part 4 of the dual-band (144 and 432MHz) all-mode transceiver describes the power supply, front panel, keyboard and display unit construction, and finally there are two microcomputer programs which should be of interest. The first is a microstrip design program by DK2RV, and the second is a high-performance—if rather lengthy—moon tracking program (in IBM PC Basic) by WA1JXN. This latter program is to be followed up by two more programs by the same author; a sky noise-source tracking program (giving co-ordinates for both "hot" and "cold" sky sources) and a sun tracking program. All these topics have, of course, been covered (perhaps in less detail but using shorter and more "portable" Basic) in John Morris' book *Amateur Radio Software* published by the RSGB.

*"Woodstock", Gaze Bank, Norley, Warrington, Cheshire WA6 8LL.

Operating news

John, G4ZTR, has sent details of an expedition to Wales (Anglesey, IO73 or XN square) under the special callsign GB3XN. Operation will be from a location near Amlwch and will, besides using 70MHz, 144MHz random ms and 432MHz, will be QRV on 1·3GHz (100W to four 23-element Yagis), 2·3GHz (power/antenna not stated), 10GHz wbfm (15mW to an 18in dish) and 24GHz wbfm (7mW to a 16in dish). Further information can be obtained from Dave, G4VIX (tel 04024 55870) for 1·3GHz, or John, G4ZTR, tel 0245 355331, or QTHR. There should be at least seven operators available for this activity which is scheduled to take place between 27 May and 4 June, encompassing the 432MHz/1·3GHz Trophy Contest on May 31 and June 1.

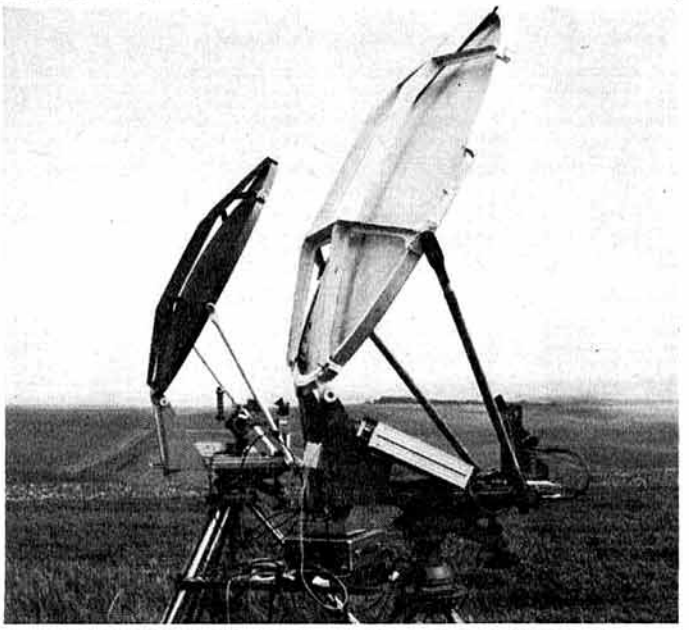
Frederick, G6FK, reported February as being a month of low activity on 1·3GHz—operators reluctant to operate from low-temperature shacks and with frozen rotators? Despite this, G3KFD (Wolverhampton) and G1DOX (Barrow-in-Furness) have made contact on 2·3GHz, the former using 25W and the latter 1W: tests continue. Frederick has heard GI4CXH "only twice out of noise in the last 8–9 weeks on 1·3GHz". Believed newly active on 1·3GHz are Graham, G6WZO (Southport), Bob, G1DKF (Ormskirk), G6HHS (St Austell), and "reactivated" Rik, G8ESB (formerly of Long Eaton, Derbyshire, now of Middlesborough). Frederick reported only 15 stations heard or worked on 1·3GHz during this period, in contrast to (usually) at least double this number.

I suppose with spring hopefully just round the corner, many operators will be turning their thoughts to portable operation, expeditions and overhauling the antenna/feeder systems after the ravages of winter. With improving weather and increasing activity I hope to be able to report results and the *Microwave Newsletter* editors would, I'm certain, appreciate advanced information on operator's intentions during the coming season. We would all dearly like to see new, unproven paths worked and a great deal more nb activity than has been apparent during the last year or two. Remember that although the Cumulatives were organized primarily to stimulate 10GHz activity, and this year are coupled with the optional use of 3·4 and 5·7GHz, there is no reason why these activity periods (they were not originally conceived as contests!) should not be used to foster activity on any of the other bands at the same time. This is where advanced notice of operators' intentions can be important to others, for what is the point in taking out gear for other bands if one is not reasonably certain that there will be anyone else to work? Please communicate!

From here and there

HB9MIN/P's total of contacts on 47GHz during 1985 was 50, two of them over the 50km mark. Erich has also had one 0·5km contact on 75GHz, with HB9AGE/P, using a 25GHz vco and Schottky multiplier/mixer. A further trial over a 2·5km path failed under conditions of light snowfall and an ambient temperature of −8°C. He now has 200mW of 10GHz nb output using an MGF1801 GaAsfet amplifier, soon to be increased to 20W by the addition of a YH1192 tube, and is interested in dx trials/skeds.

Jan-Martin, LA8AK, has notified changes to the 1·3GHz beacon LA3UHG which was mentioned in his beacon list in *Microwaves*,



The technique of using offset dishfeed on the 10GHz band

September 1985. The changes will be effective just as soon as weather conditions allow (as Jan-Martin put it "it is so unpleasant to have snow in the boots"). The new frequency will be 1,296·880MHz, and the beam heading, from a 10dB-gain Jaybeam 15/15 will be 190°. Reports of reception of this beacon will, of course, always be welcome.

Finally, the photograph reproduced here illustrates the use of offset dish feeds on the 10GHz band. This technique, which is quite common professionally and is widely used for microwave satellite tv reception systems, has, as yet, been little exploited by amateurs. Thanks to Phillippe, F6DPH/P, for the photograph: more details of this approach to optimizing dish feeds will, hopefully, be available after the VHF Convention, for this topic is to be discussed there by Charlie, G3WDG, who has been investigating this type of antenna with considerable success. During 1985, using this equipment, Philippe worked distances of 135 to 225km on 10GHz both wb and nb from a site near Le Touquet, JO00TN. In the coming season he will be looking for contacts over to Dartmoor or to other high points in Devon and Cornwall. □

SATELLITES

Bob Phillips, G4IQQ*

Amsat-UK colloquium

I mentioned last month that a colloquium on the topic of amateur satellites was to be organized by Amsat-UK in conjunction with the University of Surrey. Since that time more details have been given of the programme of events which promises to be both interesting and entertaining. First of all I have been requested to point out that the event is not limited to members of Amsat-UK, indeed one of the objectives of the colloquium is to provide for the first time an insight into all aspects of amateur satellites. With this in mind the programme will cover the history of amateur satellites, descriptions of the existing operational satellites, and a look into the future including the use of digital techniques and microwave frequencies. Pat Gowen, G3IOR, will give a talk on the RS series of satellites, and will perhaps be able to provide some information on the latest offerings—RS9 and RS10. It is also anticipated that Karl Meinzer, DJ4ZC, will also be able to take part in the proceedings and give a description of the status of the Phase 3C satellite construction. Towards the end of the second day there will be a question-and-answer session with a panel of experts selected to cover all aspects of satellite operation, theory and practice.

The event will take place on the weekend of 5/6 July, and will be held at the University of Surrey, Guildford. Some accommodation is available at the university for those travelling from a distance, as well as for those who wish to stay on for the special dinner on 5 July. Needless to say, there is expected to be a high turn-out for the colloquium, so it would be wise to book as early as possible, particularly in respect of accommodation and the dinner.

Uosat

Both satellites are in very good health, though Uosat Oscar 11 had a few problems maintaining gravity gradient stabilization during March. The problem was not felt to be serious and was probably brought about as a result of substantial use of the magnetorquer which caused the satellite to be partially locked with the earth's magnetic field rather than the gravity field. The benefits of the new diary software for Uosat Oscar 9 are now showing results and much improved reliability has been achieved, particularly as seen on the weekend news bulletins. In order to save space on the bulletin, a trial has been carried out using a compressed version of the satellite ephemeris. If the format is adopted for all such information a considerable amount of space will be freed for other information.

Good progress has been made with the modernization of the control station at the university. All equipment has been delivered and the antennas and tracking system are being checked out. When the new system has been thoroughly tested it will take over all command operations for both satellites.

Oscar 10

The satellite visibility chart shows that the best periods for operation are the first and third weeks of the month. During both these periods the elevation angle to the satellite will not exceed about 25°, so operation with fixed horizontal beams should present no problem. Maximum elevation occurs

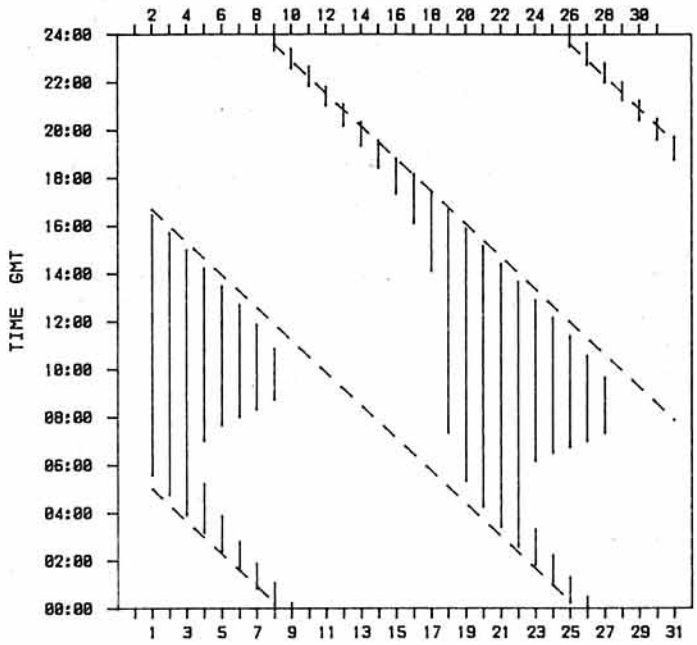


Fig 1 OSCAR 10 VISIBILITY (London area) - MAY 1986

for the short passes on the 14/15 May when it increases to around 36°. Operating conditions on the satellite should be quite good during the month, with the spacecraft antennas having optimum direction of pointing, ie at apogee the antennas will be pointing close to the centre of the earth. In addition the duration of the daily solar eclipses, which are present until mid-August, will be only around 17min.

For reference purposes, the details of the first orbit of the month are as follows:

Date	1 May
Orbit number	2170
Orbit perigee	0502 gmt
Argument of perigee	105·9°

The orbital period for the satellite is 699·5175min, and the inclination is 26·27°.

New satellites

Despite many rumours, the launch of the new Russian amateur satellites RS9 and RS10 had still not taken place at the end of March. Also, the expected deployment of Iskra 4 was still eagerly awaited.

Status reports of the progress of the Phase 3C satellite indicate good results have so far been achieved. Thermal-vacuum tests are scheduled for the two-week period beginning 23 May. It now seems likely that the launch will not take place until October as a result of delays in the Ariane launch programme.

The first test flight of the Japanese H1 rocket is due to take place in August this year, and one of the payloads will be the first Japanese amateur satellite JAS-1. The satellite will have orbit characteristics similar in some respects to those of the RS satellites, but will carry two mode-J transponders (145MHz uplink 435MHz downlink). One will be a standard linear, frequency changing transponder, and the second will be a digital, store and forward transponder. The choice of the frequencies reflects the increasing difficulty of using 145MHz as a downlink.

Amateur satellite software

Neill Taylor, G4HLX, sent a copy of an excellent data decoder program for the ZX Spectrum. The program is intended for the Uosat satellites and is completely menu driven from which the desired selection is made. Parity checking is carried out where appropriate, and processed data can be output to a printer or saved onto tape or microdrive. Further details from G4HLX, 87 Hunters Field, Stanford in the Vale, Faringdon, Oxon.

While not being part of amateur radio, many operators have been attracted to receiving data and pictures from weather satellites. John Doerr wrote from Cuxton in Kent to say that he has been getting excellent results from a 128k Lynx with software from Timestep Electronics. The high resolution colour display produces one of the best images around from a home micro, especially considering the low price for which the Lynx and its peripherals can now be obtained. □

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

DATA COMMS

Ian Wade, G3NRW*

FIRST NEWS ITEM: a long letter from Darrell, G4MZF/W4, with news of the many packet networks and gateways in the USA. He is active on 14MHz on AX.25, and would like to make contact with UK stations on packet. He can be reached as G4MZF-0 via mailboxes W3IWI-0 or W3IWI-1. (The -0 and -1 codes are callsign extensions, known as "secondary station identifiers", or ssids. More about ssids, networks and gateways in a later column).

A new monthly packet magazine has emerged from Florida, replacing the *FADCA Beacon Newsletter*. Called *Packet Radio Magazine*, or *PRM*, this new venture is edited by *Beacon* editor Gwyn Reedy, W1BEL—with that pedigree it promises to be one of the best in the business. The first issue has several full-length technical articles, operating hints and tips, and news of TAPR developments, including the network node controller (a kind of super tnc), and an inexpensive hf tuning indicator. *PRM* details from Gwyn, 812 Childers Loop, Brandon, FL 33511, USA.

Another packet tnc to add to last month's list: a plug-in tnc board for the IBM PC, and known as the HAPN PC-Packet Adapter. It features AX.25 and Vancouver V1/V2 protocols, and has a modem for interfacing direct to the radio. Assembled, tested and documented, the board costs US$199 (plus US$3 overseas shipping), and is available from Hamilton Area Packet Network, Box 4466, Station D, Hamilton, Ontario, LV8 4S7, Canada. I have an information sheet on this tnc; drop me an sae for a copy.

If you are interested in satellite packet communications experiments, keep the weekend of 5/6 July free for a visit to the Amsat-UK colloquium at the University of Surrey, Guildford (see p351 for details). Incidentally, the university publishes data sheets containing detailed information about receiving and decoding Uosat data transmissions. To obtain a set, send a large sae to Dr M Sweeting, Dept of Electronic & Electrical Engineering, University of Surrey, Guildford, Surrey GU2 5XH.

Micro-rtty basics

In the January *Data Comms* I invited individuals and companies supplying computer-based rtty systems to fill in a questionnaire about their products. I received 12 replies, covering most of the well-known micros, but before getting down to the details it is useful to look in general at how a micro-rtty system works.

Fig 1 shows the principal functions. Starting at the keyboard, the first step is to convert keyboard characters (usually coded in ascii) to five-bit parallel Baudot characters (box 1). This conversion is almost always done by software table look-up, with a special routine to detect when LTRS (letter-shift) or FIGS (figure-shift) has to be inserted. The next step is to convert the Baudot character into a stream of rtty mark and space pulses (box 2), with start and stop bits automatically inserted. In some rtty packages this conversion is done by software, whereas in others a uart is used instead. These pulses are typically 22ms or 20ms long, corresponding to 45.45 or 50 bits/s respectively.

The third step is to convert the rtty pulses into audio tones, usually 1,445Hz for mark and 1,275Hz for space (box 3). This process may be done by software, whereby square waves at these frequencies appear on a pin at the user port or cassette port, or they may be generated by a two-tone audio oscillator external to the computer. Finally, to ensure that pure sine waves are fed to the microphone socket of the transmitter, there is usually some form of tone filtering (box 4); this is certainly essential if the tones are generated as square waves.

For received signals, the above process is essentially reversed. First, audio sine waves output from the receiver's loudspeaker or headphone socket are usually shaped by some form of limiter circuit, which may be inside or outside the computer, depending on the system (box 5). The resulting square wave audio tones are then demodulated, to produce a stream of rtty mark and space pulses (box 6). Again, this step may be done by software, or by an external frequency discriminator or phase-locked loop circuit. The rtty pulses are then stripped of their start and stop bits, and converted into parallel Baudot characters (box 7), either by software or by a uart. Finally these characters are converted by software to ascii (box 8), for display on the screen.

RTTY system configurations

All of the rtty systems in the survey perform the eight functions just described, in one way or another. The differences arise mainly in the split between what is done inside the computer and what is done by external hardware; this external hardware is usually referred to as an "interface" and/or a "terminal unit". The bottom half of Fig 1 shows four different configurations for the transmit path (a-d), and four for the receive path (e-h). The small boxes containing crosses represent computer ports, such as the user port, uart port, "ear" and "mic" sockets, and so on.

Looking briefly at each configuration in turn: tx(a) and rx(e) show all of the rtty processing taking place inside the computer; there is no external interface or terminal unit, and the computer "ear" and "mic" sockets are connected direct to the radio. This approach is clearly the cheapest, but has the disadvantage that tone demodulation is usually done by software. This is fine if signals are clean and strong, but not very satisfactory for noisy, weak signals with QRM, so a computer-only solution is unlikely to be suitable on the hf bands. Also, it is likely with this configuration that the transmitted audio tones are not perfect sine waves.

Configurations tx(b) and rx(f) are marginally better. Here, the audio tones are filtered and shaped by a simple interface. For transmitted tones the tone filtering network, which may be a simple RC combination, ensures that more or less pure sine waves are produced. On receive, a limiter circuit (sometimes known as a "slicer") squares up the sinewaves, giving the computer a better chance of demodulating the tones correctly.

Configurations tx(c) and rx(g) are much better. In this case, all of the audio processing is done outside the computer, in what is usually called a terminal unit or modem. Transmit tones are generated by an audio oscillator, and received tones are demodulated by tuned filters or phase-locked loop. Probably the best terminal unit is the ST5 and its variants. Although one of the oldest designs around, it has proved to be most effective in decoding weak signals under the noisy conditions found on the hf bands, and is described in full in BARTG's *RTTY The Easy Way*.

Finally, configurations tx(d) and rx(h) do even more work outside the computer. As well as a terminal unit, there is an interface performing parallel/serial conversion; this is usually a uart. A uart is very good at handling received signals which are severely corrupted by noise and phase distortion, thus saving the computer a lot of work and letting it carry out more powerful and interesting software tasks. □

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

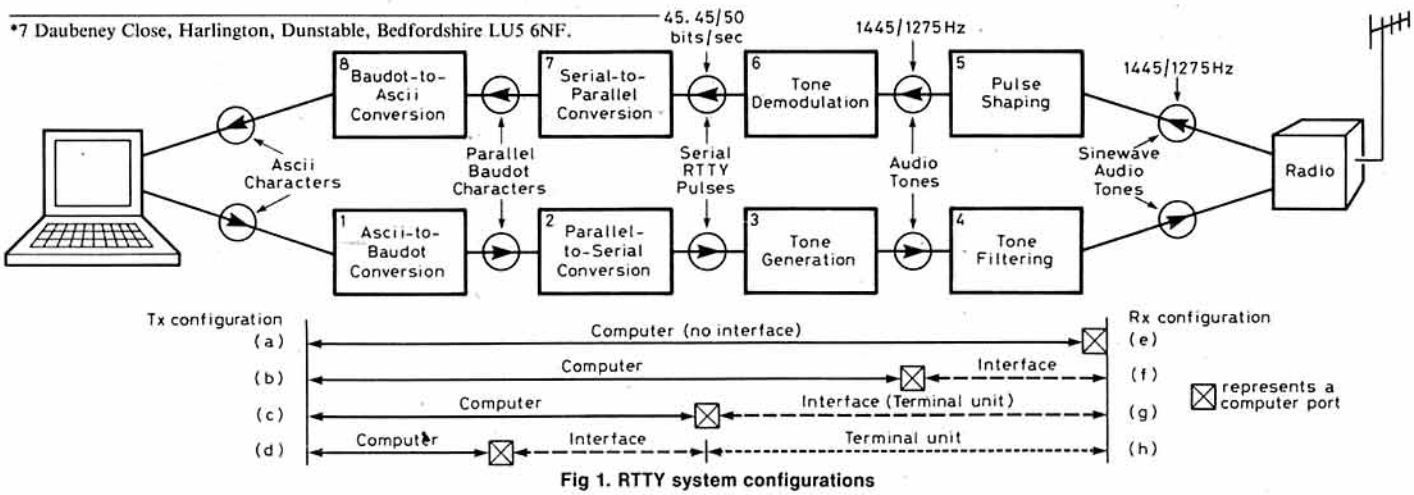


Fig 1. RTTY system configurations

RAYNET

Geoff Griffiths, G3STG*

A new start

In the early part of any year, Raynet groups around the UK are holding that great and mystical ceremony known as "the agm". Only too often in clubs and societies, this event is seen as a very good reason for staying away for the evening, because, you may run the danger of being given a job!

There is nothing more embarrassing than sitting in a meeting and being faced with a deathly hush when the question is posed: "Well, who wants the controller's job this year then?". That's almost as unfortunate as attending a meeting where the committee seems to have everything so well organized that the appointment of the new officers is cut and dried before the meeting commences. All too often a newer member who longs to play a more constructive role within the group doesn't get the opportunity to offer his or her enthusiasm and skills to the service of the group. On the other hand, it is vital for the group's stability that the potential capability of the new controller has been well tried before the appointment is made, and that all the members believe that the appointee will have the stamina to continue with enthusiasm for at least 12 months, and preferably for a longer time to ensure the group's continuity.

How to achieve this then? Well, first of all, it's important to have a clear idea of what the controller's job really involves. I would suggest that he or she doesn't have to be the best operator the group possesses. On the contrary, while the net is operating, the controller should be spending time preparing for the next development in the activity, thinking about relief operators, talking to the user service etc. The controller must therefore be capable of logical thinking and planning, he should be able to talk to the user services at all levels from county director to stretcher bearer, and should be above all things a good "man manager". Some controllers may not think of themselves in these terms, but it is easy to look at a group and spot those controllers who can fill the bill, and those who don't!

So where does this lead us. Many group committees give a great deal of thought to the succession of leadership for the group, and identify potential leaders early on, recruiting them to the committee and ensuring that they are gently introduced to the rigours of the task. It is most important that all members of a group committee are given useful and satisfying tasks to undertake by the controller. Heaven knows, there are enough jobs to be done in any group: treasurer, secretary, membership registrations, training, equipment, user service liaison, technical, antenna specialist—the list seems never ending.

But don't forget that the first member on the scene of any emergency will need to take control of the operation until reinforcements arrive, either physically, or on-air. Each individual member should therefore get the chance to sit in the hot seat in training, at least once, to discover for themselves whether they really know the standard operating procedures in the *Raynet Manual*, and to find out how they react to pressure.

To those newly elected to the group committee, my congratulations—I hope you enjoy it. To those newly-appointed controllers, please don't hesitate to shout to your county controller or zonal representative for help or advice, 'cause that's what they're there for. To those who have retired from appointments, well done and many thanks for all your efforts.

Zonews

March saw the distribution of a new issue of *Zonews*. This is a regular newsletter put together by Dave Lankshear, G3TJP, which is intended to be a clearing house of information for zonal representatives and group controllers.

This *Zonews* has much information of great interest for all members, and I hope that by now your group will have seen a copy, or have read extracts built into your own group newsletter. The contents this time include such items as notes on charging for services(!), co-ordination with cb, 432MHz frequency planning, nuclear electromagnetic pulse (nemp) testing, as well as including reports from most of the zones. Also included are the latest details of availability and price of supplies from Jane Balestrini, as well as from various groups around the UK.

The content of the next issue will only be as good as you make it. If the current issue doesn't carry details of your group's activities, then you only have yourselves to blame.

In addition, mainly to make my life easier when preparing for the transmissions on 3·5MHz every Sunday morning, a national event diary is being prepared, so please let me have details of your planned activities. Apart from any other considerations, it will help adjacent groups to avoid clashing with your frequency occupation.

Zonal representation

Members in the northeast, Zone 1, will by now know that their new zonal representative is Les Graves, G4BCP, who was successful in the recent election. I know that Les is as keen as I am on seeing the zone become even stronger and continue the process of growing together as an effective regional team, as well as functioning as individual groups. It was particularly good to see so many voting, and also to see both candidates appearing together at one meeting in the zone before the poll. We shouldn't forget the efforts of Sue Jebb, who worked for so long as the zone's first representative since the scheme's inception.

Sadly, Clive, GW3YKL, has resigned from the post of ZR8, and I know that members in Wales will join me in paying tribute to the strides forward made since he was appointed. John Jones, GW3IGG, has very kindly agreed to fill the post in "caretaker mode" until the necessary elections can be completed, and I know that you will support his efforts. The ZR for Wales has some special problems all of his own. If you don't know what I mean, then just look at the map: Wales covers a tremendous area, with a lot of mountains in the middle!

Operational activities

On 10 December, a century-old 42in water main carrying water from a large reservoir in the North Leeds area to a local treatment plant fractured, and as a result by 13 December, 250,000 consumers were without a supply. The Army was called in to provide 200 water bowsers, and Yorkshire Water Authority contacted the W Yorkshire cepo who called out the Leeds Group, initially, and later the entire county.

For the next 48 hours, communications were provided for 14 vehicles as they supplied water to the bowser points. A total of 53 Raynet members were involved in this operation from the Leeds, Calderdale, Keighley, Kirklees, Pontefract, Todmorden and Wakefield groups. The reactions of the user services to this highly-efficient and professional operation were extremely favourable, with the Leeds Group now being the proud possessors of a new comms caravan. Our congratulations to them all.

Once again the Plymouth Group performed sterling service to their cepo during snow, with vital communications being provided to snow ploughs and emergency vehicles during bad weather until even four-wheeled vehicles could no longer reach the operators to relieve them. It seems that the group is in danger of becoming expert in this sort of operation.

Thank you

Can I add a personal note of thanks to all those who wrote, telephoned and passed messages over the air during my recent illness. They were all much appreciated, while being too numerous to acknowledge individually. As David reports in *Zonews*, I am "once more propelling the treadmill at full speed". □

The first Yorkshire Raynet dinner/dance was held on 8 March 1985 in Leeds. Some 91 members and guests attended, and the guest of honour was Geoff Griffiths, G3STG, chairman of the Raynet Committee. L to r: Jim Bedford, G6RBE, Wakefield Group controller; Nigel Drayton, G1IBX, Leeds Group controller; Ivor G3KWT, Zone 2 controller, welcoming G3STG; Pat Smith, G4ZWQ, Doncaster Group Controller; and Colin Thomas, G3PSM, West Yorks county controller. *Photo:* G4HSZ

*11 The Grove, Asfordby,
Melton Mowbray, Leics LE

Contest News

FIELD DAY EVENTS

AS REPORTED in *Rad Com* September 1984, the IARU Region 1 Conference held in Cefalu in April 1984 favoured the adoption of a multi-mode field day in June to replace the well-established cw national field days organized by the RSGB, DARC and USKA, and the September IARU SSB FD. Resulting from objections to the decision by the RSGB and the German and Swiss societies, the proposal was referred to the Region 1 HF Working Group for further consideration.

Many of the societies that voted for the change had no actual experience of field day operation, but believed that by having only one large multi-mode field day contest in June there would be a substantial reduction in interference to non-contest stations, while others were concerned with the clash of dates between the September SSB FD and the IARU VHF Open Contest.

Following the Cefalu conference, the RSGB HF Contests Committee sent questionnaires to NFD and SSB FD groups asking for their views. This resulted in an almost unanimous wish to keep the two separate field day events, a decision which gave the RSGB a clear mandate to use every effort to persuade the Region 1 HF Working Group to recommend a reversal of the Cefalu decision. The HFCC sent letters to every society in Region 1 explaining the history of NFD, how it operated and the reasons why the membership were so keen to keep separate events.

The HF Working Group met in Lubeck in March 1985, but was still very divided; while more societies favoured separate cw and ssb events, there was insufficient backing for a recommendation to quash the multi-mode event, so it was decided to defer any decision until the next meeting in March 1986. Since the Lubeck meeting there have been further discussions with the German and Swiss societies, and a large volume of correspondence with other IARU Region 1 societies. The RSGB originated over 60 letters, and together with DARC and USKA has used every opportunity to promote the need to keep the *status quo*. The DARC exhibitions in Friedrichshaven and Hannover, attended by many representatives of IARU Region 1, provided another platform for these efforts.

The HF Working Group recently met in Vienna and recommended that the June field day becomes the official Region 1 cw event and that the September IARU SSB FD reverts to being a national event organized and supported by those societies who wish to continue this contest. This recommendation from the 19 societies present was carried by 17 votes, with 2 absentions, and will now go forward to the 1987 IARU Regional Conference for ratification. This decision was not easily reached and it is largely due to the help given to the RSGB and DARC by LA5QK, the Region 1 contest co-ordinator, and HB9AGA, the USKA delegate, that the recommendation received such a large majority.

There is a good expectation that the recommendation will be adopted by the conference, and it has been suggested that the 1987 CW NFD might operate under the IARU banner. The HF Working Group has asked LA5QK, assisted by RSGB and DARC, to co-ordinate the rules for the new event. DARC and USKA are keen to add a 25W and a single-person entry class to the existing open and restricted sections. They also feel that the country multiplier should be included and there is agreement to the RSGB proposal for inclusion of 1·8MHz.

The HF Contests Committee feels it is essential to have the views of NFD groups about these, or any other proposals for rule changes. As time is limited, groups who wish to comment should write to the HF Contests Committee, Box 73, Lichfield, Staffs, as quickly as possible, and certainly not later than the end of June 1986. A questionnaire will be included with all the NFD documentation being sent to entrants.

G6LX

1986 HF Cumulative Contests results

Well over 700 different callsigns appeared in the 283 logs that were received for checking in the 12 sessions of the January cumulatives, a substantial increase over the 1985 event. All entries were in the single-operator category and there were no swl participants. Most entrants were pleased with the revival of the four sessions/band and did not find the overlapping of the contest periods or the near clash with AFS to be a problem. Several competitors commented that the 3·5MHz sessions provided the opportunity to "fine-tune" their station under contest conditions in readiness for AFS. One even went so far as to suggest that a 3·5MHz session should be held on the morning of AFS, a proposal that will not get much support bearing in mind the timings of the two events!

Band conditions were generally thought to have been poor on all three bands. There were many complaints about 7MHz, particularly from the south of England, and a number of entrants suggested that it should be droppd during the sunspot minimum years. Analysis of the 7MHz logs shows that very few inter-UK contacts were made during the four sessions and, apart from the GM stations, most of the other entrants obtained their points from working Europeans. The HF Contests Committee was very grateful to the nine European stations that sent entries as they were very useful for cross-checking entrants' logs.

The alphabetical listing used last year was not liked, so this year three separate band tables are used. Certificates are awarded to the band leaders; to G4OGB and G4OTU, who tied with the highest combined score for the three bands; to G4ODV who made the best score as a first-time entrant, and to G6QQ who was the longest-licensed entrant (August 1932).

In the report of the last 1·8/3·5/7MHz Cumulatives, mention was made about the possibility of including some phone sessions. A number of entrants are strongly opposed to this as they feel that it would change the nature of the event. It was pointed out that these series of contests were intended to provide contest training, and to enable more experienced operators who were unable or unwilling to enter the longer events to participate in short cw contest sessions at their own speed.

The standard of the logs was very good and this time all the entrants remembered to put their callsigns on the individual sheets. The HF Contests Committee thanks all those that entered or sent in check logs. The next set of low-frequency cumulatives will be in January 1987, and we look forward to another bumper entry.

