November 1983

RADio COMmunication

SCOTTISH AMATEUR RADIO CONVENTION 1983

Report on page 979

Don Baptiste, CBE, RSGB President; Tom Hughes, GM3EDZ, chairman of the convention organizing committee; and Michael Kelly, Lord Provost of Glasgow, at the dish antenna which received Russian television signals. *Photo*: GM4SRL

David Dalrymple, GM3OLK, demonstrating the reception of Russian television programmes at the convention to Don Baptiste. *Photo*: GM4SRL

Journal of the Radio Society of Great Britain

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WORLD COMMUNICATIONS YEAR
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1983

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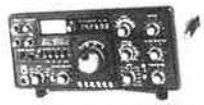
YAESU FT101ZD Mk III



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Don't take our word for it, find out for yourself, ask around on the air, you'll keep coming up with the same answers, good competitive prices and excellent after-sales service. Go on, ask around.

NOVEMBER 1983

VOLUME 59 No 11

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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.

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

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We here at TRIO-KENWOOD have over the years developed a range of equipment designed by our professional engineers for you the active radio amateur. Our products range from the top notch TS930S HF amateur band transceiver to the smallest accessory. Each piece of equipment is specifically designed with the requirements of you, the radio amateur in mind. It has always been our policy at TRIO-KENWOOD to improve the specification and reliability of equipment by listening to the valuable comments of radio amateurs all over the world. The important relationship between yourself, the radio amateur and TRIO-KENWOOD is through our authorised distributor for the UK, LOWE ELECTRONICS LTD.

We give below a list of approved dealers in the UK. Any dealer not on this list has no connection with the UK distributor network and has no direct factory backing. Great care should be taken when purchasing your amateur radio equipment, to ensure that the dealer is factory approved. In any case, first contact our sole distributor for the UK: Lowe Electronics Ltd., who will be pleased to advise you of your nearest dealer.

Sole Distributor Lowe Electronics Ltd.
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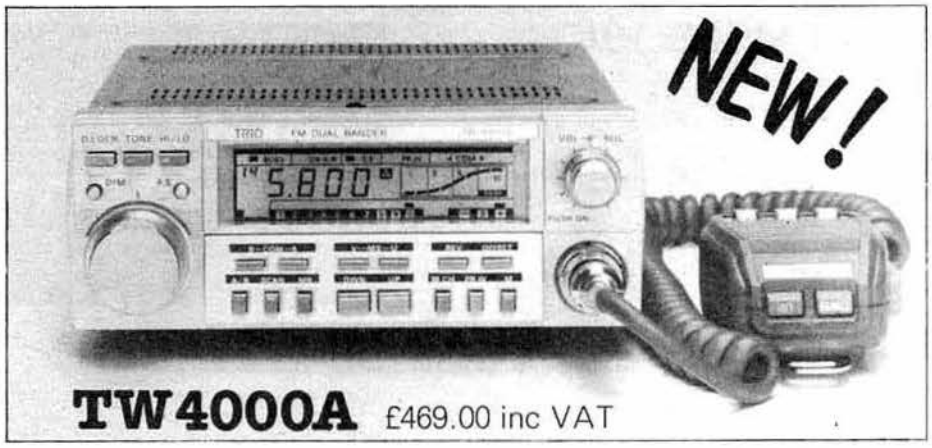

TW4000A £469.00 inc VAT

The TW4000A is the latest step forward in Trio's programme of providing today's radio amateur with the very best in equipment. Following the success story of the Trio TS780 dual band base station transceiver, the TW4000A gives the mobile operator a superb FM transceiver for both 70 centimetres and the 2 metre band. Not only for mobile operation is the TW4000A perfect but also for shack use where the rig with its scanning and dual band facilities enable the enthusiastic amateur to keep in touch with the local scene.

* The TW4000A covers in one compact transceiver both the 2 metre band (144.000 to 146.000 MHz) and also the full 10 MHz of the 70 centimetre band (430.000 to 440.000 MHz). Measuring 60mm high, 161mm wide, 217mm deep and weighing only slightly more than 2.0 kg, the TW4000A is smaller than most current 2 metre transceivers.
* Added to the exceptional receive performance, now a Trio standard by which others are judged, is the TW4000A's 25 watt capability on both 2 metres and 70 centimetres.
* A green backlit liquid crystal display gives frequency, memory channel, repeater offset, VFO A or B, scan function, channel occupied and "ON AIR" information.
* Ten memory channels are provided which store frequency, band and repeater offset (on 2 metres minus 600 KHz shift, on 70 centimetres plus 1.6 MHz shift). Memory 1 is used for priority watch, memories 8 and 9 for instant recall and memory 0 for split channel use (cross band operation).
* Frequency scan is extremely versatile in that the rig can be programmed to scan either all memory channels or those holding either 2 metre or 70 centimetre frequencies. The rig can also be programmed to skip those channels which the operator does not wish to monitor. The scan direction can also be changed by using the UP/DOWN switch on the microphone. In order that an important contact is not missed, when in priority watch mode, the rig switches back from the frequency in use to memory channel 1 for one second out of ten. The two most used frequencies can be placed in memories 8 and 9 respectively, common channel scan checking each alternatively for approximately 5 seconds.
* The use of GaAs FET's in the RF amplifiers on both 2 metres and 70 centimetres, as well as the use of high performance MCF's in the 1st IF section, provides a high receive sensitivity and an excellent dynamic range.
* Two VFO's are provided tuning in either 5 or 25 KHz steps, the UP/DOWN shift switch on the microphone providing control.
* Full repeater facilities are included giving the correct frequency shift, 1750 Hz access tone, and of course the essential repeater shift.
* The use of advanced diecasting techniques in the fabrication of the combined chassis/heat sink, as well as in the RF shielding results in greatly improved mechanical strength, plus a higher immunity to RF interference.

Optional Accessories
PS430 matching power supply.
VS1 voice synthesizer unit.
SP40 compact mobile speaker.
MA4000 dual band antenna with duplexer.
SW100B mobile SWR and power meter.
SW200B base station SWR and power meter.
PG3 noise filter for mobile use.

TRIO

TRIO-KENWOOD CORPORATION
Shionogi Shibuya Building, 17-5, 2-chome Shibuya, Shibuya-ku, Tokyo 150, Japan

TRIO-KENWOOD COMMUNICATIONS, GmbH
D-6374 Steinbach-TS. Industriestrasse,8A West Germany

TR9130 TWO METRE ALL MODE TRANSCEIVER

This rig is proof, if one needed it, that TRIO do not bring out new models just for the sake of it. The TR9000 is remembered as a classic rig and today people are still asking for second hand ones. They're even a rarity on our S/H shelf. The TR9130 incorporates the improvements that all amateurs asked for, green display, reverse repeater, tune whilst transmitting, higher power, more memories and of course memory scan. TRIO's answer, the TR9130.

TR9130 . . . **£433.32** inc VAT.

TS780 DUAL BAND BASE STATION TRANSCEIVER

The TS780 is the perfect base station VHF/UHF transceiver for the enthusiastic operator. The rig has all the necessary control functions essential for operating on both today's busy two metre band and the wide open spaces of seventy centimetres. Full repeater facilities plus reverse repeater are included and the transceiver has the usual memory channels (10), two VFOs, up/down frequency shift microphone, IF shift, two priority channels, memory and band scan etc. A superb rig, I have one myself, write for a full enthuse!

TS780 . . . **795.00** inc VAT.

TR7930 TWO METRE FM MOBILE TRANSCEIVER

Those who have used or owned a Trio TR7800 will know what I mean when I say that Trio, with the introduction of the TR7930 have improved on the unimprovable. The Trio TR7930 improves on the TR7800 by giving a green floodlit liquid crystal display, extra memory channels, both timed and carrier scan hold, selectable priority frequency and correct mode selection (simplex or repeater). The most significant change is the liquid crystal display, but closely following this must be the ability to omit specific memory channels when scanning and the programmable scan between user designated frequencies.

TR7930 . . . **£305.21** inc VAT.

R2000 GENERAL COVERAGE RECEIVER

The amateur bands are only a very small part of the radio spectrum, many other transmissions are available for the short wave listener. Broadcast stations provide an alternative source of current information both political and regarding the life style of the country. Fitted with the internal VHF converter the R2000 covers continuously frequencies from 118 to 174 MHz giving access to amateur two metre transmissions (am, fm, ssb and cw) plus a lot more. Having 10 memories, memory scan and programmable scan the R2000 provides in one rig the perfect receiver.

R2000 . . . **£398.82** inc VAT.

TS930S HF TRANSCEIVER WITH GENERAL COVERAGE RECEIVE FACILITIES

Much has been said about the TS930S transceiver and it now has a place high in the affection of those amateurs fortunate enough to own one, indeed it has become the "flagship" of the TRIO range. Providing full amateur bands plus a general coverage receiver (150kHz to 30MHz), the TS930S has every conceivable operating feature for today's crowded frequencies.

TS930S . . . **£1216.70** inc VAT.

TR2500/TR3500 HANDHELD TRANSCEIVERS

Two first class hand held transceivers, one for two metres and the other for seventy centimetres. Ten memory channels, band and memory scan, repeater shift, reverse repeater and a low power position make the rigs extremely useful for the radio amateur who wishes to keep in touch with his local scene. A comprehensive range of accessories, base station charger, speaker microphone, mobile mount etc. can be added to enhance operation, accessories used with one rig being compatible with the other.

TR2500 . . . **£232.53** inc VAT.

TR3500 . . . **£250.70** inc VAT.

TS530S HF AMATEUR BAND TRANSCEIVER

A logical progression from the reliable TS520 series the TS530S was the most popular HF rig in the range. I use the term "was" because TRIO decided to cease production and supplies were no more, however the demand from radio amateurs worldwide for the transceiver have continued and TRIO have reintroduced the rig. A standard HF valve transceiver without the frills but providing today's amateur with all necessary facilities for reliable world wide communication, the TRIO TS530S.

TS530S . . . **£595.00** inc VAT.

TW4000A DUAL BAND FM TRANSCEIVER

I have been waiting for this rig for the last three years, now it is here and I am using one, words fail me. Send for details.

TW4000A . . . **£469.00** inc VAT.

just a part of the range

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for all round reliability, a **DAIWA** rotator.

The Daiwa range of rotators has established itself as the most popular series on the market. There are some simple reasons why this is so, not least of which is the almost legendary reliability of Daiwa equipment. After all, when you have installed a rotator high up on a mast, you want it to stay up there, so it's foolish to buy anything less than Daiwa quality.

Here are a few of the more detailed advantages of the Daiwa rotator system:

UNIQUE CONTROLLERS

Since the controller scales can be set anywhere within their range of rotation, you can arrange the rotator end stop position to be in the most convenient direction to suit yourself. For example, in many rotators, the end of rotation is either South or North. This can be very inconvenient if you want to work DX from Africa and you find that in order to turn your beam from Kenya at about 170 degrees, to Capetown at about 185 degrees, you have to rotate all the way round the scale. With the Daiwa system, you can set the overlap point to the least favoured direction, for example 45 degrees and eliminate the problem. A really elegant idea to solve an annoying drawback of other rotator systems.

PRESET CONTROLLER ROUND CONTROLLER

SAFE OPERATION

Since the motor supply is only 24V ac split phase, there are no dangerous voltages being fed up the mast, unlike some other rotators on the market.

DEPENDABILITY

The rotator head units are housed in a weather sealed and factory lubricated die cast housing finished in a melamine/resin paint for corrosion protection. All external screws are of stainless steel, and a moulded plastic cover with a rubber gasket protects the connection terminals.

QUIET OPERATION

The reduction gear train has moulded hard nylon pinions and die cast spur gears which ensure smooth and quiet operation. The lower ratio gears are surface hardened for exceptionally long life.

EASY MAST ALIGNMENT

Calibration scales are cast into the upper and lower rotator housings, and both sides of the mast clamp are adjustable. This means that the rotator can be aligned exactly on the mast centre line with none of the mast skewing and binding which takes place in other types of rotator. Mast sizes from 38 to 63 mm can be used.

SUMMARY

The Daiwa rotators are the best we have ever found, and we searched for a long time. Their combination of top quality construction coupled to the unique controller system and their ability to withstand harsh treatment have made them the standard by which others are judged. The Daiwa DR7500 and 7600 rotators employ a servo indicating system which ensures really accurate indication of beam heading and fully automatic alignment of the controller and rotator.

The Daiwa rotators are designed to support and rotate the normal range of multi element HF beams used in amateur service. Detailed specifications are available on request, but as a general guide, the DR7500 will rotate up to and including a 3 element tribander such as a TA33 or TH3, whilst the DR7600 will take anything up to and including a two element 40 metre beam . . . and that's some aerial.

DR7500X.....Preset Controller.....**£113.72** inc VAT.
DR7500R.....Round Controller.....**£125.00** inc VAT.
DR7600X.....Preset Controller.....**£163.49** inc VAT.
DR7600R.....Round Controller.....**£176.29** inc VAT.

for the hf operator for whom only the best will do, the **JST100** amateur band transceiver.

JRC *Japan Radio Co., Ltd.*

The JST100 from the Japan Radio Company is a solid state transceiver built to the high standards as set by JRC for their complete range of products. The JST100 is first and foremost an "Amateur Bands" only rig. Having an extremely high class receiver, the JST100 enables the enthusiast HF operator to clearly hear weak signals under even the poorest of conditions.

Having located the weak DX station or your sked contact out of the QRM then the high quality of JRC transmitted audio produces a first class contact.

Those familiar with the Japan Radio Company's previous items of equipment—the NRD505 and 515 general coverage receivers, the NSD515 matching amateur band transmitter, the NDH518 96 channel memory unit and the NCM515 remote controller—will know that the equipment is designed to provide the ultimate in operating satisfaction. The JST100 is built in the same tradition.

JST100 £998.00 inc VAT carr £6.00
NFG97 ATU £150.00 inc VAT carr £6.00
NVA88 SPEAKER £37.50 inc VAT carr £6.00

EMPORIUM NEWS

Good morning

I noticed with interest **the numerous** other **Emporia** that are springing up but I hardly consider that many of their owners have consulted **a dictionary** for the real meaning of the word. **Talking about real Emporia,** the Lowe shops will soon have a new addition: Cardiff. Located on the eastern side of town just behind the infirmary is 21 Moira Terrace. **Easy street parking** is available for all visitors and if you want to drop the family off in town for a shopping, sightseeing spree whilst you check the latest and best in amateur radio, then Cardiff city centre **is only minutes away.** For those who do not know Cardiff, let me tell you. The city is well worth a visit. The **castle** and **museum** are points of major interest and following a visit to our shop, Welsh culture can be absorbed. Please ring Matlock for details of the opening date of the Cardiff shop.**New products** are still arriving from **TRIO.** To complement the **SW200 meter** we now have in stock the **SWC 1** and **SWC 2** directional couplers. These are the external sensors which are inserted into the transmission line. Now the full performance of the **SW200 meter** can be appreciated since up to three directional couplers can be connected to cover HF, VHF or UHF frequencies, the required range being selected by a front panel switch on the meter. The advantage of a remote sensing head being that the meter can be easily sited in the shack whilst the aerial cables, usually found on the floor behind the station, are not disturbed. Very accurate meters and the ideal way to constantly monitor the state of rig, cable and aerial. The **SW200 costs £80,50,** including VAT, and comes complete with either an HF or V/UHF coupler. The new optional couplers are available for £22.50 including VAT, carriage £1.00.

The **AL2** is another **new product** from **TRIO.** Designed to protect your rig from either static or a near lightning strike, the AL2, like the SWC 1 and 2 fits in the aerial cable and provides a path to earth instead of through your rig. Suitable for a frequency range from 1.8 to 500 MHz and a transmitted power of up to 2 KW PEP, the AL2 has an insertion loss of less than 0.3 dB so when you are awoken from **a deep satisfying sleep** by **violent** flashes of lightning and tremendous **crashes** of thunder, then don't leap out of bed and run into the shack to disconnect all the equipment, turn over and quickly fall asleep again secure in the knowledge that your **TRIO coaxial arrester** is protecting your station. Sorry, I am being flippant. If a thunder storm is near enough to disturb your slumbers then definitely rise and disconnect your aerials immediately.

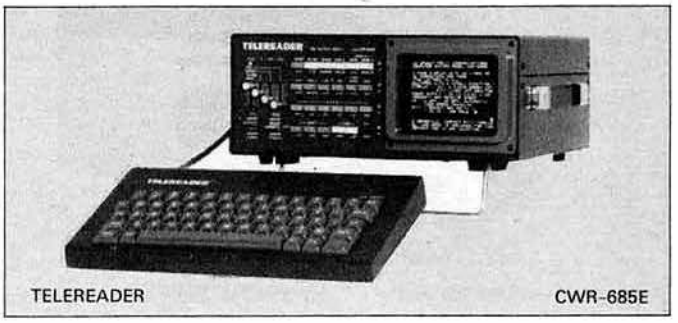

AR 2001

Another desk microphone, **the TRIO MC80** completes the range. An electret condensor microphone having a gooseneck support, up/down frequency shift bar, p.t.t. and transmit lock switches, the MC80 requires 4 AA battery cells for operation. To conserve power when the microphone is not in use a power on/off switch is on the top panel. Fitted with an 8 pin plug the new microphone, by its distinct styling, will **enhance** not only your **transmitted audio** but the appearance of your shack.

Interest in the new receiver from AOR, **the AR2001,** continuous coverage 25 to 550 MHz, is hotting up. We exhibited the rig at Telford recently and many people were impressed with **both** the **performance** and **size** of the new receiver. John spent much time discussing the rig with a large number of amateurs. As the news spread around the Rally about the AR2001 John was constantly besieged by enthusiasts requesting information. The December issue of **Amateur Radio Magazine,** as well as featuring the receiver in colour on the front cover, also has an initial review by Angus McKenzie G30SS who has had the sole honour of having the rig in his possession for a while. According to Angus he can hear the **third harmonic of aeroplane VHF transmitters** flying over his house. Amazing!!

Good news . . .

We have just been appointed as distributors for **Telereader range of equipment.** Having used the equipment here at Matlock I can say, without a shadow of doubt, that the **attention to specification** and **ease of operation** which has been incorporated in the three models fills me with great admiration for Telereader. The three models we have are the **CWR685E combined receive and transmit model** with both keyboard and inbuilt 5 inch. green phosphor screen. This model will receive and transmit CW and RTTY, both BAUDOT and ASCII code. CW speeds of up to 250 characters/minute can be received and up to 200 characters/minute transmitted. The unit has a **Centronics compatible parallel**


TELEREADER CWR-685E

interface for hard copy so records of contacts can easily be kept. For those who have a general coverage receiver then many other RTTY transmissions can also be read. For the operator who only wishes to receive then model **CWR670E** performs this task with distinction having the major features of its Big Brother.

If you want a less expensive reader then the **CWR610E is perfect,** having an inbuilt CW generator to give code practice as well as RTTY and CW decoding. The CW610E really adds to one's station facilities. The respective prices of the units are: CWR685E £730.94 including VAT, CWR670E £335.00 including VAT and the CWR610E Code Master CW/RTTY £175.00 including VAT. All nice pieces of gear **and a perfect complement to any shack.**

On the opposite page we have a new advert for **Daiwa rotators.** Please read this carefully if you are considering the purchase of a rotator. If you consider your present rotator perfect but it is not a Daiwa product then read **even more carefully** because soon it will fail and you will have to buy a replacement. Just a thought on second-hand rotators: only buy if you know the rotator's life history **like the palm of your hand.**

The **TM201A** and its 70 cm version, the **TM401A,** have met with the reaction I imagined. Most people at first seeing the rig cannot comprehend its small size. 10 watts output they say – "No", say my men, up and down the country, **"25 watts on 2 metres** and 12.5 watts for the 70 cm version".

Amazing! Unbelievable, they say. Had a chap who owns a Roller order one. Apparently there is not a lot of space in such a car and I presume the TM201A fitted perfectly. Someone else rang who had a Jaguar. He considered the same rig would fit nicely into his car. I don't wish you to think that the TM201A/401A can only be afforded by the wealthy amateur, the prices are £269 including VAT and £299 including VAT respectively.

Anyway, that's about it for now. I still have **the Geisha girl,** aged 32, wearing her **blue Kimono** riding with me and **the TW4000A.** John Thorpe, our **"digital expert"** tells me that it is technically not a "voice synthesizer" but a digital recording of a human voice programmed into the memory of a **dedicated microprocessor** chip and recalled by commands from the main transceiver control microprocessor. **So the girl really exists** and I have asked TRIO to send me a photograph!

No doubt it will arrive by FAX.

Gud DXes 73es FBYLS, XYLS, esFBOM, etc. David

"THE INTERFACE" from KANTRONICS
Software available for six computers
CW/RTTY/ASCII **£138.00**

SOFTWARE—HAMTEXT

VIC-20 Board	**£87.40**
Commodore 64 Board	**£87.40**

SOFTWARE—HAMSOFT

Apple Diskette	**£29.00**
Atari Board	**£43.70**
VIC-20 Board	**£43.70**
TRS-80C Board	**£54.95**
TI-99 Board	**£87.40**

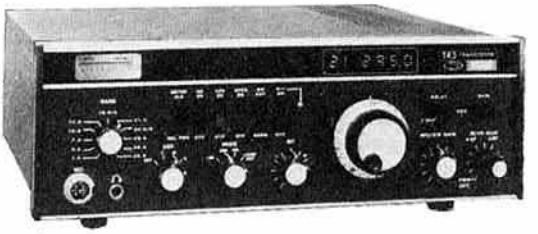
COLLINS KWM-380 Amateur Bands

Transceiver 1.8–30MHz
Receiver 1.8–30MHz
£2199.00

DRAKE TR7A

The Transceiver others try to copy
£1099.95

DRAKE TR5



DRAKE's low cost Transceiver
£552.00

BEARCAT SCANNERS

BC-100FB **£345.00**
Hand held 16 channel programmable

NEW!
BC-20/20FB

40 Channels
AM/FM
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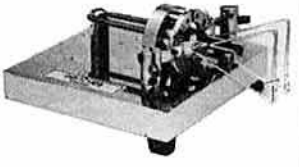
BC-150FB 10 channel	**£144.90**
BC-200FB 16 channel	**£184.95**

DRAKE R7A

General Coverage Receiver
£1069.50

BENCHER PADDLES



BY-1 Black Base	**£37.95**
BY-2 Chrome Base	**£48.30**
BY-3 Gold plated	**£92.00**
ZA-1A Balun	**£15.00**
ZA-2A Balun	**£17.25**
ZY-2 CW Audio Filter	**£57.50**

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YAESU - Latest...

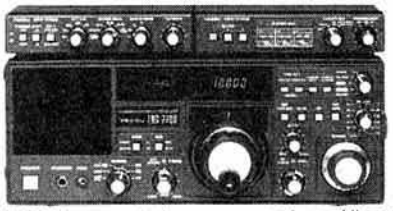
Latest news from YAESU—Expected soon is the new **FT-757GX** all-mode HF transceiver—160 thru ten of course plus general coverage RX. FM and all options fitted including dual VFO's, eight memories, programmable memory scan, full break-in on CW, 100 watts PEP/DC output at 100% duty cycle and all this in a package measuring 238W x 93H x 238D mm!

KEEP AHEAD WITH THE YAESU FT-102!

STOP PRESS

We are pleased to announce a new price breakthrough on this Superb Transceiver —Phone or Write for details

FRG-7700 HIGH PERFORMANCE COMMUNICATIONS RECEIVER



YAESU's top of the range receiver. All-mode capability, USB, LSB, CW, AM *and* FM 12 memory channels with back-up. Digital quartz clock feature with timer. Pictured here with matching FRT-7700 Antenna tuner and FRV-7700 VHF converter.

FT-290R/790R 2m & 70cm PORTABLES

10 memories, 2 VFO's, LCD display, C size battery, easy car mounting tray. FT-290R 0.5 low/2.5 high watts out FT-790R 0.2 low/1.0 high watts out (incorporates speech compressor).

FT-230R/730R 2m & 70cm FM MOBILES

- Two independent VFO's
- 10 memories
- Priority function
- Memory and band scan
- 12.5/25KHz steps (25/100KHz FT-730R)
- Large LCD readout.

FT-780R/208R SYNTHESIZED UHF/VHF TRANSCEIVERS

- NC-7 - Standard charger
- NC-8 - Standard/quick charger/DC Power supply
- NC-9C - Compact charger (220-234V)
- PA-3 - Car adapter
- YM-24A - Speaker/microphone
- FL-2010 - 10 watt power amplifier for FT-208R
- FL-7010 - 10 watt power amplifier for FT-708R

FT-480R/780R 2m & 70cm MOBILES

The most advanced 2 metre and 70 cm mobiles available today — USB, LSB, FM, CW full scanning with priority channel, 4 memory channel, dual synthesized VFO system.

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FT-980 ALL MODE HF CAT *

* Computer-Aided Transceiver

This incredible new transceiver incorporates the highest level of microprocessor control ever offered in an HF all solid-state radio. Including a general coverage (0.15-30MHz) receiver with its own, separate front end, this amateur transceiver offers a new dimension in frequency control; whereby frequencies can be entered by either front panel keypad or tuning dial, and then scanned in selectable steps either freely or between any two programmable limits. Twelve memories include four with special protection, and two large digital displays allow full flexibility and control for split frequency operation while two meters allow full transmitter information.

Additional controls include IF Width and Shift on concentric controls, AMGC (Automatic Mic Gain Control) to set microphone input threshold, RF Speech Processor, ALC Meter Hold function, IF Notch and Audio Peak filters, Transmit Monitor, Noise Blanker and CW Full Break-in. Controls are also provided for FM Squelch and CW Keyer Speed when the optional FM and Keyer Units are installed.

The most important feature of the FT-980 is that practically all of the above features can be controlled by the user's separate personal computer, when connected through an optional Interface, also available from Yaesu. Where up to now the few amateur transceivers that offered any kind of computer interfacing at all permitted only frequency control, the FT-980 permits almost total control of all functions from a separate microcomputer, including Mode; IF Width and Shift; Scanner Step, Speed and Limits; and switching of most other functions. (Microcomputers are not available from Yaesu.)

FT-77 THRIFTY HF TRANSCEIVER

UTILIZING THE NEW CAD/CAM* MANUFACTURING TECHNIQUES, YAESU PRESENTS THE FT-77 AS A NEW MILESTONE IN RELIABILITY, SIMPLICITY AND ECONOMY IN HF COMMUNICATIONS.

Thrifty

Featuring efficient, all solid-state, no-tune circuitry, the FT-77 offers a nominal 100 watts of RF output on all amateur bands between 3.5 and 30 MHz, including the WARC bands. New CAD/CAM techniques plus the simple design of the FT-77 add up to one of the smallest, lightest HF transceivers ever; both in your hands, and on your wallet.

Simple

The front panel control layout and operation are actually simpler than some VHF FM transceivers, with only essential operating controls; while the simple circuit design leaves fewer parts that could cause problems. Nevertheless, all of the essential modern operating features for HF SSB and CW are included, along with extras such as dual selectable noise blanker pulse widths (designed to blank woodpecker or common impulse noise), full SWR metering, and capabilities for an optional internal fixed-frequency channel crystal, narrow CW filter and FM Unit.

Reliable

Computer-aided design of the circuit boards in the FT-77 ensures the most efficient component layout possible in the smallest space, while automatic parts insertion and soldering greatly diminish the chance for human error. Reliability and quality control are thus improved and simplified beyond the degree previously attainable in amateur equipment. This means longer equipment life with less chance of breakdown.

Expandable

The extremely compact size and simple control layout make the FT-77 ideal for mobile operation, or as the heart of a complete base station with the optional FP-700 AC Power Supply, FV-700DM Digital Scanning VFO and Memory System, FTV-700 V/UHF Transverter and the FC-700 Antenna Tuner. The competitive price of the FT-77, coupled with the expansion capabilities presented by these accessories, make this transceiver the perfect choice for those new to amateur HF communication, or as a practical second rig for old-timers.

*Computer Aided Design/Computer Aided Manufacture

FT-726R VHF/UHF Multi-bander

Combining all of the best features from Yaesu HF and V/UHF transceivers, the FT-726R opens a new world of operating ease and flexibility for FM, SSB and CW on the 50*, 144 and 430/440 MHz amateur bands. The design of the FT-726R integrates the individual operating requirements of each of the three operating modes into one unit, and the user can then select which of the optional plug-in band modules he desires.

The VFO-A/B scheme has ten programmable memories, and can be tuned in 20Hz steps for CW and SSB operation, or in selectable steps for FM. FM tuning is accomplished by an indented tuning knob. IF Width and Shift controls are provided for CW and SSB operation, while both preset standard and user programmable repeater offsets can be selected for all modes. An optional Satellite Unit makes the FT-726R into a full duplex cross-band satellite transceiver.

*144 MHz Unit installed, other Units available as options according to local regulations.

AGENTS

North West - Thanet Electronics Ltd. Gordon, G3LEQ, Knutsford (0565) 4040
Wales & West - Ross Clare, GW3NWS, Gwent (0633) 880 146
East Anglia - Amateur Electronics UK, East Anglia, Dr. T. Thirst (TIM) G4CTT Norwich 0603 667189
North East - North East Amateur Radio, Darlington 0325 55969
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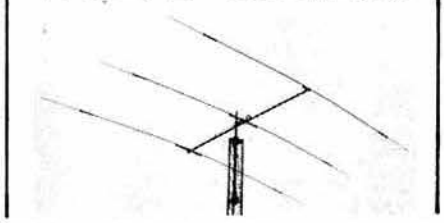
TET ANTENNA SYSTEMS



AX210N	10 ele. yagi for 2m crossed	74.95	(n/c)
HB10F2T	2 ele. 10m mono band beam	51.50	(n/c)
HB10F3T	3 ele. 10m mono band beam	74.95	(n/c)
HB15F2T	2 ele. 15m mono band beam	60.66	(n/c)
HB15F3T	3 ele. 15m mono band beam	93.46	(n/c)
HB15M2SP	VP mini size 15m 2 ele.	69.50	(n/c)
HB15M3SP	VP mini size 15m 3 ele.	102.30	(n/c)
HB34D	4 ele. tri band beam 10/15/20m	222.90	(n/c)
HB33SP	3 ele. tri band beam 10/15/20m	192.50	(n/c)
HB35C	Tri band array 10/15/20m	283.95	(n/c)
HB35T	5 ele. 10/15/20m	278.50	(n/c)
MV3BH	Vertical for 10/15/20m	37.99	(n/c)
MV4BH	Vertical for 10/15/20/40m	48.90	(n/c)
MV5BH	Vertical for 10/15/20/40/80m	63.95	(n/c)
MLA4	Loop antenna 10/15/40/80	105.60	(n/c)
SQ22	Phased 2 ele. swiss quad 2m	58.95	(n/c)
SQY06	6 ele. quagi 2m	45.75	(n/c)
SQY08	8 ele. quagi 2m	52.75	(n/c)
HB210S	10 ele. dual driven yagi 2m	47.99	(n/c)
TE214	14 ele. long yagi 2m	74.40	(n/c)
SSL720	9 x 2 ele. (18) slot fed 70cm	77.20	(n/c)
HB23SP	2 ele. tri band beam 10/15/20m	135.60	(n/c)
SSL218	9 x 2 ele. (18) slot fed 2m	144.79	(n/c)
TPH2	Phasing harness 2m	17.25	(n/c)
QYU10	10 ele. quagi 70cm	67.90	(n/c)
SQ007	70cm 2 ele. phased swiss quad	66.99	(n/c)
SQ10	Swiss quad 10m	97.50	(n/c)
SQ15	Swiss quad 15m	106.90	(n/c)

YAESU ANTENNAS

Base			
RSL145GP	½ wave base ant. 2m	21.20	(1.50)
RSL435GP	½ wave co-linear 70cm	31.60	(1.50)
HF Mobile			
RSL3.5	3.5MHz resonator & whip	12.21	(0.50)
RSL7.0	7.0MHz resonator & whip	11.80	(0.50)
RSL14.0	14.0MHz resonator & whip	11.45	(0.50)
RSL21.0	21.0MHz resonator & whip	11.20	(0.50)
RSL28.0	28.0MHz resonator & whip	11.00	(0.50)
RSL2A	Mast to suit above	5.00	(0.50)
RSM2	Gutter mount/Feeder/PL259 suit above	10.94	(0.75)
VHF Mobile			
RSL145	2m ½ wave fibreglass whip	12.10	(0.50)
RSL145S	2m ½ wave steel whip foldover	9.25	(0.50)
RSL150SS	2m ¼ wave PL259 shock spring	3.90	(0.50)
RSM2	Gutter mount/Feeder/PL259 (RSL145)	10.94	(0.75)
RSM4M	Heavy duty mag/Feeder/PL259	13.25	(1.00)
UHF Mobile			
RSL453S	½ wave antenna	15.50	(0.50)