G4RWW and G6LX

1·8MHz
Date (January)

Posn	Callsign	6	14	22	30	Best three total
1	G3XWZ	249	204	225	—	678
2	GM4SID	156	171	180	CK	507
3	G4GIR	—	150	186	150	486
4	G4OGB	174	CK	150	138	462
5	G4OTU	159	147	147	—	453
6	G4ODV	156	CK	144	138	438
7	G3YEC	147	—	165	123	435
8	G3BPM	162	CK	135	120	417
9	G5LP	123	159	123	CK	405
10	G4BOU	135	—	144	120	399
11	G3VYI	CK	99	132	132	363
12	G3HZL	111	—	126	105	342
13	G3HTI	102	—	108	117	327
14	G3MCX	108	111	99	CK	318
15	G4SLE	93	57	105	—	255
16	G3LIK	CK	75	96	81	252
17	G3WYK	147	—	—	102	249
18	G3AWR	90	66	90	CK	246
19	G2HLU	81	CK	66	57	204
20	GM3UM	—	63	36	75	174
21	G3SWH	147	—	—	—	147
22	G4HZF	66	—	—	66	141
23	G4NFX	66	—	—	69	135
24	G3ILO	45	—	27	48	120
25	G4RPW	18	—	87	—	105
26	GW3GWX	—	—	99	—	99
27	G3SB	33	CK	27	30	90
28	GM3VEY	—	—	60	—	60
	G3BFP	CK	CK	CK	—	CK
	G6LX	CK	—	CK	CK	CK
	PA3BFH	CK	CK	—	—	CK

3·5MHz
Date (January)

Posn	Callsign	5	11	19	25	Best three total
1	G3WYK	243	219	235	CK	697
2	G5LP	252	234	201	CK	687
3	G4EOF	CK	225	222	204	651
4	G3SYA	210	198	234	CK	642
5	G3JJG	216	198	219	—	633
6	G3UZN	213	216	183	—	612
7	G3YEC	189	—	207	213	609
8	G4UML	198	198	213	—	609
9	G4OTU	189	201	216	CK	606
10	G4OGB	201	186	216	CK	603
11	G4BOU	CK	201	201	186	588
12	G3HZL	201	180	—	180	561
13	G4VXE	CK	195	186	168	549
14	G2HLU	177	180	CK	174	531
15	G4HZV	159	165	165	CK	489
16	G4OBK	258	225	—	—	483
17	G3GHY	CK	159	156	150	465
18	G3HTI	135	—	168	159	462
19	G4OTV	141	147	162	—	450
20	G6QQ	—	141	156	135	432
21	G4RPW	CK	147	156	123	426
22	G3BPM	141	138	138	CK	417
23	G3SZI	—	141	144	132	417
24	G4SLE	—	120	162	108	390
25	G4ODV	111	CK	123	132	366
26	G4WZV	120	CK	117	120	357
27	G3SB	CK	117	111	111	339
28	G3AWR	105	CK	123	102	330
29	G3MCX	120	60	144	—	324
30	G4NFX	96	123	102	—	321
31	G4HZF	—	—	162	129	291
32	G3HQH	—	—	153	138	291
33	GM3VEY	—	—	147	114	261
34	GM3UM	—	39	111	54	204
35	GW4KVJ	30	—	90	78	198
36	GW3GWX	—	108	75	—	183
37	G3SWH	—	157	—	—	157
38	G4XRV	—	—	9	36	45
	G2PA	CK	—	—	—	CK
	G6LX	CK	CK	CK	CK	CK
	PA3BFH	—	CK	—	—	CK
	SM6BGG	—	—	CK	—	CK
	F0AAF	—	CK	CK	—	CK
	SM5AOH	—	—	—	CK	CK

7MHz
Date (January)

Posn	Callsign	4	12	18	26	Best three total
1	GM4SID	204	CK	189	171	564
2	G4ODV	CK	126	141	126	393
3	G4OTU	132	CK	129	114	375

Posn	Callsign	4	12	18	26	Best three total
4	G3YEC	156	—	87	126	369
5	G4OGB	123	CK	108	129	360
6	G5LP	129	123	81	—	333
7	G3HZL	87	93	—	105	285
8	G2HLU	87	CK	84	105	276
9	G3SYA	99	—	165	—	264
10	GM3VEY	—	—	135	123	258
11	G4BOU	105	42	99	—	246
12	G3HTI	69	—	72	102	243
13	G3SWH	—	36	—	198	234
14	G4NFX	51	—	63	72	186
15	G3AWR	69	45	66	CK	180
16	G3SB	45	45	CK	63	153
17	GM3UM	—	39	60	42	141
18	G3BPM	—	63	72	—	135
19	G4SLE	84	—	—	39	123
20	G4HZF	—	—	69	27	96
21	G3MCX	27	—	24	24	75
22	G4RPW	—	—	57	—	57
	GW3GWX	—	—	CK	—	CK
	G6QQ	—	CK	CK	—	CK
	G6LX	CK	—	CK	—	CK
	PA3BFH	—	CK	—	—	CK
	SM6BGG	—	—	—	CK	CK
	F0AAF		CK	CK	—	CK
	SM5AOH	—	—	CK	CK	CK
	DA2CZ	CK	CK	CK	CK	CK
	OH2EJ	CK				CK
	DL1ZQ	—	CK	—	—	CK
	LA1IE	—	CK	CK	CK	CK
	DF3QN	—	—	CK	—	CK

HF SWL Championship 1985 results

1985's hf contests prompted 13 listeners to take part in the listener sections of whom 12 scored championship points. This is the highest number for many years and the HF Contests Committee are confident that the trend will continue in 1986. There was a healthy response to the Society's 1st SWL Contest, and this event is now to form part of the contest calendar and will count for championship points.

The results of the 1985 Championship covered six events—three cw and three ssb. In 1986, the number of events has been increased to 10—five cw and five ssb. The rules were in January's issue of *Radio Communication*.

Congratulations to Brad Bradbury, BRS1066, for his first place gained by winning the three cw events. However, I am sure that he would like a little more opposition in 1986.

BRS32525

Posn	Callsign	7MHz ssb	7MHz cw	Town & County ssb	RRU cw	21/28MHz ssb	21MHz cw	Total
1	BRS1066	0	70	0	50	0	80	200
4	BRS32525	70	0	35	0	80	0	185
3	BRS28198	55	0	5	0	55	0	115
4	BRS26407	0	0	0	0	65	0	65
4	BRS52868	0	0	0	0	0	65	65
6	BRS86204	50	0	10	0	0	0	60
7	BRS48909	0	0	50	0	0	0	50
8	BRS20249	0	0	0	0	45	0	45
9	BRS31976	0	0	30	0	0	0	30
10	G6GWR	0	0	25	0	0	0	25
11	BRS25429	0	0	20	0	0	0	20
12	BRS52543	0	0	15	0	0	0	15

RSGB Listener Contest 1986 rules

Object of the contest. To log as many stations in QSO as possible.
Date and times. 1400gmt 12 July to 1400gmt 13 July 1986.
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 28, 21 and 14MHz and three points for each station heard on 7, 3·5 and 1·8MHz. 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 penalised 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 11 August 1986.
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.

RSGB SSB Field Day/IARU Region 1 HF Phone Field Day 1986 rules

1. Eligible entrants. Members or groups of members of the RSGB located in the British Isles.
2. The general rules for RSGB hf contests, published in the "Operating Guide" supplement, *Rad Com* January 1986, will apply.
3. Period. 1500gmt Saturday 6 September to 1500gmt Sunday 7 September.
4. Sections.
(a) Open. Multi-operator, maximum licensed power. Equipment: one transmitter and one receiver, or one transceiver plus an additional receiver if desired. Antenna: no restriction.
(b) Restricted. Multi-operator, 200W p.e.p. input maximum. Equipment: only one transmitter and one receiver, or one transceiver. Antenna: only one antenna may be used which must be a single element such as a dipole, long wire, W3DZZ, or trapped vertical, having not more than two elevated support points. No part of the antenna may be higher than 15m above ground level.
Notes (these apply to both sections).
(i) Stand-by equipment is allowed, but it may not be connected at the same time as the main equipment.
(ii) The use of support points for antennas from permanent buildings or structures is not permitted.
5. Location. Each portable station must operate from the same site for the duration of the contest and may not be located in a permanent building or use public mains supply.
6. Power. Power for all equipment may be derived only from a portable generator on the site, accumulators, or batteries.
7. Installation. No equipment or antennas may be installed or erected on the site prior to 24 hours before the start of the contest. This does not apply to the storage of equipment.
8. Contacts. Phone only in the 3·5, 7, 14, 21 and 28MHz bands.
9. Contest call and exchange. Call "CQ Field Day". Exchange RS plus serial number starting with 001.

Contests Calendar

1 Jan-31 Dec	UBA SWL *(Rules in December* SWL News)
May-Sept	Microwave Cumulatives *(Rules in March issue)*
May-Sept	10GHz Cumulatives *(Rules in March issue)*
1 May	AGCW-DL QRP/QRP Party *(Rules in March QRP)*
3, 4 May	432MHz-24GHz *(Rules in March issue)*
5 May	BATC Mayday Microwave *(Details G6IQM)*
10, 11 May	Peace to the World *(Rules in April* HF)
17, 18 May	144MHz and SWL *(Rules in March issue)*
17, 18 May	ARI *(Rules in May* HF)
18 May	DF Qualifying Event, Chelmsford/Colchester. *Details in this issue*
18 May	Region Round-up *(Rules in March issue)*
24, 25 May	CQ WW WPX CW *(Rules in May* HF)
31 May	1.3GHz Trophy *(Rules in April issue)*
1 June	432MHz Trophy and SWL *(Rules in April issue)*
7, 8 June	HF NFD *(Rules in February issue)*
15 June	DF Qualifying Event, Northampton
28, 29 June	Summer 1·8MHz *(Rules in May issue)*
29 June	DF Qualifying Event, Dartford Heath
5, 6 July	VHF NFD and SWL *(Rules in April issue)*
5, 6 July	BATC Summer Fun *(Details G6IQM)*
12, 13 July	HF SWL *(Rules in May issue)*
13 July	DF Qualifying Event, South Manchester
20 July	Low Power FD
26 July	144MHz Low Power and SWL
27 July	432MHz Low Power and SWL
3 August	DF Qualifying Event, Mid-Thames
3 August	Hopscotch
17 August	DF Qualifying Event, Coventry
24 August	1,296/2,320MHz
31 August	Ropoco 2
6, 7 September	144MHz Trophy and SWL
6, 7 September	IARU Region 1 SSB FD *(Rules in May issue)*
7 September	DF Qualifying Event, Slade
13, 14 September	BATC International *(Details GGIQM)*
21 September	70MHz Trophy and SWL
21 September	DF National Final, Salisbury
4, 5 October	432MHz-24GHz
7 October	432MHz Cumulative
12 October	21/28MHz SSB *(Rules in May issue)*
15 October	1,296/2,320MHz Cumulative
19 October	21MHz CW
23 October	432MHz Cumulative
26 October	70MHz Fixed
26 October	DF Treble Night Event, Mid-Thames
31 October	1,296/2,320MHz Cumulative
1, 2 November	144MHz CW
8 November	432MHz Cumulative
8, 9 November	Second 1·8MHz
9 November	BATC Autumn Vision *(Details GU1QM)*
16 November	1,296/2,320MHz Cumulative
24 November	432MHz Cumulative
2 December	1,296/2,320MHz Cumulative
7 December	144MHz Fixed and AFS
10 December	432MHz Cumulative
14 December	70MHz CW
18 December	1,296/2,320MHz Cumulative

10. Scoring
(a) QSO with a fixed station in IARU Region 1 ... ... 2 points
(b) QSO with any station outside IARU Region 1 ... ... 3 points
(c) QSO with a portable or mobile station in IARU Region 1 ... 5 points
See Appendix for list of IARU Region 1 countries.
11. Multiplier. Each DXCC country worked on each band gives one multiplier.
12. Final score. The total points scored on all bands is to be multiplied by the total number of different countries worked on each band to give the final score (ie total QSO points × multiplier = final score).
13. Logs. Separate logs are required for each band, together with a check list showing the countries worked on each band. Log sheets are to be headed: date/gmt; station worked; RS and serial number sent; RS and serial number received; operator; new country/multiplier; points. RSGB HF Contest Log Sheets should be used.
14. Declaration. Logs must be accompanied by an RSGB HF Contest Cover/Summary Sheet with the declaration signed by the person responsible for the contest entry.
15. Address for logs. RSGB HF Contests Committee, c/o P Miles, G3KDB, PO Box 73, Lichfield, Staffs WS13 6UJ.
16. Deadline for logs. Postmarked not later than the Monday 22 days after the end of the contest.
17. Awards. The leading station in the open section will receive the Northumbria Trophy. The leading station in the restricted section, and the entrants placed second and third in each section will receive certificates of merit. Certificates will also be awarded to the stations submitting the leading check log from each continent.
IARU Region 1 will award certificates to the top 10 stations in each section in the combined results table.
18. Any log found to contain more than five unmarked duplicate contacts for which points have been claimed will be automatically disqualified. Points to the rate of 10 times the contact value will be deducted for each unmarked duplicate contact up to five.
Appendix
IARU Region 1 countries include those in Europe and Africa, the USSR, Mongolia and ITU Zone 39. For a precise definition refer to the RSGB *Amateur Radio Operating Manual*.

21/28MHz Telephony Contest 1986 rules

TRANSMITTING SECTION
1. The general rules for RSGB hf contests, published in the "Operating Guide" supplement, *Rad Com* January 1986, will apply.
2. Eligible entrants
(a) British Isles. RSGB members only.
(b) Overseas (including EI). All licensed amateurs.
3. Period. 0700 to 1900gmt Sunday 12 October 1986.
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, GJ0, 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 be automatically 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 3 November 1986. Overseas entries must be received by 8 December 1986.
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. 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. Certificates of merit will be awarded to those placed second and third overall and to the leading entrants in each overseas country.

Summer 1·8MHz Contest 1986 rules

1. Eligible entrants. Single or multi-operator. British Isles entrants must also be members of the RSGB.
2. Period. 2100gmt Saturday 28 June to 0100gmt 29 June 1986
3. Sections.
(a) British Isles stations
(b) Overseas stations (including EI).
4. Frequency/mode. 1,820–1,870kHz cw only.
5. Contest call and exchange. CQ test, RST plus serial number starting at 001. British stations must also give their county codes, published in the "Operating Guide" supplement, *Rad Com* January 1986.
6. Scoring.
(a) British Isles section. Three points for each contact, with a bonus of five points for the first contact with each new county code and the first contact with each new country outside the British Isles.
(b) Overseas section. Three points for each contact with a station in the British Isles (not EI), with a bonus of five points for the first contact with each new county.
7. Logs. Log sheets to be headed: date/gmt; callsign; RST/number sent; RST/number received; code received; bonus; points.
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."
9. Address for logs. HF Contests Committee, c/o PO Box 73, Lichfield, Staffs WS13 6UJ. Ajudicator—G4DJX.
10. Closing date for logs. Logs must be postmarked not later than Monday 14 July 1986.
11. Awards.
Certificates of merit will be awarded as follows:
(a) The leading score and runner-up in each section and, at the discretion of the HF Contests Committee, the leading entrant from each overseas country.
(b) The highest placed entrant in the British Isles section who has not reached 18 years of age by the date of the contest. Candidates should mark their entries "Under-18 Award".

DF Qualifying Event—Chelmsford/Colchester

Date. 18 May 1986
Map. O S Sheet 168 1:50,000 series, Colchester and the Blackwater
Assembly. 1300 BST for start at 1320 BST
Location. Layer Breton Heath NGR944187
Competitors requiring tea should notify Mr R Brocks, 30 Rowan Drive, Maldon, Essex. Tel 0621 55707(home) 0245 353221 Ext 3086 (work) not later than 11 May 1986.

Some of the Plymouth Polytechnic ARS Contest Group: (front) G8XYS, G6CZI, G4OML, G6IBI; (back) G1PJI, G1PJJ. *Photo:* G1PJI

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 1986**.

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 **10 May** and for the **August** issue by **10 June**.

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.

Barnoldswick (Rolls-Royce ARC)—7 May (Fox hunt), 4 June ("RTTY", T P Athewes). 8pm. Rolls-Royce Sports & Social Club, Barnoldswick. Sec G4ILG, tel 0282 812288.

Barrow-in-Furness (South Lakeland ARS)—Meetings on 15 May, 5 June. 8pm. Norweb Sports & Social Club, rear of Ormsgill Hotel. Sec G6LKB, tel 0229 54982. A special event station will be run during Spring Bank Holiday week from Piel Island near Barrow for the first time. Locator is 1084 JB and WAB SD 26. Operating on 7·5, 3·5, 2, and 144MHz. See *Radio Communication* March for further information.

Bury (BRS)—13 May (Film show). 8pm. The Mosses Youth & Community Centre, Cecil St, Bury. Details G0CUK, tel Bolton 706191.

Chester (C&DRS)—6 May (Committee meeting), 13 May ("ATV" G4EZO and G6IFA), 20 May (Outside activity evening near Frodsham), 27 May ("Computer aided design", GW8ICT), 3 June (Committee meeting). 8pm. Chester Rugby Union Football Club, Hare Lane, Vicars Cross, Chester. Details G6IFA, tel 336639. Morse Classes 7.15pm.

Crewe (South Cheshire ARS)—12 May ("Contest working", G4APA). 8pm. LMR Sports Club, Goddard St, Crewe. Details G1PUV.

Fylde (FARS)—6 May (Equipment sale), 20 May ("Satellite tv in the UK", Mr J Greenhall). 7.45pm. Kite Club, Blackpool Airport. Sec G8GG, tel 725717.

Liverpool (L&DARS)—6 May ("Radio in boats", G4ZKF), 12 May (144MHz contest preparation), 20 May (Junk sale), 27 May ("HGV", G1JEI), 2 June (Preparations for HF NFD). 8pm. The Churchill Conservative Club, Church Rd, Liverpool 15. Sec G1EXJ, tel 051-728 8811. Morse and RAE classes 7.15pm.

Macclesfield (M&DRS)—4 May (WAB LF Phone Contest), 6 May (Shack night), 13 May (Committee meeting and shack night), 17/18 May (144MHz Contest), 20 May ("Japanese morse", G3CSG), 27 May ("Fire prevention", G4WKD). 8pm. The Fermain Club, Oxford Rd, Macclesfield. Sec G1NUS, tel 0625 24534.

Manchester (Trafford ARC)—8 May ("PSUs and construction". G1AEO). 8pm. The Sea Cadet Unit, Bradshaw Lane, Stretford, Manchester. Sec tel 061-748 9804.

Manchester (West MRC)—18 May ("All band synthesized tcvrs", G3OGQ). 8pm. Astley & Tyldesley Miners Welfare, Meanley Rd, Gin Pit Village, Astley, Tyldesley, Nr Manchester. Details G1IOO, tel 0204 24104.

Maryport (Solway RC)—Meetings each Wednesday for "chats". RAE classes on demand. Maryport Educational Settlement, High St, Maryport. Contact G0AFP, tel Cockermouth 826461.

Morecambe (MBARS)—12 May (Talk by Bert Donn, G3XSN, RSGB RR1), 19 May (Morse class), 5 and 28 May (No meetings, Bank Holidays). 7.30pm. Luneside Eng Co, Mill Lane, Halton, Nr Lancaster. Details G3PER, tel 0524 52659.

Sale (South Manchester RC)—2 May ("Club project", G4AOU), 9 May (DF event), 16 May ("QRP", Rev G Dobbs, G3RJV), 23 May (AGM, please be early), 30 May (Lecture tba), 6 June (Preparations for HF NFD plus video lecture). 8pm. Sale Moor Community Centre, Norris Rd, Sale. Sec G3WFT, tel 061-973 1837.

Stockport (SRS)—14 May (Slides of VS5 and ZL, Bill Shaw). 8pm. The Magnet Inn, Wellington Rd, (A6) Stockport. Sec G4FFW, tel 061-224 7880.

Thornton Cleveleys (TCARS)—5 May (No meeting), 12 May (Informal/club on the air), 19 May ("Microwaves", G3PFR), 26 May (Special event station GB2FCL—Fleetwood 150 birthday celebrations). 7.45pm. 1st Norbreck Scout HQ, Carr Rd, off Fleetwood Rd, Bispham, Blackpool. Details G4BFH, tel 0253 853554. Morse classes by G3ZRZ.

Wirral (WARS)—7 May ("RSGB affairs", Bert Donn, G3XSN, RR1), 10 May (Golden jubilee dinner dance at Heswall Hall. Tickets from G2AMV), 13 May ("A programmable electronic keyer", G4EWJ), 4 June ("Regulated power supplies", G3UZU). 8pm. Ivy Farm, Arrowe Park. Details G3VEB.

Wirral (W&DARC)—14 May (Quiz night), 27 May (Talk by G3LEQ). 8pm. Irby Cricket Club, Mill Hill Rd, Irby. Details G6CGJ, tel 051-677 7376.

Woodford (RATEC)—12 May ("WAB", G3WWX), 2 June ("Basic computing", G8XVX). 8pm. British Legion Club, Moor Lane, Woodford, Nr Bramhall, Cheshire. Details G4SFU, tel 061-485 3912.

My thanks to RATEC for a very nice evening at their premises. *RR1*

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

Halifax (H&DARS, G2UG)—20 May (Lowe dealer, demonstration). 7.30pm. Running Man PH, Pellon Lane. Details G0DLM, tel 0422 202306.

Hull, (H&DARS, G3AMW)—9 May (DF hunt), 16 May (Natter night and visit), 23 May (Contest site demonstration of 1·3GHz dish antenna), 6 June (Construction competition for Keith Younger Cup). Clubroom, Walton St. Details G0DMP, tel 0482 862149.

Keighley (KARS, RS84851)—13 May (Informal meeting), 27 May ("Amateur radio on a shoestring", G3RJV). 8pm. Victoria Hotel, Cavendish Rd. Details G1IGH, tel 0274 496222.

Leconfield (RCTARS, G4GGD)—8 May (Contest working), 15 May (Natter night), 22 May (HF NFD cw procedures, part 1), 29 May (HF NFD cw procedures, part 2). Normandy Barracks. Details G4SMB, tel 0401 51200.

Maltby (MARS, G4SKM)—16 May (Club quiz with G3ZHI). 7.30pm. Hellaby Community Hall, Clifford Way. Details G3ZHI, tel 0709 814911.

North Wakefield (NWRC, G4NOK)—1 May ("Crime prevention", Morley CPO), 8 May (Visit to Leeds/Bradford Airport, 7.15pm), 15 May (Talk by G4OOC), 22 May (Water Prince, floating restaurant), 29 May (Monthly meeting), 5 June (Visit to Spen Valley junk sale). 8pm. White Horse PH, Fall Lane. Details G4RCH, tel 0532 536633.

Spen Valley (SVARS, G3SVC)—1 May ("Amateur radio from a different world", G3GJV), 15 May (Visit), 5 June (Surplus sale). Old Bank WMC, Mirfield. Details G4PHR, tel 0924 499397.

Todmorden (T&DARS, G4WYT)—5 May (Club station and rtty demonstration), 19 May (Practical construction demonstration). 8pm. Queen Hotel. Details G1GZB, tel 070681 7572.

UK FM Group (Northern)—4 May (Monthly meeting), 1 June (Monthly meeting). 7.30pm. Royal Hotel, Barnsley. Details G4UNA.

Wakefield (W&DRS, G3WRS) 13 May (DF antenna practice run), 17/18 May (144MHz Contest), 27 May (Bring & buy junk sale). Meetings 8pm. Ossett Community Centre. Details G8PBE, tel 0924 378727.

Wawne (WAWNE Raynet Group, G4UWE) 5 May (Comms tests), 11 May (Beverley 20 walk radio support), 19 May (Group meeting and training). EP Section, Meaux Road. Details G4EJP, tel 0401-50397.

White Rose (WRARS G3XEP) 14 May (AGM), 21 May (Meeting the new committee), 28 May (NFD briefing). Moortown RUFC, Moss Valley. Details G6NIZ.

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

Bedford (B&DARC)—1 May ("Getting going on 10GHz", G8OFA), 15 May (RTTY and datacomms evening). 8pm. Sec G4VHF. The club meets on an informal basis on Thursdays between the above dates.

Cambridge (C&DARC)—18 May (Club rally and car boot sale), 10.30am. Hall and playgrounds of Coleridge Community College, Radegund Rd, Cambridge. Sec G4TRO. Weekly meetings, Fridays 7.30pm, at above address.

Daventry (DARC)—17 May (Spring dinner, Stags Head). Sec G0DPA.

Dunstable (DDRC)—6 May (MKTV, a visit to an intelsat downlink station), 23 May ("Rig doctor", a session with Spectrum Analyser), 6 June ("Wire antennas", G3WLM). 8pm. 3 Chews House, High St South, Dunstable, Beds. Sec G6EES.

Leighton Linslade (LLRC)—5 May (DF hunt, 7.30pm, Duncombe Street car park. Listen on 144·275MHz). 7.30pm. Room A64, Vandyke Rd, Leighton Buzzard. Sec D Jones, tel 0908 649238.

Milton Keynes (MK&DARS)—12 May ("BSI and tvi", G1NXH), 9 June ("Long-range aircraft communications", speaker from USAF). 7.30pm. The Meeting Place, Hodge Lea, Milton Keynes, Bucks. Sec G3ZPA.

Northampton (NRC)—8 May (Guest speaker), 22 May (Walking df), 5 June (Bring and buy, local clubs invited). 8pm. Kingsthorpe Community Centre. Sec G4YJP.

Nene Valley (NVRC)—7 May (Natter night), 14 May (Ordnance Survey, where the squares come from). 8pm. Prince of Wales, Well St, Finedon. Sec G6UWS, tel Wellingborough 71189.

Peterborough (GPARC)—22 May (Preparations for VHF NFD). Sec G4NRJ.

Peterborough (PR&ES)—16 May (144MHz fm df hunt, 7.30pm, Brook St). 7.30pm. Brook St Institution, Brook St, Peterborough. Sec G4PNW.

Shefford (S&DARS)—8 May (Junk sale). 8pm. Church Hall, nr Fish & Chip Shop, Amptill Rd, Shefford, Beds. Sec G4PSO (who gets married this month), tel Hitchen 57946.

REGION 6—RR F S G Rose*, G2DRT, 84 Cock Lane, High Wycombe, Bucks HA3 7EA. Tel Penn (049481) 4240.

*Acting until post is filled.

Newbury (NADARS)—13 May ("Sporadic-E", G4VSQ), 10 June ("Intermodulation, phase noise and dynamic range", G3RZP), 8 July ("Satellite operation", talk and demonstration by member of Amsat UK). Newbury College. Sec G3VOW, tel 43048. This club meets on second Tuesday of the month.

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

Ashford (Echelford ARS)—12 May ("Satellite tv", G8CMQ), 29 May (Bring and buy sale). 8pm. The Hall, St Martins Court, Kingston Crescent, Ashford, Middx. Sec G4VAZ, tel Sunbury 83823.

Coulsdon (CATS)—12 May ("Glider radio", G6MFM). 8pm. St Swithins Church Hall, Grovelands Rd, Purley, Surrey. Sec G6HC, tel 01-684 0610.

Cray Valley (CVRS)—1 May ("HF Contests/Committee", G4BUO), 15 May (Natter night), 5 June ("Microwave modules range", G4EFO). 8pm. Progress Hall, Admiral Seymour Rd, Eltham SE9. Details G3TAA.

Croydon (SRCC)—12 May (Construction contest). 8pm. TS Terra Nova, 34 The Waldrons, South Croydon, Surrey. Sec G8IYS, tel 01-657 0454.

Crystal Palace (CP & DRS)—17 May ("Solders and fluxes", G6YAF). 8pm. All Saints Parish Room, Upper Norwood SE19. Sec G3FZL, tel 01-699 6940.

Dorking (D & DRS)—13 May (Informal meeting). 8pm. Star and Garter Hotel, Dorking. Sec G3AEZ, tel 0306 77236.

Guildford (G & DRS)—9 May (Meet the new committee), 23 May (Video/natter night). 8pm. Model Engineers HQ, Stoke Park, Guildford. Sec G4KXA, tel Byfleet 46847.

Sutton and Cheam (S & CRS)—16 May (AGM). 8pm. Downs Lawn Tennis Club, Holland Ave, Cheam, Surrey. Sec G4BOX.

Thames Ditton (TVARTS)—6 May ("EMC", G3AEZ). 8pm. Thames Ditton Library, Watts Rd, Giggs Hill, Thames Ditton. Sec G3ENI.

Wimbledon (W & DRS)—9 May (Inter-club quiz), 30 May (Grand bazaar with traders and club stands). 8pm. St John Ambulance HQ, 124 Kingston Rd, Wimbledon SW19. Sec G3DWW, tel 01-540 2180.

I will be at the Wimbledon club bazaar and look forward to meeting members there. *RR7*

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

Chichester (CARC)—6, 20 May (Club meeting). 7.30pm. North Lodge Bar, County Hall, Chichester. Sec G4EHG, tel 789587. **NB** 1-6 June, centenary special event station, GB2NM, Chalk Pits Museum.

Crawley (CARC)—7 May (Junk sale), 9 May (Club annual dinner), 28 May (Quiz against Mid-Sussex ARC). 7pm. **NB** new meeting place, The Leisure Centre, Haslett Ave, Crawley. Details G4TVC, tel 28612.

Dartford (DDFC)—2 May (AGM, Scout House, Broomhill Rd), 6 May (Pre-hunt meeting), 11 May (Club hunt), 18 May (Club hunt). Pre-hunt meetings held after 9pm. Horse & Groom, Leyton Cross, Dartford Heath. Details G8DYF, tel Greenhithe 84467.

Eastbourne (Southdown ARS)—5 May (Foxhunt with Hastings HERC), 12 May ("Converting cb rigs to 28MHz", G4XRU), 26 May (Fox hunt with Hastings HERC), 2 June ("Batteries", B Sparkes, Exide). 7.30pm. Chaseley Centre, South Cliff, Eastbourne. Sec G4XNL, tel 638653. Various courses held on Tuesday evenings. Friday evenings are chat nights at the Clubrooms, Hailsham Leisure Centre, Vicarage Lane.

Edenbridge (EARS)—14 May ("History of the Blue Bell Railway"), 11 June ("Contest operating", Brighton Contest Group). The Scout Hut, High St, Edenbridge. Sec G8VCH, tel East Grinstead 24748.

Hastings (HERC)—21 May ("Antennas"). 7.45pm. West Hill Community Centre. Sec G4NVQ, tel 420608. Other activities during the week.

Herne Bay (East Kent RS)—1 May (Kent Repeater Group presentation, G4RVV and G3TIS), 15 May (Natter night). 7.30pm. Cabin Youth Centre, Kings Rd, Herne Bay. Sec G4RIS, tel 0227 262042.

Horsham (HARC)—1 May ("Data bases", G3IEE). 7.30pm. The Guide HQ, Denne Rd, Horsham. Details G4YFY.

Medway (MARTS)—Fridays, 7.30pm. St Lukes Church Hall, King William Rd, Gillingham. **NB** new sec, G4EVY, tel 716463.

Maidstone (MYMCAARS)—30 May (AGM, 8.30pm), 6 June (HF NFD "gear check"). YMCA Sports Centre, Melrose Close, Cripple St, Maidstone. Details G4AXD, tel 0622 29462. Morse tuition Fridays, 7.30pm. RAE classes every other Friday, 8.30pm,

Tunbridge Wells (West Kent ARS)—2 May (Construction contest). 8pm. Adult Education Centre Annex, Quarry Rd, Tunbridge Wells. Details G4KIU, tel 33586.

REGION 9—RR A H Hammett, Rosehill, Ladock, Truro, Cornwall TR2 4PQ. Tel 0726-882 758.

Axe Vale (AVRC)—2 May (Surplus equipment sale). 7.30pm. The Cavalier, West St, Axminster. Sec G3VW.

Exmouth (EARC)—**NB** new sec Michael Newport, G1GZG.

Plymouth (PARC)—19 May ("BBC programmes", C Rich), 2 June ("BBC engineering", R Terry and T Melhuish). 7.30pm. Plymouth Albion RFC, Beacon Park, Plymouth. Sec G4SCA.

Redruth (CRAC)—1 May ("Layman's guide to repeaters", G3NPB), 12 May ("Some applications of the Commodore 64 in amateur radio", Ricky), 19 May ("Down in the mouth, some light-hearted dental techniques", G4STB), 9 June (Hands on demonstration of computer networking on the Nimbus system. 7-9pm, Cornwall Technical College). 7.30pm. Church Hall, Treleigh, Old Redruth. Sec G4USB.

Saltash (S&DARC)—2 May ("DX tv in colour", with video tape illustrations, R Roper), 16 May (Quiz evening, G3XCS) 7.30pm. Burraton Toc H Hall, Saltash. Sec G0AKH.

Torbay (TARS)—31 May ("Digital recording"). 7.30pm. ECC Social Club, Ringslade Rd, Newton Abbot. Sec G1EUA.

REGION 10—E J Case*, GW4HWR, 2 Abbey Close, Tyrhiw, Taffswell, Mid-Glam. CF4 7RS. Tel 0222 810368.

*Acting until post is filled.

Barry (BCoFERS, GW4BRS, GW3VKL, GW6BRC)—22-26 August the club is establishing a station on Flat Holm Island, Bristol Channel to commemorate the achievements of Marconi. Station QRV on all frequencies, requests for skeds welcomed. Details 50·120MHz and 70·210MHz, GW8NVN; 144·270MHz and 432·270MHz, GW1JCB; 1,296·270MHz, GW8CMU; 3cm wideband fm, GW8NVN; all hf bands, GW4XKE. Club meets Thursdays, 7.30pm. College Annexe, Weycock Cross, Barry. Sec GW0ACH, tel 065679 710.

Cardiff (CRSGBG)—12 May. (The second of the series of four lectures. Lecture 2, "Feeding the antenna", H Kempson). 7.30pm. Pantmawr Hotel, Tyla Teg, Pantmawr Estate, Whitchurch, Cardiff. Sec GW0CUM, tel Cowbridge 3212.