ANTIFERENCE ANTENNAS

VHF Mobile			
TAP3009	½ wave 3db snap-in hinged whip	13.00	(3.00)
TAP3677	½ wave 3db snap-in shock coil	14.56	(3.00)
TAP3002	¼ wave unity gain snap-in hinged whip	9.96	(3.00)
UHF Mobile			
TAP3462	½ over ¼ wave 3db	16.86	(3.00)
TAP3697	½ over ¼ wave 5db	20.00	(3.00)
K220	Mag mount/Feeder to suit above	11.96	(2.00)

Antennas Various/Accessories			
HQ1	Mini beam 10/15/20m 2 ele. 1kW	139.00	(4.00)
C4	Vertical 10/15/20m	48.50	(3.00)
G4MH	Mini beam 10/15/20	88.00	(4.00)
KTLM-4	Gutter mount/Cable assy. SO239	6.90	(0.50)
DATONG PRODUCTS			
PC1	50KHz to 30MHz receive converter	137.42	(0.50)
VLF	Very low freq. converter	29.90	(0.50)
FL1	Frequency agile audio filter	79.35	(0.50)
FL2	Multimode audio filter	89.70	(0.50)
ASP/A	Auto RF speech clipper (YAESU)	82.80	(0.50)
ASP/B	Auto RF speech clipper (TRIO)	89.70	(0.50)
D75	Manual RF speech clipper	56.35	(0.50)
RFC/M	RF speech clipper module	29.90	(0.50)
D70	Morse tutor	56.35	(0.50)
AD270	Active dipole RX ant. (indoor)	47.15	(0.50)
AD370	Active dipole RX ant. (outdoor)	64.40	(0.50)
MK	Morse keyboard	137.42	(0.50)
DC144/28	2m converter	39.67	(0.50)
RFA	Broadband preamplifier	33.92	(0.50)
MPU	Mains power unit	6.90	(0.50)
MICROWAVE MODULES			
Transverters			
MMT28/144	10m transverter	109.95	(2.50)
MMT70/144	4m transverter	119.95	(2.50)
MMT432/144R	70cm transverter	184.00	(2.50)
MMT1296/144	23cm transverter	184.00	(3.00)
MMT70/28	4m transverter	119.95	(2.50)
MMT144/28	2m transverter	109.95	(2.50)
MMT432/28S	70cm transverter	159.95	(2.50)
Linear Amplifiers			
MML28/100S	10m 100W linear amp.	129.95	(3.00)
MML70/50S	4m 50W linear amp.	85.00	(2.50)
MML70/100S	4m 100W linear amp.	139.95	(3.00)
MML144/30LS	2m 30W linear amp. 1-3W in	69.95	(2.50)
MML144/50S	2m 50W linear amp.	85.00	(2.50)
MML144/100LS	2m 100W linear 1-3W in	159.95	(3.00)
MML144/100S	2m 100W linear 10W in	139.95	(3.00)
MML432/50	70cm 50W linear amp.	109.95	(3.00)
MML432/100	70cm 100W linear amp.	228.65	(4.00)
MML1296/10	23cm 10W linear amp.	199.00	(2.50)
MML432/30	70cm 30W linear amp. 1-3W in	99.00	(3.00)
Converters			
MM1000KB	ASC11 morse converter with keyboard	99.95	(3.00)
MM4001	RTTY to TV converter	189.00	(2.50)
MM4001KB	RTTY transceiver	269.00	(2.50)
MM4000KB	RTTY transceiver with keyboard	299.00	(4.00)
MMC28/144	10m to 2m converter	29.90	(1.00)
MMC50/28	6m to 10m converter	29.90	(1.00)
MMC70/28	4m to 10m converter	29.90	(1.00)
MMC70/28LO	4m to 10m with LO	32.90	(1.00)
MMC432/28S	70cm to 10m converter	37.90	(1.00)
MMC432/144S	70cm to 2m converter	37.90	(1.00)
MMC435/600	UHF ATV converter	27.90	(1.00)
MMC1296/28	23cm to 10m converter	34.90	(1.00)
MMC1296/144	1296MHz low noise converter	69.95	(1.00)
MMK1691/137.5	1691MHz meteosat converter	129.95	(2.50)
Morse Talkers			
MMS1	Morse tutor 2-20WPM Side tone	115.00	(2.50)
MMS2	Morse tutor (advanced) 6-32WPM + speak back	169.00	(2.50)
Amateur TV			
MTV435	70cm 20W (PSP) transmitter	149.00	(2.50)
MMC435/600	Converter ATV UHF output	27.90	(1.00)
Preamplifiers			
MMA144V	2m preamp RF switched	34.90	(1.00)
MMA28	10m preamp	16.95	(1.00)
MMA1296	23cm preamp	34.90	(1.00)
Frequency Counters			
MMD650/500	500MHz digital meter	75.00	(1.00)
MMD600P	600MHz pre scaler	29.90	(1.00)
MMDP-1	Probe	14.90	(0.50)
Filters			
MMF144	2m band pass 40W max.	11.90	(1.00)
MMF452	70cm band pass 40W max.	11.90	(1.00)
Various			
MMS384	384MHz signal source	29.90	(1.00)
MMR15/10	15db 10W attenuator	11.90	(1.00)
HI-MOUND MORSE KEYS			
HK702	Up down keyer marble base	24.50	(0.50)
HK704	Up down keyer	16.68	(0.50)
HK705	Up down keyer	12.50	(0.50)
HK706	Up down keyer	13.75	(0.50)
HK708	Up down keyer	11.96	(0.50)
HK808	Up down keyer marble base	39.57	(0.50)
MK704	Twin paddle keyer	10.95	(0.50)
MK705	Twin paddle keyer marble base	22.00	(0.50)
MOULDINGS			
IK	Iambic keyer	19.95	(0.50)

TOKYO HY POWER			
HC150	HF ATU SWR/Power meter 200W PEP	62.50	(n/c)
HC2000	HF 2kW ATU SWR/Power meter 6 POS ant. switch. 6 to 1 vernier high Q coils 2kW peak 1kW continuous	276.55	(n/c)
Antenna Rotators & Accessories			
9502	Channel master med duty up to 8 ele.	57.00	(3.50)
9523	Alignment bearing for 9502	15.81	(1.25)
KR400	Med/Heavy duty 180° meter	90.85	(3.50)
KR400RC	Med/Heavy duty 360° meter Load 200Kg 1¼"-2" masts	114.94	(3.50)
CASTING	Lower casting set	15.00	(1.25)
KR600RC	Heavy duty 360° meter Load 200Kg Rot600Kg/cm Brake 4000Kg/cm 1¼"-2"masts	163.30	(3.50)
Antenna Switches			
SA450	SO239 connectors 1 in 2 out	9.75	(0.50)
SA450N	"N" type connectors 1 in 2 out	12.75	(0.50)
Baluns			
BL50A	RAK 50 ohm ferrite BALUN 1:1 1.8-38MHz 1kW	12.88	(1.50)
BL-40X	Balun 2K PEP 1.1	11.52	(1.50)
Dummy Loads			
T30	30W DC 500MHz PL259	6.61	(0.50)
T100	100W DC 500MHz SO239	20.12	(1.00)
T200	200W DC 500MHz SO239	31.36	(1.50)
T210	Wide band 10W 1.2G-2.4G	24.50	(0.75)
AW05	Pocket RF wattmeter 5W up to 500MHz BNC	19.75	(1.00)

DRAE PRODUCTS

DRAE4	4 amp PSU	30.75	(2.00)
DRAE6	6 amp PSU	48.00	(2.50)
DRAE12	12 amp PSU	74.00	(3.00)
DRAE24	24 amp PSU	105.00	(4.00)
DRAE WM	135-450MHz wavemeter	27.50	(1.00)

"N" Connectors (Silver Plated)			
N58	"N" Male connector RG58	2.25	(0.25)
N8	"N" Male connector RG8	2.40	(0.25)
N308	"N" T adaptor (three female)	2.40	(0.25)
N307	"N" L adaptor (1 male 1 female)	2.40	(0.25)
N306	"N" Double female adaptor	1.90	(0.25)
N310	"N" Double male adaptor	2.50	(0.25)
N8304	"N" Female to BNC male adaptor	2.10	(0.25)
N402	"N" Plug to SO239	2.05	(0.25)
N403	"N" Socket to PL259	2.00	(0.25)
N404	"N" Socket to SO239	1.80	(0.25)

TOKYO HY POWER			
HL32V	VHF 30W linear 1-5W drive HI-LOW output	53.50	(n/c)
HL82V	VHF linear preamp output meter 2-12W in 35-85+ out	144.50	(n/c)
HL160V	VHF linear preamp output meter 1-10W in 160W+ out	242.40	(n/c)
HL45U	UHF linear preamp 2-15W in 10-45W out	119.75	(n/c)
YAESU			
YH55	Headphones Low Z	10.00	(0.50)
YH77	Lightweight headphones Low Z	10.00	(0.50)

SWR/Power Meters

YAESU			
YS200		52.90	(n/c)
YS2000		69.79	(n/c)
Other Makes			
RF2000	Twin meter 3.5-150MHz F/Scale 200/2000W	18.25	(1.00)
YM1X	Twin meter 3.5-150MHz F/Scale 12 or 120W	14.99	(1.00)

COMPUTERS

Commodore 64. 64K, sprites, sound chip etc.	229.00	(n/c)
Vic 20 + C2N datasett + intro to base part 1 + 4 games. Special price	139.99	(3.00)
Commodore 1541 174K disk drive	229.00	(n/c)
Vic 3K ram pack	19.95	(0.25)
Vic 8K ram pack	29.95	(0.25)
Vic 16K ram pack	39.95	(0.25)
Vic 20 reference guide	9.95	(0.25)
Commodore 64 reference guide	9.95	(0.50)
C2N datasett	44.95	(1.75)
Spectrum 48K	129.95	(1.75)
Spectrum 16K	99.95	(1.75)
ZX Printer	39.95	(0.50)

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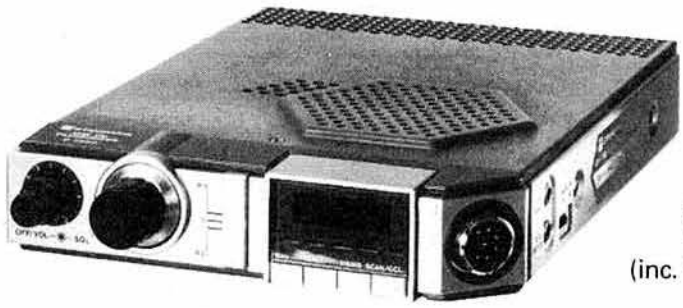

C8900 (2 mtr)
C7900 (70 cm)
£219/ £239
(inc. VAT)

These small slim transceivers are ideal for todays compact cars as very little room is required for fitting. The units can be fitted separately or stacked one above the other with the brackets provided. Both units feature tiltable led displays for easy reading when the sets are mounted below the drivers eye level. The sets provide a good 10 watts RF output with excellent performance specification.

s.a.e. for details

NORMAN G4THJ

2 metre MULTI-MODE

The C58 has all the features possible on a portable rig, many of which are absent in mobiles. The optional accessories allow it to be used in the car with a power output of 25W.

C58
£249 inc. VAT

C5800
£359
(inc. VAT)

* 144-146MHz
* 25W SSB/FM
* 10 Memories
* 3 Scan Modes
* 25/5KHz Steps
* RIT Control
* S/Power Meter

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FT901
FT902

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STANDARD C5800 Cash Price: £359	STANDARD C7900 Cash Price: £239	STANDARD C8900 Cash Price: £219	STANDARD C58 Cash Price: £249
H.P. over 6 months	H.P. over 6 months	H.P. over 6 months	H.P. over 6 months
Deposit £72	Deposit £48	Deposit £45	Deposit £51
Repayments ... £47.83	Repayments ... £31.83	Repayments ... £29.00	Repayments ... £33.00
TOTAL £359	TOTAL £239	TOTAL £219	TOTAL £249
H.P. over 12 months	H.P. over 12 months	H.P. over 12 months	H.P. over 12 months
Deposit £180	Deposit £120	Deposit £111	Deposit £126
Repayments ... £14.91	Repayments £9.91	Repayments £9.00	Repayments ... £10.25
TOTAL £359	TOTAL £239	TOTAL £219	TOTAL £249

400 EDGWARE ROAD,
LONDON W2
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BARCLAYCARD VISA Access

Normally 24hr despatch but please allow up to 7 days for delivery.

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Lee Electronics Ltd

WE DON'T BELIEVE IN MINCING WORDS.

WE LEAVE ALL THAT TO OUR COMPETITORS.

ICOM FROM THANET IS QUITE SIMPLY, THE BEST.

Something new to celebrate! ICOM's Latest IC-745 HF Transceiver £759.

What's the celebration about? The IC-745...a new all band HF transceiver with SSB, AM, CW, RTTY and an FM option.. plus, a 100KHz – 30MHz general coverage receiver.

And...the IC-745 has a combination of features found on no other transceiver at such an incredibly low price.

The IC-745 is the only transceiver today that has so many standard features, options, and accessories available.

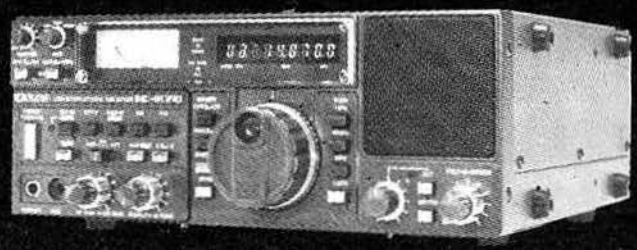
ICOM is simply the best amateur radio equipment built today. See the IC-745 at our shop and showroom at Herne Bay or contact your local authorised ICOM dealer for more information.

Compare these exceptional features

- 100KHz – 30MHz Receiver
- 16 Memories
- Full function Metering with a built in SWR Bridge
- IF Shift and Pass Band Tuning
- 10Hz/100Hz/1KHz Tuning Rates with 1MHz band steps
- Optional Internal AC Power Supply
- Adjustable Noise Blanker (width and level)
- Continuously Adjustable AGC with an OFF position
- Receiver Preamp
- 100% Transmit Duty Cycle

Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM

IC-R70, HF Receiver, £499.



The R-70 covers all modes (when the FM option is included), and uses 2 CPU-driven VFO's for split frequency working, and has 3 IF frequencies: 70MHz, 9MHz and 455KHz, and a dynamic range of 100dB. It has a built-in mains supply.

Other R-70 features include: input switchability through a pre-amplifier, direct or via an attenuator, selectable tuning steps of 1KHz, 100Hz or 10Hz, adjustable IF bandwidth in 3 steps (455KHz). Noise limiter, switchable AGC, tunable notch filter, squelch on all modes, RIT, tone control. Tuning LED for FM (discriminator centre indicator). Recorder output, dimmer control.

The R-70 also has separate antenna sockets for LW-MW with automatic switching, and a large, front mounted loudspeaker with 5.8W output. The frequency stability for the 1st hour is ± 50Hz, sensitivity- SSB/CW/RTTY better than 0.32 μv for 12dB (S+N)÷N, Am-0.5μv, FM better than 0.32 for 12dB Sinad. DC is optional

IC-751, £969. HF Transceiver

Think about the IC-740,
One of the most popular amateur bands transceivers, make a few improvements such as adding 36 memory channels, doing away with mechanical bandswitching and then add full HF receive capabillity (0.1-30 MHz) which is even an improvement on the famous R70 and you get a pretty good idea of what the IC-751 is like. It is fully compatible with Icom Auto units such as the AT-500 and IC-2KL and a further option for computer control can be added. There is also a digital speech synthesizer option which will be ideal for blind operators For power supplies you have the option of the IC-PS740 (which fits inside) or the PS-15/PS20 range for external use.

As you would expect there is a built in speech processor, a switchable choice of a J-FET pre-amp, straight through or a 20dB pin diode attenuator and two VFOs allowing split frequency operation.

Other standard features include:- 36 memory channels with scan facility and start/stop timers, a marker, 4 variable tuning rates, Pass Band Tuning, notch, variable noise blanker, monitor switch, DFM (direct feed mixer) in the front end, full break-in on CW and AMTOR compatibility. The first IF is 70.045 MHz. Any XIT and RIT adjustment is shown on the display.

NEW! IC-120, 1296 MHz FM £419.

Thinking of 1296? Then Icom IC-120 could be the answer.

Now you can have the sophistication of today's technology on this up and coming band-all built into a unit the same size as the IC-25E, very compact...