Rhondda (PARC)—1 May ("Noise bridge talk", GW4NOS), 15 May (Ordinary meeting), 29 May (Talk No 1, "W A USA Counties", GW3CDH). 7.30pm. National Union of Mineworkers' Club, Tonypandy. Sec GW4BUZ, tel Tonypandy 432542.

Swansea (SARS)—15 May ("USA holidays, including space-centre visits", slides, GW6JGE). 7.30pm. Lecture Room N, Applied Sciences Bldg, Swansea University. Sec GW4HSH, tel 404422.

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)—First and third Mondays of the month. Bangor Rugby Clubhouse. **NB** new sec Mr W Williams, 31 Ty Groes Estate, Llanfair PG, Anglesey, Gwynedd LL61 5JR.

Colwyn Bay (Conwy Valley ARC, GW6TM)—15 May (Fox hunt, Clwyd Valley area), 29 May (Open meeting), 12 June (AGM). 8pm. Green Lawns Hotel, Bay View Rd, Colwyn Bay. Sec GW4VVW, tel 0492 636376.

Deeside (Alyn & DARS)—12 May (Outdoor DF hunt, bring OS map Chester), 19 May ("Robotics", GW4EVX), 9 June (Amateur hovercraft demonstration, GW4IEQ). 8pm. Shotton Social Club, Shotton Lane, Deeside. Sec GW1ILZ.

Dolgellau (Meiron ARS)—**NB** new sec GW3KOR.

Holyhead (H & DARS)—11 May (Lecture and demonstration on construction, GW4WLZ). 8pm. Foresters Arms, Kingsland, Holyhead. Sec Mrs B Anziani, 12 London Rd, Holyhead, tel 0407 50577.

Porthmadog (P & DARS)—15 May (Ladies' night), 19 June ("Transistor biasing," GW3UTI). 8pm. The Harbour Cafe, Ffestiniog Railway, Porthmadog. Sec GW4WKQ, tel 0758 40445.

Rhyl (R & DARC, GW4ARC)—5 May (No meeting), 19 May (Talk by G3CSG), 2 June (DF hunt planning). 7.30pm. 2nd Rhyl Scout HQ, Vale Rd, Rhyl. Sec GW8OYT, tel 0745 37284.

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

Aberdeen (ARC)—2 May (Junk sale), 9 May ("Dealing with tvi", GM4FFX and GM4AXB), 16 May ("The IBA transmitter network", GM3YMK, a chief engineer with IBA Scotland), 23 May (Fox hunt), 30 May (Building competition both senior and junior. Final preparations for field day will also be discussed), 6 June (CW NFD on site preparations—bring your wellies!). 7.30pm. 35 Thistle Lane, Aberdeen. Sec GM4GXD, tel Pitcaple 251.

Dundee (Kingsway Tech ARC)—13 May (Video "Aurora: what causes it"), 27 May (Last meeting of the season. Video "VU7 dxpedition"). 7.30pm. Kingsway Tech Annex, Grayham St, Dundee. Sec GM4WEQ, tel 0382 552362. **NB** the cw net has moved to 21,065kHz, still at 1pm daily.

Elgin (Moray Firth ARS)—First Wednesday each month. 7.30pm. Spey Bay Hotel, Fochabers. Remaining Wednesday in the society's room, Moray College of Further Education, 7.30pm. Sec GM4IZY, tel Elgin 41549. **NB** correspondence should be sent to the sec QTHR, and not to the college.

Inverness (Black Isle RG)—Sec Sue Maclennan, GM4UMA, 10 Ruilick, Beauly, Invernesshire, IV4 7EY. At the recent agm tributes were paid to GM3JFG, who retired as treasurer. Without Ian's considerable efforts the group would not be as financially sound as it is today. However, his successor GM1PRR would like to hear from members who have not yet paid their subs. The remainder of the committee were re-elected.

Raynet—3 May (Meeting of all Scottish members. Speakers include: Geoff Griffiths, chairman Raynet Committee; Mr M W Haward, district controller, HM Coastguard; John Allen, deputy leader, Cairngorm MRT). 10am. Strathspey Hotel, Aviemore. Details (including accommodation if required) from GM3RFA, Raynet Zone Representative (Scotland), tel 0397 3833.

Scottish Amateur Radio Convention 1986, Scotam 86—is being organized this year by Glenrothes & DARC, on 13 September. Details to follow.

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

Berwick (Borders ARS, GM0BRS)—2 May (Collection of surplus equipment for Kelso Rally), 16 May (Preparation for contest weekend). Sec GM1IRN, tel Berwick on Tweed 82491. For summer activities contact the sec.

Dunfermline (DRS, GM3IDS)—Thursdays, 8pm. Club station now operational on 144MHz and hf from Outh wireless site, Knockhill. Programme of operations/dxpeditions from sec GM1OIN, tel 0383 414283.

Galashiels (G&DARC, GM4YEQ)—14 May ("RTTY/sstv", talk and demonstration, GM1JGI). Sec GM0AMB, tel 0896 55569. Contact sec for summer events.

Kelso (KARS, GM4KHS)—4 May (3rd Anglo-Scottish Rally, Tait Hall, Kelso. 11am.) Meetings Mondays, 7.30pm, Abbey Centre. Sec GM3VLB, tel 24664.

Leslie (Glenrothes & DARC, GM3ULG/GM4GRC)—Club organizing the Scottish Convention, Scotam '86, to be held on 13 September. Sec GM3ZSP, tel 0334 53336.

Lothian (LRS, GM3HAM)—14 May ("Raynet", GM3OWU), 28 May (DF hunt), 11 June (AGM). 7.30pm. Harwell House Hotel, Ettrick Rd, Edinburgh. Details GM4YPL, tel 0506 890177.

Members of the Glenrothes & DARS. L to r: (seated) GM4EHO, GM3KKO, GM3UNJ, GM4AQO, GM4TCW; (standing) GM3ZSP, GM4TKK, GM3YBQ, GM3PFQ, GM4BFQ, GM0CWR, GM1BID, GM3YOR, GM4PWQ, GM4ZMZ, GM4HBQ, GM4HBG, GM4TNP. *Photo:* GM4TNP.

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

Dumfries (MARK GM0AEE)—21 May (Joint meeting with Dumfries R&E Club, Solway RC and Carlisle RC. Talk and demonstration by Jaycee Electronics from Glenrothes, Fife). 8pm. Tam O'Shanter Inn, Queensbury St, Dumfries. Details GM0AVB.

Dunoon (D&DARS, GM0COD)—30 May ("The fishery service," GM4PSW). 7.30pm. Community Centre, Edward St. Details GM0BUL, tel 0369 84217.

Glasgow (WOSARS, GM4AGG)—30 May (AGM). 7.30pm. 154 Ingram St, Glasgow. Details GM4JDU. CW classes available.

Motherwell (MLARS, GM3PXK)—16 May ("144MHz meteor scatter", GM4CXM). Wrangholm Hall Community Centre, Jerviston St, Motherwell. Details GM4UXX. CW and RAE classes available.

Oban—Bill, GM4AIE is trying to get a club started in the Oban district. Would any person in that general area interested in joining or in the formation of a club, please give him a ring on 0631 63399.

Stirling (S&DARS, GM4TMS)—22 May ("Fire prevention", Fire Brigade Personnel). Argyll Centre, Princess St, Sterling. Details GM0BFS, tel 0259 217702.

REGION 15—RR Parsons, GI3HXV, 45 Erinvale Avenue, Belfast BT10 0FP Tel 0232 612322

Ballyclare (E Antrim ARC, GI4KKK)—13 May (May Fair preparation and video). 8pm. Fairview Primary School, Ballyclare. Sec GI4PRH.

Ballymena (BRC, GI3FFF)—1 May ("Computers", GI1KLH). 8pm. 70 Nursery Rd, Gracehill, Ballymena. Sec GI4HCN.

Banbridge (Mid-Ulster ARC, GI4BAC)—18 May (Mobile Rally, Parkanaur Dungannon) Meetings 3pm. Guide Hall, Castle Hill, Gilford, Co Down. Sec GI1BIW.

Londonderry (North West of Ireland ARC, GI3CFH)—5 May (HF night). 8pm. Prehen Municipal Boathouse, Victoria Rd, Londonderry. Sec GI4OUN.

REGION 17—RR T Emery, Wilverley, Old Lyndhurst Road, Cadnam, Southampton SO4 2NL. Tel 0703 812435.

Amateur Radio and Computer Club (AMRAC)—2 May (AGM followed by "Packet Radio", G3VPF). 8pm. The Crown, Bishops Waltham, Hants. Sec G1NIM, tel 0705 381062.

Basingstoke (BARC)—5 May ("Home construction", G3CBU). Forest Ring Community Centre, Sycamore Way, Basingstoke. Sec G4WIZ, tel Tadley 5185.

Binstead (IOW BARS)—Wednesdays, 7.30pm. Binstead Scout Headquarters. Morse and RAE tuition. Amtor and atv is demonstrated on selected evenings. Sec G4VJFN, tel Ryde 66298.

Blackmore Vale (BVARS)—13 May ("The sands of time", G3KWU). 7.45pm. The Bell and Crown PH, Zeals (on the A303). Sec G1GRS, tel 0963 70969.

Eastleigh (Itchen Valley ARS)—9 May ("RSGB committees", G3KWU). Results of agm: chairman G3ABA; treasurer G1GRI; secretary G1IPQ. The Scout Hut, Brickfield Lane, Chandlers Ford, Hants. PRO G1OWN, tel Winchester 55339.

Fareham (F&DARS)—3-5 May (Special event station, GB2HAM, at PCA Arts & Crafts Exhibition), 7 May ("Demonstration of 1·3GHz tv", G3VXM), 21 May ("SHF measurements", A Dearlove), 14, 28 May (Natter nights). 7.30pm. Portchester Community Centre, Portchester, Hants. Sec G4ITG, tel Fareham 234904.

Gosport (Rowners & DARS)—14 May and every alternate Wednesday, 7.30pm. Searles Mfg Co, Newgate Lane, Fareham (Opposite HMS Collingwood). **NB** change of meeting place. Sec G6OTY, tel Locks Heath 2541.

Guernsey (GARS)—23 May (Live atv demonstration, GU6EFB and GU8FBO). 8pm. The Lodge, La Corbinerie, Oberlands, St Martins, Guernsey. Sec GU1PMY, tel 0481 26392.

Horndean (H&DARC)—1 May ("CW with a difference", G3JZU). 7.30 for 8pm. Murchiston Hall, London Rd, Horndean. PRO G4BEQ. 1986 is 10th anniversary year of club with special award.

Liphook (Three Counties ARC)—14 May ("HM coastguard", G H Becconsall), 28 May (Junk sale). 8pm. The Railway Hotel, Liphook. Sec G0BTU, tel Petersfield 66489.

Poole (PARS)—30 May ("Natter night"). 7.30pm. Commander's House, Constitution Hill Rd, Poole. **NB** change of meeting place. Sec G4XYX.

Swindon (S&DARC)—1, 8 May (Rally planning), 15, 22 May (Natter nights), 29 May ("Construction practices", G3LLZ). 7.30pm. Oakfield School., Marlowe Ave, Swindon. Sec G4YQZ.

Winchester (WARC)—16 May ("Satellites for tv", G3RDQ). 7.30pm. **NB** change of venue and day of meeting, third Friday of month, Durngate House, Winchester. Sec G4ZNO, tel 0703 772191.

Members of the Burton-on-Trent & DARS were hosts recently to two visiting amateurs from the Lingen Radio Club, Lingen, W Germany, which is the twin town of Burton-on-Trent. The two clubs keep in close contact via regular Sunday morning skeds on 7MHz. L to r: Harold, G3ACR; Eberhard, DJ8RI; Rudi, DB7XT; Clr Bob Pride, mayor of Burton-on-Trent; and the mayoress

REGION 18—RR Ian Gibbs, G4GWB, 61 The Gables, Widdrington, Morpeth, NE61 5QZ. Tel 0670 790090.

Consett (Derwentside ARS, G4PFQ)—12 May ("Amateur radio in the Antarctic", slides, G4BCP), 19 May ("Map and compass", G4YMU), 2 June ("Amateur television", Mid-Durham ATV Group). Consett Assocn FB Club, Belle Vue Park, Consett. Sec G3KMG, tel 0207 504198.

Easington (EARS, G4APN/G6APN)—29 May (Visit—to be announced). Easington Workmen's Club, Seaside Lane, Easington. Sec G4RIK, tel 0783 815331.

Newcastle (Tynedale ARC, G4ONQ)—Members and potential new members **NB** new venue, new sec and new meeting day. Meetings first Tuesday in each month, 8.30pm. French Arms pub, Throckley, Newcastle. Sec G0DZG, tel 091 2742840.

Whitley Bay (Tyneside ARS-G3ZQM)—7 May (Informal), 14 May (ATV demonstration), 21 May (Informal), 28 May (Constructors' night). Community Centre, Earsden. Sec G4KOT, tel 091 2341148. **NB** sec's new phone number.

I was proud and privileged to chair the very well attended official regional meeting of the Society held 16 March in Region 18. The 130 or so members and non-members who attended proved, in my opinion, that they cared about the hobby, and were interested in what the Society was doing and achieving on their behalf. The conduct of the meeting, the quality of the questions and the willingness to listen was a credit to the region. I am proud to serve as your regional representative. I would also like to thank those members of council, committees and panels who attended, each contributing to a very successful meeting. Thank you.

Ian Gibbs, G4GWB, RR18

REGION 20—N F O'Brien, *G3LP, 26 Southfield Road, Gloucester GL4 9UD.

*Acting until post is filled.

Bristol (RSGBG)—19 May ("DX on the hf bands", G3XTT), 25 May ("Mobile picnic"). 7.30pm. Small Lecture Theatre, Bristol University. Details G4SQQ, tel 0272 508451, or G4ROX, tel 0272 513573.

Bristol (South Bristol ARC)—7 May (Lecture—"Simple hf antenna construction"). 7.30pm. Whitchurch Folk House, East Dundry Rd, Whitchurch, Bristol BS14 0LN. Details G4RZY, tel Whitchurch 834282.

Gloucester (GARS)—7 May (Medical talk—"Does amateur radio give you a pain in the back?") 4 June ("Final details for NFD"), 14, 21, 28 May (Natter nights). 7.30pm. St John Ambulance HQ, Heathville Rd, Gloucester. Details G6AWT. RAE and morse classes every Wednesday, 7pm.

Stroud (SARS)—14, 28 May ("Meeting nights"). 8pm. Nelson School, Stratford Rd, Stroud. Details P Gainey, tel Nailsworth 2773. Regular morse classes. Club station G4SRS operational.

Weston-Super-Mare (WSMRS)—12 May ("The work of the coastguards", an illustrated talk). Rugby Club, Weston-super-Mare. Details G1DJW, tel Weston 514429.

Yeovil (YARC, G3CHM & G8YEO)—8 May ("Inductance coupling", G3MYM), 15 May ("Transmission lines", G3MYM), 22 May ("Antenna gain", G3MYM), 29 May (Natter night), 5 June ("The effect of the sunspot cycle", G3MYM). 7.30pm. The Recreation Centre, Chilton Grove, Yeovil. Sec G3GC, tel 0935 75533.

The Mayor of Lincoln, Councillor Ida Campbell presents Roger Hunt, G3PVU, chairman of Lincoln Short Wave Club, with a special certificate when the club visited the 15th century Guildhall in January. *Photo:* G8VGF

WATERS & STANTON ELECTRONICS

TRIO

APPROVED DEALER FOR ESSEX & THE SOUTH

TRIO	
TS940 HF tcvr.	£1795.00
AT940 Int ATU	£218.00
TS HF 430S tcvr.	£750.00
PS403 PSU for above	£139.00
AT250 Auto ATU	£314.00
AT230 HF ATU	£170.65
TS830S HF 240v tcvr.	£898.00
TS530S HF 240v tcvr.	£779.00
TL922 linear	£1265.00
MICS—All stocked	
TS780 2m/70cm tcvr.	£1061.00
TR9130 2m all-mode	£544.00
TH21E 2m h'held	£189.30
TH41E 70cm h'held	£220.95
TR2600 2m h'held	£299.00
TM201A 2m fm mobile	£296.00
TM401A 70cm fm mobile	£350.90
TM211E 2m fm tcvr.	£398.00
TS711E 2m base	£770.00
R600 Receiver	£323.75
R2000 Receiver	£518.70
VC10 VHF module	£139.00

ICOM	
ICV751 HF tcvr	£1399.00
IC745 HF tcvr	£989.00
IC735 HF tcvr	£899.00
PS35 PSU	£182.85
PS15 PSU	£149.50
PS55 PSU	£185.00
SM6	£39.10
ICR71 Receiver	£789.00
IC271E 2m base	£779.00
IC471E 70cm base	£889.00
Higher power units available	
IC290D All-mode	£519.00
IC27E 2m FM	£399.00
IC47E 70 cm FM	£495.00
IC2E 2m	£199.00
IC02E 2m	£299.00
IC04E 70cm	£299.00
BP3 Ni-cad pack	£28.75
LC3 Case	£6.50
LC11 Case	£8.05

BNOS	
25Amp P.S.U.	£169.00
40Amp P.S.U.	£345.00
2M 3/50 no pre-amp	£125.00
2M 10/50W no pre-amp	£125.00
2M 1/100W	£197.50
2M 3/100	£175.00
2M 10/100	£255.00
2M 25/160	£217.00
70cm 3/50	£235.00
70cm 10/50	£195.00
70cm 10/100	£335.00

TONNA	
6M 5 EL	£37.95
2M 9 EL	£25.95
2M 9 EL Portable	£21.00
2M 9 EL Crossed	£41.00
2M 13 EL Portable	£32.95
2M 17 EL	£48.00
70cm 9 EL	£15.95
70cm 19 EL	£21.95

NOBODY BEATS OUR MAIL ORDER SERVICE

All goods despatched by return. 24 hour Securicor £6. Carriage: Transceivers, receivers, etc, Securicor £6, smaller items £2. Aerials at cost. If in doubt phone for quote.

YAESU	
FRG8800 Receiver	£575.00
FRG9600 Scanner	£465.00
PA4C PSU	£14.50
FRV8800 VHF module	£90.00
FT203/FNB3 2m	£225.00
FT209R/FNB3 2m	£265.00
FT270R 2m	£359.00
FT290R All mode	£369.00
FT2700R Dual band	£499.00
FT709/FNB3 70cm	£275.00
FT726R 2m base	£899.00
FTV70CM 70cm module	£309.00
SAT726	£116.00
FT57GX HF tcvr.	£879.00
FC757AT Auto ATU	£318.00
FP757GX Switch mode	£199.00
FT980 HF tvcr.	£1759.00
FP757HD PSU	£199.00
FF501DX L.P.F.	£33.00
FL2100Z 1KW linear	£862.00
YH55 H'phones	£17.50
NC11C Charger	£10.00
YM48	£46.00
YHA15 290 helical	£7.50
QTR24D Clock	£39.00

WELZ	
SP825 HF; 6m; 2m; 70cm; 23cm	£163.00
SP10X Budget HF/VHF	£36.50
SP220 PEP HF/VHF	£59.95
SP225 Dual meter	£109.95
SP420 PEP VHF/UHF	£71.00
SP425 Dual meter	£109.95
AC38 ATU 10-80m	£99.00
CH20A Coax switch	£26.50
RS485 4 amp PSU	£48.00
RS655 6 amp PSU	£87.95
RS1150 11 amp PSU	£136.00
RS3050 25 amp PSU	£195.00

DIAMOND	
CP4 4 band vert.	£131.00
CP5 5 band vert.	£169.00
EL40 40m whip	£49.50
EL80 80m whip	£56.00
M285 5/8th 2m	£12.50
M287 7/8th 2m	£22.95
GLS Gutter mount	£13.25
D130 Discone 25-1300MHz	£69.95
RH200B 3db 2m BNC	£28.50
EL770 Dual band	£26.50

FDK	
M750XX 2m all-mode	£449.00
M725X 2m FM mobile	£279.00
ATC720 Airband rx	£189.00
RX40 140-180MHz	£159.00

ADONIS	
AM303G Base mic.	£46.00
AM503 Base mic.	£59.00
AP1 Amp for ICOM	£12.95
FX-1 Goose neck mobile	£49.00

MISC.	
Rubber mag mount	£16.95
AT1000 SWL ATU	£58.95
HP4A High pass filter	£6.95
HK708 Morse key	£19.50
BL40X 1:1 HF Balun	£16.75
Ferrite rings	£0.60
DRAE VHF/UHF W'meter	£27.95
Datong Morse Tutor	£56.35
Mutek Pre-amps	£39.95
Revcone Discone (RX)	£29.00
CDE AR40 Rotator	£115.00
KR400 Rotator	£148.00
KC038 Mast clamps	£13.80
KS065 Bearing	£26.45
KR500 Elevator	£139.95
AR250 Rotator VHF	£69.00

MICROWAVE M.	
MML144/30LS	£94.30
MML144/50S	£106.95
MML144/100S	£149.95
MML144/100HS	£159.85
MML432/30L	£169.95
MML432/50	£149.95
MML432/100	£299.00
MMG144V	£37.90
MMT144/28R	£236.90
MMC435/600	£35.65
MMC50/28S	£35.65
MMC432/28S	£39.90
MMC432/144S	£39.90
MMK1296/144	£129.95

JAYBEAM	
TB3 hf 3 el. beam	£230.00
VR3 3 band vert	£55.75
4Y6m 4 el 6m	£46.95
UGP 2m g. plane	£14.85
LR1/2m 2m col. 4.3db	£39.00
LW5/2m 2m 5 el	£16.75
LW8/2m 2m 8 el	£21.00
LW10 2m 10 el	£27.25
LW16 2m 16 el	£40.75
5XY 2m 5 el xd.	£32.00
8XY 2m 8 el xd.	£41.50
Q4 2m 4 el quad	£33.95
Q6 2m 6 el quad	£44.50
PBM18 70cm 18 el	£37.00
PBM24 70cm 24 el	£52.90
MBM48 70cm 48 el	£40.75
MBM88 70cm 88 el	£55.75

SPECIALS

SONY AIR-7 Just arrived. Superb hand-held monitor with LCD readout. Covers 150–2194kHz; 74–108MHz; 108–136MHz (AM); 144–174MHz. 40 memories with lockout. Quite frankly it puts other units to shame! SAE for spec. **£249.00**

PART EXCHANGE

We urgently need your good unwanted gear. Must be clean and in working order. Just telephone for our cash or Px offer.

NEW THIRD EDITION AVAILABLE APRIL

UK CONFIDENTIAL FREQUENCY LIST

Completely updated with 50% more information. Covering 2-30? This publication is a must for all UK short wave listeners. It contains information that no serious listener should be without. Listed are details not normally available to the public of frequencies used by a wide range of services. As well as some general information the main body of the publication contains a comprehensive list of non-broadcast stations such as Military, Air, Navy, Marine & Embassy, even details of stations whose whereabouts are still a mystery! In addition, there is a comprehensive list of broadcast stations with times and frequencies of all the broadcasts in English. This publication will certainly have you burning the midnight oil. Only a fraction of the price of some overseas publications and written with the UK listener in mind.

New third edition available NOW **£5.95 + 75p P&P**

SCANNER OPERATORS' GUIDE TO THE VHF/UHF SPECTRUM NEW!

If you're one of the many new owners of a scanning receiver and are not sure where to listen then this is for you. Only just published and covering the range 27 to 130MHz it provides details of frequencies that the various services operate on. Fascinating reading for the student of the radio spectrum it will put you at a tremendous advantage to those who just 'fumble about in the dark'. At this price can you afford not to have a copy beside you. **£3.95 + 40p P&P**

NEW AOR 2002 RECEIVER

25-1300MHz **£435**

The new AOR scanner must now rule supreme over its competition and is without doubt the best available. We have tested this unit thoroughly on air and have nothing but praise for it. Each one is carefully tested by us before despatch (important at 1.3GHz). Order yours today. The Yen is getting stronger.

WORLD RADIO TELETYPE HF FREQUENCY LIST NEW!

It's what the RTTY enthusiast has been asking for. A complete list of the World's RTTY frequencies including marine, meteorological, and press with language details, time schedules etc. Available now.

NEW WELZ "PEP" RANGE

At last you can read — PEP — RMS — VSWR

SP220
1·8-200MHz
2/20/200 Watts
£59.95

SP420
140-525MHz
4/20/200 Watts
£69

SP225
1·8-160MHz
5/15/150 Watts
Twin meters
£109.95

SP425
140-525MHz
5/15/150 Watts
Twin meters
£109.95

"MINI WHIPS" 2m & 70cm

Highly efficient, these new helical whips are extremely short and yet have amazing performance. Just like the "professional" type antennas they make your hand-held highly compact. Fitted with BNC connector it is a direct substitute for your regular whip.

£7.95 P&P 75p

COMMING SOON! 3dB Gain Whip for FT290

The item that everybody has been asking for, a "Super Rod" that plugs into the FT290. These amazing antennas give a full 3db of gain when extended to ⅝th length. Alternatively they can be telescoped down to a ¼ wave. Packs down to slip in ones pocket it gives 3dB of gain on both receive and transmit (2 × power increase!)

£11.50

WELZ ANTENNA BREAKTHROUGH!

25-1300mHz Wide-band Discone (receive) PLUS Transmit on 6m*; 2m; 70cm; 23cm. *Not permitted in UK.

£69.95
P&P £2.00

MONITORING OR TRANSMIT . . .
. . . ONE ANTENNA DOES EVERYTHING?

VISA

MAIL ORDER & MAIN SHOWROOM: 18-20 MAIN ROAD, HOCKLEY, ESSEX. Tel: Southend (0702) 206835 & 204965

BRANCH: 12 NORTH STREET, HORNCHURCH, ESSEX. Tel: Hornchurch (04024) 44765

HOURS: MON-SAT 9.00 am-5.30 pm. E.C. WED 1.00 pm

Access

NUNSFIELD HOUSE AMATEUR RADIO GROUP PRESENT THE SEVENTEENTH

ELVASTON CASTLE

See us at ELVASTON CASTLE June 8th

See us at ELVASTON CASTLE June 8th

MOBILE RADIO RALLY

SUNDAY 8th JUNE 1986

ATTRACTIONS INCLUDE: Over 90 Trade Stands • The Skydivers Free-Fall Parachute Display Team • The English Folk Dance and Song Society displays and performers • Technical Bookstall • Prize Draw • Grand Bring & Buy Stall • Flea Market • Children's entertainment • Arena displays and other attractions • Full on-site catering • Talk-in on 144 & 432MHz • ADMISSION FREE • Car parking 45p, coaches £2 (charges levied by local authority)

Further details: John Robson G4PZY 31 Melton Avenue, Littleover, Derby. Tel: Derby (0332) 767994
Ian Cage G4CTZ Tel: Derby (0332) 799452 or club HQ on Derby (0332) 755900—answering machine

ELVASTON CASTLE IS LOCATED 5 MILES SOUTH-EAST OF DERBY ON THE B5010

Don't let faulty transception get you down. Switch on and tune in with

HALBAR AERIALS

They reach the signals that other antennae probably neglect.

HALBAR are specialists in 2m and 70cm antennae. Our aerials are the products of first-class design and sound British engineering. Each aerial is constructed to give lasting service and enjoyment.

2M

CQDX	: 19 element dble diamond yagi	**£55.00**
*QDX	: 11 element dble diamond yagi	**£31.00**
QD	: 5 element dble diamond yagi	**£22.00**
G7XY	: 7 element crossed yagi	**£28.00**
G7/2m	: 7 element yagi for horizontal or vertical use	**£19.50**
G9XY	: 9 element crossed yagi	**£32.50**
G9/2m	: 9 element yagi	**£23.00**
G5XY	: 5 element crossed yagi	**£21.00**
G5/2m	: 5 element yagi	**£15.00**
HB9CV	: Our version when folded makes the most compact high gain aerial on the market	**£14.00**
I.T.	: Inverted Turnstile, double crossed dipole with reflectors. Version U for UoSAT and version N for NOAA SATELLITES	**£24.00**
	Masthead preamplifier for these aerials (fitted)	**£11.50**
VBS/2m	: Colinear with unique end-feed device, 5dBi	**£23.00**

70cm

G9XY/70	: 9 element crossed yagi end mounted	**£27.50**
G9/70	: 9 element yagi end mounted	**£17.00**
G15/70	: 15 element yagi with under-boom	**£22.50**
5EL	: Ecomonic 5 element yagi, end mounted	**£9.00**
VBS/70	: Colinear with unique end feed device 7dBi	**£27.00**
QUAD6	: Compact 6 element quad end mounted	**£15.00**

PHASING HARNESS

PHG9XY	: Particular to G9XY/70. Circulation polarisation	**£13.00**

POWER SPLITTER/COMBINER

PS/C70	: Can combine any two 70cm aerials	**£16.00**

*As reviewed in PRACTICAL WIRELESS, Jan. 1986, vol. 62 no. 1, p.46.

ALL HALBAR AERIALS have an impedance of 50 ohms and are supplied with mast clamps.

ALL PRICES INCLUDE VAT & POST AND PACKING.

To save on post & packing, drop in at our TRADE COUNTER.

HALBAR AERIALS, Unit 1, Bury Walk, Bedford MK41 0DU. Tel: (0234) 44720.

AMATEUR ELECTRONICS UK

G6XBH
G1RAS
G8UUS

R.A.S. (Nottingham)
Radio Amateur Supplies
Tel: 0602 280267

Visit your Local Emporium
Large selection of New/Used Equipment on Show

AGENTS FOR:
F.D.K.
AZDEN
ICOM
YAESU
VODAFONE & CELLNET

ACCESSORIES:
Welz Range
Microwave Modules
Adonis Mics
Mutek Pre-Amps
Barenco Mast Supports

DRAE products
BNOS Linears and PSUs

AERIALS: Tonna, Halbar, New Diamond Range of Mobile Whips
Jaybeam and Tiger Antennas
JUST GIVE US A RING
Monday: CLOSED Tuesday-Saturday: 10am to 5pm

3 Farndon Green, Wollaton Park, Nottingham
Off Ring Rd, between A52 (Derby Road) & A609 (Ilkeston Road)

W.H. WESTLAKE

CLAWTON, HOLSWORTHY, DEVON. (0409) 253758

1 H100 50 ohm Low Loss COAX **80p per m** 50m – 10% 100m – 20% (p 5p p/m)
2 50Ω Double screened UR76—5mm dia **25p per m** (post 3p p/m)
3 UR67 10.3mm Low Loss 50 ohm **60p per m** (p 6p p/m)
4 UR76 50 ohm stranded conductor Coax **23p per m** (p 3p p/m)
5 POPES RG58C/U with NC PVC **23p per m** (p 3p p/m)
6 Mini Coax RG174/U 50 ohm **25p per m** (p 1p p/m)
7 UR70 6mm 75 ohm Coax **23p per m** (p 3p p/m)
8 UR57 10.5mm low loss 75 ohm COAX **60p per m** (p 6p p/m)
9 75 ohm Double Screened 8mm 75 ohm Coax **35p per m** (p 4p p/m)
10 Low Loss UHF TV Coax 75 ohm **20p per m** (p 3p p/m)
11 75 ohm Twin Feeder **18p per m** (p 2p p/m)
12 NEW! RG62AU 95Ω 7mm dia Coax **50p per m** (p 5p p/m)
13 BOFA GMP6 Slotted 300 ohm Feeder **25 per m** (p 3p p/m)
14 Strong PVC covered Aerial Wire **6p per m** (p 2½p p/m)
15 14 SWG Copper HD Aerial Wire **20p per m** (p 2½p p/m)
16 500m Mixed equipment Wire on Reels **£5**(p £1.40)
17 50 ohm BNC plugs for UR67/H100 **£3.60** each
18 50 ohm N Plugs for H100/UR67/213 **£2.50** each
19 50 ohm N line Sockets H100/UR67/213 **£2.30** each
20 50 ohm N Chassis Sockets **£1.80** each
21 50 ohm N Plugs for UR43/76 **2.50** each

Post on plugs, 50p per order

DEWSBURY ELECTRONICS

G4CLX

NEW NEW

THE NEW STAR MASTERKEY ELECTRONIC CMOS MEMORY KEYER

Following the outstanding success story of the Dewsbury Electronics' STAR-MASTERKEY with over 500 units in use world wide, by amateurs, and at sea by professional operators, many users requested memory facilities at a reasonable price. So here it is. The STAR-MASTERKEY CMOS Memory Keyer.

* Features full iambic keying. * Eight 50-character memories
* Automatic Repeat on one memory (CQ calls etc.). * Memory retention for battery life.
* Ultra low current drain. * Uses four AA size cells. * Switchable Auto-character Spacing.
* Dash & dot memories * Compact 3" high, 6" wide, 7" deep.
* Direct & grid block keying sockets for both solid state & valved PAs.
* Switchable Sidetone Oscillator with loudspeaker & headphone socket.
* Loads memory from paddle "OFF AIR". * Speed & weight controls.
* Adjustable sidetone pitch & volume. * Comes complete with batteries.
* BRITISH BUILT & FULLY GUARANTEED.

Price **£95.00**. Post, packing and insurance £3.00.
VIBROPLEX, HI-MOUND & BENCHER KEYS AVAILABLE.

FULL RANGE OF TRIO PRODUCTS STOCKED
We are also stockists of DAIWA—MET ANTENNAS—MUTEK—WOOD & DOUGLAS—TASCO TELEREADERS—MICROWAVE MODULES—ICS AMTOR—AEA PRODUCTS—DRAE

Dewsbury Electronics, 176 Lower High Street, Stourbridge, West Midlands.
Telephone: Stourbridge (0384) 390063/371228.
Telex: 337675 TELPES G

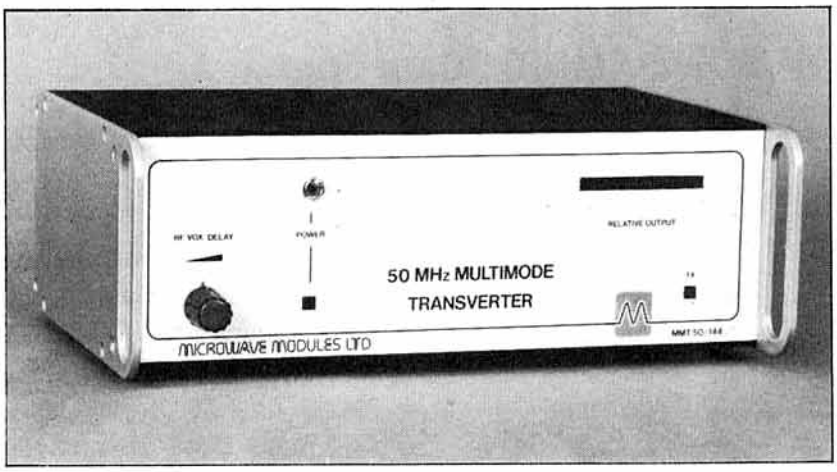
VISA

Instant finance available subject to status. Written details on request.

Access

MICROWAVE MODULES LTD

THE NEW 50MHZ TRANSVERTER



General:
Input Frequency Range: 144-148MHz
Output Frequency Range: 50-54MHz
Modes of Operation: SSB, FM, CW, FSK, AM
Input/Output Impedance: 50 ohm
RF Connectors: SO239
Power Connector: 5 pin DIN 240 degree
DC Power Requirements: 13.8 volts at 4 Amps peak

Transmit Section
Output power: 20 watts at −23dB 3rd order IM
15 watts at −28dB 3rd order IM
10 watts at −32dB 3rd order IM
Input level range: 150 milliwatts to 15 watts
ALC range: 20dB
Level of spurious output: better than −65dB

Receive Section
Conversion gain: 10dB ± 1dB
Noise figure: better than 3.8dB
Input 3rd order intermod intercept point: better than +10dB
Spurious response rejection: better than −80dB

PRICE £245.00 inc VAT

Transit power output of 20 Watts
This power level of 20 watts, when used in conjunction with a typical antenna of 7dB gain, gives an ERP of 100 watts (the maximum permissible in UK). This power level is also ideal for driving a grounded-grid amplifier.

Purity of transmission
The MMT50/144 transverter has been optimally designed to ensure that spurious radiation falling with the 88-108MHz broadcast band are typically better than 90dB below full output. This has been achieved by the use of 16 poles of filtering, well-balanced mixing and push-pull amplification.

Exceptional large signal receiver performance
The 50MHz transverter enjoys a uniquely high overload characteristic of typically +12dBm (third order intercept point at transverter input). This has been achieved by the use of parallel FET's in the front end driving a balanced pair of FET's in the mixer. Given that the background sky noise at this frequency represents an equivalent noise figure of greater than 8dB, the low noise figure achieved in the transverter ensures that external noise is the limiting factor. The conversion gain of 10dB is provided to ensure that the 144MHz transceiver in use will detect the weakest of signals, while not being subjected to overload in the presence of strong signals on the 50MHz band. In other words, a system of impressive dynamic range is guaranteed.

Further features
The transverter will accept a drive level at 144MHz of between 150 milliwatts and 15 watts. The automatic level control (ALC) ensures that the 20 watt output signal is of consistently high quality. An LED bargraph display indicates the relative transmit output power, and the RF VOX control allows the operator to select the "hang" time to anything from 20 milliseconds to 1.5 seconds.

		Total inc VAT	Post Rate
MML28/100-S	10m 100W Linear, 10W input	**129.95**	C
MML144/30-LS	2m 30W Linear, 1 or 3W input	**94.30**	B
MML144/50-S	2m 50W Linear, 10W input	**106.95**	B
MLL144/100-S	2m 100W Linear, 10W input	**149.95**	C
MML144/100-HS	2m 100W Linear, 25W input	**159.85**	C
MML144/100-LS	2m 100W Linear, 1 or 3W input	**169.95**	C
MML144/200-S	2m 200W Linear, 3, 10, 25W input	**334.65**	D
MML432/30-L	70cm 30W Linear, 1 or 3W input	**169.05**	C
MML432/50	70cm 50W Linear, 10W input	**149.50**	C
MML432/100	70cm 100W Linear, 10W input	**334.65**	D
MMC435/600	70cm ATV Converter, UHF output	**35.65**	A
MTV435	70cm ATV 20W Transmitter	**197.80**	B
MM2001	RTTY to TV Converter	**189.00**	B
MM4001-KB	RTTY Transceiver with keyboard	**299.00**	D
MMS1	The Morsetalker	**115.00**	B
MMS2	Advanced Morse Trainer	**169.00**	B
MMT50/144	6m Linear Transverter, 20W o/p	**245.00**	B
MMT144/28	2m Linear Transverter, 10W o/p	**129.95**	B
MMT144/28-R	2m Linear Transverter, 25W o/p	**236.90**	B

		Total inc VAT	Post Rate
MMT432/28-S	70cm Linear Transverter	**195.50**	B
MMT1296/144-G	23cm Linear Transverter	**258.75**	D
MMX1286/144	1268MHz Transmit Up-Converter	**195.50**	D
MMC50/28	6m down to 10m Converter	**35.65**	A
MMC144/28	2m down to 10m Converter	**35.65**	A
MMC144/28-HP	2m High Performance Converter	**47.90**	A
MMC432/28-S	70cm down to 10m Converter	**39.90**	A
MMC432/144-S	70cm down to 2m Converter	**39.90**	A
MMK1296/144	23cm down to 2m Converter	**129.95**	B
MMK1691/137·5	1690MHz WX Satellite Converter	**145.00**	B
MMG144V	2m RF Switched GaAsFET Preamp	**37.90**	A
MMG1296	23cm GaAsFET Preamplifier	**75.00**	A
MMG1691	1690MHz GaAsFET Preamp	**129.95**	B
MMD1500P	1500MHz Divide by Ten Prescaler	**119.60**	A
MMR3/25	3dB 25 Watt Attenuator	**19.95**	A
MMR7/3	7dB 3 Watt Attenuator	**14.50**	A
MMR15/10	15dB 10 Watt Attenuator	**14.50**	A

Postage/Packing Charges: A = £1·84 B = £3·91 C = £4·60 D = £5·98

ALL MICROWAVE MODULES PRODUCTS ARE FULLY GUARANTEED FOR 12 MONTHS (INCLUDING PA TRANSISTORS)

Access VISA
WELCOME

MICROWAVE MODULES LTD
BROOKFIELD DRIVE, AINTREE, LIVERPOOL L9 7AN, ENGLAND
Telephone: 051-523 4011 Telex: 628608 MICRO G
CALLERS ARE WELCOME, PLEASE TELEPHONE FIRST

HOURS:
MONDAY-FRIDAY
9-12.30, 1-5.00
E. & O.E.

SOUTHEND & DISTRICT RADIO SOCIETY

Announce their

1986 RALLY

SUNDAY JUNE 1st 10.30am-5pm

Rocheway Centre, Rocheway, Rochford, Essex

THERE WILL BE SOMETHING FOR EVERYONE SO BRING THE FAMILY

- ★ Bring & Buy (CCTV controlled)
- ★ Trade Stalls
- ★ Satellite Television
- ★ Crime Prevention Stand
- ★ Station on the Air
- ★ Snacks available
- ★ Lectures
- ★ Fancy Goods
- ★ Tombola
- ★ RTTY
- ★ CW Tests
- ★ Bar
- ★ Armed Services Hospitality
- ★ RSGB Books on Sale
- ★ Fun & Games for Children
- ★ Children's Entertainments
- ★ Model Aircraft Display
- ★ And Many Other Attractions

Talk-in on S22 (Ample on-site parking)

Further details contact

Ron G6SOH on 0702 713211 or Brian G4RDS on 03745 50494

Entry by program £1, obtainable on the day. OAPs and Under 14s, 50p.

HAVE YOU HEARD?

LOOKING FOR A HANDHELD? READ ON!

No doubt you will have heard of Kenpro and their reputation for uncompromising quality. But have you heard just how good Kenpro's new UHF/VHF handhelds are? Since our first Kenpro's started to arrive at their new homes, we've received many letters and telephone calls from delighted owners. Just one example is G3YGI who writes, ". . . extremely pleased—performance has amazed me." Listen out for Kenprofessional owners on the airwaves. Hear and be assured—Kenpro won't sing and dance but will communicate extremely well! Join the Kenprofessionals—full range available from selected dealers or direct from us!

200EE VHF transceiver **£169**+£5 p&p
(less NiCads and batteries but with empty battery case) **£149**+£5 p&p
400EE UHF transceiver **£189**+£5 p&p
Standard accessories/full U.K. spec.

HP/PERSONAL LOANS VISA AMERICAN EXPRESS

HI-TEC WORLDWIDE LIMITED

584, Hagley Rd West, Quinton, Birmingham B68 0BS.
Tel: 021-421 8201 (24hr) Telex: 334303 TXAGWM-G.

HATELY ANTENNA TECHNOLOGY

1 Kenfield Place, Aberdeen AB1 7UW, Scotland **GM3HAT**

DIPOLE OF DELIGHT

PRICE BREAKTHROUGH MEDIUM POWER VERSIONS 100W

Following re-design, there are now available NEW medium power versions of the Dipole of Delight. These have even lighter weight and even less visual impact, but radiate with the same superb characteristics as the traditional 1 KW capacitor balun antennas. Some are half the price of the first series.

MP DDM 14	**£10** inc VAT & Postage
MP DD 7/14/21/28L	**£25** inc VAT & Postage
MP DD 3.65/7	**£30** inc VAT & Postage

Order Now, or send SAE for technical details of these and all the earlier models which continue to be available.

Proprietor: **Maurice C Hately, MSc, MIEE, Chartered Electrical Engineer (GM3HAT)**

MANUFACTURERS SURPLUS STOCKS

Electronic Components, Test Gear, Radiotelephones, Computers, Photographic and Video Equipment. All at knockout prices.
Export and Trade Enquiries welcome. Catalogues available from:

B. Bamber Electronics, 5 Station Road, Littleport, Cambs.
Phone: Ely: (0353) 860185

VALVES VALVES VALVES

The following valves in matched pairs 6JS6/C, 6KD6, 6JB6/A, 6LQ6, 6HF5, 6146A, 6146B. **YES** the 6JS6/C is Japanese and works in the FT101. Most amateur radio valves including difficult to obtain types **EX STOCK.** Quotations without obligation. If we don't stock your type we may be able to import for you, PLEASE ENQUIRE, REMEMBER over 200 types **EX STOCK.** Sae for list. 'Phone for assistance re types suitable for your equipment. USA and Jap manufacture of popular types available.

DON'T DELAY 'PHONE TODAY 045 75 6114, G4AZM
Wilson, Peel Cottage, Lees Road, Mossley, Tameside, Manchester

The BRITISH Answer

HIGHER TEC—HIGHER SPEC

Is **your** Radio protected against the damaging effects of 240V @ 50Hz by a manufacturer's guarantee? The answer will certainly be **NO!**. For many Radio Amateurs the answer came too late and a repair bill for £200 too soon!

All BNOS Power Supplies have a comprehensive range of features that will prevent the mains vapourising your rig and will keep that £200 in your pocket.

For **our** customers, **BNOS means 'Peace of Mind'**

Take a look at your existing Power Supply. Have **you** got peace of mind?

Overvolts Protection ● Overcurrent Shutdown
RF & Back EMF Protection ● 100% Continuous Duty
Low-Noise Linear Torroidal Design

SPECIFICATIONS

	12/6A	12/12A	12/25A	12/40A
Continuous O/P	6A	12A	25A	40A
Peak O/P	7A	15A	30A	50A
O/P Volts	13.8V			
Regulation	0.2% of O/P (Load & Line)			
Noise & Ripple	20mV @ Peak O/P			
Price (inc. VAT)	**£69.00**	**£115.00**	**£169.00**	**£345.00**

The steadily increasing demand for our products has caused us to move to larger premises, again!

We apologise, in advance, for any inconvenience that this may cause.

Please note our NEW address.

- **DELIVERY FREE ON ORDERS OVER £10**
- **SECURICOR £5 EXTRA**

MAIN STOCKISTS

Amateur Electronics UK	021-327-1497	Dressler UK	01-558-0854
Amateur Radio Exchange	01-992-5765	Photo Acoustics	0908-610625
Amcomm Services	01-422-9585	R & E. S. (Guernsey)	0481-28837
ARE Communications	09252-29881	Reg Ward & Co Ltd	0297-34918
Arrow Electronics	0245-381626	Scotcomms	031-657-2430
Bredhurst Electronics	0444-400786	South Midland Comms	0703-867333
Dewsbury Electronics	0384-390063	Thanet Electronics	02273-63859
DW Electronics	051-420-2559	Waters & Stanton	0702-206835

or your local emporium

B.N.O.S. ELECTRONICS

Mill Lane, Stebbing
Dunmow, Essex CM6 3SL
Tel. (037 186) 681

PSU PRICES HELD

CURRENT PRICES OR CURRENT SHOCKS?

HAVE YOU CHECKED THE PRICES OF OTHER POWER SUPPLIES THIS YEAR? ALL OF OUR 1985 PRICES HAVE BEEN HELD TO GIVE YOU, OUR CUSTOMER, SUPERB VALUE FOR MONEY. JUST LOOK:

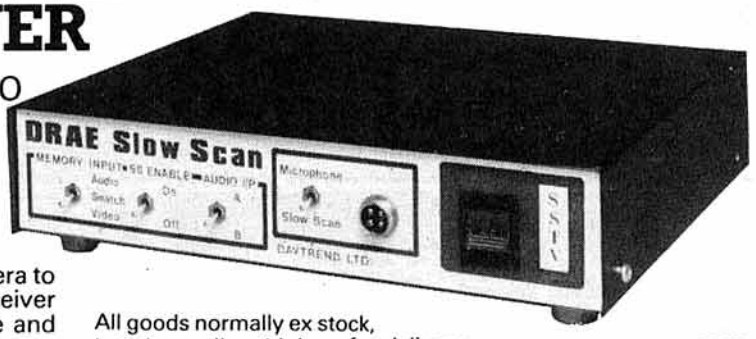
24A @ 13.8V	**£125.00**	**6A @ 13.8V**	**£63.00**
12A @ 13.8V	**£86.50**	**4A @ 13.8V**	**£40.50**

SSTV TRANSCEIVER

ADDING A NEW DIMENSION TO AMATEUR RADIO:

SSTV EQUIPMENT

SSTV TRANSCEIVER	**£310.00**
SSTV RECEIVER	**£189.00**
SSTV TX MODULE	**£128.00**



Simply connect between your rig and a TV camera to transmit slow scan pictures. The SSTV receiver needs only a monitor (or television) to decode and display pictures from your receiver.

All goods normally ex stock, but please allow 14 days for delivery

E&OE

OTHER DRAE PRODUCTS:

VHF WAVEMETER	**£27.50**	3 WAY SWITCH (SO239)	**£15.40**
MORSE TUTOR	**£52.00**	3 WAY SWITCH (N Type)	**£19.90**
2 METRE PRESET ATU	**£14.50**		

DAVTREND LTD. Sanderson Centre, Lees Lane, Gosport, Hampshire, PO12 3UL Telephone 0705 520141

BRITISH MADE

DRAE

INDEX TO ADVERTISERS

CLASSIFIED ADVERTISEMENTS

Classified advertisements **35p** per word (VAT included), minimum **£5.60**
Box Number £2.00 extra to wordage or minimum.
Semi-display 1/8 page 2¼" × 3½" (57 × 91mm) **£87.00**
3/32 page 1⅞" × 3½" (42 × 91mm) **£67.00** } + 15% VAT
1/16 page 1" × 3½" (26 × 91mm) **£47.00**
Please write clearly. No responsibility accepted for errors.
Latest date for acceptance—7 weeks before 1st of issue month.
All classified and semi-display advertisements MUST be prepaid.
Copy and remittance to: **M. J. HAWKINS G3ZNI, RSGB Advertisements, PO Box 599, Cobham, Surrey KT11 2QE.**
Cheques should be made payable to RSGB.
Members' Ads must be sent to "Members' Ads," RSGB Hq.

FOR SALE

QSL CARDS printed to your own specification on white or coloured gloss card. Send S.A.E. for sample pack to: The Caswell Press, 11 Barons Way, Woodhatch, Reigate, Surrey.
AMIDON TOROIDAL CORES, ferrite rings for TVI filters, ferrite beads. Send SAE for data and prices. SMC (TMP Electronics), Unit 27, Pinfold Works, Pinfold Lane, Buckley, Clwyd.
QSL & LISTENER CARDS. Quality printing on coloured and white gloss card at competitive prices. SAE for samples. S. M. Tatham, "Woodside", Orchard Way, Fontwell, Arundel, West Sussex.
G5RV TYPE AERIALS. Half-size £13.50, Full-size £15.50. New Hard Drawn Copper Aerial Wire, 140ft 14swg £7.90; 50 metres 16 swg £6.90. Enamelled soft copper wire 10 metres 12swg £3.50; 50 metres PVC covered Aerial wire £4.20. Ceramic Egg insulators, 40p. Guy rope, 4mm Polypropylene, 50 metres £3.95; 4mm Nylon 50 metres £6.90. 1Kw 1:1 Baluns £13.00. All items post paid. S.M. Tatham G3RSY, 1, Orchard Way, Fontwell, Arundel, West Sussex.
PERSONALISED QSL CARDS. 1000 £15.00; 5000 £50.00. 5000 gloss in two colours £70.00. Send SAE for samples. [DIY QSL's/SWL's—state which!!—100 mixed designs/colours, £2.50. C.W.O.] Q/Cards, 89 Derwent Street, Blackhill, Consett DH8 8LT.
50m (165ft) AERIAL WIRE. Strong PVC covered copper only, £4.40 inc postage. W. H. Westlake, Clawton, Holsworthy, Devon.
QSL CARDS. Gloss or tinted cards. SAE for samples to Twrog Press, Penybont, Gelildan, Blaenau Ffestiniog, Gwynedd.
ALL THE FAMOUS MOSLEY ANTENNAE. TA33Jr, Mustang, Atlas, V-3Jr, TD-3Jr Beams, Verticals, etc. Also spares available only direct from us. Send £1 for our Handbook showing all Antennae. Mosley Electronics, 196 Norwich Road, New Costessey, Norwich NR5 0EX.
G4TJB QSL CARDS. Personal and standard designs. SAE samples. 100 matt colour DIY £2.50, gloss £3.50. Logbooks £2.20 (mobile £1.20). Buro envelopes £1.00 (20), letterheads A5 £7.00 (100), A4 £11.00. G. C. Patterson, 10 Rowton Drive, Sutton Coldfield, Birmingham B74 2AG.
WAVEGUIDE, FLANGES & DISHES. All standard sizes and alloys (new material only) from stock. Special sizes to order. Call Earth Stations, 01-228 7876, 22 Howie Street, London SW11 4AR.
QSL CARDS. Try me for quality and price. SAE for samples. A. W. Bailey (G3YNI), Brean Down Press, Wick Lane, Lympsham, Somerset.
HIGH CLASS QSL CARDS. Keen prices. SAE for samples and prices to J. S. Coates, Dept RC, 57 Worrall Street, Morley, Leeds LS27 0PJ.
G2VF D.I.Y. LOOP ANTENNAS Long, Medium or Short Wave. SAE details. Rylands, 39 Parkside Avenue, Southampton SO1 9AF.
"RAYNET" YELLOW REFLECTIVE TABARDS with "RAYNET" front and rear similar to Police and Ambulance, etc. Also "RAYNET CONTROLLER". 2 sizes. Medium, £8.00; Large, £8.50 inc p&p. Details Mike Watson G8CPH. Ipswich (0473) 831448.
QSL CARDS from £10.00 per 1000. Logbooks £2.30. Samples 20p. Springwood Print, Springfield Avenue, Honley, Huddersfield.
TRAP DIPOLES, TRAPS for beams, verticals or wire aerials. Baluns. Data sheets 24p SAE. Aerial guide £1. (039 86) 215. G2DYM, Uplowman, Devon EX16 7PH.
4CX/2C39A BERYLLIUM COPPER ANODE fingering, £4.00 per ft. CWO to V. Gordon, 44 Valon Road, Arborfield, Reading, Berks RG2 9LT. Tel. (0734) 760179.
G.W.M. RADIO LTD. 40/42 Portland Road, Worthing, Sussex. Tel. (0903) 34897. Radio Telephone Pye W15U UHF Westminsters. Sets only, £35.00; or with control gear, £50.00. Ideal to mod to 70cm. Pye BC5 charger for one pair PF.1's, £12.00. Pye BC4 charger to take 12 red/yellow batts. for PF.1 etc, £12.00. Prices include p&p.
G3LLL/HOLDINGS' HOLIDAYS Closed 16th-30th May. Special pre holiday offers. G.E. 6146B (as fitted Yaesu). Matched pair £27.50, matched 3 £40.00 p.p. + Free driver. 3 New Band Warc kit FT101 £16 p.p. D.B.M. for quieter RX FT101 £17 p.p. 160m Kit Z-Match/E-ZEE Match £7 p.p. Black Star 600MHz counters £145 p.p. Holdings/Amateur Electronics, 45, Johnston Street, Blackburn, BB2 1EF, (0254) 59595. Access. B. Card.
SERVICE MANUALS. Amateur, Television, Audio, Video, Vintage, Test, etc. SAE enquiries:- Mauritron (RC), 8 Cherrytree Road, Chinnor, Oxon. OX9 4QY.
A.K.D. TVI FILTERS—with 55dB rejection notch tuned to the Ham band of your choice. As supplied to the DTI. £6.95 incl. Post/Packing. Telecomms, 189 London Road, North End, Portsmouth PO2 9AE. (0705) 662145.
DX QSL CARDS Display your best cards in our clear plastic hanging wallets. Holds 20 large size cards. Pack of 3, £2.40. Viola Plastics, 36 Croft Road, Hastings, Sussex.
QUICK FIT CLIP-ON feeder spreaders. 3" pack of 25, £5.00. 6" pack of 20, £8.00. Ideal also for folded wire dipoles. Viola Plastics, 36 Croft Road, Hastings, Sussex.
MANUALS/EQUIPMENT bought and sold. FRV7700 (with 6M), R2000 Scanners, AVO/8s, HRO, CR300. Marine/2M scanners 16 memories new, £145.00. Large stocks, aerials, receivers, co-ax, plugs, xtals, part exchanges. SAE for manuals. S.S.B. Products, 42 Halvarras Road, Playing Place, Truro. (0872) 862575.
20AMP 13.6V BELIX PSU. Ex-equipment, crowbar overvoltage, foldback current limit, over temperature protection. £35.00 plus £5.00 p&p. Details PRH Electronics. (0733) 210870.
ICOM HANDHELD OWNERS New from MRZ—Desk power supply and charger suitable for Icom portable radio's 2E/02E/4E/04E/H2/H6. Icom: Yaesu: We supply/repair amateur and business radio equipment. MRZ 6 amp (continous) psu:—total equipment protection for only £59.95. MRZ Communications Ltd, 248 Uttoxeter Road, Longton, Stoke on Trent, ST3 5QL. (0782) 619658 (24hrs).
ANTENNA FOR 70cm HANDHELDS Professional UHF Helical antenna—cut for 432-435MHz operation—BNC Termination. £6.95. MRZ Communications Ltd, 248 Uttoxeter Road, Longton, Stoke on Trent, ST3 5QL (0782) 619658 (24hrs).
QSL CARDS printed at competitive prices. SAE for details. Delta Cards, 62 Newark Lane, Ripley, Surrey.
KDK FM2016A 2 meter FM synthesized mobile Transceiver, 4 memories, Scanner, 15W output, excellent condition £160 o.n.o., contct ZL2All ph. 061-477-7112.
QUALITY QSL CARDS. Distinctive pictorial designs. SAE for samples. G4YAI, 85 Beech Gardens, Rainford, Merseyside WA11 8EB.
PLUGTOP TRANSFORMERS, 6-7 V AC max 1 A, with ouput flex and jack, £8 inc post and VAT. Inelco Lectron 2000 kits with 252 page book, ideal for beginners of any age, £15 inc post and VAT. SAE for details and lists of surplus. W Jarvis, Salewheel, Ribchester (tel 215), PR3 3XU.

RSGB AMATEUR RADIO INSURANCE SCHEME

"ALL RISKS" INSURANCE for portable/mobile/base station amateur radio and ancillary equipment. A service for RSGB members only. Also public liability and equipment insurance for affiliated clubs and societies. Details and leaflets from Nick Gibson, Amateur Radio Insurance Services Ltd, 19 Quarry Street, Guildford, Surrey. Tel: 0483 33771.

COMPUTER SOFTWARE/HARDWARE

AMPROM. THE ULTIMATE amateur radio communications ROM for the BBC Micro. SAE for details. CTP Software, 107A Shacklewell Lane, London E8 2EB.
AECOMM NOW SELL this popular program cheaper than anyone else! Castles unbeatable Morse Tutor for Amstrad 464/664/6128. Does everything. Satisfaction guaranteed! Simply send £6.50 (cassette) or £10.75 (disc) payable to "AECOMM" at 48 Shenley Lane, Birmingham, B29 5PN. SAE—details.
AMSTRAD MORSE TUTOR. From the complete beginner to beyond the Morse Test (6-25wpm). Teaches and tests you in stages right through to simulated morse receiving tests. Cassette £6. Yeovil Electronic Developments, 44, St. Marys Cresent, Yeovil, Somerset. BA21 5RR.
AMSTRAD QSO INDEXING SYSTEM. Records callsigns, QSO date, band, mode, name, QTH, QRA, medium used and remarks. Comprehensive file handling and editing facilities. Duplicate file check, callsign search and file display. Easy updating of files etc. £6. Yeovil Electronic Developments, see ad. above.
ELECTRON/BBC: Refund if dissatisfied: Morse programs, do everything, plus! eg Variable speed/delay; real words; 100 plain language 3 min tests; tests your sending and much more; £5.95 (tape). SAE details D. Brandon, Woodlands Rd. Chester CH4 8LB.
COMMODORE VHF CONTEST Program. Calculates points/distance for Maidenhead. Converts QRA or Lat/Long to Maidenhead. Tape £4.50 for 16, +4 or 64. G8PCA, QTHR.

HOLIDAY ACCOMMODATION

FLYING FROM GATWICK? Stay with G4MGU. Mill Lodge Guest House. 4 minutes from airport. Transport available. Telephone (0293) 771170.
IN IBIZA your holiday flat. Comfortable, tranquil, reasonable prices in summer and winter. Information: DL7AEA. Tel. 003471 34 11 38, PO Box 73, San Antonio, Ibiza, Spain.
PEACE/QUIET SELF-CATERING chalets. (£15-£120). Central touring, omni for DXing. G0ATS shack. 'Chylean', Tintagel, Cornwall PL34 0HH. (0840) 212262.
SOUTH DEVON HOLIDAY: Farmborough House, Chudleigh, Newton Abbot, Devon, TQ13 0DR. Tel: (0626) 853258. In own 10 acres near Dartmoor. Opportunities: painting, Yoga, etc. Well equipped radio shack (G4YXC), metal/woodworking facilities. Vegetarian wholefood. Non-smoking. SAE please: Mrs Sophie Edwards.
TORQUAY S/C FLATS. Couple until 23rd May £47.00, 13th June £55.00. Inclusive linen, TV. Take that break now. (0803) 607333. G4NOA.
STOP PRESS! FAIRMOUNT NOW LICENSED. Enjoy our wonderful meals, and good wines, in the peace and tranquility of Fairmount House Hotel. Ensuite bedrooms, all warm, comfortable and with tea-making facilities. Dogs welcome too. Special family holidays. From £18 BBEM. Also meet G6GR, licensed 64 years, use the rigs if you are licensed and try the new Tono communications-terminal computer. Tel (0803) 605446. Fairmount House Hotel, Herbert Road, Chelston, Torquay.
ISLE OF MAN. Bring the family to a cosy Licensed Guest House and you can try the new G.D. Repeater as well. Use of Ariels/Rig. E.D./B.B. from £7 to £9. GD3ZEX. Chris 'Strathmore' Broadway, Douglas. (0624) 73286.

MISCELLANEOUS

COURSE FOR CITY & GUILDS, Radio Amateurs Examination. Pass this important examination and obtain your licence, with an RRC Home Study Course. For details of this and other courses (GCE, Career and professional examinations, etc) write or phone—THE RAPID RESULTS COLLEGE, Dept JT10, Tuition House, London SW19 4DS. Tel: 01-947 7272 (9am-5pm) or use our 24hr Recordacall service 01-946 1102 quoting JT10.
HEATHKIT. UK spares and service centre. Cedar Electronics, Unit 12, Station Drive, Bredon, Tewkesbury, Glos. Telephone (0684) 73127.
DIGITAL ELECTRONICS. The professional correspondence course for both theory and practice. Send for brochure. Update, Waveney House, 150 Waveney Drive, Lowestoft NR33 0TR.
QSL MANAGER SERVICE for DX or Special Event Stations, etc. QSL cards written and despatched to fulfil your log records. SAE for details to Anthony Stokes G3ZRH, 34 Shenfield Cresent, Brentwood, Essex CM15 8BW.
AMSAT-UK. The amateur satellite organisation of the UK. Want to know more? Send for the starter pack. You will get the "Guide to Amateur Satellite Operation", current look-up tables of all satellites, the 'Oscalator' position indication map and grid for Russian, NOAA and UoSAT's, a recent issue of 'OSCAR News' plus other items of current interest. £3.00 (UK) for immediate response. SAE will also bring you the software list. The Hon. Secretary, G3AAJ, AMSAT-UK, London E12 5EQ.
A BETTER DEAL INSURANCE for all Radio Amateurs. Complete cover for all radio equipment. Other types of insurance also available. Contact Charles Elliott, Hertfordshire Insurance Services, 41 Longfield Avenue, N.W.7. 2EH 01 203 2286.