Features include:	Output Power = 1 W or more
Frequency coverage 1260 - 1300	Mode:- FM
Adjustable Repeater Shift	2 VFO's
6 Memories - with scanning facility	Deviation + 5 KHz
Spurious Emissions - 40dB or better	RIT

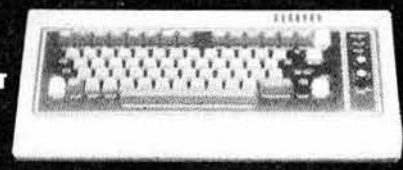
8 W and 16W (Puma) Linear Amps available shortly.

RTTY, Morse & ASCII

Shortwave listeners and amateurs are able to take more interest in other modes of transmission than speech with the latest range of decoders and senders available. As well as amateur transmissions, there is an abundance of news and other interesting broadcasts which can be read using these space-age devices.

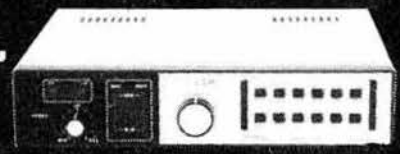
Some models in our range are the Tono 550, 9000E and the Telereader CWR-670, CWR-685E and CWR-610E. There is now available a professional version of the Tono 9000E, the PRO-1, which has a built-in scrambler. The Telereader CWR-670 is also available with a built-in VDU which can include a 40 column printer.

TONO 9000E Sender/Decoder £669.



CWR-610E, Decoder £189.

TONO 550, Decoder £299.



As U.K. importers of the renowned TONO and TELEREADER products, we can offer you a wide range, from a simple morse and RTTY reader which can be plugged into your TV., to a complete send and receive system with memories and built-in displays, or outputs for high-definition VDU.

Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM

NEW! IC-271, £569. VHF Multimode Base station

Icom have made improvements to the IC-251 and brought it up to date.

Power can be adjusted up to 25W on all modes SSB, CW and FM. Squelch works on all modes and a listen-input facility has been added for Repeater work. RIT shift is shown on the display.
Options include a switchable front end pre-amp.
Speech synthesizer announcing displayed frequency.
22 Channel memory extension - with scan facilities.
10 Hz tuning facility. SM5 desk mic
Internal chopper PSU, Why not call us for further details?

IC-251E. Available at special price to clear, £479.

Icom produce a perfect trio in the VHF base station range, from 6 meters through 2 meters to 70cms. The IC-251E is the 2 meter station while the IC-451E is used for 70cms. The 251E is now available with Mutek front-end fitted.

IC-290D, VHF, £433. Multimode Mobile

The recently introduced IC-290H has proved so popular that we have decided to concentrate on this (25W) model 2m multimode. With its bright green display, 5 memories, scan facilities on either memories or the whole band, tone-call button on the microphone and instant listen input for repeaters, this little box really is a beauty. The 70cm version, the IC-490E has similar features (although the output is only 10W in this case).

IC-2E, VHF/FM, £179. IC-4E UHF, £199.

Nearly everybody has an IC2E – the most popular amateur transceiver in the world – there is also the 70 cm version which is every bit as good and takes the same accessories.

IC-25H/25E, £329/£369. VHF, FM Mobiles

The FM mobile choice has to be the Icom IC-25E. It is so small yet boasts a powerful 25 Watt voice and a sensitive receiver. The new 25H now available has a green display and 45 Watts output. There are five easily programmable memories, and facilities for changing the repeater shift from the default value of 600kHz.

Do you know what time it is! £59.

When the globe of this digital clock is revolved, a red lamp indicating a major city in the world will blink, and the current time of that city will be displayed in place of the date. At a glance know the current times of 24 different time zones throughout the world.

This mini-globe clock stands 195mm. high and also has an alarm fitted. This useful device should stop you getting your Amateur friends, on the other side of the world, out of bed in the middle of the night.

As well as stocking the complete ICOM range of equipment suitable for European use, we also sell Yaesu, Jaybeam, Datong, Welz, G-Whip, Western, TAL, Bearcat, Versatower and RSGB publications from our shop and showroom at the address below.

Agent Please telephone first, anytime between 0900 – 2200 hrs.
Gordon Adams, G3LEQ Tel: Knutsford (0565) 4040

All prices shown include VAT.
Interest-free credit available
Securikor or post despatch free, same day if possible.

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Western

It's Western for YAESU and KENWOOD

Since we first introduced the "Yaesu Musen" brand name to the UK market in 1970 and more recently the "Kenwood" name for Amateur Radio equipment, you can buy with confidence where experience counts. We maintain links with the factories for spares though we maintain stocks also. We also have extensively equipped service facilities with extensive (and expensive!) test equipment. It's gratifying to hear that more and more discerning prospective customers object to the "knocking and false rumours" put around by our competitors. Thank you Mr A. in Kent for your order for Kenwood TS-530S a few minutes ago. Remember, Kenwood is *THE* brand name throughout the world. It's only for UK that Trio is used. At 'WESTERN' we are not part of any illegal price ring and we are pleased to supply KENWOOD brand equipment known and recognised throughout the world.

Western – FOR VALUE FOR MONEY WITH

THIS MONTH'S SPECIAL CHOICE... YAESU PRICES (carr. paid)

YAESU FT-101Z £499 **FT-101ZD £569**

- ★ Digital frequency readout on 'D' model
- ★ QRM-beating Variable IF Bandwidth
- ★ High performance RF processor
- ★ Rugged 6146B PAs with RF negative feedback
- ★ Full band coverage 160-10 metres
- ★ Compatible with all '901 accessories

VHF/UHF EQUIPMENT

1234	FT-290R	2m all mode transceiver, portable	245.00
1242	FT-720RV	2m FM mobile transciever, 10W	189.00
1241	FT-720RU	70cm FM mobile transceiver, 10W	219.00
1263	FT-230R	2m FM mobile transceiver, 25W	230.00
1210	MMB-11	Mobile Mount for FT-290R	21.50
1202	CSC-1A	Carrying Case for FT-290R	3.25
1220	FP-80A	AC PSU, 4.5Amps	53.00
1595	C NICADS	Set of 8 Nicads for FT-290R	21.00
1205	FP-4	AC PSU, 4Amps	42.00
1211	NC-11C	Charger for FT-290R	8.00
1200	NC-1	Desk Charger for FT-202R	19.00
1201	PA-1	12V adapter for FT-202R	19.00
1258	NC-7	Base charger for FT-208/708R	26.00
1253	NC-8	Deluxe fast charger for FT-208/708R	42.00
1260	FBA-2	Battery sleeve for NC-7, NC-8	3.00
1262	NC-9	Compact trickle charger	8.00
	FT-208R	VHF Handie FM Transceiver	189.00
	FT-708R	UHF Handie FM Transceiver	199.00
	FT-726R	VHF/UHF multiband transceiver (2m installed)	649.00
	FT-730R	70cm 10W FM SSB Transceiver	250.00
	FT-790R	70cm SSB/FM Transceiver	290.00

KENWOOD PRICE LIST

1301	STS-1	Base stand/charger for TR-2400	43.00
1302	KB-1	Deluxe knob for TS-530/830 series	10.50
1307	PS-20	DC PSU for TR-9000	49.00
1308	PBK-24K	Spare battery pack for TR-2400	16.00
1309	MC-30S	Hand microphone, 500 ohm	13.00
1312	MC-50	Desk microphone, 500 ohm/50k	30.00
1313	MC-60	Desk scanning microphone, dual impedance	50.00
1317	MB-100	Mobile mount for TS-130S	18.00
1318	SP-100	Speaker for R-1000	26.00
1322	TS-130S	HF transceiver	525.00
1323	DFC-230	Digital remote frequency controller	130.00
1324	TS-430S	HF transceiver with gen. cov. receiver	705.00
1328	R-600	Receiver	240.00
1329	SP-930	External speaker	55.00
1330	TS-930S/ATU	HF transceiver with gen. cov. receiver & ATU	1263.00
1331	TS-930S	HF transceiver with gen. cov. receiver	1199.00
1332	R-1000	General coverage receiver, digital	279.00
1333	DCK-1	DC operating kit for R-1000	8.26
1335	R-2000	New general coverage receiver	389.00
1337	TR-2400	2m FM hand portable transceiver	195.00
1339	TR-9130	2m Multimode transceiver, 25W	419.00
1341	TR-9500	70cm FM/SSB/CW mobile transceiver	399.00
1343	TR-8400	70cm FM mobile transceiver, synthesised	250.00
1344	DS-2	DC converter for TS-830S	42.00
1319	SP-430	Speaker for TS-430S	30.50
1320	AT-130	Aerial tuning unit 100W	91.00
1321	MB-430	Mobile mounting bracket for TS-430S	12.50
1325	AT-230	Aerial tuning unit, all band, matches TS-830S	135.00
1326	TS-530S	HF Transceiver 160-10m with new bands	515.00
1327	SP-230	External speaker unit	41.50
1334	FM-430	FM option unit for TS-430S	33.75

from the KENWOOD STABLE FOR... the discerning DX-OPERATOR... or... DX-SWL ... the TS-930s, £1199... and... R-1000 £279

Since, at 'WESTERN', we sell both Yaesu and Kenwood, we do not try to push a prospective purchaser into a particular brand of equipment... we have no "axe to grind" one way or the other.

Our M.D. (He's spoilt! He just takes home what he fancies for a trial evaluation!) thought he'd try the top of ranges FT-1 and TS-930S. He promptly brought the FT-1 back to the stock-room (Mr Hasegawa, please note!). Then he took the FT-102. He hitched the FT-102 and TS-930S up together but brought the FT-102 back. Said he'd got too old and lazy to bother with controls like PA Tune, PA Load, Pre-selection tuning, when the TS-930S does the same job with less knobs. He's grown to like the 930S so much he hasn't tried it against the Yaesu FT-980 – although no doubt it's only a matter of time (The FT-102 is back in the demonstration room!). The 'Noise Blanker' really cuts old "Woody Woodpecker" down to size! UA's will have to find something new to annoy a TS-930S owner.

How often have you found a rare DX-station only to discover he has a good pile-up too! With the '930' you just press "M In" and store his frequency in the memory and carry on tuning round or QSO elsewhere. Then to come back smack onto the rare DX you just select 'Memory' instead of the VFO, and up pops your DX station. Since there are 8 memory channels there are more than enough for anyone!

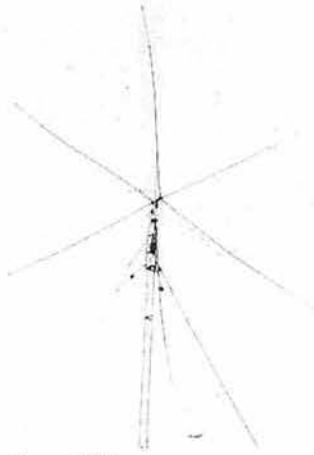
The R-1000 is an un-cluttered simple to use and excellent general coverage receiver. It brings the world to your fingertips in seconds. With its PLL synthesised receiver you get excellent stability and accuracy.

Features are:–

- ★ Covers 200kHz to 30MHz continuously
- ★ 30 1MHz bands
- ★ Noise Blanker
- ★ Terminal for external tape recorder
- ★ Built-in 12hr. quartz digital clock with auto-timer facility to switch 'On' at pre-determined time
- ★ 'S' meter with 'dimmer' control to panel lighting
- ★ Built-in 4" speaker
- ★ Built-in attenuator to prevent overloading
- ★ Digital readout to 1kHz and analogue dial

Electronics (UK) Ltd

... AN EXCITING NEW ANTENNA IN THE 'PENETRATOR' SERIES



... the DX-26Q ... 6-BAND QUAD

its a formidable force on the band!

5&9 ZP5CDB
5&9+20DB VP8NX
5&9. 8P6DH
5&7. TG9NX
5.9+20DB WD9AEU
5.9 ZD7BW
5.9 WA70PZ OREGON
5.9 VP8AEN. ANTARTICA
5,9+20dB. CX8CB
5&7. 5WIDZ
5H3JR "Strong Signal"
G4HRN/W5 "Very outstanding signal"
W4US/HR1. "Wow Man! are you really in England?"
VK81F "Thought you were local"

The above are a few of the reports and comments received over the course of a few hours operating. They (or the antenna!) speak for themselves. When you upgrade your antenna system to a quad, you'll only have one regret ... and that's not having done it sooner! Send SAE for specification.

DX-24Q
2 Elements
2,10,15,20m **£199.99**

DX-26Q
2 Elements
2,10,12,15,16 & 20m **£224.25**

Prices (Inc. Carr. and VAT)

DX-31 Dipole, 2KW, 10-15-20m, Rotary	£75.89
DX-32 2 element, 2KW, 10-15-20m	£112.70
DX-33 3-element, 2KW, 10-15-20m	£164.45
DX-34 4-element, 2KW, 10-15-20m	£234.59
DX-6V Vertical 10-80m	£82.79
DX-103 3-element, 10m	£82.22
DX-51, Dipole Rotary for 14, 18, 21, 24 and 28 MHz	£90.85
DX-105 5-element, 10m	£106.95
TD1/10/80 Trapped dipole, 10, 40, 80m	£52.90
TD1/15/80 Trapped dipole, 15, 20, 40, 80m	£52.90

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Models 103SAX and 502SAX (illustrated) now have 360° circular dial presentation.

EMOTO 103SAX For light HF and large VHF arrays	£123.05
EMOTO 502SAX For heavier HF beams plus VHF/UHF	£171.35
EMOTO 1102MXX The really big one for large HF monobanders	£240.35
EMOTO 1103MXX As 1102MXX but greater turning power	£246.10
EMOTO 1102MSAX Circular dial	£303.60
EMOTO 1103MSAX Circular dial	£309.35
MB-300 Rotary bearing	£17.25
450 Flexible mount for '103'	£6.32
451 Felxible mount for 1102/3	£12.65

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ask for Cat. No. 1145

HF ROTATOR
only £86.25
ask for Cat. No. 1144

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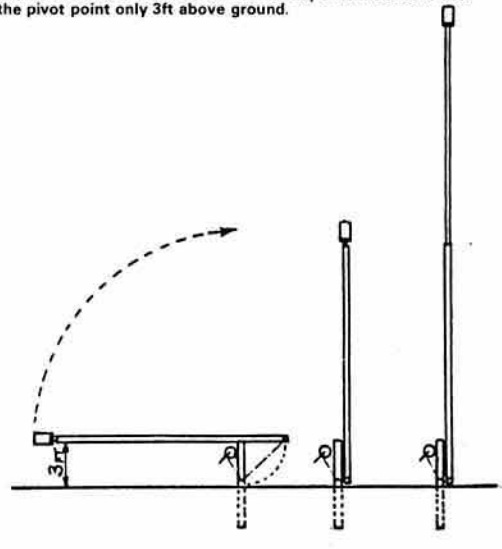
The 30ft ULTIMAST

A new mast for the budget-conscious amateur. Constructed in two sections, the lower being a square section tube and the upper a 3" dia. round tube, the ULTIMAST telescopes up to 30ft and down to 15ft. The tilt-over allows easy antenna access with the pivot point only 3ft above ground.



ANOTHER **Western** WINNER!

We designed our ULTI-MAST for PEOPLE WITH 2 HANDS!

Seems our competitors got it wrong! They need 3 hands according to the review in "Practical Wireless" of March, 1983.

REMEMBER ... the ULTI-MAST was so called because it is the

ULTI-MATE IN DESIGN

Our structural engineering department came up with the maximum of strength for the minimum of cost. It's impossible to get MORE strength for LESS cost ... so beware of cheap copies ... they may not have the correct material.

Slim, unobtrusive — **One-winch operation**
For VHF and HF antennas — **Telescopic and Tilt-over**
Simple ground fixing — **Self-supporting**

THIS IS THE TELESCOPIC YOU CAN AFFORD!

Ultimast, UM-1 ..... £251.85
Reducer head, UHD-1 (reduces to 2" dia stub) £16.10
Rotor head, UHD-2 (takes up to Emoto 103SAX) £35.65
PRICES INCLUDE DELIVERY AND VAT AT 15%

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RETAIL CALLERS We have 2 showrooms in Essex with the widest selection of amateur radio equipment available in the South East. Both premises have full demonstration facilities and our staff will be happy to give you advice on your requirements.

CREDIT As licensed credit brokers we can offer immediate H.P. on all our equipment to holders of cheque guarantee cards or credit cards. Alternatively we can normally arrange credit within 3 working days subject to status. Credit can also be arranged for mail order customers.

PART EXCHANGE We are always interested in good condition, modern equipment, and will be happy to quote you a part exchange deal. We will happily give an indication of the part exchange allowance by phone but this will be subject to a visual inspection before completing the transaction.