RSGB MAIL-ORDER PRICE LIST

RSGB books

	Non-members' price	Members' price
A Guide to Amateur Radio (19th edn)	£4.14	£3.52
Amateur Radio Operating Manual (3rd edn)	£6.52	£5.54
Amateur Radio Software	£8.69	£7.39
How to Pass the Radio Amateurs' Examination	£3.62	£3.08
Morse Code for Radio Amateurs	£1.75	£1.49
RSGB Amateur Radio Call Book 1986	£5.75	£4.89
Radio Amateurs' Examination Manual (11th edn)	£4.07	£3.46
Radio Communication Handbook Vol 2 (hb)	£8.96	£7.62
Radio Communication Handbook Vol 1 & 2 (pb)	£14.10	£11.99
Radio Data Reference Book (5th edn)	£9.13	£7.76
Raynet Manual (1984 edn)	£2.95	£2.51
Teleprinter Handbook (2nd edn)	£7.67	£6.52
Television Interference Manual (2nd edn)	£2.45	£2.08
Test Equipment for the Radio Amateur	£6.79	£5.77
VHF/UHF Manual (4th edn)	£11.20	£9.52
World at Their Fingertips	£8.21	£6.98

RSGB logbooks

Amateur Radio Logbook	£2.93	£2.49
Mobile Logbook	£1.30	£1.11
Receiving Station Logbook	£3.04	£2.58

RSGB maps, charts and lists

HF Awards List and Countries List	51p	43p
Great Circle DX Map (wall)	£2.57	£2.18
IARU Region 1 Beacon List	42p	36p
Locator Map of Europe (wall)	£2.07	£1.76
Locator Map of Europe (card for desk)	75p	64p
Locator Map of Western Europe (wall)	£3.24	£2.75
Meteor scatter data sheets	£3.72	£3.16
Smith Charts, pad of 25 (Chartwell D7510)	£2.35	£2.00
UK Beacon List	42p	36p
UK Repeater List	53p	45p
World Prefix Map in full colour (wall)	£2.68	£2.28

RSGB members' sundries (members only)

RSGB badge car sticker	—	53p
RSGB belt (real leather)	—	£7.57
RSGB tie (coffee, maroon, green or blue—please state)	—	£3.20
RSGB callsign cap	—	£4.98
RSGB logo rubber stamp	—	£3.16
RSGB station callsign plaque (Five weeks' delivery)	—	£12.31
RSGB teeshirts (medium, large ex large—please state)	—	£4.90
Standard callsign lapel badge (Five weeks' delivery)	—	£2.21
De-luxe callsign lapel badge (Five weeks' delivery)	—	£3.18
Standard lapel badge (RSGB emblem, pin fitting)	—	60p
Mini lapel badge (RSGB emblem, pin fitting)	—	72p
Members' headed notepaper (50 sheets) quarto	—	£1.20
Members' headed notepaper (50 sheets) octavo	—	76p

Miscellaneous

Car sticker "Amateur radio" (two colours)	78p	66p
Car sticker "I'm on the air with amateur radio" (four colours)	89p	76p
Car sticker "I'm monitoring ·5 are you?" (two colours)	78p	66p
Radio Communication back issues	£1.40	£1.19
Radio Communication bound volume, 1983	£17.90	£15.22
Radio Communication bound volume, 1984	£17.90	£15.22
Radio Communication bound volume, 1985	£17.90	£15.22
Radio Communication Easibinder	£7.90	£6.72
RSGB coffee mug (plastic)	£2.16	£1.84
RSGB hf contest log sheets (100)	£3.69	£3.14
RSGB vhf contest log sheets (100)	£3.69	£3.14

Other publications

	Non-members' price	Members' price
All About Cubical Quad Antennas (RPI)	£7.73	£6.57
Amateur Single Sideband (Ham Radio)	£6.04	£5.13
Amateur Television Handbook (revised) (BATC)	£3.25	£2.76
Antenna Compendium Vol 1 (ARRL)	£10.29	£8.75
ARRL Antenna Book (ARRL)	£11.29	£9.60
AX25 Amateur Packet Radio Link-layer Protocol (ARRL)	£5.68	£4.83
Basic Radio Electronics (Willey)	£17.71	£15.05
Beam Antenna Handbook (RPI)	£8.22	£6.99
Better Short Wave Reception (RPI)	£7.57	£6.43
Care and Feeding of (Varian) *Power Grid Tubes (ARRL)*	£11.07	£9.41
CMOS Cookbook (Sams)	£14.47	£12.30
Complete DX'er (ARRL)	£8.60	£7.31
**Complete Shortwave Listener's Handbook* (Tab)	£13.53	£11.50
Design of VMOS Circuits with experiments (Sams)	£9.40	£7.99
DX Edge (hf propagation Aid)	£15.65	£13.30
FM and Repeaters for the Radio Amateur (ARRL)	£4.75	£4.04
Fourth ARRL Amateur Radio Computer Networking Conference	£11.16	£9.49
G-QRP Club Circuit Book	£5.00	£4.25
Guide to Oscar Operation (AMSAT—UK)	£1.97	£1.67
Hints and Kinks for the Radio Amateur (ARRL)	£4.93	£4.19
**How to Troubleshoot and Repair Amateur Radio Equipment (Tab)*	£11.58	£9.84
Linear Op-Amp Handbook (Carr)	£12.93	£10.99
Radio Amateurs' Antenna Handbook (RPI)	£8.72	£7.41
Radio Amateur Callbook Foreign Listings 1986 (ARCI)	£19.43	£16.52
Radio Amateur Callbook North American Listings 1986 (ARCI)	£19.98	£16.98
Radio Amateurs' Handbook 1986 (ARRL)	£18.12	£15.40
Radio Communication Receivers	£17.43	£14.82
Radio Frequency Interference (ARRL)	£4.63	£3.94
RTTY the Easy Way (BARTG)	£4.69	£3.99
Satellite Experimenters' Handbook (ARRL)	£11.19	£9.51
Secrets of Ham Radio DXing (Tab)	£8.78	£7.46
Semiconductor Data Book (Newnes)	£8.80	£7.48
Shortwave Listeners' Antenna Handbook	£17.54	£14.91
**Shortwave Propagation Handbook* (Cowan)	£8.63	£7.34
Simple Low-cost Wire Antennas (RPI)	£10.55	£8.97
Towards the Radio Amateurs' Examination (Stam)	£4.77	£4.05
Towers International Transistor Selector	£15.46	£13.14
**Towers Op-Amp Selector*	£10.51	£8.93
TV for Amateurs (BATC)	£2.45	£2.08
UHF-Compendium Parts 1 and 2 (Weiner)	£16.50	£14.03
Understanding Amateur Radio (ARRL)	£5.20	£4.42
Weekend Projects for the Radio Amateur (ARRL)	£5.45	£4.63
World Atlas (ARCI)	£3.72	£3.16
World Radio TV Handbook 1986 (Billboard)	£17.99	£15.29
**99 Test Equipment Projects You Can Build*	£10.75	£9.14

RSGB kits and components

RSGB Morseman (*Rad Com* December 1984) Kit 1 (2716 eprom, pcb, pcb artwork)	£13.52	£11.49
Kit 2 (27C16 eprom, pcb, pcb artwork)	£20.67	£17.57
Kit 3 (Led display holder, battery holder, potentiometers, knobs and knob covers, case, front panel)	£38.24	£32.50
D70008C microprocessor for Morseman	£10.63	£9.04
Ferrite ring for interference suppression (Pack of two) (Neosid)	£2.99	£2.54

MORSE INSTRUCTION AID

RSGB morse instruction tape (to 5wpm)	£4.80	£4.08

MAGAZINE SUBSCRIPTIONS

QST (including ARRL membership). One year	£33.39	£28.38
Two years	£63.53	£54.00
Three years	£95.02	£80.77
By air via KLM (to W Europe only) one year	£47.45	£40.33
Ham Radio Magazine (per annum) (incl air delivery)	£27.99	£23.79

NEWSLETTER SUBSCRIPTIONS

Microwave Newsletter, VHF Newsletter, DX Newsletter. For details contact the membership services department at RSGB headquarters.

***Items marked with an asterisk may not be available immediately; please telephone before ordering to confirm availability.**

ORDERING INFORMATION

NON-MEMBERS. Use left-hand price columns. Note that members' sundries are only available to members of RSGB.

MEMBERS. Use right-hand price columns. It is essential that you quote your call sign or BRS number so that you can be recognised as a member.

PRICES. These include postage, packing and VAT where applicable, and are subject to change without notice. For airmail despatch, please ask for price before ordering. Goods are obtainable, less p & p, at RSGB headquarters between 10am and 4pm, Monday to Friday.

POSTAL TERMS. Cash with order. **Stamps and book tokens cannot be accepted.** Cheques and postal orders should be crossed and made payable to "Radio Society of Great Britain". Our Giro account number is 5335256. Please write your name and address clearly on the order, and allow up to 28 days for delivery.

ORDER FROM: RSGB Publications (Sales), Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JW

(Raynet supplies should be obtained from Mrs J. Balestrini, Merrivale, Willow Walk, Culverstone, Gravesend, Kent)

THE
RSGB News Bulletin
PAGES

It's out! The 1986 Callbook is available, and we think it's the best edition ever. It's not just a callbook this time - it incorporates what we've called the "Members' Handbook", which you could think of as a mini-Amateur Radio Operating Manual. All the odd bits of information you need when you're on the air - band plans, repeater and beacon lists, slow morse frequencies, awards and contest information and lots more besides, all in one handy book.

There's more. It doesn't just say "1986 edition" on the cover this year - it says "April 1986 edition". Reason is that a fully updated Callbook will be produced part-way through the year, thanks to our in-house computer technology (same technology that produces this news, which you're reading about a fortnight after we wrote it .... the most up-to-date amateur radio news in the business).

And the price? Less than it was last year - for members, only £3.83 to personal callers or £4.89 including postage & packing. That's around £1.30 LESS than the 1985 edition.

Get up to date with the new Callbook - get yours from Headquarters or from one of the rallies up and down the country. Or get your club to open a trade account with the Society if it doesn't already have one (details from Headquarters) and get them in bulk for your members.

MORSE TESTS

- the latest news and your questions answered

The RSGB Morse Test Service got off to a fine start at the NEC Convention - 86 candidates were tested and we've since had some half-a-dozen thank-you letters complimenting us on how well the tests went. The pass rate was 78%.

As far as the next stage is concerned, it looks as though several RSGB test centres will be operational by the end of May/beginning of June. To put you in the picture, here are some answers to the most frequent questions we're receiving about the new arrangements;

Q How do I book a Morse test?

A Apply to RSGB Morse Test Service (BR) at Headquarters and fill in the form which you'll receive back from us.

Q Do I need to be an RSGB member?

A No

Q When is the earliest I can take a Morse test?

A It depends somewhat on where you live, but the earliest would have been the beginning of May at the Kelso or the Swindon rallies if you had a booking. The main scheme will take a little longer to get going since there have been a few delays which were outside the Society's control. We're still short of examiners in some places (see the question below) and it took longer than we expected to clear a number of matters with the DTI, including the text of the examiners' booklet. BTI's refusal to let their staff co-operate with the Society also didn't help.

The Society is arranging for Morse tests to be available at a number of rallies in the course of the next couple of months - details are given below.

Q Will the Morse test be available at rallies throughout the season, as it was last year?

A Yes, in principle - but it will depend on the availability of an examiner and whether there's a suitable venue at the event. At the moment the list of rallies where Morse tests will definitely be available looks like this:

-(the date in the left hand column is the date of the rally and the date in the right hand column is the absolute deadline for receipt of completed application forms at HQ)-

1 Jun	Southend	20 May
8 Jun	Elvaston Castle	27 May
15 Jun	HMS Mercury	3 Jun
29 Jun	Longleat	17 Jun
13 Jul	Sussex	1 Jul
27 Jul	Scarborough	15 Jul
3 Aug	Woburn	18 Jul

Q Will I be able to turn up and take the examination on the day without booking?

A No - the present system agreed with the DTI does not, for security reasons, allow for last-minute entries for the test - or for the ad-hoc reusal of slots which have been cancelled. So please don't turn up on the day expecting to be able to take the test unless you've made a prior booking via Headquarters.

Q You say you're short of examiners in some places - where?

A As of 18 April we didn't have enough examiner applications in hand to be able to operate centres in the following counties, regions or islands:-

Borders,
Cleveland,
Co.Armagh,
Co.Down,
Co.Fermanagh,
Co.Londonderry,
Co.Tyrone,
Dumfries & Galloway,
Gloucestershire,
Guernsey,
Isle of Man,
Isle of Wight,
Jersey,
Lothian,
Mid-Glamorgan,
Powys,
Orkney,
Shetland,
Shropshire,
South Glamorgan,
Warwickshire and
Western Isles.

Think you can help us?

Write to Ms Heather Norman at RSGB Headquarters and ask for a copy of the "RSGB Morse Test Service Booklet for Examiners". Please enclose a large SAE.

Q Can my affiliated club help by providing premises for Morse tests?

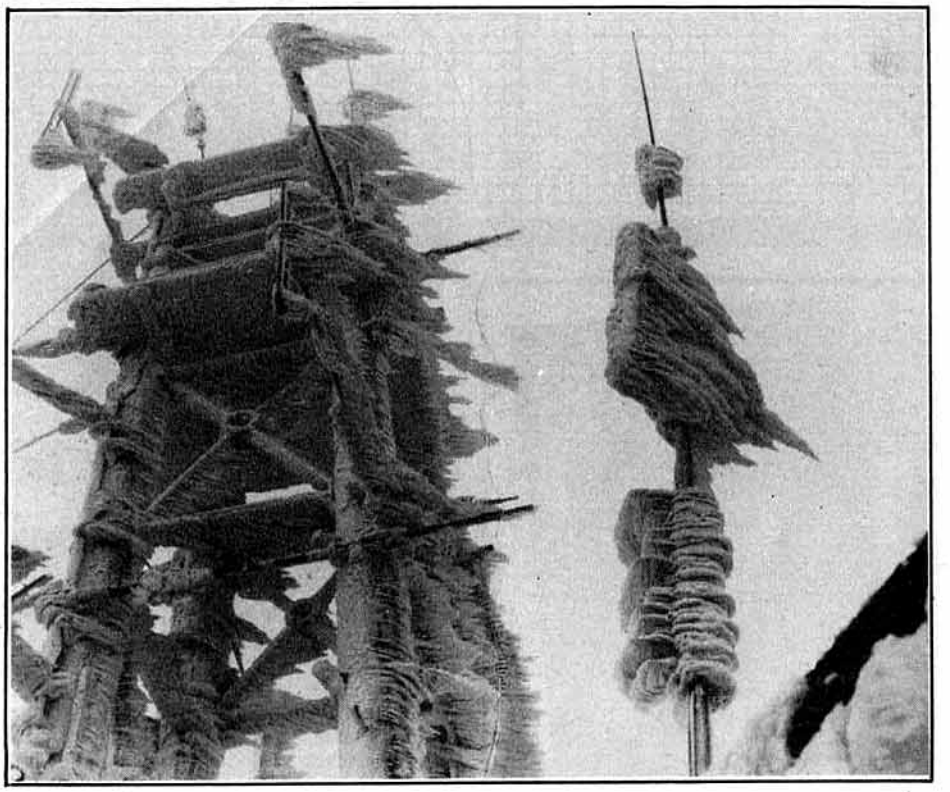
A Yes - if your club premises could be used for local examinations, please write to Ms Heather Norman at RSGB Headquarters giving details.

Q It used to cost £15 to take a Morse test before the RSGB took over - what will it cost me now?

A The cost of the test is £7 including VAT - less than half the old fee. This fee, which can only be varied with the agreement of the DTI, will be held for two years.

Q Can I use my own Morse key and headphones at the test?

A Yes if it's a straight key (i.e. of the manual up-and-down variety) - positively NO keyers, keyboards, paddles, bugs or other artificial aids whatsoever - and it has a flying lead terminating in croc-clips. You may bring and use your own cans providing they have a standard 1/4" mono jack - i.e. bring a stereo adaptor if they're stereo cans unless you want the Morse in one ear only.



Ice-o-tropic??

If you think you have antenna problems, take a long and careful look at this picture - and this isn't a freak, it's quite common at this particular site. On 1 February 1986 GD3LSF and GD3ZEX visited the site of the GB3GD repeater (Snaefell Mountain on the Isle of Man) following reports of poor signals, and the pic shows the situation. The dry bulb still-air temperature was -7 C and the wind speed was averaging 62 knots (over 70 mph), which equates to very nearly hurricane Force 12. The windchill factor is staggering - it implies a still-air temperature of below -40 C!

The bizarre shape on the right of the picture is the repeater antenna - it comprises the main antenna (a co-linear) at the top and a standby folded dipole below. There is between 4 and 5 feet of ice build-up. The site is 2036 ft above sea level and it's used by various institutions for VHF and UHF radio purposes - but conditions such as those shown in the picture are quite common, and structural failure of antennas is a frequent problem. A friend of ours in an organisation which also uses the Snaefell site tells us they had to replace no less than four very heavy-duty antennas in five months in 1985.....

We think the GB3RS antennas would survive about half-an-hour in those conditions - anyone ever seen worse icing on an antenna system?

Oil rigs, platforms and amateur radio licensing

The DTI has again been pondering the status of oil rigs and platforms from the point of view of amateur radio licensing. For this purpose they are now happy to regard them as off-shore islands; however, the DTI stresses that there are VERY IMPORTANT SAFETY ASPECTS to consider before even thinking about radio operation. In ALL cases when amateur radio operation is contemplated from oil rigs or oil platforms, permission MUST be obtained from the owners or lessees of the rig, the safety officer and the radio officer; any restrictions imposed by any of these MUST be followed. Any costs involved in any necessary inspections must be borne by the amateurs concerned.

- BOOKS -

Lots of news about books this month, so get your flexible friends ready and we'll make you some offers you definitely can't refuse. Don't forget that the RSGB's Radio Communication Handbook combined volumes 1 and 2 in paperback is back in stock. Regarded as the ultimate in radio handbooks it covers everything from first principles to satellite and image communication. It deals with transmitters, receivers and antennas for HF, VHF and UHF, together with chapters on keying, modulation systems, propagation, station layout and operating, interference, noise, and measurements. The book is used as a course text on many university and college electronics and radio courses and is well regarded in the electronics industry - you'd be amazed at how many we sell to professionals..... Containing almost 800 pages, the Radio Communication Handbook paperback edition costs £11.99 by post to members. The non-members price is £14.10.

Also held in high esteem is our VHF/UHF Manual - this book is absolutely essential reading for all those who are interested in this part of the radio spectrum. The first chapter 'Historical Perspectives' has all sorts of fascinating insights into the early days of VHF/UHF - bet you didn't know that Hertz used frequencies approaching 800MHz in his experiments during the 19th century! Come to that, Marconi built a 150MHz AM transmitter in 1919. However, the book certainly isn't all history. Most of it contains up-to-date information on VHF and UHF receivers, transmitters, filters, antennas, satellite communication, test equipment, and gear for microwave bands. An appendix gives lots of useful data on feeder characteristics, VHF/UHF PA valves and transistors, mixers, and all sorts of other things. There's even a splendid pictorial section on how to get N types, PL259s, BNCs & one or two others on to the end of your feeder without wailing and gnashing of teeth.

With over 500 information packed pages the VHF/UHF Manual costs £9.52 to members by post and £11.20 to non-members.

The ARRL's Antenna Compendium is now available - this contains a large number of articles previously submitted to the League's magazine QST. The book covers antennas for use between 1.8 MHz and 10 GHz, and includes articles on HF loops and quads, log-periodics, multiband wires and verticals, reduced-space antennas and general items on everything from baluns to ground losses. There's also an article on a very simple and cheap 5-element log-Yagi for 50 MHz. All this for £8.75 to members by post.

Another new book we're now stocking is the Linear IC Op-Amp Handbook, by Joseph Carr, K4IPV. This excellent publication contains design data for virtually every type of op-amp currently available and it's full of useful circuit ideas. A thumping good read at £10.99 to members by post. Still on the subject of op-amps, Towers' Op-Amp Selector is now back in stock - this lists the characteristics of hundreds and hundreds of the devices and all for a mere £8.93 to members by post. Don't forget we keep some other Towers in stock as well - no home-brewer and/or buyer of weird semiconductors at rallies should be without them.

Oh yes - in a burst of generosity we've reduced the price of the 1986 World Radio & TV Handbook - it now costs only £15.29 to members by post!

Finally this month, the 1985 Bound Volumes of Radio Communication are now in stock - yours for £15.22 by post.

It's worth remembering, by the way, that if you find yourself in the Potters Bar area you can save on postage costs by purchasing your books over the counter at Headquarters. We're only ten minutes' walk from the station (take the path running alongside the railway line as you come out of the station) and less than five minutes' drive from the infamous Bignells Corner (as featured on broadcast traffic reports most weekday mornings....) If you've had enough of the A1(M) for a while or you're just coming off the M25, why not drop in and refresh your spirits with some of our publications?

The DP Act and your club

All clubs affiliated to the RSGB and also all Raynet groups will by now have received written advice from the Society relating to their membership databases. If you're responsible for keeping your club records on a computer system and you haven't seen a copy of the advice, we'll send you one on receipt of a 4" by 5" SAE - send it to the Membership Services Department, marking it "DPA".

Ring us now!

The item in last month's Bulletin about solving RFI problems with ferrite rings must have rung loud bells with members - the sales figures for those items went sky-high and we ran out of stock mid-April! We promptly ordered another large quantity, which were expected to arrive at Headquarters more or less about now - so if you've been waiting for ferrite rings, they might well be available by now. Ring Headquarters for the latest position.

RIS - the latest

As we went to press with this edition of the Bulletin in mid-April there had been no new developments in the RIS saga recounted last month. A major meeting between HQ staff and members of relevant committees was scheduled to take place a week or so ago, with the intention of assessing the present state of play and starting to devise the Society's formal comments on the RIS' strategy.

As soon as there are any developments in this story we'll report them via the Headline News and the Databox. Incidentally, we're sorry the Headline News was out of service for a week during April - because of a fault the telephone answering machine chewed two of the special three-minute message tapes in quick succession. The reserve tape then broke about half-an-hour after being put into service, and to cap it all the Post Office proceeded to take six working days to deliver some new tapes from South London to Potters Bar - so much for first-class post! All's well that ends well and the Headline News is available again, on Potters Bar 59312.

ANNUAL SUBSCRIPTION RATES

Like other organisations, the Society is not immune from the effects of inflation; consequently, it has now become necessary to increase rates for membership subscriptions. These were last increased on 1 July 1984, at which time the Society stated that the new rates would be held for two years.

As of 1 July 1986, and in respect of renewals due on or after that date or in respect of new members, the principal rates will be as follows:

*Corporate members (UK and overseas, with Radio Communication via surface mail) £18.50
*Family members £7.40
*UK associate members under 18 £6.95
*UK students over 18 and under 25 £10.45
*Affiliated clubs, societies or registered groups:
-including Radio Communication £18.50
-excluding Radio Communication £11.10
*Senior Citizen £11.10

There will be comparable increases in all other subscription rates, and details can be obtained on application to RSGB Headquarters. In addition, a once-off joining fee of £1.50 will be payable on or after 1 July on joining or re-joining the Society.

Subject to inflation, we intend to maintain these rates for the next two years. The new rates are about 12% above the present rates, and the change corresponds very closely to the increase in general inflation during the past two years as measured by the retail price index.

B on the key

There's a sporting chance that by the time you receive this issue of Radio Communication, the DTI should have issued a press release on the subject of Class B Morse - if it has, the Society should have passed on details of it via the Headline News Service, the Databox and GB2RS. The omens are that the facility for Class B licensees to use Morse, more or less under the circumstances laid down in the initial experiment, will be written into their licence. Keep an ear on the usual news outlets for more info.

50 MHz ally-up

You remember the 50 MHz stripline filter we published in last month's Bulletin? Metalwork suppliers H L Smith got all confused about their prices - they forgot to add the VAT to the prices quoted to HQ, and also tell us the cost of aluminium went up by a rather horrific amount a couple of weeks after we went to press. New prices are £8.90 over-the-counter and £11.47 by post - these are for all the metalwork to make the filter.

Address of H L Smith is 287-289 Edgware Road, London W2 1BE, telephone 01-723 7595.

P.S.

All US amateurs presently in the UK who continue to hold an FCC licence are asked to contact Mike McGlynn, G0AAF, QTHR, with a view to arranging FCC licensing tests.

Advance notice that the Denby Dale Mobile Rally takes place on - 22 June 1986 - the venue is the Shelley High School, near Skelmanthorpe, Huddersfield, and talk-in will be available on S22 and SU8. The event begins at 11am.

Enthusiasts in the south of England have formed the Southern 10FM Group, with the objective of keeping the band active during sunspot minimum. They'll be publishing a regular newsletter with information, technical tips, equipment availability and general news - a years' subscription costs £1. Contact Jim Hicks, G4XRU, 33 Hayling Rise, Worthing BN13 3AL.

Wiesbaden Amateur Radio Club will be on the air from Lichtenstein between 22 May and 2 June 1986 callsign to listen for is HB0/DA1WA on all bands.

Minutes of the 59th ANNUAL GENERAL MEETING of the RADIO SOCIETY of GREAT BRITAIN held at the Institution of Electrical Engineers, Savoy Place, London WC2 on Saturday 7 December 1985 commencing at 2pm.

Present: Mrs J Heathershaw, G4CHH (President, in the chair): Mr P F D Cornish, G3COR, Honorary Treasurer: Mr R G Barrett, GW8HEZ, Immediate Past-President: Mr D A Evans, Secretary/General Manager: and 277 corporate members.

The President welcomed members to the meeting and introduced those present on the rostrum. She then outlined the format of the meeting, and said that in fact there were to be two separate meetings. One would deal with the business required by the Companies Acts and the other would take the form of an open meeting; in the course of this the awards would be presented and there would be a short address from the President. The meeting would then be thrown open to questions from the floor.

Notice convening the meeting

The President stated that the notice calling the meeting was set out on page 11 of the Annual Report & Accounts which had been circulated to all members in the November 1985 edition of Radio Communication. The Secretary read the first part of the calling notice and proposed that, to save time, agenda items be read as they arose.

Minutes of the 58th AGM

The minutes of the 58th Annual General Meeting had been circulated with the September 1985 edition of Radio Communication. Two amendments had been notified to the Society; on page 4 the callsign should have read G4NWC and on page 6 the callsign G4UFC should have read G4UXC. A letter had also been received from Mr G Smith, G4AJJ, pointing out that a proposal of no confidence from Mr P Crosland, G6JNS, had not been recorded. The President stated that the Society was obliged to record notified resolutions but was not obliged to report matters which did not form part of the proper business of an Annual General Meeting; however, the point would be noted in the present minutes. There was then some debate on this point, after which the meeting voted to move on to the next business. The President read out the apologies for absence and stated that there were 277 members present; this was 145 more than had been present at the 1984 meeting.

Accounts for the year ended 30 June 1985, and the reports of Council and auditors

The President invited the Honorary Treasurer to introduce and comment on the accounts which had been circulated to members. Mr Cornish firstly apologised for the absence of the auditors, who could not be present at the meeting; in their absence he read out their formal report. This stated that in the opinion of the auditors the accounts, prepared under the historical costs convention, gave a true and fair view of the state of affairs of the Society and its subsidiaries as at 30 June 1985 and that they complied with the Companies Act 1985.

Mr Cornish said that the accounts reflected another difficult year for the Society. Two written questions on the accounts had been received. The first, from Mr H Bellfield, G3SBV, asked why the costs of insurance had gone down by £3,347 when in general insurance costs had risen and also what was the present cover for fire insurance on the Headquarters building. Mr Cornish said that insurance costs in 1983-4 had included some insurances for beacons and repeaters which had amounted to about £1,900; in the current year these had been charged against Membership Services. A comprehensive review of Society insurance had also been carried out in 1983-4, and this had identified quite substantial savings although insurance cover was now in fact more comprehensive.

Replying to the second part of Mr Bellfield's question, Mr Cornish stated that the current cover for fire on the Headquarters building alone was £345,000. There were additional policies for the contents and special items such as the computer.

The second written question was from Mr C Thomas, G3PSM, who queried an item in the Income and Expenditure account. The item headed "Beacons, repeaters and Intruder Watch" cited a figure of £7,116, which was an increase of 38% over the previous years' figure. Since the Intruder Watch had effectively been inactive for the past two years, Mr Thomas wondered why the increase had occurred. Mr Cornish explained that the increase was due to the figure of £1,900 for insurance which had been mentioned in the previous question and that no increase was attributable to Intruder Watch.

Mr Cornish added that this led on to a supplementary question which he had been asked just prior to the meeting, which concerned the precise nature of the insurance cover for beacons and repeaters. The cover was for third-party risks, and Mr Cornish noted that since the Society was the licensee for repeaters, it was the Society which would receive claims rather than individual repeater groups.

An unidentified member asked the Honorary Treasurer to comment on what appeared to be a 9% increase in wages and salaries and a 100% increase in the cost of pensions. Mr Cornish stated that the increase was associated with an increase in the number of staff. He added that the increase in pension costs was related to the introduction of a pension scheme for senior staff.

Mr I Abel, G3ZHI, noted the figure of £43,000 relating to committee expenditure and asked whether a breakdown of this figure was available to the membership. The Honorary Treasurer stated that it was not. Mr Abel asked why this was the case. Mr Cornish replied that he did not think it was necessary for Mr Abel to have the information. Mr Abel requested a realistic reason why he should not have it. The President asked what Mr Abel was implying by asking the question, to which Mr Abel replied by saying that he thought the purpose of the AGM was to

Just some of the 277 corporate members who attended the 1985 Annual General Meeting.

ask questions: he did not have to give a reason why he was asking a particular question. The President asked Mr Abel whether he felt that a particular committee was overspending. Mr Abel said that that was not his point: he believed that a breakdown of committee expenses had been offered to members on request in recent years and he was now requesting that information. The President said that there was no reason why the information should not be made available and that she was not aware that it had ever been requested.

An unidentified member felt that it was undignified for the Society to quibble about expenses and that Council should be left to get on with the job of running the Society.

Dr D Evans, G3RPE, said that in principle the Society could provide any service demanded of it by its members but resources were always limited. He was worried that a good deal of the Society's efforts and energy had necessarily been dissipated in areas which many would regard as contrary to the interests of amateur radio in the course of the past year.

Mr M Butler, G4UXC, felt that both the President and the Society were secretive.

Mr J Bladon, G3FDU, said that he felt that the Society should make more information available but that the meeting should now pass on to the next question.

Mr I McLuskie, G8ORG, wondered why £5,000 had apparently been spent on litigation or expenses involving Raynet. The Honorary Treasurer did not have exact information to hand but he believed that this was a sum of money which had been a possible cost in relation to Raynet.

Mr L Ross, G8MWR, felt that matters which were stated to have been noted at the annual meeting should subsequently appear in the minutes of Council meetings. The President said that if the matter was discussed in Council, this would happen.

Mr D Smith, G4DAX, felt that a considerable amount of time had been wasted and that the meeting should press on.

Mr P Crosland, G6JNS, asked whether the Honorary Treasurer could confirm that there was a furnished flat at Headquarters and what the costs of running it were. The Secretary explained that when the Potters Bar building had been purchased it contained a small caretakers' flat; however, this was now predominantly used for storage purposes including the storage of awards and trophies - as the Trophies Manager could no doubt confirm. He added that members of Council occasionally used it in order to save hotel and transport costs, although it was neither a comfortable nor a warm residence. The Treasurer said that its rateable costs - such as they were - were assessed along with those of the Headquarters building and it was not separately rated.

Mr L Ross, G8MWR, wished to return to the matter of committee expenses. He said that the meeting was not complaining about how much was being spent and how; the point at issue was the fact that members did not have access to information concerning the expenses. The Honorary Treasurer said that Mr Ross was raising a general question on the extent to which the detail behind the accounts should be made available to the membership. He said that he was happy to give information where it helped members to understand the accounts but that he could not go into extreme detail. Mr Ross said that he accepted that, and added that the original question related purely to the availability of information.

Mr G Adams, G3LEQ, felt that it was unreasonable to expect the Honorary Treasurer to have all the information available at the meeting. He suggested that a breakdown of committee costs could be prepared at Headquarters and that anyone wanting the information could request it. The President said that the suggestion would be put to Council.

Dr D Evans, G3RPE, pointed out that an offer along those lines had been made about two years ago in Radio Communication to those who wished to receive a breakdown of committee attendance. No member had requested the information. Last year, therefore, the offer had been omitted and no-one had commented. Dr Evans felt that it was reasonable to infer that no-one was interested and that, once away from the annual meeting, the topic ceased to be important to members.

Mr P Crosland, G6JNS, said that he had been told that a substantial sum was included in the accounts relating to overtime at Headquarters which should have been included in the 1983-4 accounts. He asked the Honorary Treasurer to confirm whether or not this was correct and, if so, the sum of money involved.

The General Manager confirmed that one member of Headquarters staff had made a very late claim for overtime which, spread over many months, had amounted to some £1500. For the sake of goodwill the payment had been made.

There were no more questions on the accounts.

Members to serve on Council for 1986

The President read the letter from the scrutineers announcing the results of the recent Council election; these were as follows:

Election for Ordinary members:

Mr R H Edmondson, G3YEC, 1,464 votes - Mr K A M Fisher, G3WSN, 1,208 votes - Miss Sheila Gabriel, G3HCQ, 924 votes - Mr R S Hewes, G3TDR, 1,107 votes - Mr J D Heys, G3BDQ, 1,809 votes - Mr R C Locher, W9KNI, 667 votes - Mr T I Lundegard, G3GJW, 1,283 votes - Mr A McKenzie, G3OSS, 2,552 votes - Mr N F O'Brien, G3LP, 1,484 votes - Mr G P J Plucknett, G4FKA, 1,053 votes - Mr C J R Reed, G8MFP, 650 votes - Mr F S G Rose, G2DRT, 1,610 votes - Mr C J Thomas, G3PSM, 1,469 votes - Mr K E V Willis, G8VR, 2,355 votes. Therefore Messrs J D Heys, A McKenzie, N F O'Brien, F S G Rose and K E V Willis were elected as Ordinary members.

Election for Zone C: Mr G L Benbow, G3HB, 522 votes - Mr J Greenwell, G3AEZ, 536 votes. Therefore Mr J Greenwell was elected as Member for Zone C.