TRIO

TS930S	160-10m t'ceiver with gen. cov.	1,216.00	5.00
AT930	Automatic ATU 80-10m	141.75	2.50
SP930	External speaker unit	59.00	2.00
SO1	Comp unit	138.75	2.00
YK88A-1	6kHz AM filter	33.25	0.75
YK88C-1	500Hz CW filter	33.25	0.75
YG455C-1	500Hz CW filter	77.50	0.75
YG455CN-1	270Hz CW filter	91.75	0.75
TS430S	160-10m with gen. cov. rec	736.00	5.00
PS430	Mains PSU for TS430S	112.75	5.00
SP430	Speaker for TS430S	29.50	1.50
MB430	Mobile mounting bracket	11.25	1.50
FM430	FM option unit TS430S	34.50	1.00
TS830S	160-10m trans. 100w	697.75	5.00
VFO230	Digital VFO with memories	243.75	5.00
AT230	All band ATU/meter	135.75	5.00
SP230	External speaker unit	41.25	2.00
DS2	DC pack for TS830S	50.25	1.50
DFC230	Digital remote cont	153.25	2.50
YK88C	500Hz CW filter	31.75	0.75
YK88CN	270Hz CW filter	37.25	0.75
SM220	Station monitor scope	209.00	5.00
BS8	Panoramic display	52.50	1.00
KB1	Knob for TS830/530	10.25	0.75
YG455C	500Hz CW filter	75.50	0.75
YG455CN	250Hz CW filter	77.75	0.75
YG88A	6kHz AM filter – TS430S	35.50	0.75
TS530S	160-10m transceiver	595.00	5.00
VFO240	TS530S External VFO	92.75	5.00
TS130S	200w pep mobile t'ceiver	559.25	5.00
TS130V	20w pep mobile t'ceiver	456.25	5.00
TL120	Linear for TS120/130	167.50	2.50
MB100A	Mob mount for TS120/130	18.50	2.00
YK88C	500Hz CW filter	31.75	0.75
YK88CN	270Hz CW filter	37.25	0.75
YK88SN	1.8kHz SSB filter	32.50	0.75
VFO120	External VFO unit	98.50	2.50
SP120	External speaker unit	26.50	1.75
SP40	Mobile speaker unit	14.25	1.00
AT130	100w aerial tuner	93.00	1.75
PS20	AC for TS120/130V	57.75	2.50
MA5	Trio 5 band mobile aerial	106.00	4.00
TL922	160-10m 2kw linear	724.50	5.00
MC50	Dual impedance desk mic	30.75	1.75
MC60 N4	Desk microphone	51.50	2.00
MC60 S6	Desk mic with up/down	53.50	2.00
MC60A	Desk micwith pre-amp	55.25	2.00
MC35S	Fist mic 50K imp.	14.75	1.25
MC30S	Fist microphone 500ohm imp	14.75	1.25
MC40S	Up/down mic for TR9000/7800	14.75	1.25
MC42S	Up/down mic (TS930S)	15.25	1.25
LF30A	HF low pass filter	21.25	1.25
TS780	2m/70cm all mode t'ceiver	795.00	5.00
SP70	External speaker unit	23.50	1.50
BU1	Backup battery case	8.25	0.75
TR9130	2m multi mode mobile	433.50	2.50
PS20	AC power supply (TR9000)	57.75	2.50
B09A	Base plinth for TR9130	39.25	2.00
TR7730	25w 2m FM t'ceiver	199.00	2.50
TR7800	2m FM synth 25W t'ceiver	257.50	2.50
TR7930	2m FM t'ceiver LCD disp	305.25	2.50
TW4000	FM transceiver 2m/70cm	469.00	
SP40	Mobile speaker unit	14.25	1.00
TR2300	2m FM portable t'ceiver	152.00	2.50
VB2300	10w amplifier for TR2300	65.75	1.50
MB2	Mobile mount for TR2300/VB2300	21.25	1.50
RA3	Telescopic whip ante	9.50	0.75
TR2500	2m FM synth handheld	232.50	2.50
VB2530	30w amplifier for TR2500	69.75	2.00

YAESU

FT1	Gen Cov HF t'ceiver	1,395.00	5.00
Key T 901	Curtis keyer for above	26.85	1.50
DCT1	DC power cable	9.60	1.25
RAMT1	Non-volatile mem board	13.05	1.50
FMUT1	FM unit	34.90	1.50
XF8.9KCN	300Hz CW filter	39.85	1.25
XF8.9KC	600 Hz CW filter	17.25	1.25
XF8.9KA	6kHz AM filter	17.25	1.25
XF10.7KC	CW filter	11.90	1.25
FT980	Gen cov HF t'ceiver	1,150.00	5.00
SP980	Matching speaker	54.80	2.00
FT902DM	9 band AM/FM HF t'ceiver	885.00	5.00
XF89HC	600Hz CW filter for above	24.90	1.25
XF89HCN	300Hz filter for above	24.90	1.25
XF89GA	6kHz AM filter for above	24.90	1.25
XF89GF	12kHz FM filter for above	26.05	1.25
FV901DM	External VFO	260.00	5.00
FC902	9 band atu SWR/PWR	135.00	5.00
SP901	External speaker	31.00	2.00
FT101ZDFM	HF t'sceiver with FM	665.00	5.00
FV101Z	Remote vfo for above	120.00	2.00
FAN	Cooling fan for above	14.20	1.50
FT102	9 band HF transceiver	685.00	5.00
FC102	9 band matching atu	200.00	5.00
FV102DM	Remote vfo for above	230.00	2.50
SP102	External speaker	49.05	2.00
FM/AM	Unit for above	46.00	1.00
MH1B8	Scanning hand mic.	13.80	1.00
FT707	HF t'ceiver 12v DC	499.00	5.00
FP707	230v AC power supply	110.00	5.00
FC707	8 band atu to match FT707	85.00	2.00
MR7	Metal rack for above	17.25	2.00
MMB2	Mobile mounting bracket	17.25	1.50
FV707DM	Digital vfo for above	170.00	2.50
FT77	8 band 100 watt t'ceiver	459.00	5.00
Marker unit		9.60	1.00
FM Unit		25.30	1.00
FP700	PSU for FT77	110.00	5.00
FC700	ATU for FT77	85.00	2.00
FL2100Z	160-10m linear amp	475.00	5.00
FT290R	2m Multimode portable	249.00	2.50
FT790R	70cm Multimode Portable	299.00	2.50
NC/WSE	FT290/790 ni-cad pack	22.00	2.00
NC11C	FT290/790 AC charger	9.20	1.00
CSC1A	FT290/790 carrying case	3.85	0.75
MMB11	FT290/790 Mob mount	24.90	1.75
FL2010	290R Linear amplifier	59.00	2.00
FT208	2m FM handheld 2½W	199.00	2.00
FT708	70cm FM handheld 1W	209.00	2.00
NC9C	Slow charger	8.05	1.00
FNB2	Spare Ni-cad battery pack	19.95	0.75
FBA3	Charging sleeve	5.35	0.75
NC7C	Base master charger	30.65	1.50
NC8C	Base master quick charger	50.60	2.00
PA3	Charger 12v DC	14.20	0.75
MMB10	Mobile mounting bracket	6.90	1.50
FT230R	2m 25W FM mob t'ceiver	239.00	2.50
FT730R	70cms 10W FM mob t'ceiver	259.00	2.50
FT726R	3 band all mode base station	675.00	5.00
430T726	70cms module	230.00	2.50
50T726	6 metre module	170.00	2.50
SAT726	Full duplex x/band unit	90.00	2.00
FRG7	0.5-30mHz gen cov rec	199.00	5.00
FRG7700	0.2-30mHz gen cov rec	335.00	5.00
FRG7700M	7700 with memory unit	389.00	5.00
MEMGR7700	Memory module	98.90	1.50
DCRG7700	DC modification kit	2.95	0.75
FRT7700	Antenna tuner unit	42.55	1.50
FRA7700	Active Antenna	38.70	2.00
FF5	Low pass filter	9.95	1.00
FRV7700A	118-130, 130-140, 140-150mHz	78.95	1.50

JAYBEAM ANTENNAS

TB1	HF rotary dipole 1kw	69.00	3.00
TB2	HF 2 element tribander	126.50	5.00
TB3	HF 3 element tribander	189.75	5.00
VR3	HF Vert triband dipole	46.00	4.00
4Y-6M	4 element folded dipole	42.00	4.00
4Y-4M	4 element folded dipole	29.90	4.00
PMH2/4M	2 way phasing harness	16.10	1.50
DC1/WB	Wide band discone	41.40	4.00
LR1/2M	Vertical colinear 4.3dB	29.90	4.00
LR2/2M	Vertical colinear 2.8dB	23.00	4.00
C5/2M	5dB glass fibre colinear	54.60	4.00
LW5/2M	5 element folded	14.40	4.00
LW8/2M	8 el folded dipole	17.80	4.50
LW10/2M	10 el folded dipole	24.15	4.00
LW16/2M	16 element yagi	35.00	4.00
PBM10/2M	10 element parabeam	44.85	4.00
PBM14/2M	14 element parabeam	55.80	4.00
5XY/2M	Crossed 5 el yagi	28.20	4.00
8XY/2M	Crossed 8 el yagi	35.65	4.00
10XY/2M	Crossed 10 el yagi	46.00	4.00
X6/2M/X12/70cm	Dual band crossed yagi	42.55	4.00
PMH/2C	2 way phasing harness	9.80	1.50
Q4/2M	4 element quad	29.30	4.00
Q6/2m	6 element quad	39.10	4.00
Q8/2M	8 element quad	44.85	4.00
D5/2M	Double 5 slot-fed yagi	25.30	4.00
D8/2M	Double 8 slot-fed yagi	34.50	4.00
SVMK/2M	Kit for vertical polar	9.20	4.00
UGP/2M	Ground plane	12.65	2.50
HO/2M	Mobile 'halo' head	6.00	2.00
HM/2M	'Halo' with 24" mast	6.60	2.00
PMH2/2M	2 way phasing harness	12.65	1.50
PMH4/2M	4 way phasing harness	28.75	1.50
C8/70cm	8dB glass fibre colin	62.10	4.00
D8/70cm	Double 8 slot-fed yagi	25.90	4.00
PBM18/70	18 element parabeam	28.00	4.00
PBM24/70cm	24 element parabeam	42.55	4.00
LW24/70cm	24 element yagi	27.00	4.00
MBM28/70cm	28 element multibeam	21.30	4.00
MBM48/70cm	48 element multibeam	35.65	4.00
MBM88/70cm	88 element multibeam	48.90	4.00
8XY/70cm	Crossed 8 el yagi	42.55	4.00
12XY/70cm	Crossed 12 el yagi	52.90	4.00
PMH2/70cm	2 way phasing harness	10.35	1.50
PMH4/70cm	4 way phasing harness	22.45	1.50
CR23cm	Corner reflector array	40.25	4.00
D15/1296	Double 15 slot-fed yagi	39.00	4.00
PMH2/23cm	2 way phasing harness	31.00	1.50

DATONG

PC1	Gen. Cov. Con.	137.40	1.00
VLF	Very low frequency conv.	29.90	1.00
FL1	Freq agile audio filter	79.35	1.00
FL2	Multi-mode audio filter	89.70	1.00
FL3	Auto filter for receivers	129.00	1.00
ASP/B	r.f. speech clipper for Trio	82.80	1.00
ASP/A	r.f. speech clipper for Yaesu	82.80	1.00
ASP	As above with 8 pin conn	89.70	1.00
D75	Manual RF speech clipper	56.35	1.00
D70	Morse Tutor	56.35	1.00
MK	Keyboard morse sender	137.40	1.00
RFA	RF switched pre-amp	33.90	1.00
AD270	Active dipole indoor	47.15	2.00
AD370	Active dipole outdoor	64.40	2.00
AD270 + MPU	As above with mains p.s.u.	51.75	2.00
AD370 + MPU	As above with mains p.s.u.	69.00	2.00
MPU	Mains power unit	6.90	1.00
RFC/M	RF speech clipper module	29.90	1.00

FDK

M.700AX	2m FM 25W transceiver	215.00	2.50
M.750X	2m FM/SSB/CW 10W t'ceiver	315.00	2.50
EXP.430	M.750 70cm transverter	249.00	2.50
SNAP-1	Clamps joins M.750/EXP.430	7.95	1.00
PS750	M.750 230v AC PSU	69.00	2.50
FDK	12v DC lead	2.95	0.75
Palm II	2m FM 2W 6 ch. h'held	119.00	2.00
Palm II TB	As above with tone burst	131.00	2.00
Palm IV	70cm 1W FM 6 ch. h'held	119.00	2.00
Palm IV TB	As above with tone burst	131.00	2.00
TM56B	Amateur scanning rec 12v	59.00	2.00
TM56B	Marine scanning receiver	59.00	2.00
BC2	Palm II 230v AC charger	4.95	0.75
BT2	Nicad battery pack	14.00	0.75
Xtals	Palm II and Palm IV	3.75	0.40
Xtals	for TM56B	3.75	0.40
KP100	AC/DC Electronic Keyer	69.00	2.00
ATC720	Synth air monitor 110-138MHz	159.00	2.00
RX40	Synth FM mon	119.00	2.00
ATC12V	12v DC car adaptor	4.95	0.75
ATCC	Carrying case	4.95	0.75
TB1	1750Hz tone burst	12.00	0.50

HF ANTENNAS

Mini-Products HQ-1 20/15/10m 2 el.		139.00	4.00
Mini-Products C4 20/15/10m vertical		59.00	4.00
Welz-Diamond CP5 10-80m vertical		115.00	4.00
Welz-Diamond CP4 10-40m vertical		89.00	4.00
Welz-Diamond CP3 6-10-15m vertical		49.00	4.00
Mosley TD3JR 20/15-10m wire dipole		43.70	2.00
Mosley "Mini-Beam" 20/15-10m 2 el.		135.00	4.00
Mosley TA33JR 20/15-10m 3 element		177.00	4.00
Hy-Gain 12AVQ 20/15/10m vertical		50.00	4.00
Hy-Gain 14AVQ 40-10m vertical		64.40	4.00
Hy-Gain 18AVT/WB 80-10m vertical		114.00	4.00
HF5 80-10m vertical 200 watts		55.75	4.00
HF5R Radial kit for HF5		35.00	3.00
Jaybeam TB3HF element		189.75	5.00
Jaybeam VR3HF vertical		46.00	2.00
5-band commercial grade 1kw 80-10m dipole		39.00	2.00

VHF/UHF MONITOR RECEIVERS

Saiko SC7000	230v/12v scan mon	259.00	5.00
SX200N	Scanning receiver	289.00	5.00
BEARCAT 2020	Scanning receiver	259.00	5.00
TM56B	FM scanner 4 + 12 chan	59.00	2.00
Sound Air M161	16 channel FM monitor	39.00	2.00
SR9(A)	2m Amateur receiver	46.00	2.00
SR9(M)	Marine band receiver	46.00	2.00
SR1000E	Daiwa 1000 channel	83.00	2.00
MK4000	FM synth receiver	99.00	2.00
AS2320	Fairmate VHF, UHF scan rec	149.00	2.00

STATION ACCESSORIES

PP1305GS	13.8v 4 amp. AC p.s.u.	15.00	2.00
PP1307	7 amp AC power supply	32.00	2.50
PP1310	13.8v DC 10 amp. protected	49.50	3.00
Global PS15	6 amp power supply	22.00	2.00
EK121	Katsumi Electronic keyer	35.00	1.50
EKM12	Matching side tone mon	10.95	1.25

ST2	Base stand and charger	51.75	1.75
SC4	Soft case and belt hook	13.75	0.75
MS1	Mob stand and power unit	31.75	1.50
SMC25	Speaker/microphone	16.00	1.00
PB25	Spare ni-cad battery pack	25.00	1.00
LH2	Deluxe leather case	24.00	1.00
DC25	Power supply from 12V	16.00	1.00
TR3500	70cm handheld trans.	250.75	2.50
TR8400	70cm FM mob t'ceiver	299.00	5.00
PS10	Matching power supply for TR8400	64.75	5.00
TR9500	70cm multimode mob	450.75	5.00
R600	Gen. Cov. Rec 150kHz-30MHz	257.50	5.00
R1000	200kHz-30MHz rec	297.75	5.00
R2000	Gen cov rec	398.75	5.00
VC10	VHF unit for R2000. 118mHz to 174mHz	113.00	1.50
HC10	World time clock	67.50	1.50
TM201A	2M FM Transceiver	269.00	2.50

WELZ

SP200	1.8-160mHz PWR/SWR	69.95	1.75
SP300	1.8-500mHz PWR/SWR	97.00	1.75
SP400	130-500mHz 150w PWR/SWR	69.95	1.75
SP600	1.8-500mHz PWR/SWR	97.00	1.75
SP10X	1.8-150mHz PWR/SWR	24.45	1.25
SP15M	1.8-160mHz PWR/SWR	37.00	1.75
SP45M	130-470mHz PWR/SWR	51.00	1.75
SP250	1.8-60mHz PWR/SWR	49.50	1.75
SP350	1.8-500mHz PWR/SWR	59.95	1.75
AC38	3.5-30mHz ATU 400w PEP	65.00	1.75
TP05X	50-500mHz 0-5w meter	13.95	0.75
TP25A	50-500mHz 0-25w meter	17.50	1.50
TP20G	30-1500mHz 0-15w meter	139.00	2.00
CA-35A	Static protector	10.75	1.00
CA23N	Static protector	12.60	1.00
CT15A	15/50W dummy load PL259	8.50	1.00
CT15N	15/20W dummy load N plug	13.95	1.00
CT150	150/400W dummy load	37.00	1.00
CT300	300/1kw dummy load	49.50	2.00
CT03N	3w dummy load 1.3gHz	30.00	1.00
CH20A	2 way coax switch SO239	17.95	2.00
CH20N	2 way coax switch N socket	31.95	2.00
DF72C	144/430mHz duplexer	18.95	1.00
RS-45S	DC PSU 3-15v 3.6A	39.00	2.00
RS-65S	DC PSU 3-15v 6A	59.00	2.00
RS1100	DC PSU 13.8v 10A	75.00	2.50
RS-1150D	DC PSU 3-15v 10A	89.00	3.00

WELZ DIAMOND AERIALS

RH2B	2m ¼ wave whip BNC	8.95	1.00
RH200B	2m half wave whip BNC	18.95	1.50
RH702B	70cm 2 × 5/8 whip BNC	16.00	1.50
M285	2m 5/8th mobile PL259	8.95	2.00
M287	2m 7/8th mob	14.95	2.00
EL770E	Dual band 2m/70cm mobile	18.95	2.00
B285	2m 5/8th base with radials	15.95	2.00
GH22	2m 2 × 5/8th base	29.95	2.00
GH72	70cm 2 × 5/8th base with radials	29.95	2.00
DP100S	80-10m mobile system 100w	79.95	4.00
GLS	Gutter Mount with 4m cable	8.95	1.00
GLP	SO239 vehicle mount	2.75	1.00
SPM	Heavy duty magnetic base	12.95	1.50
TRB	Heavy duty trunk lip mount	11.50	1.50
LBR	14" elevated ground plane	19.95	2.00
LBR	Heavy duty base spring	10.50	1.50
BDS	Bumper mounting strap	9.50	1.50
BSB	As LBR with ball adjustment	8.50	1.50
EL80	Base loaded whip. 3.5mHz	37.00	2.00
EL40	Base loaded whip 7mHz	32.50	2.00
CP3	6-10-15 vertical with G.P.	69.00	4.00
CP4	10-40m vertical with G.P.	89.00	4.00
CP5	10-80m vertical with G.P.	115.00	4.00
KB101	10-40m 1kw vertical	55.00	4.00
KB105	10-80m 1kw vertical	79.50	4.00
GH7	70cm 5/8 base 3.5dB	24.95	2.00

FRV7700B	118-130, 140-150, 50-59mHz	84.70	1.50
FRV7700C	140-150, 150-160, 160-170mHz	74.75	1.50
FRV7700D	118-130, 140-150, 70-80mHz	80.90	1.50
FRV7700E	118-130, 140-150, 150-160mHz	83.95	1.50
FRV7700F	118-130, 150-160, 170-180mHz	83.95	1.50

ICOM

IC740	100w HF trans 12v DC	769.00	5.00
PSU(int.)	230v AC power supply	134.00	5.00
FM-EX242	FM module for above	26.00	1.00
KEYER(EX243)	Keyer module for above	36.00	1.00
IC730	100w HF trans 12v DC	695.00	5.00
FL30	SSB pass band filter	29.00	1.00
IC720A	100w HF trans plus gen. cov.	949.00	5.00
PS15	230v p.s.u. for HF t'ceivers	119.00	5.00
PS20	230v chopper type unit	155.00	5.00
FL45	500Hz filter for 740/730	39.00	0.75
FL44	2.4kHz SSB filter	65.00	0.75
FL32	CW narrow filter for 720	34.00	0.75
FL34	AM filter for 720	29.00	0.75
EX202	LDA unit for 730	13.50	0.75
EX203	CW audio filter for 730	14.00	0.75
EX205	TRV unit for 730	11.50	0.75
B10	Memory back up for 720	5.75	0.75
IC2KL	500W solid state linear	915.00	5.00
IC2KL PSU	Matching 230v AC PSU	256.00	5.00
AT100	100 watt HF Auto ATU	249.00	5.00
AT500	500 watt HF Auto ATU	349.00	5.00
CF1	Cooling fan	20.50	1.00
SP3	Matching ext speaker	39.00	1.50
HP1	Communication phones	25.00	1.00
SM5	Base microphone	29.00	1.50
IC-R70	Comms rec 230v AC	499.00	5.00
FM unit	Plug in module	30.00	1.00
FL63	CW Narrow filter	32.50	1.00
FL44	Xtal filter	65.00	1.00
IC251	Multimode 2m base station	479.00	5.00
IC290E	Multimode 2m 12v DC	433.00	3.00
IC25E	2m FM mobile 12v DC 25 w	269.00	3.00
BU1	Back up supply	20.00	1.00
IC451E	Multimode 70cm	689.00	5.00
IC490	Multimode 70cm12v DC	459.00	5.00
IC45E	70cm FM mobile DC 10w	289.00	3.00
IC402	70cm SSB portable 3W	257.00	2.50
IC2E	2m synth h'held 1.5w	179.00	2.00
IC4E	70cm synth h'held 1.5w	199.00	2.00
MMB2	Mobile mounting bracket	t.b.a.	
MMB5	Mobile mounting bracket	12.50	1.00
MMB9	Mobile mounting bracket	12.50	1.00
MMB12	Mobile mounting bracket	11.50	1.00
HM3	4 pin hand mic.	12.50	1.00
HM7	8 pin hand mic.	12.50	1.00
HM9	L/S mic for IC2E/4E	15.00	1.00
HM10	Up/down scan mic.	20.00	1.00
SM2	4 pin desk mic.	29.00	1.00
SM5	8 pin desk mic.	29.00	1.00
SP3	External loudspeaker	39.00	1.50
LC1/2/3	Cases for IC2E/4E	4.25	0.75
BC25	Standard mains charger	5.75	1.00
BC30	Base hod type charger	49.00	1.00
BP2	Low voltage pack	30.00	1.00
BP3	Standard pack	23.00	1.00
BP4	Empty battery box (AA cells)	6.95	0.75
BP5	High power battery pack	44.00	1.00
CP1	Charger lead for 12V supply	4.49	0.75
DC1	12v Regulator pack	11.99	0.75
ML1	2m linear	64.00	2.00

VHF POWER AMPLIFIERS

ALINCO	30w 12v DC Amp 1 or 3w	59.00	1.00
KMCC2300/2E	IC2E 25w 12v DC amp	79.00	1.50
KMCC2300/TR25	TR2500 12v DC amp	85.00	1.50
CORONA HP80VDX	80w amp/Gasfet pre-amp	(On request)	

PTS1	Tone squelch unit	46.00	1.00
ANF	Automatic notch filter	67.85	1.00
SRB2	Auto Woodpecker blanker	86.25	1.00

MICROWAVE MODULES RANGE

MML28/100 S	10m 100W lin/preamp	129.95	2.00
MML70/50	4m 50 watt lin/preamp	92.00	1.25
MML70/100 S	4m 100W lin/preamp	149.95	2.00
MML144/30LS	2m 30W linear amp	69.95	1.25
MML144/50S	2m 50W lin/preamp	92.00	1.25
MML144/100 S	2m 100W lin/preamp	149.95	2.00
MML144/100LS	2m 100W (1 or 3W i/p)	169.95	2.00
MML432/30L	70cm 30W lin/preamp	129.95	1.25
MML432/50	70cm 50W lin/preamp	129.95	2.00
MML432/100	70cm 100 watt linear	245.00	2.00
MML1296/10	23cm 10 watt linear	199.00	1.25
MMC435/51	70cm ATV con, VHF out	37.90	0.75
MMC435/600	70cm ATV con, UHF out	29.90	0.75
MTV435	70cm ATV 20W t'mitter	159.95	1.25
MM1000	ASCII to Morse con	69.95	1.25
MM1000KB	Converter with keyboard	135.00	2.00
MM2001	RTTY to TV converter	189.00	1.25
MM4001	RTTY terminal	269.00	1.25
MM4001KB	RTTY term with keyboard	299.00	2.00
MMS1	The MORSETALKER	115.00	1.25
MMS2	Advanced morse trainer	169.00	1.25
MMT28/144	10m linear transverter	129.95	1.25
MMT70/28	4m linear transverter	129.95	1.25
MMT70/144	4m linear transverter	129.95	1.25
MMT144/28	2m linear transverter	109.95	1.25
MMT432/28-S	70cm linear transverter	159.95	1.25
MMT432/144-R	70cm linear transverter	184.00	1.25
MMT1296/144	23cm linear transverter	199.00	2.00
MMC27/MW	27MHz to med wave conv	19.95	0.75
MMC28/144	10m to 2m up conv	29.90	0.75
MMC50/28	6m to 10m down conv	29.90	0.75
MMC10/28	4m to 10m down conv	29.90	0.75
MMC70/28LO	4m to 10m down conv	32.90	0.75
MMC144/28	2m to 10m down conv	29.90	0.75
MMC144/28LO	2m to 10m down conv	32.90	0.75
MMC432/28-S	70cm to 10m down conv	37.90	0.75
MMC432/144-S	70cm to 2m down conv	37.90	0.75
MMC1296/28	23cm to 10m down conv	34.90	0.75
MMK1296/144	23cm to 2m down conv	79.95	0.75
MMK1691/137.5	1691mHz Meteosat conv	145.00	1.25
MMA28	10m low noise preamp	19.95	0.75
MMA144V	2m RF switched preamp	34.90	0.75
MMA1296	23cm low noise preamp	37.90	0.75
MMd050/500	500MHz digital freq meter	75.00	0.75
MMd600P	600mHz-10 prescaler	29.90	0.75
MMDP1	Freqcounter amp/probe	14.90	0.75
MMF144	2m bandpass filter	11.90	0.75
MMF432	70cm bandpass filter	11.90	0.75
MMS384	384mHz freq source	29.90	0.75
MR15/10	15dB, 10W attenuator	14.50	0.75

AZDEN

PCS4000	2m FM transceiver 25W	229.00	2.50
PCS300	2m FM handheld	209.00	2.50
LC-11	Leather case for above	18.35	0.75
SDX-315	Speaker mic for PCS300	14.75	0.75
MC-1	Spare AC charger	5.85	0.75
BP500	Spare battery pack	12.50	1.00
MEX55	Mobile boom safety mic	28.50	1.75
Mic. Plugs	for PCS3000	3.75	0.50
AS-006	Mobile ext speaker	9.95	1.75

COK2	Morse osc & speaker	8.00	0.75
HK708	Telegraph CW key	12.75	1.00
MK704	Squeeze Paddle	13.25	1.00
YW3	SWR/Power/Field stren meter	12.95	0.75
FX1	Deluxe station wavemeter	33.00	1.50
FX1 K	Converts FX1 to dip meter	5.75	0.75
DM 81	Solid state dip meter	71.00	1.50
12BY7A	Driver valves	3.25	1.00
6146B S2001A	PA valves	9.50	1.00
6JS6C	P.A. valves matched pairs	13.75	1.00
Altai	Grid dip oscillator	47.00	2.00
Ni-cads (HP11 size)		2.50	0.20
Cigar Lighter plugs		0.55	0.20
UR67 cable 50 ohm (max carriage £5)		0.69	0.15
BL40X balun 50 ohm 1kw		11.25	0.75
APM1 Audio Peak and notch filter		33.00	1.00
HP3A TVI high pass filter (UHF T.V.)		3.99	0.50
HP4A TVI high pass filter (UHF T.V.)		5.95	0.50
Drake TV3300 LP Low Pass Filter		21.85	1.00
Shure 444D dual impedance (500 ohm, 50k ohm)		41.00	1.50
DL705 Digital autoranging multimeter		80.50	1.50
FDK KP100 squeeze morse key		69.00	2.00
Belcom LS102L 26-30mHz all mode		295.00	5.00
Daiwa CNA1001 Automatic Antenna tuner		156.00	3.00
CK3A 3 way coax switch 0-30mHz		5.95	0.50
Universal Ni cad battery charger		7.95	1.25

AERIAL ROTATORS

CDE AR40 (5 core cable)		90.85	4.00
Channelmaster 9502B (3 core)		56.92	4.00
Alignment bearing for 9502B		15.81	1.25
Kenpro KR400RC (6 core)		115.00	4.00
KC038 lower mast clamps for KR400RC		12.00	1.50
Kenpro KR250 (3 core)		55.00	4.00
KR500 Elevation type control		112.00	2.50
ALINCO Heavy duty aerial rotator		89.00	4.00

SAGANT AERIALS

AL-144FL	Portable ground plane	23.50	2.00
EL-40X	80-40m compact dip (70ft)	32.00	2.00
MT40XE	10-15-40-80 comp dipole	39.00	2.00
Super Rod 2	Telescopic 5/8th ant.	8.50	1.00
MG-YS	Magnetic base and cable	6.95	1.50

ADONIS MICROPHONES

MM202S	Mic. with boom & clip	24.50	1.50
MM202HG	Mic. with h'phone unit	37.00	1.50
MM202FX	Mic with flexible gooseneck	35.00	1.50
AM303	Base station mic	29.95	1.50
AM503	As above with compressor	39.95	2.00
MS10	Mobspeaker & message pad	16.25	1.50

VHF MONITOR RECEIVERS

R537	Airband portable receiver	49.50	1.50
Case	Soft case for R537	3.00	1.00
Crystals for	R537	ea. 3.75	0.25
CD6000	12v DC mobile or base	99.00	2.00
ATC720	Fully Synth. portable rec.	159.00	2.00

MAIL ORDER SLIP to: Waters & Stanton Electronics, Main Road, Hockley, Essex.

Name..... Goods required.....

Address..... .....

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18-20 MAIN ROAD, HOCKLEY, ESSEX. Tel: (0702) 206835
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South Midlands

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FT77 HF MOBILE

FTONE	~~£1450~~	now only **£1395** inc
FT980	~~£1215~~	now only **£1150** inc
FT102	~~£839~~	now only **£685** inc
FT77	~~£515~~	now only **£459** inc
FT775	~~£435~~	now only **£399** inc
FT707	~~£515~~	now only **£499** inc

FT726R ~~£699~~	now only **£675** inc
FT290R ~~£285~~	now only **£249** inc
FT790R ~~£349~~	now only **£299** inc
FT230R ~~£255~~	now only **£239** inc
FT730R ~~£299~~	now only **£259** inc
FT708R ~~£229~~	now only **£209** inc

FT290R 2m Multimode

FV102DM	~~£250~~	now only **£230** inc
FC102	~~£225~~	now only **£200** inc
FRG700M	~~£399~~	now only **£389** inc

FC700	~~£99·65~~	now only **£85** inc
FV707DM	~~£200~~	now only **£170** inc
FC707	~~£88·55~~	now only **£85** inc

NEW FROM YAESU

FT757GX

* Frequency range 160-10M Tx, general coverage Rx. 10Hz VFO steps and 500kHz band steps. * Modes, USB, LSB, CW, AM, FM all as standard. * Power output 100W SSB, CW, FM 25W carrier AM, 3rd order products −40dB at 100W on 14MHz. * Dynamic range better than 100dB CW(N) at 14MHz. * Frequency stability better than ±10ppm after warm up. * Dual VFO's and 8 memories with VFO/memory transfer feature allowing more flexible split frequency operation. * Programmable memory scanning with scanstop threshold adjustable with the RF Gain control. * All accessories installed including AM, FM, marker, speech processor, shift filters, 600Hz CW filter and keyer. * New heatsink design and ducted cooling system allows 100W o/p at 100% transmitter duty cycle. * Selectable semi break-in or full break-in and built-in iambic keyer with dot-dash memory. * Three microprocessors control most of the switching and adjusting functions normally done by hand and on optional CAT interface unit allows further operating flexibility with an external computer.