Election for Zone E: Mr E J Case, GW4HWR, was elected unopposed. Therefore Mr E J Case was elected as Member for Zone E.

The President then announced the names of all Members who were to serve on Council during 1986; these were as follows. President: Mr W J McClintock G3VPK, Immediate Past-President: Mrs J Heathershaw G4CHH, Honorary Treasurer: Mr P F D Cornish G3COR. Ordinary Members: Dr E J Allaway G3FKM, Dr D S Evans G3RPE, Dr J N Gannaway G3YGF, Mr B O'Brien G2AMV, Mr D Smith G4DAX, Mr H S Pinchin G3VPE, Mr J T Barnes GI3USS, Mr F Hall GM8BZX, Mr J Greenwell G3AEZ, Mr E J Case GW4HWR, Mr J D Heys G3BDQ, Mr A McKenzie G3OSS, Mr N F O'Brien G3LP, Mr F S G Rose G2DRT and Mr K E V Willis G8VR.

An unidentified member queried the number of late, spoiled or invalid votes. The President said that there had been 409 votes falling into this category out of a total of 4,383 votes cast, which equated to 9.1%.

The President thanked the scrutineers who had performed the count and called for volunteers to act as scrutineers at next years' election. Their names and callsigns were noted.

Mr N Negus, G6AWT, noted that the total number of votes cast constituted about 5% of the membership of the Society and asked whether anything would be done to improve this figure. The President asked Mr Negus what he suggested should be done. Mr Negus felt that the cost of pre-paid envelopes was excessive for such a small return; the Secretary pointed out that the Society only paid for postage on envelopes which were returned. The Honorary Treasurer noted that the editorial in the November edition of Radio Communication had exhorted members to use their votes.

Mr G Stancy, G3MCK, said that despite the Editorial, of which he was aware, he could only vote for three candidates because of the completely inadequate information which candidates were permitted to give; he had raised this point at previous meetings and received strong support from the floor. He felt that nothing had happened. The President asked Mr Stancy to raise his point again in the second part of the meeting.

Appointment of auditors and the fixing of their remuneration

The President announced the resolution that Messrs Moores & Rowland be re-appointed auditors of the Society for the ensuing

year and that their remuneration be fixed by Council. On a show of hands the President declared the resolution carried overwhelmingly. Mr I Abel, G3ZHI, called for a poll. The Secretary confirmed that Mr Abel was authorised to call for a poll, and it was agreed that the poll should be conducted immediately. The Secretary called out the names of proxy holders and asked how each would cast his or her vote. In the interests of saving space, in these Minutes the name of the proxy holder is followed in brackets by the number of proxy votes held and the words "for", "against" or "abstained" with reference to the resolution.

Mr I Abel (22 - abstained). Dr E J Allaway, G3FKM (3 - for). Mr J Allen, G3DOT (3 - for). Mr J T Barnes, GI3USS (6 - for). Mr R G Barrett, GW8HEZ (121 - for). Mr R Broadbent, G3AAJ (2 - for). Mr M Butler, G4UXC (1 - abstained). Mr E J Case, GW4HWR (4 - for). Mrs C Clark, G1GQJ (1 - for). Mr P Crosland, G6JNS (43 - abstained). Mr T E H Day, G3PHO (7 - for). Mr M Ellis, G4ROM (1 - for). Mr George-Powell, G3NNO (1 - for). Mr R Glaisher, G6LX (1 - for). Mr J Greenwell, G3AEZ (1 - for). Mr G Griffiths, G3STG (4 - for). Mr F Hall, GM8BZX (3 - for). The President, Mrs J Heathershaw (762 - for). Mr R Hewes, G3TDR (1 - for). Mr J Heys, G3BDQ (1 - for). Mr H Holmden, G4KCC (1 - for). Mr L Mansfield, G2SP (11 - for). Mr T Lundegard, G3GJW (13 - for). Mr A Marston, G4UIF (1 - for). Mr W McClintock, G3VPK (124 - for). Mr A McKenzie, G3OSS (2 - for). Mr N Negus, G6AWT (1 - for). Mr B O'Brien, G2AMV (7 - for). Mr N O'Brien, G3LP (2 - for). Mr B Bower, G3COJ (1 - for). Mr J Pearce, G3IGP (1 - for). Mr H Pinchin, G3VPE (4 - for). Mr D Pratt, G4DMP (1 - for). Dr J Roberts, G6JQV (1 - abstained). Mr L Ross, G8MWR (1 - for). Mr R Royall, G8ESB (2 - abstained). Mr J Sleight, G3OJI(1 - for). Mr D Smith, G4DAX (3 - for). Mr G Smith, G4AJJ (71 - for). Mr M Stokes, G3ZXZ (15 - abstained). Mr C Thomas, G3PSM (14 - for).

The result of the poll was declared by the President to be as follows. For the resolution - 1,305. Against the resolution - 2. Abstentions - 106. The President therefore declared the resolution to reappoint the auditors carried.

A tea break was then taken.

Presentation of awards

The President then proceeded with the presentation of awards. The Calcutta Key, for outstanding service to international friendship, was presented to Mr G C Voller, G3JUL. The Founders Trophy, for services to the RSGB, was awarded to Mr G P Watts, BRS3129.

The Calcutta Key was presented to Mr G C Voller, G3JUL.

Open forum

The President opened this part of the meeting by saying that during her year in office she had come to realise the volume of work carried out by the Society and the tremendous amount of effort associated with it. She wished to commence her address by thanking the staff for their efforts, together with all those members who contributed to the work of the Society. She added that it would be impossible to continue to provide the multitude of services to amateur radio without the help of the latter.

The President stated that the meeting would shortly become an open forum, which would provide an opportunity for members to ask questions and to make their views known. She wished to stress that RSGB staff and Society representatives around the country collectively received thousands of letters and comments, and these obviously had a direct influence on the way in which the Society operated on behalf of its members. She assured the meeting that there was no shortage of good ideas; the difficulty was in giving them a priority and finding the resources with which to progress them.

The President went on to comment on progress made with matters which were raised at the 1984 open meeting. Two questions had related to interference problems; in the course of the year the EMC Committee had been revitalised under its new chairman, Mr L Hawkyard, G5HD, and a good start had been made in tackling some of the problems in this particularly sensitive area. There was now also an RSGB representative on the relevant committee of the British Standards Institute, and it was hoped to be able to influence future developments in the area of EMC problems.

With regard to a question concerning the retention of trophies, this had always been a difficult problem. The winners of trophies were always keen to take them away but on occasions were reluctant to return them; as a result, Council had decided not to permit them to be retained, and this had understandably not been a popular decision. However, a dedicated volunteer - Mrs H Claytonsmith, G4JKS - had offered to take up a new post of Trophies Manager. The President was happy to report that, for an experimental period commencing next year, winners would again be permitted to retain their trophies.

The question of what could properly be raised at an annual meeting was an item of major concern at the last AGM, and this topic had been investigated in depth. Because of its complexity, legal advice had been obtained both from solicitors and Counsel and the outcome of this work had been published in the September edition of Radio Communication.

The 20 wpm limit on callsign sending speed on CW, which had been queried at last year's meeting, was one of a large number of topics being discussed in the current review of the amateur licence. The matter of statements by prospective candidates for Council had also been very carefully considered, but the Society was convinced of the advantages of the existing scheme at present.

The Society's requirement to include the words 'Amateur Radio' in the title of radio clubs and societies seeking affiliation to the RSGB, which had been the subject of comment, had in practice not caused any difficulty. Council considered that, as a matter of policy, members should be proud of their status as licensed radio amateurs; to declare it was very much in their interest. The President added that there was a view that the Society should change its own name to include the word 'amateur', and this point would be considered in any revision of the present Memorandum and Articles of Association of the Society.

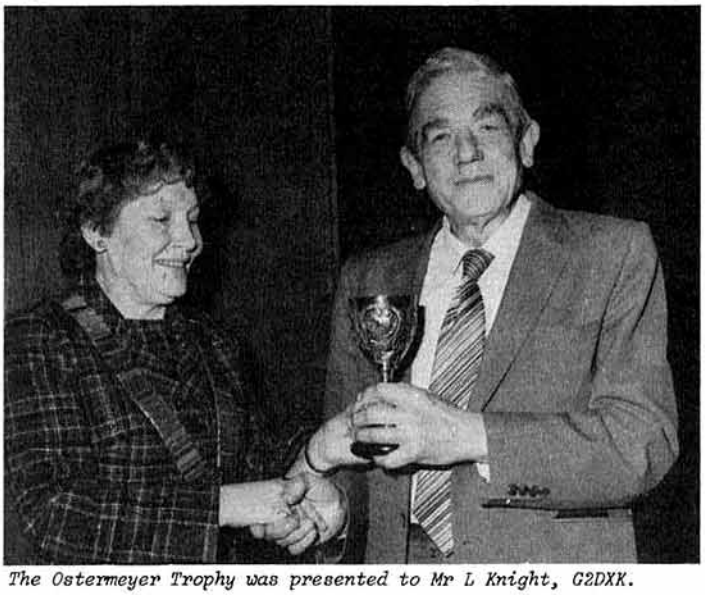
The alleged self-perpetuation of committees had also been the subject of comment. The President said that the average rate of turnover of committee members was 30% per annum, which was probably higher than it should be. However, Council recognised that there was a genuine problem in that, when a chairman sought to fill a vacancy, he did not always know who might be available. Conversely, suitable people might not know that there was a vacancy available! It was Council's opinion that vacancies for ordinary committee members should be advertised in Radio Communication, and this procedure would probably be ratified at the January 1986 Council meeting.

The President went on to mention four matters which arose after the end of the financial year. A good deal of effort had been expended in an attempt to make the rather arbitary process of

Council elections less so by making some alterations to the nomination procedure, and Council would be interested to know of members' reactions to the changes. Secondly, it was worth noting that the members' discount on books and sundries had been changed from 10% to 15%. Thirdly, the Department of Trade and Industry had invited the Society to submit proposals for taking over amateur radio Morse tests from British Telecom International. The President was pleased to be able to inform the meeting that the Society had been successful in this, and further information would be given in the January 1986 edition of Radio Communication. Fourthly, the Society hoped that a 50 MHz allocation would be come available in February 1986 on a 24-hour basis, although the initial conditions of access were not yet known. The President said that the Society was delighted to have achieved a further advance in the 50 MHz experiment. Many encouraging letters had been received from other European societies, who were much encouraged by the RSGB's lead. She also wished to acknowledge the work of the DTI in respect of 50 MHz; they had put in a great deal of effort on the Society's behalf in the face of opposition from other administrations in Region 1.

In conclusion, the President wished to comment on the future work of the RSGB. She said that the Society was increasingly conscious of the manner in which it continually overstrained its relatively limited resources in its anxiety to provide the best possible service to members. The Society was prone to saying that because something could be done, it should be done. Present thinking within the Society was that it should determine which matters had the highest priority and concentrate its efforts on their progression; the President was disappointed that work in several vital areas had had to be put into abeyance because of the requirement to react to pressures outside its control. She felt that three items in particular had high priority. One was the strengthening of amateur radio at local level. The second was a major revision of the licence document, which was long overdue. In third place was the updating of the Society's Memorandum and Articles of Association.

In conclusion, the President thanked members for their attention and said that it was now time for the open forum. This year there was a change from previous practice; all members had been given the opportunity to submit written questions, and as many as possible would be dealt with in the remaining time. Those which could not be answered in the time available would receive replies from the appropriate officer of the Society later.



The Ostermeyer Trophy was presented to Mr L Knight, G2DXK.

The President said that, not surprisingly, there were many questions on licensing. Mr R Holyoake, G4WAY, had asked whether it would not be possible to revive the suffix /T to avoid the confusion over the use of /P or /A with regard to places of work, etc. Dr J N Gannaway, G3YGF, chairman of the Licensing Advisory Committee, said that there had always been confusion in this area. The entire question of suffixes was being considered in the course of work connected with the revision of the licence.

Mr R Pounder, G3DVQ, had asked whether there had been any official reply to the letter written by the Society to the Prime Minister concerning spectrum abuse. The General Manager said that there had been a reply but the entire matter was one of continuing concern; as soon as there was anything important to report, the membership would certainly hear about it.

An unidentified member was concerned that the Radio Investigation Service had moved away from interference work and towards an enforcement role; he considered that the Radio Interference Service, as such, had been lost. He added that for the Society to write to the Prime Minister encouraging her to take resources away from interference work was doing a grave disservice to amateur radio in the UK. The General Manager said that in making an attempt to persuade the Government to put more resources into enforcement, the Society had not been aware that this would involve a reduction of RIS effort in other areas and a major re-orientation of the Service away from domestic interference problems. The Society had received no notification or prior warning that this would take place. He invited the Chairman of the EMC Committee to comment further. Mr L Hawkyard, G5HD, said that the situation was still rather confused. The service to amateurs and their neighbours had not been withdrawn; it was merely no longer free, and any amateur with breakthrough problems cound still opt to pay the £21. In the long term the Society hoped that the role and reputation of the Radio Investigation Service as impartial mediators and negotiators between the amateur and the neighbour could be maintained. It was vital for amateur radio.

Mr J Wiles, G4TVA, said that his local Electricity Board used to rely on the RIS for information concerning problems caused to radio amateurs by noisy power lines. This service was no longer available; the Board had no instrumentation with which to locate problems of this type, and at the present time was doing nothing about noisy lines. One amateur in his locality was experiencing considerable difficulty. Mr Hawkyard pointed out that, in fact, the services of the RIS were available to any commercial organisation at a fee of £42/hr. He added that he could see no quick solutions to problems of this type; they were an area of major concern to the Society. The EMC committee needed feedback so as to be able to make recommendations to Council.

Mr M Williams, G4GRS, asked whether the Society could make clear to ordinary members the procedure for reporting illegal intruders in amateur bands. The General Manager said that problems could be reported either to the Society or the RIS; however, the Society's experience during the past decade had been that problems relating to intruders had not been dealt with in a satisfactory manner as far as the Society was concerned. Council was interested in improving this situation, and discussions with the DTI at high level were taking place to this end. It was clear that the RIS could not physically tackle every problem relating to the amateur bands; however, the Society's view was that some attempt should be made to tackle the more serious offenders, who were widely known.

The next question was from Mr J Greenwell, G3AEZ, who was concerned by the implications of the re-issue of "silent-key" call signs. In reply Dr J N Gannaway, G3YGF, siad that this matter was currently being discussed with the DTI.

Mr R Sharp, G4VNR, had asked whether the class B letter of variation would be available for a further period and whether a calling frequency would be recommended; he was greatly in favour of both. In reply, Dr J N Gannaway, G3YGF, said that the experiment had gone very well and had been appreciated by many class B licensees. The chairman of the VHF Committee, Mr M Appleby, G3ZNU, added that the matter of calling frequencies had recently been discussed; the committee felt that activity should take place in the all-mode section of a particular band, but many users had been using frequencies around 144.155 MHz for the initial CQ call. The committee felt that this practice should continue and that after initial contact had been established, a frequency in the all-mode section should be used. With regard to the extension to the experiment, a report was currently being prepared for the DTI; the Society was greatly in favour of the facility becoming a permanent feature of the class B licence.

Miss A Voss, GOCCI, said that at the end of June an official announcement was made in Germany to the effect that an agreement had been signed by 14 countries - including the UK - relating to the CEPT common licence. She wondered why British amateurs had not been informed of this important agreement. In reply the

General Manager said that his latest information was that an agreement had not been signed; it had merely been reached. The topic had been mentioned in Radio Communication; some 25 countries had been present at the meeting. The current position was that no agreement had actually been signed but the UK government was considering the adoption of the CEPT recommendation. He added that as soon as the Society had any more information on this matter, it would be given to members. The prospect of a licence which freely permitted amateur operation in CEPT countries without the need for prior paperwork and administration was an exciting one, to which the Society had given its support.

Mr K Partridge, G8AUU, commented that some countries in Europe were still outside CEPT and reciprocal agreements did not yet exist; he wondered what the Society's view of this situation was. The General Manager said that there were effectively four levels of licensing which allowed amateurs to operate overseas, and he felt that the DTI was giving a fair amount of attention to the CEPT licence at present. He said that the Society could give relatively little in the way of direct assistance, but it constantly encouraged the DTI to work actively on matters relating to foreign licensing and operation. Mr Partridge felt that in the case of Yugoslavia there was still a problem, which the General Manager undertook to investigate.

Mr N Roberts, G4IJF, said that the CEPT licence should not be confused with a so-called "common" licence. The CEPT licence was nothing more than an agreement to dispense with the paperwork of reciprocal licenses, and operators would still have to work to the regulations relating to the country in which they were located. The common licence was a long-term aim which would take some considerable time to achieve. Mr K Matthews, G0CWI, asked whether any information on the timescale for the CEPT agreement was available, and Mr Roberts said that he thought that it would take at least twelve months, if not more.

Mr Matthews had also asked whether alterations in the licence conditions could be submitted to a referendum of members before being ratified by the Society and the DTI. In reply Dr D Evans, G3RPE, felt that this was impractical. The subject of licensing was extremely complicated and time-consuming, and the process of decision-making would become completely impossible if the membership as a whole was included in the process. By way of example, Dr Evans cited the difficulties associated with beacon and repeater licensing, in which he understood that some 40 individual government departments were involved. He said that the best which could be done in practice was for the Society to be democratic about such matters. People were voted into office by the membership at large to carry out tasks to the best of their ability, and could be voted out of office if their actions were not approved. Dr Evans added that he was amazed by the length of time taken to solve licensing problems, and he would be unhappy about slowing the process down even further.

Mr R Cracknell, G2AHU, pointed out that the majority view was not necessarily the optimum one as far as the Society was concerned; he added that his own amateur radio interests were not of much interest to the majority of amateurs but that he nontheless enjoyed them and felt that they were valid.

The next two questions, from Messrs F Claytonsmith, G3JKS, and T Watkin, G6GBH,.related to log-keeping, computerised logs and the requirement to keep a mobile log-book. In reply Dr J N Gannaway, G3YGF, said that in the context of the overall licence revision being undertaken by his committee, the intention was to simplify log-keeping as far as possible. The Society was decidedly in favour of retaining some form of logging for fixed stations but it was currently considering the need for keeping a log when mobile. Computer-based logs were certainly attractive, although there were undoubtedly problems which would need to be solved.

Mr J Rabson, G3PAI, said that an accurate log was very useful to the radio amateur involved with TVI problems, insofar as an accurate log could demonstrate that the amateur was not operational at particular times.

Mr R Cracknell, G2AHU, hoped that the committee did not tie itself up with minutiae; earlier amateur radio licences had consisted of one sheet of paper if he remembered correctly.

Mrs H Claytonsmith, G4JKS, said she was in favour of keeping logs but that she objected to the extra work involved in transferring a contest log to the main log-book. She wondered whether there was a possibility of being allowed to keep a photocopy of the submitted contest log sheet at the back of the log-book.

Mr E Godsmark, G5CO, pointed out that some time ago the Home Office had stated that there was no need for stations in the amateur service to keep log-books and that the RIS had also found them unnecessary; they only required a "diary" to show that the station had been operational on a particular day. He added that many other users of radio servives, such as PMR, did not have to keep log-books and that perhaps log-keeping in the amateur service should be on an optional basis.

Mr M Stokes, G3ZXZ, asked when the meeting would be thrown open to the floor, since it appeared to him that time was short. He also felt that in future meetings the written questions should be put in a box and drawn out at random, since it appeared to him that questions were being selected with a view to those associated with certain callsigns being avoided. The President said that the next question, which she was holding in her hand, actually originated from Mr Stokes; to sustained laughter, she asked him whether it was to be answered or not. Mr Stokes said that he had only made a suggestion for future meetings. His question asked why the Society had not seen fit to publish parts of the draft novice licence proposals originated by Mr I Abel, G3ZHI. In reply Dr J N Gannaway, G3YGF, said that the Society had received a large quantity of input relating to novice licensing proposals and alterations to the amateur radio licence - much more, in fact, than could ever have been reported in

Above: an ARRL award went to Mr R G Cracknell, G2AHU, who also received the Worthy-Talbot Trophy.

Below: the Raynet Trophy was collected on behalf of "Operation Mexico" by Prof M Harrison, G3USF and Mr J E Wiles, G4TVA.

Radio Communication. All this input had been considered by various committees, and the result had been the production of the "intermediate licence" proposals which had been sent to the DTI earlier in 1985. A number of letters relating to this topic had been published in the "Members' Mailbag" section of Radio Communication, but this was only a small sample of the letters which had been received.

Mr I Abel, G3ZHI, felt that the situation was farcical and that the position should be clarified.

Dr D Evans, G3RPE, commented that in the course of his visits to clubs he received several questions relating to the novice licence. One member had pointed out that in a survey by the independent magazine Practical Wireless, 80% of respondents were not in favour of a novice licence.

The General Manager said that the principal difficulty was that the novice licence was only one element in a large number of matters relating to licensing in general. He felt that novice licensing necessarily had a low priority, largely because it required the setting-up of a new examination system with its associated administration at a time when many licensing problems required more urgent attention and solution. He added that at present there were some fifteen main licensing topics in hand with the DTI, of which some five were what he referred to as "top, top priority"; on that basis, the novice licence was currently something of an academic construct. The General Manager added that, personally, he felt that novice licensing schemes were highly suspect and could lead to an overall lowering in the standards of entry into amateur radio. By contrast, many radio amateurs were more anxious to raise standards, and he thought that the Society should be looking in that direction as well. He said that in his opinion the provisions of the intermediate licence went as far as were desirable to make it easier to get into amateur radio.

Mr C Thomas, G3PSM, stated that when he had been a member of the then Licensing Advisory Committee, the Home Office had said that it could not consider any form of novice licence until licensing records had been transferred to computer. He felt that there had been a lowering of standards during the past twenty years, and he was opposed to anything which would allow anyone simply to pick up the microphone of an amateur radio transmitter and speak; that was the province of CB radio. There should be some form of incentive scheme in amateur radio licensing. Mr Thomas added that he could see no reason for a novice licence, and he considered that Mr Abel was making an issue out of the topic simply to enhance his own reputation. Mr Abel said that he had been told by the Society in 1983 that it had been pursuing a novice licence since 1947; his point was that the Society should state clearly whether or not it wanted a novice licence. He felt that the Society was, on the one hand, saying that it was considering the matter of a novice licence whilst on the other wanting nothing to do with the idea. Mr Abel added that the Society had been pursuing a novice licence for far longer than he himself had. The President emphasised that it was wrong to take as read that what was being pursued would necessarily come to fruition; it merely implied that the matter was being discussed and the various options considered.

Mr A Korda, G4FDC, had asked why resources were being wasted my the maintenance of a separate office at Chelmsford for Radio Communication. The Honorary Treasurer said in reply that the editorial office moved to Chelmsford some years ago when Headquarters was still located at Doughty Street and there was gross overcrowding in that building. The lease for the Chelmsford premises was to be reviewed in about two years' time, and it was intended that the editorial department would move to Potters Bar at that point.

Mr M Chatfield, RS18624, had asked whether Council really expected members to believe that Council Proceedings could not have appeared before December. The President explained that Council had been considering ways in which the presentation of Council Proceedings could be improved but from July onwards had been busy with other pressing matters and the subject had fallen by the wayside. There had also been staff shortages. The net effect had been that the publication of Council Proceedings had become delayed.

An unidentified questioner asked whether this meant that more staff were required at Headquarters; the President and the General Manager simultaneously said that they were. The questioner felt that a wage bill of £290,000 for 29 staff was very little and wondered whether staff were paid enough; the President said that they were not. The amount of free overtime given by some senior staff would not be tolerated anywhere else, and the Society was very lucky in the quality of its personnel. There was no question that more staff were necessary; the difficulty was how to afford them. The General Manager added that this was an apposite moment to refer to a point made earlier in the meeting concerning last years' wage increase, which on paper appeared to be 9%. He said that Headquarters staff would have been delighted to have received a 9% rise, but this was what had happened. More staff had been taken on and some staff had been replaced by a higher grade of staff; it was necessary to pay them more money but the end result was better work. He said that the Society had now reached the stage wherein it needed more staff in practically every region of its activities; Membership Services, the book department, the accounts department and for Radio Communication. However, there was no money available to pay for additional staff. A great deal of effort had been put into getting more work out of the present staff, largely by making extensive use of in-house computing facilities, but there was a limit to what could be achieved by this means. The editor of Radio Communication, in particular, had had a difficult year, with five or six staff changes to contend with.

Mr H Bellfield, G3SBV, asked why the delivery of Radio Communication was so uneven. The General Manager said that this was a perennial problem; there had always been enormous variation in the delivery dates of the magazine and this could be laid entirely at the door of the Post Office. He felt that the only way to improve the situation would be to send Radio Communication to members via first-class mail, but this would substantially increase the annual subscription; he thought that even so, there would still be a spread in delivery.

Mr A Milne, G2MI, said that the Post Office were contemptuous of second-class mail and that the only remedy for consistent late delivery of Radio Communication was to write a complaining letter to the local postmaster.

Mr R Clews, G3CDK, felt that the General Manager of the RSGB had an enormously difficult task and wondered whether an "administration manager" should be employed to assist him. The General Manager said that serious consideration was currently being given to this and that he had already indicated to the Finance & Staff Committee that he wanted to discuss the subject further next year.

Mr E Trowell, G2HKU, outlined his experience with his local postmaster at Maidstone in respect of the delivery of Radio Communication. The General Manager clarified some points of detail.

Mr J Sutton, G3TVY, noted that the address labels for Radio Communication were printed by computer; he felt that the computer could be used to carry out preliminary sorting to save time. The General Manager explained that this was already done and labels were pre-sorted before being sent to the packers.

Mr P Crosland, G6JNS, had asked why the Society had attempted to circumvent the Companies Act with reference to the disclosure of members' names and addresses. The Secretary said that this was not the case. Licensed radio amateurs could request that the Secretary of State for Trade & Industry did not disclose their particulars, and a number of amateurs took advantage of this provision. Under the terms of the Companies Act, the Society was required to give a full list of the names and addresses of its members, but the Secretary stressed that this did not apply to their callsigns. Two individuals had recently asked the Society for such a list, and in both cases the Society had suggested that they did not ask to be included in the list the names and addresses of those members who had asked the Secretary of State not to disclose their particulars in respect of their amateur radio licences. This had simply been a request; if anyone asked for a full list of members, the Society would have to produce it.

Mr R Broadbent, G3AAJ, commented on the provisions of the forthcoming Data Protection Act and asked whether the Society was familiar with its provisions. The General Manager replied that full legal advice on this matter had been taken and one senior staff member was about to attend a relevant course.

Mr G Membury, G8DJW, had asked why the chairman of the Raynet committee had been allowed to expel Mr T I Lundegard, G3GJW, from Raynet without advising or consulting the Council of the Society. In reply the chairman of the committee, Mr Geoff

Griffiths, G3STG, said that Mr Membury was effectively asking four questions, which he would answer in sequence. Firstly, the Raynet committee and its chairman were responsible to Council for the administration of Raynet. If the committee chairman failed to do his job, Council could remove him from office and no doubt would quickly do so. Secondly, in regard to the suggestion that Council had not been advised or consulted, Mr Griffiths pointed out that one member of the Raynet committee was also a Council member; both the Secretary and the President of the Society had been advised before the decision was taken.

Mr Griffiths went on to explain that Mr Membury's terminology was incorrect. Mr Lundegard had not, in fact, been expelled from Raynet; it was simply that Mr Lundegard's membership of Raynet became due for renewal on 31 December 1985 and Mr Griffiths and the Raynet committee had decided not to permit him to renew that membership. Only one Raynet member had been expelled in 1985; his expulsion had been requested by his Group Controller and was confirmed by the committee in accordance with the normal rules of membership of Raynet.

Finally, the refusal to renew Mr Lundegard's membership of Raynet had been a very painful decision, which the committee had been considering for about two years. There were many reasons for it, but the simple one was that Mr Griffiths had been presented with an ultimatum by all the Group Controllers in Kent. This group had collectively stated that either Mr Lundegard ceased to be a member of Raynet or Raynet in Kent would cease altogether.

Mr H Holmden, G4KCC, said that since he was an ordinary member of the Society, Mr Lundegard surely had the right to appeal against expulsion. The President said that, as Mr Griffiths had just pointed out, Mr Lundegard had not been expelled. Mr Holmden asked what was the difference. The President said that the difference had just been explained to the meeting. Mr Griffiths reiterated that it was not an expulsion; it was a refusal to renew membership, and there was an important distinction. Raynet was a voluntary organisation supported by RSGB, and this support included financial support for the central administration of the network but not for its detailed administration or operation throughout the UK. On joining Raynet, a member signed a registration form in which he agreed to abide by the rules, which were clearly set out. Mr Lundegard had no right of appeal beyond the Raynet committee.

Mr Holmden felt that any Raynet member should have a right of appeal. He thought that that a case against Mr Lundegard had been brought up in Council and that he had been victimised.

Mr L Ross, G8MWR, had asked why, as far as GB2RS was concerned, there had been an embargo on news relating to the new arrangements for Morse tests. Mr J Nelson of Headquarters staff explained that embargoes were occasionally used as a means of co-ordinating release of news; in this case, the intention had been to co-ordinate GB2RS, the Headline News and the Databox. As a matter of fact the GB2RS embargo had been overtaken by events, since the news was released at an earlier time than had been scheduled, on the Wednesday before the Sunday of the relevant transmission. It had, therefore, not been necessary. Mr Nelson added that the vagaries of first-class post made it difficult to make embargoes meaningful.

Mr P Day, G3PHO, had enquired as to Council's view of a suggestion that the RSGB hold a delegate conference at the National Convention, at which proposals put forward by affiliated clubs and societies could be discussed and voted on and at which a positive vote would make each proposal become RSGB policy. This system would enable grass-roots members to have a more democratic say in RSGB affairs, and was at present used by the New Zealand society. The chairman of the Membership and Representation committee, Mr W McClintock, G3VPK, said that one obvious objection would be that a minority could not be permitted to dictate to the whole of the membership, since not all members belonged to clubs. Equally, not all members of clubs were RSGB members. Council was currently considering in depth the relationship between the central administration of the Society and the affiliated clubs and societies; in its view the organisation of amateur radio at local level was of top priority. Mr D Holmes, G4FZZ, said that under such an arrangement the Society would have a similar constitutional framework to that of a trade union; it would require each member to have a local branch of the Society to which he could go. Such branches would require roughly equal numbers of members, which might be difficult to arrange. However, it would be a democratic way of running the Society. Mr Holmes added that he thought that there was a conflict between the part of the Society run as a company and the part which existed to promote amateur radio; as had been demonstrated at the present meeting, the requirements of the two did not always go smoothly together. Council needed to review this problem.

Mike Dixon, G3PFR, collected the Fraser-Shepherd Award on behalf of Mr F Smith, G6FK. He also collected the Mullard Award on behalf of Mr R M Jones, G3NKL.

Mr T Day, G3PHO, said that this topic had been discussed at his club some months ago; he himself had been a member of NZART of the local branch which sent its members to such a conference. He could confirm that the system worked well and felt that if all affiliated societies sent one delegate to such a conference, no more space would be required than that which was being used for the current meeting. Members of his club felt that they had no direct access to Council, and the "trade union" system seemed attractive since the club was located in an area where trade unionism was prominent.

Ms L Harper, G4FNC, pointed out that the proposals did not reflect trade union organisation since affiliated societies were not simply local area groups. Some were small groups with a handful of members and others, like the Royal Air Force Amateur Radio Society, had a much larger number.

Mr R Broadbent, G3AAJ, speaking as a Regional Representative, commented that he received little feedback either from the Society itself or from his local members. He also reminded Council that there had been no Regional Representatives' Conference in the current year.

Mr J Rabson, G3PAI, said that one difficulty with the proposals for a delegate conference was that Council members could conceivably be in possession of confidential information. Delegates might produce a policy which required Council to do something which it could not in fact do, and could not explain why it could not.

Mr P Nicol, G8VXY, said that members of clubs which were located some distance from the annual meeting could perhaps send delegate members to the meeting.

Mr R Clews, G3CDK, felt that there were also difficulties with this proposal. Not all club members were members of the Society, and neither were all members of the RSGB also members of clubs. He added that in his own area of South London there were at least ten clubs within a short distance of each other, and many local amateurs were members of more than one. Compulsory membership of an amateur radio club was also probably impractical.

Mr D Holmes, G4FZZ, said that the proposed delegate conference system would have to be separate from the existing club organisation and would need to be run by the RSGB on a centralised basis; it would cost money. Speaking personally, he felt that such a proposed system was a good idea. It would be open to members to join a branch which supported their particular interest rather than their regional branch, which again was comparable with the modus operandi of the trade union movement. He cited the example of his own trade union.

Mr L Ross, G8MWR, speaking as a regional representative, said that he did not feel that the Society was making efficient use of the existing scheme of regional and area representatives. New Society members were not told who their regional representative or area representative were, what they could do for him or how he could get in touch with them. Mr Ross felt that a good deal of routine matters handled by Headquarters should never have arrived there; they should have been dealt with by a local representative. Equally, representatives received very little information on Society affairs and were therefore not in a position to comment on or clarify matters to local RSGB members. Representatives were, therefore, accused of having poor communication with members at local level. Mr Ross added that members had frequently told him that there was no point in their asking him anything and that they would have to contact Headquarters. This point had been made at the last Regional Representatives' Conference some 18 months previously, but nothing had been done. Mr Ross said that it was as though a company possessed a regional and local sales force but did all its selling from its headquarters.

The President said that she quite agreed with Mr Ross' comments; she had very much wanted to make changes of this nature at the beginning of her presidency but other matters had had to take priority. She added that the saddest part of her year of office was that she had not made progress in this area.

Mr Ross suggested that, as a matter of urgency, Council contact all regional and area representatives to obtain their views on how the situation could be improved. There were real problems at local level, and members felt that they had no access to the Society; something had to be done quickly if the Society was not to alienate the loyalties of many of its members.

Mr L Mansfield, G2SP, had asked who had access to, or sight of, copies of Radio Communication before the membership at large. The President said that the answer was Council members, regional representatives and members of staff, making about 45 people. Mr Mansfield asked how many staff were involved, and the President answered that it was about five; she asked why Mr Mansfield wanted to know. Mr Mansfield said that earlier in 1985 he had played a practical joke by advertising a piece of equipment which did not exist; however, he had received three or four offers for it before Council members received their copies. Between then and the time at which the membership in general received copies, he had received a further 15 offers. He had not told anyone else about the advertisment or the purported sale of the equipment.

Mr A McKenzie, G3OSS, cited a similar instance.

The President said that a letter had recently been sent to all regional representatives reminding them that they were not to divulge the contents of their advance copy of the magazine; she added that they received Radio Communication early so as to be able to answer questions from members relating to its contents.

An unidentified member pointed out that the printers and distributors of the magazine saw it before anyone else.

Mr R Cracknell, G2AHU, said that questions of this nature were frequently asked at annual meetings and he would have thought that by now a culprit would have come to light. Mr A McKenzie, G3OSS, said that in his case the buyer was not prepared to tell him how he had obtained the information; he added that it was difficult to be rude or forceful if one was attempting to sell something.

The President said that there were two final questions which she would like the General Manager to read out. The General Manager said that one was from a member who wanted the National Exhibition & Convention to move back to London, and the other was from a member who wanted the annual meeting to be moved away from London. He added that the move to the NEC had taken place because greater access was thereby given to the majority of Society members; costs for London venues and the National Exhibition Centre were also similar. However, the situation was reviewed every year, and if there was a possibility of a smaller exhibition in the London area at a favourable time of year, the Society would consider backing it. As regards the second question, the matter had been considered many times in the past. Council's concern had always been with the necessity of having a quorum, which was 50 members. The Secretary could see no reason why Council should not reconsider the venue for the annual meeting, but the meeting could not take place at all without a quorum. Other members had asked whether the annual meeting had necessarily to be held in December; the Secretary believed that it had to be held in either November or December, but he would check this in the Memorandum & Articles of Association. This was because of the way in which the Society's financial year ran from 1 July.

Mr A Milne, G2MI, wished to draw the meeting's attention to the recent sad death of Mr Arthur Watts, G6UN. He had died at the age of 91, and an obituary notice had appeared in the December issue of Radio Communication. Mr Milne felt that it was appropriate to mention the debt of gratitude owed by the Society to the late Mr Watts; he had attended early conferences relating to radio in the 'twenties at his own expense and had done much to establish the credibility of amateur radio with the world's governments. He had been President of the RSGB several times and was one of its honorary members.

Maj K Ellis, G5KW, asked the President to read out the two questions regarding the 50 MHz band which she had not answered earlier in the meeting. This was so that the Six Metre Group did not feel isolated. The General Manager said that there had been a number of questions relating to the timescale involved in the release of the band; the President had given the latest information, which was essentially that the Society hoped to see some progress early in 1986.

Mr R Broadbent, G3AAJ, wished to mention that a G2BVN memorial was planned; it had been mentioned in Region 1 News but not in Radio Communication. Mr Broadbent also asked for more information from Region 1 News to be promulgated by the Society.

The President then closed the meeting at 6.50pm.

The Norman Keith Adams Prize went Messrs P Robinson, G3MRX and A Jones, G8WJL.

THE Members' Ads PAGES

FOR SALE ••••••

TA33 Jnr tri-band 3-ele beam, £50. Ham II rotator HD, £60. Telescopic ali mast, 3x15' c/w winch, wall brackets, guys, £65. SP25 t/table, mc cart, plinth, £10. Organ, 2off 5-octave manuals, needs attn, £50. G2BUW, NOT QTHR, tel: Locks Heath (Hants) 81135.

COMPUTER, Tatung Einstein, twin drives, colour monitor & 80 column card, as new boxed, lots of software available, exch for 70cm/23cm TCVR, cash adjustment if necessary or sell for £420. TS120V, bought for mobile, never fitted, ex condx, sell £250 no offers. WANTED: 70cm gear. For 2m:- muTek masthead pre-amp, 100W+ linear amp. Large psu. Frequency counter. Daiwa CN500 or CN620A meters. SP102. Ext vfo for 102. Cash waiting! Morris, tel: Telford (0952) 461277, after 6.30pm.

ICOM IC730, Daiwa CNW218 pwr/vswr cross needle atu, Icom PS20 psu, Fritzell tri-band vertical antenna plus coax & antenna mounting brackets. Complete sation, £600 ono. G4KHY, QTHR, tel: Bude (0288) 4228.

KENWOOD SW2000 swr/pwr meter, £75. SPC3000 atu enables use wire coat hanger on top-band, £165. Both brand new. G4CHP, QTHR, tel: 0508-470365.

HOUSE CLEARANCE SALE: Trio TS430 c/w PS430 & AT130 little used, £700. Trio TR2300 with nicads etc, £85. 15W amp for 2300, £15. Also VHF antenna & rotator; 10m converted DNT 11m rig; MM144/28 tvtr. G4TJG, tel: Reading 866770.

DATONG AD170 active antenna, £20 ono. Pair Wharfdale Melton II spkrs, £45 ono. Buyer collects G4SQG, QTHR, tel: 01-337 3454 (Morden).

OVER 50 BOXED VALVES for Army WS62 TX/RX, offers? Icom 29MHz FM TCVR, offers? Creed 444 teleprinter, offers? Pair T1154/R1155 rotary transformers, offers? Buyer collects transformers & teleprinter! G3JFC, QTHR, tel: 0474-872743.

TELETYPE ASR33 upright desk model, good for spares only, also set of 4 teletype manuals. All FREE to collector. G3KKN, QTHR.

DECCA 202 RX, vgc, £80. Buyer inspects & collects. J Shepherd, 140 The Broadway, Herne Bay, Kent, tel: Herne Bay 368798.

STANDARD C78 70cm FM TCVR, soft case, chgr, nicads helical, £175, matching CPB78 10W amp, £65; the pair, £230. Drake SSR1 gen/cov RX, vgc, £140. Eddystone EC10 gen/cov RX, battery/mains, £65. G3BDK, QTHR, tel: Towcester 52309.

ICOM 740 TCVR, £570, Icom psu ICPS15, £85, psu not sold before TCVR; pair £635. Marconi Instruments digital multimeter TF2670, amps/volts/ohms ac battery pack integral, charged from 110V ac, £50. G3BDK, QTHR, tel: Towcester 52309.

JAYBEAM 3-band vertical, 10/15/20m, vgc, £25. 10m 3-ele beam, £15. Sinclair Spectrum Interface 1 M-drive & 14 tapes, £65. Ext extn 'S' meter, £10. WANTED: FT290, cash waiting. G0EGX, tel: Tiptree (Essex) 815978.

VIDEO RECORDER, Philips colour, working, with 5 tapes, £50. 2 hour tapes 1500/1700, £2.50. BNOS 25A psu, £120. Standard C58, 2m multimode, £195. FT726R 2m, mint, £585. FT757GX, boxed as new, £595

WANTED: JVC CRC-1 video, Sony or JVC PCM adaptor. Lynch, tel: 01-998 4936, after 7pm.

TRIO TS820 c/w dc converter, CW filter & stand mic £525. VFO520, £520, AT200, 200W tuner, £65. All with manuals. If purchased as complete stn, £600. GW8OKR, QTHR, tel: 0222-627151.

MM432/28S tvtr c/w plugs, new, £145. MM144/100LS amp, 1-3W i/p, mint, £120. Standard C58, 2m multimode mobile/portable TCVR c/w CPB58 25W amp, mobile mount, chgr, nicads, case, mint, £270. Prefer buyer inspects & collects. G3RLN, QTHR, tel: Tewkesbury 296769.

50MHz home-brew tvtr, QQV06-40 pa, 50W o/p c/w psu spare valves, MM50/28 cvtr, £80. J-beam 144 4-ele quad, unused, £25. KR250 rotator, unused, £40. JR310 RX, £30. G4DSC, QTHR, tel: 0765-2230.

TOWER, approx 35', 2-section, tilt-over & wind-up, less than one year old, winches included, ground post fixing, £150 ono. Sirtel 5-ele 11m beam for conversion to 10m, all details included, 11dB gain on 11m, £20 ono. G4WMO, tel: Lincoln 752563.

TRIO TS770E VHF/UHF TCVR, boxed with manual & in mint condx, £600. Silent key sale of G3WSI. Contact G3SRU, NOT QTHR, tel: 0843-42209.

TRIO TS530S c/w MC30S mic, YK88C filter, KB-1 deluxe knob & handbook, also full Trio workshop service manual, just over 1 year old, little used, immac condx, £525 ovno. G4AQZ, tel: Clacton-on-Sea 435700.

AR88D, gwc c/w handbook & some spares, £40. Mains psu, 28V @ 4A, £5. KR500 elevation rotator, hardly used, £90. Buyer collects or will deliver 50 miles Martin, G8IEM, QTHR, tel: Hayling Island 466825.

SOMMERKAMP TS788DX AM/FM/CW/SSB with handbook, gc, 26-30MHz, £200 ono. G4PYU, QTHR, tel: 0737-63773. Sommerkamp TS280FM, gc, with handbook, £100, G4PYU QTHR, tel: 0737-63773. Yaesu FT202R, 6ch handheld with nicads & chgr, £85. G4PYU, QTHR, tel: 0737-63773.

CREED 444 Teleprinter, vgc c/w perforator, reader, paper etc, just overhauled, £30 or exch for 2m linear suitable for 290R, Rotator or WHY? G1SIQ, tel: 01-391 0450, after 5pm.

SILENT KEY SALE: Hallicrafters SX100 RX, 4 new electron tubes (ex USA), instructions. Offers please and tel: 08482-568.

ICOM IC02E, full coverage 144-148MHz, BC26E chgr, Kenpro spkr/mic, manual, £210. G3FVB, QTHR, tel: Buxted 3356.

JAYBEAM 2m 4-ele Quad, £15. Hygain 12AVQ, £35. HF5 radial kit, £20. Yaesu FAS-1-4R remote antenna selector, £25. Sony ICF2001 synthesised RX, £60. All carriage extra. Middleton, 49 Wolseley Road, Stafford, ST16 3XW.

TRIO 7200G, 10W FM mobile TCVR, 18ch fitted, offers? Microwave Modules cvtr, 2m-28MHz, £20. Trio 9R-59DS HF RX, original packing, £70. Roger Killick, G8KWR, QTHR, tel: 0260-275658, evenings, or Telecom Gold 72:MAG90034.

ICOM IC22A 1/10W o/p, xtalled S10-S23 & R0-R7, auto tone-burst, mobile bracket, original box, handbook, £135. Adonis AM502 base compressor mic with scan, fit any rig, £25. Winch for tower/boat etc, 7" drum, £25. Comben, tel: 0245-324555.

TELEREADER CW & RTTY model CWR-680 & Reuters monitor, must sell together, vgc, £125. Allan, G4ZON, tel: 01-805 6132.

KW2000A, 2 new 6146B, c/w Datong D75 processor & Grundig mic, vgc. G4KBY, QTHR, tel: 01-778 9422.

HEATHKIT "MOHICAN" gen/cov RX, 550kHz-30MHz and 144-146MHz, digital display, internal 12V rechargeable, £95. MM2000 RTTY-TV converter, £85. Datong Morse tutor, £40. All ex condx. K W Clark, G3WIF, QTHR, tel: Bristol, 293738.

IC720A with FM board, gen/cov RX and amateur band TCVR, c/w ICPS15 psu. Both ex condx, £650. G4UKS, QTHR, tel: Thanet 224558.

TOKYO HY-POWER 2m linear type HL45U, 10W i/p 45W o/p, £110. Microwave Modules 2m linear 1-3W/30W, mint, £72. NEC RGB high res monitor, £235. NEC green screen monitor, £70. Also muTek SLNA144S pre-amp, £30. Paul, tel: 0293-515201.

HALLICRAFTERS SX101A RX c/w original manual, £60. ANF notch filter, £40. GM1RDG, NOT QTHR, tel: 0467-22381.

YAESU FT290R TCVR with MM 30W linear amp, as new, nicads, chgr, carrying case, spare antenna, £280 or exch for good 25W FM TX plus cash. Brian, GOADL NOT QTHR, tel: 061-724 4218, anytime.

SPOKES, will fit HQ1 and C4 aerials, £1.10 ea plus 50p p&p per on total qty. G4RUJ, 33 Kingsman Drive Clacton-on-Sea, Essex, tel: 0255-431435 (or 431390 after 6pm).

IC202 2m SSB TCVR with nicads, beacon/Oscar xtals, £100. G8UUE, QTHR, tel: Bristol 507056.

DRAGON 32k computer with RTTY tone generator interface & RX CW program, few games, immac condx, in orig packing, £55 incl p&p. GM4VNQ, QTHR, tel: 0563-30401.

SWL LAR OMNI-MATCH, £30. For listening only. Also Trio R2000. Wood, tel: Clochen 378.

YAESU FT101Z Mk3, unused, £450. FT780R 70cm multimode, £320. FT480R 2m multimode, £280. FT720RU 70cm mobile, £150. FT720RV 2m mobile, £125. TR2400 c/w chgr, £150. All ono, can deliver. David, G8PZL, NOT QTHR, tel: Poole 631636 or mobile 0860-320702.

TRIO 9R-59DS RX plus matching spkr, £50 ono. G4CLZ, NOT QTHR, tel: 0226 766377.

MM144/28R tvtr, 25W o/p, as new, £165. Yaesu FT709R 70cm handheld, YH-2 headset/mic, NC-9C nicad chgr, as new, £250. 70cm 3x 5/8 mobile colinear on gutter mount, £18. 2m 7/8 mobile whip, no mount, £10. 2x 28MHz mobile whips, no mounts, £2.50ea. 15 rolls 5-track paper tape, 50p ea. Hazeltine 2000VDU, speeds to 2400 baud, u/c only, (very heavy), £20. Ithaca DPS-1 S-100 computer system, 2x8" floppy drives (Shugart compatible), Z80 CPU, 64k memory, 4xi/o boards, real-time clock in professional cabinet plus CP/M, licence, all software & manuals, 40 floppy discs, £250 (floppy controller needs attn!) Barnett Wildcat crossbow, 45LB prod, 125LB prod, telescopic sights, other accessories, £65. Buyer collects or pays carriage on all items. G0CNR, tel: St Albans 32759, evenings & weekends only.

BNOS 12A psu, £63. FT290R TCVR, rev/rptr shift, muTek front-end, factory mods, £215, soft case £2. JIL SX200N, £180. Manuals both equipment. Telex C610 cans £4, Microwave 100LS linear amp, £100. Daiwa CN620A meter, £36. LAR VHF omnimatch, £22. Noisebridge, £25. Shinwa 2m bandpass filter, £6. Davtrend antenna switch, £9.50. Wavemeter, £22. SA450 antenna switch, £4. Jaybeam 4-ele Quad, £10. Ringo Ranger MK2, £10. P&p extra. G8NKU, QTHR (Kings Lynn), tel: 0553-674015.

MICROWAVE MODULES 2m/70cm tvtr, MMT432/144, 10W o/p, set up for FT290R driver, ie 6dB att, vgc,

RSGB Members' Ads - seen by over 37,000 amateurs & SWLs each month

handbook, £115 plus postage. G4NFM, QTHR Grantham, tel: 0476-61206.

FDK 700E 2m FM, 25W variable, rptr shift & tone burst, mobile slide mount, £130 ono or part exch. G1BWW, tel: Hitchin 711722.

YAESU FT7 TCVR, manual, £225. Racal RA17RX, SSB adapter, manual, £175. Trio 7010 2m SSB TCVR, manual, £90. Teac X10 reel to reel stereo tape recorder plus tapes, £230. KW107 atu, £105. G6PJT, NOT QTHR, tel: 0278-684042 (Somerset).

TOTSUKO 2m SSB with pre-amp, £110. Jaybeam D5/2m Yagi, £20. SEM audio filter, £30. C4 HF vertical, damaged but easily repaired, £35. Assorted HF transformers, capacitors etc, come & have a look! Richard, G4TGJ, QTHR, tel: Potters Bar 51449.

NEWBRAIN AD Z80 based micro, completely self contained with integral display or may be used with monitor or TV, as new c/w handbooks & 32k RAM £65. G8AJM, QTHR, tel: Slough 682112, evenings & weekends.

KENPRO ROTATOR KR600C c/w control box, new and unused, still boxed, £150. Also Kenpro top bearing K5065, new, boxed, £20. Altai KDM6 TR dip meter, (basic requirement), unused, boxed, £12. G4PVV, QTHR, now QRT, tel: Leamington Spa 881507.

YAESU FT757 TCVR, 9 months old c/w desk/mic, £625. Daiwa CNW419 atu, £120. Daiwa PS310 30A psu, £135. All mint condx. G6CUL, QTHR, tel: 0602-894547.

FT209H HANDIE, FNB3, FNB4, NC9C, NC18, YH2, all new and unused (with proof), £250. Tokyo HL82V, perfect, £95. Phil, G4TXS, tel: 0602-616619.

YAESU FR101 RX fitted with 2 & 6m cvtr's, filters for CW/AM wide & narrow, unmarked condx as new, £185 ono. Pitt, tel: 021-742 8850.

FT101ZD Mk3, fitted FM c/w mic, fan, manual, orig packing, very recently serviced, mint condx, must be seen, £495. Chris, G4XWI, tel: 0474 82-3797.

YAMAHA ELECTONE A55 electronic organ, two 3-octave keyboards, 1-octave pedals, c/w stool & cover, £275 ono. G8ZNH, QTHR, tel: 0494-36505.

HF TCVR 101ZD Mk3, FM, fan, mic & FC902 atu, both unused in maker's cartons, checked, tested by Arrow Electronics. Free - with equipment, KW balun 1:1 50 ohm, 6-ele 2m quad, h/phones 2000 ohms, spare Yaesu hand/mic, Sanwa multi-test meter, first £575 secures. G1AVE, tel: 0621-55648.

TRIO 130S, incl WARC bands, mint condx, 4 hours use, bought new 1985, £500. Trio ATU230, mint, £100. Oscar 10m FM with mic, mint, £50. Original packing & manuals, buyer inspects & collects. G4SIB, QTHR, tel: Newdigate (Surrey) 362.

FT101B HF TCVR, fan, FM adapter, CW filter, ex condx, boxed, manual, new valves fitted, new spare valves, recently serviced by SMC, £300. Also 2m Jaybeam LR1/2M colinear antenna, £15. G0BDJ, QTHR South Devon, tel: 06267-6259.

COMPACT HF STN. TS130V TCVR with CW filter & mic, PS-20 psu & AT-130 atu, prefer buyer to inspect & collect otherwise carriage extra, £500 prefer not to split. G4TMO, tel: Ottershaw 3892.

FT707 + FC767 HF TCVR + atu & leads etc. No mods, vgc, £360. G8WTM, QTHR, tel: 0245-466915.

STORNO EQUIPMENT: 4off CQM600, 8ch mobiles, control boxes, mic's, xtalled 2m, 4m, marine, matching CQP500 handhelds, 4m, marine, 8 new batteries, chgr, TS500 testing stn incl regulated supply, IF marker, meters current, volts, pwr, RF probe. Plus boxes of spares for CPQ500/CQM600, enough to build up one of each, many new. VHF/UHF pa's, front-ends, filters, amps, tone incl manuals complete lot only for connoisseur, £220 ovno. G4MBZ, QTHR, tel: Farnborough 837581, evenings.

SILENT KEY SALE: AOR AR2001 VHF RX, 25-550MHz, £200. ICR71E+RC11 gen/cov RX c/w remote control, £500. FRG9600 VHF/UHF RX, £300. FR101 HF RX, £200. Datong FL1 af filter, £35. World Radio & TV Handbook 31st ed, £12. Sony ICF2001, HF RX, £75. Calscope Super 10 scope, £45. Heathkit scope, £25. MM 432MHz cvtr+psu, £25. Advance RF gen, 100kHz-60MHz, £15. Eagle af gen, 0-200kHz, £10. FRT7700 atu for RX, £35. Sony ICF5900W MW/FM/3SW RX + xtal calibrator, £40. Kenwood QR666 RX, AM/SSB/FM, HF mod for 2m/70cm, £75. Sinclair mini-TV, £50. 12" B&W TV, £30. Datong UC/1 up-cvtr £25. Stolle rotator, vert+horiz control, £30. 2off 10-ele 70cm beams + 2off 4-ele 2m beams, £30. Tandy digital multimeter, £10. Eagle variable dc psu, 1.5A 0-30V, reg, £5. Tandy variable dc psu, 1.25A 0-25V, £5. 6pr headphones, Sony & Tandy, £1ea. Kamoden 360-TR 24-range multimeter, 10k ohm/V, £5. 3-way ant switch. PC1254 Sharp pocket computer 2.2k memory. 2off Ross dynamic mics, 50k ohm & 600 ohm. Tandy: sig/tracer, sig/injector, transistor tester. Hewlett Packard 21 calculator. Cassette recorder. Microscope kit. Carousel type slide projector & holders + Boots slide box (holds 200). Home brew equipment: GDO 400kHz-150MHz + several coils; Frequency meter 0.45-90MHz and 50-500MHz; RX atu; FM IF/gen 455kHz and 10.7MHz; Coax line impulse gen impedance (to 30MHz) attenuator (75 ohm); 200W pa (believed to be for af); 4.5V 0.5A reg psu. C/R bridge; lots of connectors, BNC PL259 etc; offers to R Colomb, tel: 01-952 0033. Also GEC scope, £1 ono. Philips N1700 VCR + 24 cassettes. Micro Consultants Video analogue to digital cvtr model AN-DI 802VID. G4SYI, QTHR, tel: 01-958 9868.

FT2700, £375. TR8400, £160. FT708 c/w NC8 chgr/psu £150. Icom IC120 23cm TCVR, £300 ono. Dragon 32, £35. Altos 8000 series computer, twin 8" drives, £550. Keith Ferguson, tel: 0234-751397 (home), or 0582-29602 (work).

TS700G vgc, boxed, manual, Lowe CW sidetone, £250. MMT432/144R c/w 15dB att, vgc, £100. Revco mag/mount c/w 5/8 whip & coil, £12. VHF wavemeter, 65-230MHz, £10. Sandpiper 4m 3-ele Yagi, unused, £10. G4TIF, QTHR, tel: 0926-313669.

VIDEO GENIE level 1 with 32k exp unit, 2off 5.25" disc drives. Wascom Imp printer, flat screen monitor + software, £375 complete. G6TLB, QTHR, tel: Worksop 475554.

60' WESTERN TOWER on 4-wheel trailer, hand luff elect hoist. KR2000RC rotator, unused. Tektronix d/beam oscilloscope type 547. All vgc, offers? G4WHJ, tel: Gainsborough 788883, after 5pm.

ICOM 215E, mint, unmarked, unmodified, original packing, absolutely like new, £400. G4TSO, QTHR, tel: Torquay 213085. Icom 720A, PS15 psu, mint, unmarked, unmodified, orig box, packing, like new, £675. G4TSO, QTHR, tel: Torquay 213085.

DATONG D70 Morse tutor, ex condx, still in orig box, £35 ono. G8YQS, NOT QTHR, tel: Ruislip 31825.

VERSATOWER 60' base mounted, head unit, heavy duty Ham rotator, cable, 9' aluminium tube 2" dia. Ryall, tel: 078-571-4606.

4-ele 50MHz YAGI, £25. Heathkit valved comms RX, 1.8-30MHz, £25. SMC swr/pwr meter, £10 only. Buyer must collect antenna & RX. Ricky, G1RWV, tel: Dartford 92833.

PALM ", 6ch handheld TCVR (5 fitted), ex condx, c/w chgr & dc lead, £75 or exch for Welz SP220 meter or VHF linear (10W i/p, 50W o/p) must be in gc. G4ZFX, QTHR, tel: Workington (Cumbria) 5814, after 6.30pm.

RACAL RA117 gen/cov RX in cabinet, RA121 SSBADD, RA137 LF conn together cabinet, connec leads, spare valves, manuals, spkr, £315 or exch for AR2001/2 scanner or FRG9600. Buyer collects. Abbey, tel: Basingstoke 882825.

YAESU FT290 c/w chgr, nicads, mic, carrying case, & MML144/30LS linear amp. All mint condx & in orig packing, £300 + p&p. G4ZMG, NOT QTHR, tel: Lincoln 694327, evenings & weekends.

TRIO 830S, AT230 & MC50 mic, all vgc. Also part built PW Marchwood psu, most parts incl case & transformer. G4VOV, QTHR, tel: Rochdale 526834.

ICOM SP3 spkr, £45. Icom HM7 hand/mic, new, £15. muTek 10GHz GDIF107UB Gunn board, £46. SL144s 2m, pre-amp, £31. RGB (640x400) colour monitor, superb £215. Also green screen monitor, comp video, £71. Both NEC. Paul, G4XHF, tel: 0293-515201.

YAESU FT101E new bands, 350Hz CW filter, just back SMC overhaul, £350. YC601 digital readout, £65. FV101B ext vfo, £60. FC901 atu, £85. SP101BP, spkr phone patch, £35. Haeth 0-12-U scope, £30. Collect or carriage extra. G4COF, QTHR (E Sussex).

KENWOOD SM220 monitor/scanalyser, all accessories, ex condx, £200. Cushcraft R3 20/15/10m 3-band vertical, complete, ex condx, £180. GM3TRI, QTHR, tel: 0378-26941.

YAESU FT726R, fitted 2m only, mint condx, £550. Yaesu FT757 HF TCVR & gen/cov RX, mint condx, used on RX only, less than 1 year old. F Thomas, tel: 0524-51896, evenings.

KW2000B TCVR, ex condx. Home brew Z-match swr bridge. Tokyo 80-10m atu. Coplete HF stn, £260. Icom IC255E 2m FM 1W/25W, many features, £140. Buyer inspects & collects, G3WRO, QTHR, tel: Harlow 30609.

TRIO TS99 TX, 80-10 and RX JR599 160-10 plus 2/30m Custom Specials, £325. Can deliver 100 mile radius Also "Teleprinter Handbook", new, £5.50. G4MPK, QTHR, tel: Leatherhead 375514, anytime.

ICOM IC30A 70cm TCVR, £75 ono. Trio 2200GX, 2m TCVR, £65 ono. JIL scanner SX200 with psu, instructions, £125. Paul, G8CBM, tel: 0621-892075, evenings.

TW4000A c/w psu, £445 ono. IC202 with satellite xtal, £120. MML144/25 linear/preamp, £60. Ex-radar scanner motor unit, makes super antenna rotator, £20. G3OMK, QTHR, tel: 0509-261778.

TRIO R600 RX, little used, boxed, £200. Will deliver within 30 miles radius. Mr Sellors, 11 Barton Close, Forest Town, Mansfield, NG19 0DD.

VARIAC for 240V 0-120V @ 6A, £15. RadComs from Jan 84 to Dec 85, offers? AR200XL rotator, full 360 deg rotation, £25. DM-313P pwr dynamic hand held mic, new, £5. Buyer collects or pays postage. Marsden, tel: Burscough 892088.

ICOM IC701, psu & RM3 control, slight fault so £325. Buyer to collect. G5DS, tel: 01-390 1566.

EDDYSTONE 358X, 40kHz-30MHz, complete coils, psu, £50. Sony stereo CF610 complete, ex condx, £25. Buyer collects. G3AJT, QTHR, tel: 0794-512557.

ICOM IC251E 144 MHz multimode, muTek front end, absolutely immaculate, £500, no offers. MM 28/144, 28/430 MHz tvtrs with psu, metering, plug straight in to Icom 701/720 series, offers. Jaybeam PBM 18, boxed, never used, £20. G4FRX QTHR tel:01-794 9200

COMPUTER DISKETTE DRIVES, 8" 500k Byte. 4off plus 2 cabinets each with 60W psu, ie 5V 3A, -12V 0.17A 24V 1.7A. Will split, might deliver. G8EAD, QTHR, Camberley 61945, evenings & weekends.

FRAME STORE, G8XTW/YU3UMV design for weather satellite reception, £80. Yaesu FT790, case, nicads, chgr, spkr/mic, £225. MM432/30LS 70cm linear, £95. MM432/28 tvtr, re-cased, incl coax relay, £70. Welz SP400 meter, £50. G6VCI, QTHR, tel: 0763-61102.

POWER SUPPLIES: 0-30V 0-30A, £65; 0-3500V approx 600mA Variac controlled, £65. 2m linear, 10W i/p 100W o/p, £80. AR-40 rotator, £75. FT7 fitted 160m tvtr, £250. 2m 10ch scanner, fitted 5ch, £35. Mobile mount for TS120, £10. G4MH mini-beam, £40. Scarab RTTY with Spectrum interface, £20 ono. G4PDQ, QTHR, tel: 0242-42336.

TEKTRONIX SCOPES: 533A, £65; 581A, £70; 555 d/beam £85. Airmec 210 mod meter, £25. Marconi 801D/8S sig/gen, 10MHz-485MHz, £65. Avo 7, £19. Advance audio/gen, £25. TF1101 oscilloscope, £35. Must clear, SAE for list. G4YVJ, QTHR, tel: Brighton 416963.

RACAL RA-17 RX with handbook, £165. BC-221 freq meter, 120kHz-20MHz, £40. TS343UR freq meter, 20-500MHz, £50. Both fitted with int mains psu's, orig charts & in superb condx. Wayne-Kerr B521 C/L/R component bridge with handbook, £35. Electronic Measurements Corps, Laboratory type psu 0-35V @ 15A, full overload protection, vernier control, £35. Pye MP-1FM hi-band Bantams with data hand/mic & battery tray, £21. Hudson FM hi-band portables with mic, very rugged, ideal Raynet, £7.50. Solartron CX-1222 scope, 24MHz dual, 48Mhz single beam, interchangeable units, £60. Pye hi-band AM-10B, £7.50. Rivilin transistor bench psu, 0-30V @ 1.5A, metered, £20. Avo VVM with probe, £10. All items vgc, buyer collects or pays carriage. G3MOE, QTHR, tel 0242-524217.

FT480R 2m MULTIMODE TCVR, as new, use limited because of business commitments, £275. Buyer collects or pays carriage. G3OFK, QTHR, tel: 0734-733674.

FL-2100Z, brand new, £495. SSTV boards, built, £75 FT102, £525. TS430, £600. Ray Whitehead, G4GWZ, tel: Stroud 2429, after 6pm.

HEWLETT PACKARD VHF sig/gen type 608E, 10-480MHz, ex condx, c/w manual & cct diagram, £250. G3TEL, QTHR, tel: Wantage 4019, evenings & weekends.

FT101ZD FM MK3, £450. MM tvtr 28/144, £60. Dumont 224A scope, manual, gwo, £10. Offers for manuals: 19 set, radio compass SCR269G, Test set 184/AP. G2HHV, tel: Batley 470667.

TRIO TS120S HF TCVR, gc with manual, orig box, £350. Trio VFO120, remote vfo, suits TS120/130 or TS830, £30. WANTED: MM 70-28MHz tvtr. GM3WCS, QTHR tel: 0383-726456.

FT790R 70cm MULTIMODE, ex condx, £250. Matching BNOS linear 432-1-50, perfect, £190. BNOS linear 144-25-160, perfect, £210. 1x19-ele Tonna 432, £12. G1KDF, QTHR, tel: 0695-74868.

FT77FM, FC700, Drae 24A psu, G5RV lo-pass filter, key, mic, phones, G-Whip, £550 buyer collects or pay Securicor. G4DIU, QTHR.