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Communications Ltd.

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FTV107 grey C/W 2M MODULE

FTV901R

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FV901DM DIGITAL VFO

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TRANSVERTER C/W 2M MODULE

£149.00

SMC

TRANSVERTER C/W 2M MODULE FITTED

£119.00

FV101 DM KEYBOARD VFO

£149

FT227R

2M FM TRANSCEIVER

ALL PRICES INCLUDE VAT AND DELIVERY

YAESU FT780R

OSCAR 10
SPECIAL PROMOTION

SPECIAL OFFER FT780R MULTIMODE UHF TRANSCEIVER. NOW ONLY £289 inc

FT780R + 1.6 version with S.M.C. 1.6MHz repeater shift and full reverse R.P.T. facility (for listen on input or continental R.P.T. use) **£299 inc**

N.B. The S.M.C. 1.6 MHz shift modification is available only on sets bought from US.

FP80A Matching AC P.S.U. **£55.00 inc**

An unrepeatable bargain not to be missed, and your passport to the D.X. on Oscar 10!!

Prices include carriage & VAT

NOW AVAILABLE FOR HIRE 60ft TRAILER MOUNT TOWER. AVAILABLE MOST WEEKDAYS AND WEEKENDS EXCEPT VHF NFD!!

REMEMBER

Only authorised Yaesu dealers have direct contact with the factory in Japan, and only if you buy your radio from an authorised dealer can you be assured of spares and service back up. So **BEWARE** of grey importers who offer sets a few pounds cheaper, they may not be around if your set goes wrong!

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SMC Ltd
36/38 Rumbridge Street,
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Southampton (0703) 867333
9-5.30 Mon-Sat

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SMC (Humbridge)
247A Freeman Street,
Grimsby, Lincolnshire.
Grimsby (0742) 59388
9.30-5.30 Mon-Sat

STOKE
SMC (Stoke)
76 High Street,
Talke Pits, Stoke.
Kidsgrove (07816) 72644
9-5.30 Tue-Sat

LEEDS
SMC (Leeds)
257 Otley Road,
Leeds 16, Yorkshire.
Leeds (0532) 782326
9-5.30 Mon-Sat

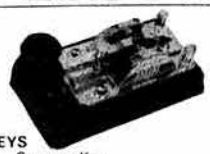
CHESTERFIELD
SMC (Jack Tweedy) Ltd
102 High Street,
New Whittington, Chesterfield
Chesterfield (0246) 453340
9-5.30 Tue-Sat

BUCKLEY
SMC (T.M.P)
Unit 27 Pinfold Workshops
Pinfold Lane, Buckley.
Buckley (0244) 549563
9.30-5.00 (Lunch 1-1.45) Tue-Sat

JERSEY
SMC (Jersey)
1 Belmont Gardens
St Helier, Jersey.
Jersey (0534) 77067
10.00-7.00 Mon-Sat

EDINBURGH
SMC (Scotcomm)
23 Morton Street
EH15 2HN
031-657 2430
10-5.00 Tue-Fri (9-4 Sat)

MORSE EQUIPMENT



MORSE KEYS

BKU1	Squeeze Key	£30.30	£1.20
HK703	Straight Key	£25.70	£1.20
HK704	Straight Key	£17.65	£1.20
HK706	Straight Key	£14.60	£1.00
HK707	Straight Key	£13.75	£1.00
HK710	Straight Key	£36.40	£1.75
HK808	Straight Key	£45.60	£1.75
HK711	Key Mounting	£29.50	£1.50
BK100	Mechanical Bug	£22.25	£1.75
MK701	Single Lever Paddle	£25.25	£1.60
MK702	Single Lever Paddle	£26.45	£1.60
MK703	Squeeze Key	£25.95	£1.75
MK705	Squeeze Key	£22.60	£1.75
MK706	Squeeze Key	£19.50	£1.75
IKP60	Iambic	£9.95	FOC
SR1	Straight Key	£12.65	FOC

MORSE EQUIPMENT

KP100	Squeeze CMOS 230/13·8V	£69.00	£2.00
KP200	Memory 4096 Multi Ch Mem Back Up 230/13·8V	£155.25	£2.50
D70	Morse Tutor (Datong)	£56.35	FOC
MMS1	Morse Tutor (M/M)	£115.00	FOC
MMS2	Morse Tutor Advanced	£155.00	FOC

MICROWAVE MODULES—RTTY EQUIPMENT

MM2001	RTTY to Demod./Convertor	£189.00	FOC
MM4001	RTTY Transceiver		FOC
MM4001KB	RTTY Transceiver c/w keybd	£299.00	FOC
MM1000	ASCII to Morse Converter	£69.95	FOC
MM1000KB	ASCII CW conv c/w keybd	£89.00	FOC

PRICES INCLUDE VAT at 15%
Carriage as shown

JAYBEAM

4 METRES

4Y/4M	Yagi 4 element	7dBd	£29.90	£2.20
PMH2/4M	Phasing harness 2 way		£16.10	£1.50

2 METRES

H0/2M	Halo head only	0dBd	£5.98	£1.20
HM/2M	Halo with 24" mast	0dBd	£6.55	£1.50
C5/2M	Colinear omni vert	4·8dBd	£54.62	£2.50
LW5/2M	Yagi 5 element	7·8dBd	£14.37	£2.50
LW8/2M	Yagi 8 element	9·5dBd	£17.82	£2.50
LW10/2M	Yagi 10 element	10·5dBd	£24.15	£2.50
LW16/2M	Yagi 16 element	13·4dBd	£35.07	£3.20
14Y/2M	Yagi 14 element	12·8dBd	£36.23	£3.20
PBM10/2M	10 ele Parabeam	11·7dBd	£44.85	£3.20
PBM14/2M	14 ele Parabeam	13·7dBd	£55.77	£3.20
Q4/2M	Quad 4 element	9·4dBd	£29.32	£2.50
Q6/2M	Quad 6 element	10·9dBd	£39.10	£2.50
Q8/2M	Quad 8 element	11·9dBd	£44.85	£2.50
D5/2M	Yagi 5 over 5 slot	10dBd	£25.30	£2.50
D8/2M	Yagi 8 over 8 slot	11·1dBd	£34.50	£2.50
5XY/2M	Yagi 5 ele crossed	7·8dBd	£28.17	£2.50
8XY/2M	Yagi 8 ele crossed	9·5dBd	£35.65	£2.50
10XY/2M	Yagi 10 ele crossed	10·8dBd	£46.00	£2.50
PMH2/C	Harness cir polarisation		£9.77	£1.50
PMH2/2M	Harness 2 way 144MHz		£12.65	£1.50
PMH4/2M	Harness 4 way 144MHz		£28.75	£1.50

SEVENTY CM

C8/70	Colinear Omni Vertical	6·1dBd	£62.10	£2.50
D8/70	Yagi 8 over 8 slot	12·3dBd	£25.87	£2.50
PBM18/70	18 ele Parabeam	13·5dBd	£32.20	£2.50
PBM24/70	24 ele Parabeam	15·1dBd	£42.55	£2.50
LW24/70	Yagi 24 element	14·8dBd	£27.02	£2.50
MBM28/70	28 ele Multibeam	11·5dBd	£21.27	£2.50
MBM48/70	48 ele Multibeam	14·0dBd	£35.65	£2.50
MBM88/70	88 ele Multibeam	16·3dBd	£48.87	£2.50
8XY/70	Yagi 8 ele crossed	10dBd	£42.55	£2.50
12XY/70	Yagi 12 ele crossed	12dBd	£52.90	£2.50
PMH2/70	Harness 2 way		£10.35	£1.50
PMH4/70	Harness 4 way		£22.42	£1.80

1296 MHz

CR2/23CM	Corner reflector	13·5dBd	£40.25	£2.50
PMH2/23CM	Harness 2 way		£31.05	£1.50

NB: PRICES INCLUDE VAT AT 15%
Carriage extra, mainland rate shown

ANTENNA ACCESSORIES

2M ASCOT ANTENNAS MOBILE
(The keenest prices) p/p
Complete with bases and cable

340COM	¼ × Standard	£6.10	£1.50
310COM	¼ × Swival	£8.10	£1.50
344COM	¼ × Sprung	£10.38	£1.50
440COM	⅝ × Standard	£7.71	£1.50
330COM	⅝ × Swival	£10.00	£1.50
341COM	⅝ × Sprung	£12.31	£1.50
092	Magnetic Mount	£10.75	£1.50
350	½ × Standard	£14.26	£1.50
351	½ × Sprung	£15.01	£1.50
091	Magnetic Mt ½ ×	£10.75	£1.50

MASTS & TOWERS

TT24	79' Tower c/w rigging	£626.00	DIST
TT30	101' Tower c/w rigging	£730.00	DIST
SMC16	16' Portable c/w rigging	£21.28	£2.20
SMC24	24' Portable c/w rigging	£25.88	£2.20
SPK16	16' Light duty portable	£17.25	£2.20
10P30	30' Telesc. Versatower	£388.00	DIST
13P40	40' Telesc. Versatower	£436.00	DIST
13P60	60' Telesc. Versatower	£534.00	DIST
16P40	40' Telesc. Versatower	£650.00	DIST
16P60	60' Telesc. Versatower	£739.00	DIST

COAXIAL CABLE (per metre)

UR43	50 ohm 5mm	£0.27	£2.00
UR76	50 ohm 5mm Stranded core	£0.29	£2.00
UR67	50 ohm 10·2mm low loss	£0.67	£2.40
LDF2	50 ohm ½" Foam Heliax	£2.85	£2.50
LDF4	50 ohm ½" Foam Heliax	£3.58	£2.50
307EP	75 ohm Economy	£2.21	£2.00
UR70	75 ohm 6mm	£0.30	£2.00
UR39	75 ohm 7.8mm	£0.44	£2.40
UR57	75 ohm 10.2mm low loss	£0.69	£2.50
302	75 ohm Galv. twin	£0.17	£1.50
306	300 ohm Galv twin	£0.23	£1.50

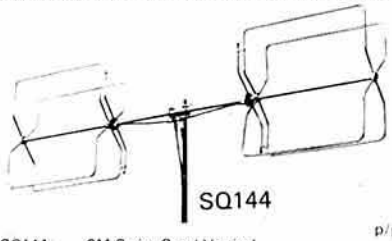
ANDREWS HELIAX CONNECTORS

L42W	'N' Plug male LDF2/50	£12.07	£0.65
L42N	'N' Jack female LDF2/50	£12.07	£0.65
L42P	UHF Plug (PL259) LDF2/50	£12.07	£0.65
L44W	'N' Plug male LDF4/50	£12.42	£0.65
L44N	'N' Jack female LDF4/50	£12.42	£0.65
L44P	UHF Plug (PL259) LDF4/50	£11.09	£0.65

SMC-HS

HF, VHF, UHF, BASE STATION ANTENNAS

SMC-HS range of base station antennas covers from 80M through to 70cm. All have S0239M connectors and are supplied complete with all required mounting hardware.



			p/p
SQ144	2M Swiss Quad Vertical Mounting 2M ⅝ c/w ground plane	£57.60	£2.50
GP2M	3·4dB ¼	£18.00	£2.50
GP144W	2M 2 × ¼ colinear 6·5dB ¼	£27.60	£2.50
GP23	2M 3 × ¼ colinear 7·8dB ¼	£39.85	£2.50
GP432	70cm 3 × ¼ colinear 6·8dB ¼	£29.90	£2.50
70N2V	2M/70cm colinear 2·8dB ¼/5·7dB ¼	£29.90	£2.50
HS770	2M/70cm Duplexer 50W 30dB isolation	£15.35	£1.50
VHFL	65-520MHz Discone Rx only	£15.70	£2.50
GDX1	80-480MHz Discone 3dB ¼	£40.25	£2.50
GDX2	50-480MHz Discone 3dB ¼	£49.45	£2.50
GDXA	100-480MHz Discone 3dB ¼	£33.75	£2.50
LT606	50-500MHz Log Periodic 7-8dB	£115.00	£2.50
HF5V	Trapped Vertical 10-80M 5 bands	£54.80	£2.50
HF5R	Loaded Radial Kit	£34.90	£2.50
3Y1015D20	3 ele 10, 15M Dipole 20M	£144.90	£5.00

NB: PRICES INCLUDE VAT AT 15%
Carriage extra, mainland rate shown

ROTATORS

The finest range: be it Kenpro, C.D.E., Channel Master, SMC, has over 19 models to choose from. Ask the experts for the right model to suit your requirements—it should save you money. Write, phone or call.

RLD3	Bell	5 Core	Light Duty		£40.25
505	Bell	5 Core	Light Duty		£40.25
AR30	Offset	5 Core	Light Duty		£56.35
KP250	Bell	6 Core	Lighter Duty		£54.91
9502B	Offset	3 Core	Lighter Duty		£56.92
AR22	Bell	4 Core	Medium Duty		£67.85
9508	Offset	3 Core	Medium Duty		£80.21
AR40	Bell	5 Core	Medium Duty		£90.85
BT1	Bell	5 Core	4 Preset medium		£91.43
KR400	Bell	6 Core	Matches KR500		£97.75
KR500	Thro	6 Core	Elevation		£112.12
AR50	Bell	5 Core	5 Position Medium		£113.85
KR400RC	Bell	6 Core	Medium Duty		£114.94
CD45	Bell	8 Core	Heavy Duty		£136.85
KR600RC	Bell	8 Core	Heavy Duty		£163.30
HAM IV	Bell	8 Core	Heavier Duty		£258.75
KR2000RC	Bell	8 Core	Heavier Duty		£314.52
T2X	Bell	8 Core	Very Heavy Duty		£327.75
H300	Bell	8 Core	Digital Readout		£493.35

Control Cable

RC4W	4 Way	28p/mtr	Carriage £1.80
RC5W	5 Way	33p/mtr	Carriage £1.80
RC6W	6 Way	51p/mtr	Carriage £1.80
RC8W	8 Way	55p/mtr	Carriage £1.80

9523	Support Bearing 9502	£15.81	Carriage £2.50
KC038	Lower Mast Clamp KR400 600	£12.07	Carriage £2.50

Prices including VAT and carriage, but carriage on accessories is extra unless sent with rotators

10M FM CORNER

Join the many others who have found that operating 10M FM can be a pleasant alternative to the overcrowded 2M band. The SMC Oscar 2 10M gives you 40 channels, channel 1 being 29.310 MHz and channel 40 29.7 MHz, a power o/p of 5 watts minimum and a receive sensitivity of better than .3μV for 12db sinad. Also for your enjoyment when the band opens up, we have incorporated a −100kHz repeater shift (by using the original front panel Hi/Low power switch), so from the car or at home you can enjoy 10M FM without having to pay £500 for an HF transceiver.

OSCAR 2 10M FM **£49.00 inc**

ACCESSORIES

		INC	P/P
SMCGP27	¼ Wave vertical with radials	£24.15	£2.50
SMC VA27	¼ Wave vertical no radials	£20.70	£2.50
SMC11V11S	Glass fibre shortened ground plane	£29.90	£2.50
SMC10SE	10M Mobile whip	£13.80	£2.00
SMCGCCA	Gutter mount and cable for 10SE	£9.95	£1.80
SMCSOCA	4M cable assembly for 10SE	£5.00	£1.20
FLEXI 10	G. Whip mobile 10-80M	£49.00	£2.00
MULTI-MOBILE	G. Whip mobile 10, 15, 20M	£30.48	£1.85
FLEXIWHIP	G. Whip 10M mobile	£18.11	£1.85
GW BASE	Base for all G. Whip antennas	£5.75	
SMCT3170L	Twin meter SWR bridge	£14.95	F.O.C.
SMC100LP30	Low pass filter	£5.30	F.O.C.
SMCRU120-406	4 Amp DC power unit	£15.00	£2.00
FSP1	Extension L/S	£11.15	F.O.C.

NB. PRICES INCLUDE VAT AT 15%
and carriage by post or Securicor

STOCK-CARRYING AGENTS WITH DEMONSTRATION FACILITIES

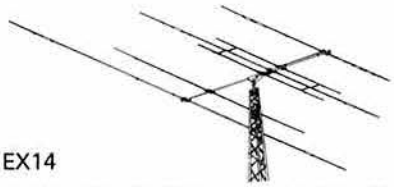
Stourbridge Andrew G4ESY (0384) 390916

Bangor John GI3KDR (0247) 55162
Tandragee Mervyn GI3WWY (0762) 840656

Neath John GW4FOI (0639) 52374 Day, (0639) 2942 Eve

HF ANTENNAS

SMC have the greatest range of HF antennas eg. Multi Beams/Quads, over 20 models. Shown below is the sensational new Explorer 14 – contact us for full details.