COMPUTER CBM64, 1541 disk drive, CZN data recorder, Simons basic, easy to file on disk, introduction to basic on disk, Morse tutor, many games, box, 5.25" disks & books, £350 ono. G1PLN, NOT QTHR, tel: Alsager 6149.

YAESU DESK/MIC MD1, scanner, duo/imp, £45. Bremi linear BRL200 11/10m, £45. H/gain 10m 5/8 vertical

£20. TCVR DNT 10m, £35. Rotel 230 TCVR, £30. Zetagi 70W 10m mobile linear, £20. All vgc. Max, G3WMB, QTHR, tel: Ware 3564.

HF5V/HF5R 5-band trap vertical & radial kit, vgc, 3 months old, orig cartons & instructions, £75 carriage extra or collect. GW4COY, NOT QTHR, tel: Prestatyn 5223.

IC720A, TS430S, both extra filters. Rotators. 10Mb Winchester & various cards for IBM PC. Shure 526T cards for IBM AT incl 2.5Mb multifunction. Icom CB1050. HC50 mic. All items in ex condx. Ring for prices, sensible offers only. G3EFB, tel: 0628-75567.

CLASSIC RX, GEC BRT Wood in working order, with manual, £80 or swap for KW107 ATU or similar. Dymek DP40 RF preselector, £30 or swap for GDO. G4MNB, QTHR, tel: Swindon 826325, after 7pm.

EDDYSTONE 740 gen/cov RX, vgc, £45 ono. G3XNA, QTHR, tel: 0705-381103.

TRIO JR599, TX599 CS, in gc, £270. G4JCL, QTHR, tel: 0484-862675.

FT203/FNB3 handheld 2m, FM, 2.5W o/p, orig packing and chgr, £165. G4FAS, QTHR, tel: 061-437 7784.

TR9130 2m MULTIMODE, 25W, £295. Also 1.5kVA petrol generator, 240/110V, £65. G4UVQ, tel: 0462-674437, evenings.

FT757GX, FC757AT, FP757HD, £815. Daiwa PS300, 30A psu, £120. MML144/100LS, £115. Mutek GFBA144e, £99. Mutek GLNA432e, £99. MMA28v, £18. Jaybeam VR3, £30. MET 144/14T, £31. Tonna pwr/splitters, 2-way, 144MHz & 432MHz, £24ea. G4YAI, QTHR, tel: 0744-883541.

YAESU FL-2100B LINEAR, mint condx, 5 hours use only, £400 ono. Yaesu FC102 atu, mint, £125 ono. Frank, GOAKX, QTHR, tel: 061-928 6828, after 6.30.

KENWOOD TS711E, mint condx with orig packing, 7 months old only, £640. Racal RA17L RX, ex condx, £180. Drae Morse tutor, £30, no offers, buyer inspects & collects. Pete, GOEDU, tel: 0386-858829, evenings.

TRIO KENWOOD TS130S TCVR & Trio PS30 dc psu, £400. Trio SP230, £35. Trio AT130, £50. Trio DFC230 freq controller, £25. MC50 desk/mic. £15. Trio world clock model HC-10, £35. Microwave Modules MMT432/144R tvtr, £100. Trio HS-5 headphones, £10. Trio TR7010USB tcvr, £70. Daiwa CN630 swr/pwr meter, £50. Datong automatic RF speech processor, £50. G8TTD, QTHR nr Blackpool, tel: 0995-71089, evenings.

DRAE 12A 13.5V psu, gc, £30. G4MPN, NOT QTHR, tel: Leyland 435316, evenings.

ICOM IC02E handheld c/w leather case, spare nicad pack & spkr/mic, £220. G4VWB, QTHR, tel: Derby 551945.

TS940 NEW, TS930 as new, all may be tested, no time wasters please. Hart, tel: Derby 833684.

2764 NEW EPROMS, surplus to needs, £1.25ea, Mitsubishi/NEC branded, 78 left! Buyer/s to collect. John, tel: 01-574 5265.

TILT-OVER 60' galvanised tower, base plate, winch, drum of new steel erecting wire, also 70' h/duty coax, £275. New, boxed PDL2 beam, £40. Also Hirschmann Hitro 250 rotator, new, boxed, with control unit, £45. Stephenson, tel: 0642-454979.

35' STEEL ANGLE IRON TOWER, with head unit drilled for Ham-M or similar rotator, buyer inspects & collects, £35 ono. G3NAS, QTHR, tel: Lichfield 255992.

FT209RH with FNB-4, MH-12 spkr/mic & mobile cradle, boxed, used 2 hours, mint, today's value £300+, yours for £210 ono. Wallace, tel: Rugby 815506.

FT101 with top band, £250. TS785D, 50W 2m FM, TCVR, £250. FRG7 RX, £120. G3UCY, QTHR, tel: Leicester 353154.

ASR33 ASCII printer with spares & paper, £40. 2-50V 15A stabilised psu, £20. HF 50W AM/CW TX, £10. Jaybeam 5-ele 2m antenna, £10 Open to offers on all items, buyer collects. G4ASH, QTHR, tel: 0525-378580.

3kW! Kubta generator, under 1 year old & run for 30 hours only, just the thing for NFD, £525 ono. G6JNS, tel: 0905-620041 anytime and speak to me or the musical answering machine.

CURTIS KB-4900 ASCII/Baudot CW4 memory keyboard keyer with speed indicator, memory buffer indicator, preset messages etc, unused, £120. HK808 key, marble base, unused, £25. All plus post or inspect/collect. John, G4TEN, Blandford Dorset, tel: 0258-53075, weekends.

TELEREADER, model CWR670E CW/RTTY/ASCII reader, cost £370, will sell or part exch for HF RX. WANTED: No 10 xtal calibrator for WS62 set, also AR88D RX, working or not for rebuild. M Cleaver, tel: Harwich 502195.

RTTY Microwave Modules MM4001 with RCA/KB, £150. WANTED: 11 pin valve holder for 2AP1 CRT. G4BEQ, QTHR (1985 C/book), tel: Locks Heath 82423.

TRIO 510 HF 80-10m, ex rig, £260 ono. Complete RTTY set-up with ST5 TU, £40. TTL psu, h/duty, £10 WHY? Part exch 70cm etc. G4RSA, 21 Rede Ave, Fleetwood, Lancs, tel: 0253-41033.

ICOM IC202S VHF SSB TCVR, £100. SEM VHF linear, £15. Alinco UHF linear, £15. Lightweight rotator, £20. MF command RX, £5. Various psu's, £5ea. Class D wavemeter, £10. Buyer collects. G6MEN, NOT QTHR, tel: 0743-246944.

YAESU FT480R, £300 gc. FT207 c/w chgr & nicads, £100. FRG7000 gen/cov RX, £200. Microwave Modules MM4001 RTTY unit c/w RCA keyboard, £200. Akai 4000DS tape machine, very little use, £100. G4BLX, QTHR, tel: 07918-4711.

TRIO 9130 MULTIMODE, immac condx, never used mobile, 4 hours use only, best offer secures. Robinson, tel: 0282-64236.

EUROPA B, 2m tvtr, spare QQV06-40 pa, vgc, £40. Yashica-Mat 2.25 sq TLR camera c/w case, vgc, £40. G1ILB, NOT QTHR, tel: 0632-586302, evenings.

TRIO TR2600E, 2m handheld c/w nicad magazine, extn/spkr, mic, chgr unit, mint condx, £250. G4DXZ, tel: Aldridge (0922) 58955.

DRAE SSTV TCVR, 3 months old, as new condx, £260. G3TRB, tel: Worcester 775206.

EDDYSTONE EC10, Mk2 RX c/w manual, £50. G4JPQ, QTHR, tel: Stowmarket 613870.

YAESU FRG7, Cambridge atu, Cambridge notch filter, Timestep digital readout, £130. Buyer collects. George, G1SQD, NOT QTHR, tel: Princetown 524.

C5800E/W STANDARD, only rig that does not require replacement front-end in my opinion! Daiwa PS120M psu with extended H/S. Bargain, little used base only, £420 ovno. G6ZNU, NOT QTHR, tel: 01-242 1234 extn 2891, daytime or 01-886 3548 evenings.

SCOPE 581A with p/in type 82, £75. Power meter TF1152A, 75 ohm 10/25W, £10. V/V TF1041B, £20. Sig/gen HP606A, 50kHz-65MHz 0-3V 50 ohm, AM, £40. Freq counter HP5245L with 5253B p/in 500MHz, £65. All with handbooks. McCoy filter c/freq 50MHz 147B76, £10. Bird low-pass filter type 5416, cut-off 400MHz, £10. Keep junior op busy with Triang train set, lots of trucks, track & engines, £25. Buyer to view & collect. G6RAH, QTHR, tel: 01-518-6652.

R2000, surplus to requirements, little used, original box & accessories, £395. G3AAZ, QTHR, tel: 0480-56781.

FT7B TCVR, FP12 psu/spkr, FC707 atu, YC7B digital readout, £370. IC290DH, 25W, £340. G4UKS, tel: 0843-224558.

YAESU FT227R 2m 10W FM mobile TCVR, very little use, boxed, £120. 2m mag/mount whip, £10. G4PLF, NOT QTHR, tel: Brimscombe 884418.

MARCONI TF995A5, 1.5-220MHz AM/FM sig/gen, £55. TF1041B vvm, £20. Both items vgc, several valves, QQV03-20A, QQV07-50, offers? G4AEQ, QTHR, tel: Lincoln 682272, evenings.

30' 2-SECTION RIGID TOWER, will accept extn/tube 2" up to 15', £150 ono. Can deliver 30 miles radius of Manchester. G1EVP, tel: 061-480 1933, after 6pm.

YAESU FRG7700 communications RX, fitted 12 memory unit. Also attractive atu FRA7700, as new, little used, £315 ono. G2BFI, NOT QTHR, tel: Weston-Super-Mare 23059.

SEM AUDIO MULTI FILTER, as new, with ac psu & spkr, £55. GW4RZU, QTHR, tel: 0437-710544.

ICOM IC210, 2m FM, £150 ono. Avo model No 7 meter, £30. TW2 2m TX with psu, xtals, £15. G3YPD, QTHR, tel: 0543-264882.

2m FM TCVR, IC22, 13ch, 5 rptr's, works well, 1W/10W pwr, £65 ono. G6XRP, tel: Luton 423495.

FT225RD with muTek board, condx entirely as new, £550, no offers. NAG 2m linear, £250 ono. FT227R, mobile, £120 ono. FT101, FV101, accessories, £200 ono. Plessey RX, PR155, offers?. G3VAG, tel: 01-670 5113.

WANTED•••••••••

FC107 ATU preferably the white model to complete line-up, must be vgc, have 2m handheld FT209R with accessories or BBC computer peripherals for exch or cash. G4MLW, QTHR, tel: Heckmondwike 409739.

DRAKE MN2700 atu. G4CHP, QTHR, tel: 0508-470365.

DATONG RF speech clipper module. G3KGN, QTHR, tel: 0702-77779

MANUAL & INFORMATION on mods for Yaesu FRG7. Will buy or copy, costs covered. T R Green, Rushmoor, Garfield Road, Bishops Waltham, Hants, SO3 1AT, tel: Bishops Waltham 4960.

TRIO 430S or 530S or Yaesu 101ZD and Trio 120S or 130S. FOR SALE: Wavemeter Class D No.2 with manual ex condx, any reasonable offer accepted. G3XFB, QTHR, tel: 0902-850033.

WW2 AIRBORNE MUSEUM COLLECTION requires early RAF sets R1082, T1083, T1115, R1116; DF loops types 1,3 & 4, TR9, TR1143 etc, WHY? Any condx, cash & collection possible if in Midlands. Colin Baker, 71 Sunnyhill Ave, Derby, DE3 7JR, tel: 0332-769404

TOWER, max height 60', must be in good condx. Also wanted heavy duty rotator. Price etc to Chas, G4UJW, tel: 01-203 2286.

PYE OLYMPIC TCVR type M201, 12ch, in good condx, high/mid/or low band AM. GW4UMX, QTHR.

FT290R with muTek front end fitted c/w nicads, chgr, mobile bracket. Also linears: BNOS LPM350; LPM3100 or similar. Diawa CN620A pwr/swr cross-needle meter. Neil, G1OFI, NOT QTHR, tel: 0726-66093.

GERMAN WW2 RESISTANCE EQUIPMENT, parts, literature for museum purpose, radio, radar, need not be working, will collect. Cash or hardware in return. OZ8RO, RAE Otterstad, Vejdammen 5, DK-2840 Holte, Denmark, tel: 010-452 801875, evenings.

TCVR, Morse talker & other useful but inexpensive equipment in working order wanted by school boy. Nigel, G1TDM, tel: Burgess Hill 41407.

B40 RX for discerning listener, must be in perfect working order. Nolan, tel: Malmesbury 2388.

Brown's headphones type 'F' and bandspread coil 14-30MHz for HRO. G3VPZ, QTHR.

FT757GX plus FP757HD psu & matching atu, must be mint condx. Exch for my TS830S, AT230, MC50 desk mic, 10 months old. Also wanted: TR9000, ex condx, for my TR7930 in ex condx. GW4SRJ, QTHR, tel: 0443-730855.

CCT DIAGRAM for Yaesu psu type FP12 for TCVR type FT7B, good photostat copy OK, your price paid. G3EBA, QTHR, tel: 0908-72864.

FC902 ATU - G1CKV, QTHR, tel: 051-430 9122.

MURPHY type 618 HF TX, AP100333 & psu AP100336. Marconi Elettra RX type 2232B (similar Eddystone 840). Aerial plug AM type 161 (10H/184). Type 889A or 966A power units with plugs & cables. G4FUY, QTHR, tel: Reading 733633.

GLASS DIAL & full set of knobs for KB HR10 domestic valve radio or complete RX. Will pay reasonable price. G1NQU, QTHR, tel: 0274-880927.

MARCONI MERCURY 1017 RX and ac psu. Also old Heath RA1 RX for extensive rebuild & modifications Please send price & details to Richard Marris, 35 Kingswood House, Farnham Road, Slough, Berks, SL2 1DA.

FT7B, gc, for FT209R c/w FNB3, ID84, YH2, IC84, MMB21, all as new. G1HSX, QTHR, tel: 0679-63472.

BALUN, 1:1, 500 ohm-500 ohm. G2DF, QTHR, tel: Warrington 31034.

YAESU FRG8800 or FRG7700 RX. FOR SALE: Heathkit SW717 RX, £60. Wood, tel: Clochen 378.

"ADMIRALTY HBK OF WIRELESS TELEGRAPY" vol 2, 1938 G4LWY, QTHR, tel: 0925 76-2485.

TR2300. Also Hy-Gain 14AVQ. G4XSQ, QTHR, tel: Ash Bank 3969.

MIRAGE B1016 144MHz linear required or similar 150W+, consider homebrew 4CX250. 6m cvtr, very cheap, 10m IF, anything. Iambic keyer and SP901 also required. Morris, GOCUZ, tel: Sedgley (West Mids) 64486, anytime.

70cm LINEAR, 1W i/p MML432/30L, BNOS 432-1-50, or similar. Must be gc. S Brown, G8BCU, QTHR, tel: 061-437 4851.

IF FILTER XTAL for GEC BRT400 RX, 455kHz in B7G glass envelope, GEC part No. RK202189. G3NPC, QTHR, tel: 07373-59472.

MANUALS & EQUIPMENT: Pye mobiles, handhelds, VHF to UHF amateur gear, all bands, dead or alive. Manuals for Tektronix 533A, 555, 581A and plug-ins type O, R, CA, W, IL5, TV2, N, P, Q, etc. G4YVJ, QTHR, tel: Brighton 416963.

RACAL! Do you have any items of Racal Tactical (Green) equipment? Collector requires 1off each: TRA931, TRA967, MA988, TA940, TA944, MA937, MA949, TA970, MA968, MA4222, MA4008, MA985, MA986, MA4142 any "PRM" models, incomplete units, encryption items, hand generators, batteries, antennas, mounting frames, connectors, spares, manuals, brochures, purchase or exch WHY? Have Racal, Redifon, Larkspur, US to exch. Also wanted: Rescue Location beacons, especially CRT-3 "Gibson Girl", any Sarah/Sarbe. Please write with details, Sayers 120 Birmingham Road, Redditch, Worcs, B97 6EP.

70cm MODULE for Yaesu FTV901R, prefer no mods except perhaps rptr shift. Also universal interface card for Sharp MZ80K i/o unit, no mods, with instructions. G6AU, QTHR, tel: 0253-727818.

BARLOW WADLEY RX XCR-30 Mk2, gc, reasonable price, handbook. FOR SALE: xtals, 1000kHz 10X plus base, wire ended 100kHz B7G plus holder, 500kHz 10X, £2ea. Cct KW Vanguard Mk2, £2. Alan, G3MBL, NOT QTHR, tel: Bury St Edmunds 60984.

2m MOBILE, prefer FT290R or similar, must be vgc, exch for Hitachi front loading video, 1 year old, cash adjustment if necessary, carriage paid. Pete G0BDF, QTHR, tel: Lutterworth 57263.

MARCONI MORSE KEY type 365, ex condx, will pay up to £30. Dave Johnson, NF5B, 15914 Val Vista, Houston, Texas 77083, USA, tel: (713) 530-7683.

HF RIG, Icom 720A or Yaesu FT757 preferred, would consider other models if reasonably priced. Rig must be in gc with no mods or repairs, cash waiting for right set. Again IC720A or FT757 pref. G0BIV, QTHR, tel: 0295-810565.

TRIO KENWOOD R600, Daiwa CN620A, Trio DM61 good gen/cov digital RX, not FRG series, WHY? Jackson, tel: 0229-85669.

VFO230 c/w cables & handbook, also digital freq display unit for FRG7. Both must be in gwo. Les, G4LNR, QTHR, tel: Hull 655501, evenings & weekends

CRT 2AP1 or 2BP1 for ex-US Navy scope. CRT 3AZP31 and E180F valves for CT436 scope rebuilt. Also to satisfy nostalgia of youth, RX BC343 or BC348 John, GM8MLH, QTHR, tel: 08382-304.

2m & 70cm base stn, must be vgc. Also linear amps for same. psu's etc, WHY? Nick, G0CRT, tel: 0455-282168.

POWER SUPPLY to suit K2RIW 70cm linear, part built unit considered, any voltage, WHY? Alan, GW8KSF, QTHR, tel: 0978-759732, evenings or weekends only.

Conditions of Acceptance

These subsidised flat-rate advertisements are accepted as a service to members of the RSGB only. They must be submitted on the Members' Ad form printed on the back of a recent address label carrier used to mail RadCom to the advertiser: this will automatically provide proof of membership and should not be more than 2 months old. No acknowledgement of receipt will be sent and advertisements not clearly worded, or which do not comply with the conditions of acceptance, will be rejected. No correspondence concerning this service will be entered into.

Trade or business advertisements, even from members, will not be accepted for "Members' Ads", these should be submitted as "Classified " or "Display" advertisements in the usual way. Traders who are members must enclose a signed declaration that the items for sale or wanted are part of, or intended for, their own personal amateur station.

The RSGB reserves the right to refuse advertisements and accepts no responsibility for errors or omissions, or for the quality of goods offered for sale. Advertisements for citizens' band equipment will not be accepted. Refunds will be sent for any advertisement which are rejected for any reason.

WARNING: Members are advised that they should, as far as possible, ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The "purchase" of goods legally owned by a finance company could result in the "purchaser" losing both the goods and the cash paid.

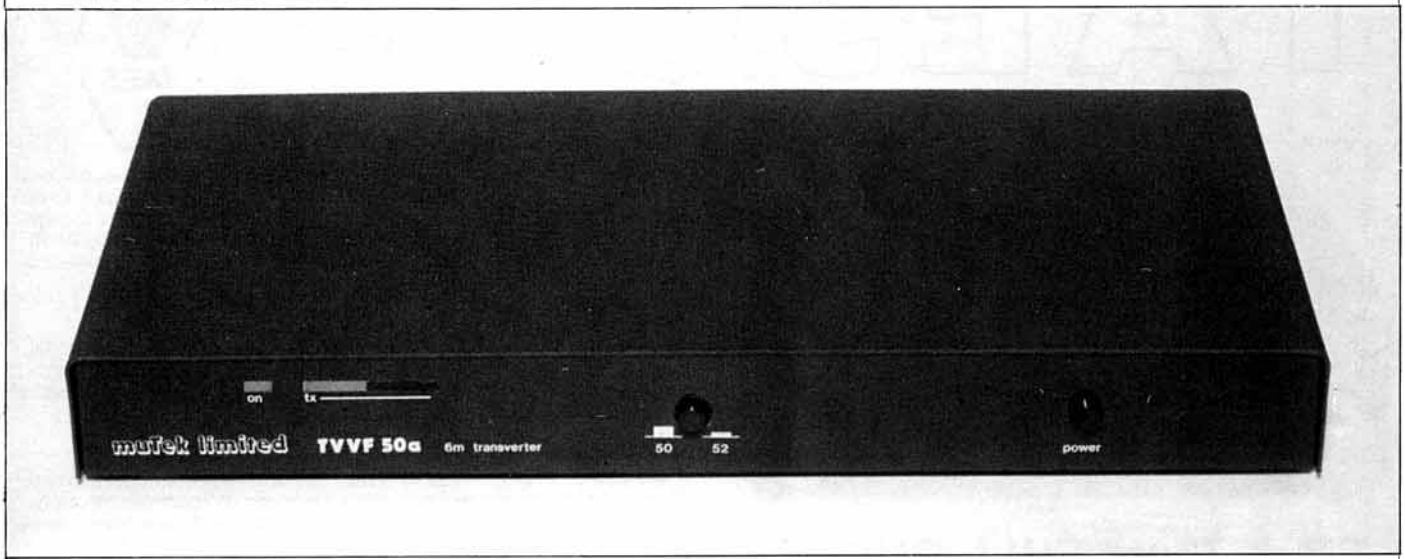
RATES: The current rate for Members' Ads is £2.30 (incl VAT) for 40 words or less. An additional cost of £2.30 is incurred for every additional 40 words or less. Each advertisement must be accompanied by the correct remittance, either as a cheque or postal order made payable to 'Radio Society of Great Britain'. When writing out advertisements, please ensure that you do not enter more than one word in each 'box' on the form. It is advisable to read some of the advertisements contained on these pages and familiarise yourself with the house style. Equipment type numbers, telephone numbers and certain abbreviations will count as one word. It may be necessary to edit certain advertisements in order for them to comply with the conditions of acceptance.

The following abbreviations are in common use for Members' Ads:-

TX - Transmitter RX - Receiver
TCVR - Tranceiver
TVTR - Transverter CVTR - Converter
gen/cov - general coverage
sig/gen - signal generator
vgc - very good condition
gc - good condition
ex - excellent condx - condition
c/w - complete with

Post to: MEMBERS' ADS, RSGB, LAMBDA HOUSE, CRANBORNE ROAD, POTTERS BAR, HERTFORDSHIRE, EN6 3JW.
DO NOT POST TO THE ADVERTISING OFFICER

WHAT A PERFORMANCE!



I'm writing this on the day following the Sandown Park VHF Convention, and I'd like to make a few comments which have come to mind as a result.

As a dedicated masochist, I enjoy rallies (and vhf contests) and I find the comments and suggestions of our friends and customers helpful (when they're polite!!!). I don't even really mind the long working days (yesterday was 21 hours!) which result from our choice of North Devon as a home. This year, however, you'll not be seeing our cheery(?) faces at many of the rallies which we've traditionally attended.

The reason for this is that there are too many events. Although I suspect that many people think otherwise, rallies and exhibitions are not particularly profitable! Now, we've never seen rallies simply as an opportunity to make money, but we do have, at least, to break-even. Unfortunately the explosion in the number of rallies has reduced our chances of doing so! I know that other people 'in the business' have come to similar conclusions, and perhaps its about time that organisers started to think about the possibility of combining their events with others or returning to the original (non-tradeshow) concept of the rally. This year, after due consultation of the Contests Calendar(!), we are attending fewer events which we have chosen strategically to offer the best possible coverage of the country.

Look out for us from various sites in IO70, 71 and JN79 on all bands from 50 to 10368MHz . . .

My other comment stems from a conversation with a very disgruntled customer of another UK amateur radio manufacturer. It seems that his transverter had developed a fault and that because it was no longer made, the manufacturer was refusing to repair it! I was able to suggest a competent person able to help, but I'm still quietly staggered! We've always adopted a very different attitude. We'll always attempt to repair anything we've made. If it is for some reason uneconomic, we'll explain why! In fact, until quite recently it was the exception for us to charge for ANY repair, and even now for the majority of repairs outside our twelve month guarantee period we usually make a very modest single charge, plus, where particularly expensive components are concerned, the cost to us of their replacement. The only time that we charge our full rate for repairs is on those rare occasions when people attempt to obtain something for nothing by lying! We ARE able to tell if you've transmitted into the wrong end of a preamplifier or have dumped 100W into a transverter . . .

The Hard Sell!

I'm afraid that due to the devices we'd chosen to use in our new GMFA 144e not doing in production what they'd done in our prototypes, we were forced to make a few changes to the design. Unfortunately, this has slightly increased the price but the performance is now reproducibly excellent!!

We should have positive news of delivery dates of the new TVUF 432u high performance 28 to 430MHz band transverter by the time that you read this. Give us a ring if you're interested!!

Chris Bartram G4DGU

The range

		£
TVHF 230c	Very high performance 2m to all 9hf band transverter	**299.90**
TVVF 50c	Very high performance 2m to 6m transverter	**209.90**
TVVF 50a	Very high performance 10m to 6m transverter	**249.90**
TVVF 144a	Ultra high performance 10m to 2m transverter	**249.90**
SLNA 50s	Rf switched 6m preamplifier	**49.90**
SLNA 144s	Rf switched 2m preamplifier	**41.95**
SLNA 145sb	Optimised preamplifier for the FT290R	**31.90**
GMFA 144e	Ultra high performance 144MHz environmentally cased masthead preamplifier	**119.90**
GLNA 432e	Masthead mounting 430-440MHz high performance GaAsfet preamplifier 0.9dB typical noise figure 250W through power. Supplied with ATCS 500 sequencer controller	**159.90**
GLNA 433e	Masthead mounting 430–440MHz high performance GaAsfet preamplifier, Rf switching. 50W through power. 1dB noise figure	**89.90**
BLNA 432e	Sub-miniature 70cm preamplifier. 1.3dB typical noise figure. Requires external filtering	**14.90**
BBBA 500u	High dynamic range 20–500MHz preamplifier. Ideal for scanners	**34.90**

		£
RPCB 144uB	Complete replacement front-end for FT221 and FT225	**84.90**
RPCB 251ub	Complete replacement front-end for IC211 and IC251	**89.90**
RPCB 271ub	Complete replacement front-end for IC271 (e and h)	**94.90**
GDIF 107ub	Gunn diode WBFM back end board	**59.90**
LBPF 50w	50–54MHz two pole two zero bandpass filter 100W thro' power	**29.90**
LBPF 144u	Low-loss 144-148MHz two-pole bandpass filter 0.3dB typical insertion loss. 120W through power	**24.90**
LBPF 432u	Low-loss 430-440MHz two-pole bandpass filter 0.3dB insertion loss. 100W through power	**24.90**
XBPF 700ub	Microstripline bandpass tvi filter	**4.40**
ATCS 500	Sequencer controller	**34.90**
VFAT 206	25W 6dB attenuator for use with 2m i.f. transverters	**22.40**

Carriage/postage rates

GMFA 144e, GLNA 432e, GLNA 433e	**3.00**
All transverters	**5.65**
All other products above	**1.85**

ALL PRICES INCLUDE VAT AT 15% E&OE

muTek limited —the rf technology company

Dept. RC, Bradworthy, Holsworthy, Devon EX22 7TU (040 924) 543

Access VISA

YAESU

NEW MOBILES

AUTHORISED YAESU

2M & 70cm FULL DUPLEX FT2700RH

The FT2700R, virtually two transceivers in one case, is designed to be the ultimate in convenience, for FM mobile or base station operation, on the 144 *and* 430MHz bands. Using Yaesu's new one piece die-cast aluminium chassis concept, the FT2700R provides 25 Watts continuous output on either band, for full duplex (or simplex!) operation whilst obtaining optimum circuit shielding and efficient heat dissipation.

SCANNING
Two 4-bit CPU's provide convenient control together with simple operation of the dual VFO's, 10 channel memory with back up and two calling frequencies.

Dual, receiver front ends, local synthesisers, IF's and transmitter RF stages make this the first mobile transceiver capable of *true* full duplex cross-band operation.

PRIORITY
Comprehensive scanning features include "PMS" (programmable memory scan) which permits continuous or skip-scanning between two memory channels in the same band. A MHz 'stepping' switch is fitted for quick transition from one band to another. Priority channel monitoring is available whilst on the same or another band!

CROSS BAND
Independently programmable transmit and receive frequencies, standard repeater shifts (with reverse facility), offers total freedom of operation.

READOUT
The large green back-lit dimmable LCD offers an aesthetically pleasing and easy to read display of the complete operating status of the transceiver, including memory and reverse repeater indications at a glance. The PO/S meter incorporated in the main display is a distinctive graphical two colour type. (Optional Voice Synthesiser available, see FT270R/RH text.)

The FT270RH is constructed on a unique massive diecast aluminium ducted heatsink which enables significantly larger output powers to be obtained from a transceiver substantially smaller than any similar radio to date. The FT270RH, with fan assisted cooling provides 45W RF output. It is also fitted with a "low power switch which provides around 10% of full output.

DISPLAY
The FT270RH uses a high visibility back-lit LCD, with large 5mm ditis, providing a readout of frequency and all important transceiver functions. Pleasant green illumination and newly developed wide angle LCD ensure easy visibility day or night from most angles.

MICROPROCESSORS
The dual 4-bit microprocessors of the FT270RH provides maximum ease of use combined with an extremely wide range of operating functions. Dual VFO's, ten memories and programmable band scan limits are all easily selectable from the front panel.

MEMORIES
The FT270RH cn memorise a number of scanning parameters for maximising performance. Upper and lower limits may be set (for quick scanning of the band). The ten memories may be scanned for a busy channel or for monitoring a priority channel. The scanning can be either manually or carrier controlled.

VOICE SYNTHESISER
For easier and safer 'eyes on the road' mobile operation an optional voice synthesiser (FVS-1) is available to give an audible indication of frequency, memory channels and VFO selections at the touch of a convenient microphone mounted button. The FVS-1 is of course ideal for those with impaired vision.

45 WATTS OUTPUT FT270RH

GENERAL SPECIFICATIONS

Mode	: FM (F3, G3E)	Antenna	: 50ohms, unbalanced
Supply	: 13.8V ± 15%	Modulation	: Variable reactance
Circuit	: Double Conversion	Deviation	: ± 5KHz
	: 21.6MHz, 455KHz	Tone Burst	: 1,750Hz
Sensitivity	: 0.2μV @ 12dB Sinad	Spurious	: −60dB (or better)
	: 1.0μV @ 30dB Sinad	Maximum BW	: 16KHz
Selectivity	: 14KHz −6dB	Microphone	: 600ohms, nominal
	: 28KHz −60dB	Temperature	: −10°C + 60°C
Image	: −60dB (or better)		
Audio	: 4 to 16ohms	**OPTIONS**	
	: 2W in 8ohms (10% THD)	FVS-1, MF-1B3B, SP55, YH1, SB10	

FT2700RH

Frequency	: 144-146MHz
	: 430-440MHz
Power out	: 2m 25/3W
	: 70cm 25/3W
Supply	: 7A (25W Tx)
	: 3A (3W Tx)
	: 0.6A (Sq Rx)
Stability	: 2M ± 10ppm, −5 +50°C
	: 70cm ± 5ppm, −5 +50°C

DIMENSIONS (Ex/Inc Projections)
150W, 50H, 130/185D mm, 1.6Kg

FT270RH

Frequency	: 144-146MHz
Power out	: RH; 45W/5W
Supply	: RH; 9A/3.5A Tx
	: 0.6A (Sq Rx) RH
Stability	: ± 10ppm (−5 +50°C)

DIMENSIONS: (Ex/Inc Projections)
140W, 40H, 143/175D mm, 1.25Kg

South Midlands Communications Ltd.
Rumbridge Street
Totton, Southampton
Hants SO4 4DP

YAESU MUSENS ONLY AUTHORISED DISTRIBUTORS

AMATEUR ELECTRONICS AE LIMITED
510-512 Alum Rock Road
Alum Rock
Birmingham B8 3HX

Printed in Great Britain for the RADIO SOCIETY OF GREAT BRITAIN, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JW
by E T Heron (Print) Ltd, Silver End, Witham, Essex