EX14

MULTIBAND BEAMS		Inc VAT	P&P
EX14	Explorer 10-20m	£325.00	£5.50
TH3JN	3 Ele 10-20m	£202.40	£3.50
TH2MK3	2 Ele 10-20m	£169.05	£3.50
TH3MK3	3 Ele 10-20m	£274.85	£5.30
TH5DXX	5 Ele 10-20m	£419.75	£6.70
TH7DXX	7 Ele 10-20m	£511.75	£8.75
TB3	3 Ele 10-20 Jaybeam	£181.70	£5.40
HQ1	Mini Quad 10-20	£139.00	£4.00
G4MH	Mini Beam 1-20	£82.50	£4.00
TA33JNR	3 Ele 10-20 Moseley	£161.00	£3.40
Mustang 2	2 Ele 10-20 Moseley	£177.10	£3.50
Mustang 3	3 Ele 10-20 Moseley	£220.80	£3.70
GQ2E	2 Ele 10-20 Quad	£189.75	£5.40
GQ3E	3 Ele 10-20 Quad	£313.95	£9.20
GQ4E	4 Ele 10-20 Quad	£446.20	£10.00
Hyquad	2 Ele 10-20	£171.35	£6.70
LP1007	Log Periodic 13-20 MHz	£1474.30	DIST
3Y1015D20	3 Ele 10-20m	£134.95	£5.00
DB10/15A	3 Ele 10-15m	£198.95	£4.80

TB3

MONO BAND BEAMS			
103BA	3 Ele Yagi 10m	£67.85	£3.50
105BA	5 Ele Yagi 10m	£155.25	£3.75
153BA	3 Ele Yagi 15m	£90.85	£3.50
155BA	5 Ele Yagi 15m	£236.90	£5.90
203BA	3 Ele Yagi 20m	£178.25	£4.90
204BA	4 Ele Yagi 20m	£286.35	£7.30
205BA	5 Ele Yagi 20m	£396.75	£9.40
402BA	2 Ele Yagi 40m	£247.25	£6.50
18TD	Dipole Tape 10-80m		

HF5V

HF5R

VERTICALS			
12AVQ	Vertical 10-20m	£50.60	£2.75
14AVQ	Vertical 10-40m	£64.40	£2.75
18AVT/WB	Vertical 10-80m	£113.85	£2.75
18V	Vertical 10-80m taped	£36.22	£2.75
C4	Vertical 10-20m	£59.00	£2.50
SMCHF5	Vertical 10-80m	£54.80	£2.50
SMCHF5P	Radial Kit for above	£34.90	£2.50
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SMCTD/HP	High Power 10-80m	£43.41	£2.50
SMCTP/P	Portable inc coax	£59.80	£2.50
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Extra coils	For above to 160m	£5.70	£1.00
Flexiten	2, 10, 12, 17, 15, 20, 30, 40, 80M	£49.00	£2.00
Bases	For above	£5.75	£1.00

NB: PRICES INCLUDE VAT AT 15%
Carriage extra. Mainland rate shown.

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IN LINE POWER/SWR BRIDGES P.E.P., R.M.S. 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.

FS-500H

					£
HANSEN					
FS710H	1.8-60 MHz	15/150/1500W	Pep		89.70
FS710V	50-150 MHz	15/150W	Pep		89.70
FS50HP	1.8-60 MHz	20/200/2000W	Pep		89.70
FS50VP	50-150 MHz	20/200W	Pep		89.70
FS500H	1.8-60 MHz	20/200/2000V	Pep		69.75
FS500V	50-150 MHz	20/200W	Pep		69.75
FS300H	1.8-60 MHz	20/200/1000			46.40
FS300V	50-150 MHz	20/200			46.40
FS200	1.8-150 MHz	20/200	Pep		50.60
FS601M	1.8-30 MHz	20/200W	Pep		51.35
FS601MH	1.8-30 MHz	200/2000W	Pep		51.35
FS602M	50-150 MHz	20/200W	Pep		51.35
FS603M	430-440 MHz	5/20W	Pep		51.35
FS210	1.8-150 MHz	20/200W	Auto SWR		55.20
FS301M	2-30 MHz	20/200W			35.65
FS301MH	2-30 MHz	200/2000W			35.65
FS302M	50-150 MHz	20/200W			35.65
FS711H	2-30 MHz	20/200W	Head		36.80
FS711V	50-150 MHz	20/200W	Head		36.80
FS711U	430-440 MHz	5/20W	Head		36.80
HB1	FS711H Coupler				23.75
VB1	FS711V Coupler				23.75
UB1	FS711U Coupler				23.75
FS5E	3.5-150 MHz	20/200/1000W	HF		37.20
FS5S	1.8-150 MHz	20/200/1000W	HF		37.95
FS7	145 & (432 MHz)	5/20/200	144		41.00
SWR3E	3.5-150 MHz	20/200/1000W	HF		25.00
SWR3S	3.5-150 MHz	F/S Meter ant.			26.45
SWR50B	3.5-150 MHz	Twin Meter			26.45
FS20D	3-150 MHz	5/20W			37.95
FS-800	1.8-150 MHz	6/30/150W			115.00
JD					
JD110	1.5-150 MHz	10/100W			13.80
MIRAGE					
MP2	50-150 MHz	50/500/1500W	Pep		100.00
S.M.C.					
S3-30L	Mini				8.80
T3-170L	3.5-170 MHz	Relative			14.95

T3-170L

NB: PRICES INCLUDE VAT AT 15%
Carriage free by post

SMC-HS

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SMC-HS Mobile Elements, tabulated below, feature an inbuilt PL259M connector, which mates with the SO239M on any of the four standard mounts. This arrangement is ideal for easy removal – band changes, comparative test, car wash, and anti-vandal, system checks from the feed point, portable operation and for ease of garaging etc. All models have fold over bases (either lift and lay or locking collar) except the 78B which has an inbuilt ball in case the mount must be fitted askew.

SMC 78F

GCD

SMC258

GCD

	SMC-HS MOBILE ANTENNAS	£	P&P
SMC6P2T/PL	Telescopic 2M PL259 fitting 0dB¼	3.45	0.60
SMC6P2T/BNC	Telescopic 2M BNC fitting 0dB¼	5.00	0.60
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SMC2H/BNC	Helical 2M BNC fitting	5.00	0.60
SMCHS430	70cm ½ wave BNC fitting 2.5dB¼	6.90	0.60
SMC2QW	2M ¼ wave 0dB¼ 1.6'	2.30	1.50
SMC2NE	2M ⅝ wave fold 3.0dB¼ 4.3'	6.90	1.80
SMC2VF	2M ⅝ wave fold 3.0dB¼ 3.5'	11.50	1.80
SMC78F	2M ⅝ wave fold 4.5dB¼ 5.7'	13.80	2.00
SMC78B	2M ⅝ wave ball 4.5dB¼ 5.6'	13.80	2.00
SMC78SF	2M ⅝ wave short 4.7'	13.80	2.00
SMC88F	2M 5/8 wave 5.2dB¼ 6.5'	18.80	2.00
SMC118M	Colinear 2M 11/8 wave fold 7dB¼ 9.7'	29.90	2.50
SMC25B	70cm 2 × ⅝ fold 5.5dB¼ 3.1'	12.65	1.80
SMC358	70cm 3 × ⅝ 6.3dB¼ 4.7'	16.85	1.80
SMC70N2M	Dual band 2M 2.7dB¼ 70cm 5.1dB¼	16.85	1.80
SMCHS770	144/432 Duplexer 50W	15.35	1.50
SMC20SE	20M 1.72M 'fold over' 100W PEP	17.65	2.00
SMC15SE	15M 1.72M 'fold over' 130W PEP	14.55	2.00
SMC10SE	10M 1.72M 'fold over' 200W PEP	13.80	2.00
SMC17SE	17M 1.915M 'fold over' 200W PEP	15.70	2.00
SMC12SE	12M 1.915M 'fold over' 200W PEP	14.20	2.00
SMCGCCA	Gutter clip 4 mtrs cable	9.95	1.80
SMCSOCA	Cable assembly 4M	5.00	1.20
SMCSOCAL	Cable assembly 6M	5.35	1.20
SMCTMCAS	Trunk mount c/w 6M cable	8.45	1.80
SMCSOMM	Magnetic base c/w 4M cable	9.95	1.80
SMCSOWM	Adjustable wing mount base	4.20	0.90
SMCGCD	Gutter clip deluxe	4.60	1.20
SMCBSD	Bumper strap deluxe	8.80	1.20
HS88BK	Bumper mounted extension for 144 MHz ant.	18.80	1.80

SOMM

HS770

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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: **Alma House, Cranborne Road, Potters Bar, Herts EN6 3JW**
Telephone (Dialling code 77 from London, 0707 from outside London) 59015. Telex 25280 (RSGBHQ G)
Secretary and general manager: D. A. Evans, G3OUF

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Slow morse practice transmissions organizer: M. A. C. MacBrayne, G3KGU
Trophies manager: P. A. Miles, G3KDB
VHF manager: K. A. M. Fisher, G3WSN

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

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Students over 18 and under 25: £8.70 (Applications should give applicant's age at last renewal date and include evidence of student status)
Affiliated societies: £14.50 (including *Radio Communication*) **£8.70** (excluding *Radio Communication*)
(Subscriptions include VAT where applicable)

RSGB QSL BUREAU

QSL cards for distribution should be sent to: **Mr E. G. Allen, G3DRN, QSL Bureau manager, 30 Bodnant Gardens, London SW20 0UD**

A list of QSL Bureau sub-managers was published in the January 1983 issue of *Radio Communication*, and amendments are published under "Amateur Radio News".

RSGB NEWS SERVICES

Headline News
Telephone 0707 (77 from London) 59312 for a recording of the latest amateur radio news.

GB2RS Broadcasts
Sunday news broadcasts from stations throughout the UK using the callsign GB2RS on frequencies in the 3·5, 7 and 144MHz bands.

Details of frequencies, locations and times were last published in the June 1983 issue.

Amendments are published under "Amateur Radio News". A full schedule can be obtained free on request by sending a large sae to the Membership Services Dept, RSGB HQ.

EDITORIAL

THAT RAE

As has been pointed out on many occasions, amateur radio is unusual in that it is necessary for individuals to pass a formal examination before they are allowed to practice the hobby to its fullest extent. In the degree of commitment required, amateur radio seems to have more in common with some professional activities than most other hobbies.

As readers of this and other magazines will be well aware, today's hot topic for discussion is the Radio Amateur's Examination. It has always attracted attention of course, if only because most of us have been anxious to pass it. However, the present interest seems to question many aspects of the examination more deeply.

The existence of the RAE depends directly on the International Radio Regulations which govern the operation of all radio communication, both professional and amateur, throughout the world. For those unfamiliar with it, the specific regulation states: "(National) administrations shall take such measures as they judge necessary to verify the operational and technical qualifications of any person wishing to operate the apparatus of an amateur station". The RSGB was heavily involved with the establishment of the RAE after the second world war. Today the City & Guilds of London Institute undertakes to provide an examination which is recognized by the UK licensing authority as the qualification for a UK amateur licence. The RSGB has three members, one of whom is normally the chairman, on the body which administers the RAE—the "Subject Committee". This is made up of representatives from the Government departments of Trade & Industry and of Education & Science, British Telecom, the IEE, the IERE, colleges of further and higher education and the RSGB, under a chairman appointed by C & G. Most of the current representatives are experienced amateurs.

Clearly, with such broad terms of reference, the examination can be designed in any number of forms and levels. One obvious design, that apparently adopted by the UK, is to make it a written examination and as simple as possible consistent with the operator having sufficient knowledge to operate safely and to avoid causing unnecessary interference. Accepting even this narrow view of the examination, the question being asked is whether it succeeds. There is much debate on the present form of the examination: for example, the previous essay style versus multiple-choice, the proportion of marks obtained by chance, the value of negative marking of mistakes, the setting of the pass level and so on. Equally important is the question of whether or not it covers the right ground. Many make the point that yesterday's amateurs often served a long apprenticeship as swls, frequently under the tutorship of experienced amateurs and as club members, and thus did not need to be tested on practicalities. Many of today's amateurs, while being proficient technically, are often unfamiliar with general operating procedures which the more experienced take for granted but which are part of neither the syllabus nor the examination.

It is not surprising that other countries interpret the regulation in different ways. For example, one country requires the new operator to have proven cw contacts before progressing to the next grade of licence—many older amateurs in this country would welcome the return of the previous UK practice where amateurs were required to use cw for a year before obtaining the full licence. In another country, the amateur is required to demonstrate his/her capacity to make simple equipment as part of obtaining his/her licence.

The technical level of the examination represents another important aspect. An entrance examination inevitably sets the overall standard of membership, especially if it is the only examination. There is no doubt that a fair proportion of established amateurs would like to see the present level raised: on the other hand there is equally no doubt that a fair proportion of those who have yet to pass, see the existing level as already too high. This poses the question: is there a case for considering some form of progressive licensing in which amateurs come into the hobby at one level and progress to higher recognized qualifications? This presumably would be seen as a worthwhile challenge by many amateurs, and something societies could point to as a very clear example of the self-education aspect of amateur radio, which is important.

Most professional bodies jealously guard their entrance qualifications for potential members. It is indeed a healthy sign to see a corresponding interest in our hobby.

David Evans, G3OUF

Amateur Radio News

NEC 84

Planning is already well under way for the 1984 RSGB National Convention—as it is now known—at the National Exhibition Centre, and it is hoped to make this an even better event than the last one. Due note has been taken of the few criticisms received, and the lecture programme contains something for everyone: details will be published as soon as they have been finalized. As in previous years, the Society will provide a special travel and entrance facility in conjunction with British Rail, and further details will appear in a subsequent issue of *Radio Communication*. Dealers and others who might wish to consider booking stand space at the RSGB National Convention, and who have not yet received an information package and booking form, are invited to write to the general manager's office at RSGB headquarters.

Shuttle delay

As members will no doubt be well aware by now, the launch of the space shuttle *Columbia*, which was to have taken place on 28 October, was cancelled for technical reasons. The earliest date by which the launch can now take place is 28 November 1983, but if this proves to be impossible then the launch will be rescheduled to take place in February 1984.

QSL Bureau

G4TAA-TZZ series. Mr J. Porter, G3YZR, sub-manager for this series, now lives at 94 Oaken Grove, Haxby, York.

Members are reminded that the QSL Bureau is closed throughout November, and that cards should NOT be sent to the QSL Bureau manager during this month.

"We goofed" department

In a reply to a reader's letter in the September issue, we said that amateurs in the USA were still prohibited from communicating with certain countries. We apologise for the brainstorm which led us to this conclusion: American amateurs used to be prohibited from communicating with stations in Cambodia, Laos, Vietnam and Indonesia as a result of the Atlantic City Convention of 1947, but this state of affairs was revoked some years ago and there are now no restrictions on amateur communications from the USA. We apologise to our American colleagues for not checking our facts.

Licensing news

The Department of Trade & Industry has asked the Society to take over responsibility for the issuing of special event callsigns in the GB series on its behalf. In practice, the only change as far as the user is concerned is that the letter of authority now comes from the RSGB rather than the DTI: similar procedures are often used by Government departments, the international driving licence issued by the Automobile Association being a case in point. The special event callsign prefixes which are now available are: for Class A licences, GB0 plus three letters, GB2 plus two and three letters, and GB4 plus two and three letters; for Class B licences, GB1, GB6 and GB8—all plus three letters—are available. Since GB3 plus two-letter callsigns are used for repeaters, and GB3 plus three-letter callsigns are used for beacons, no new GB3 callsigns will be issued for special events.

An application form for a special event station is available from the membership services department, RSGB HQ, marked "Special Calls". Completed application forms MUST reach RSGB HQ at least 28 days prior to the commencement of the event.

Antennas and power lines

On page 725 of the August issue of *Radio Communication*, under the heading "Antenna Antics", two photographs of a three-element hf beam being erected were printed. There have been some comments that the installation was in very close proximity to 415V three-phase electricity supply cables, contrary both to note (d) of the amateur licence and to common sense: the caption to the photographs did not make clear that the antenna system at G3ESO has been erected with the knowledge and co-operation of the local Electricity Board. The group carrying out the erection of the antenna were highly organized and working closely with the board's engineers, and all concerned were very aware of the potential dangers. There is an earthed guard wire above the three-phase cables, and the beam antenna is some 15ft above them. The trapped dipole mentioned in the caption to the lower photograph was installed by the Electricity Board engineers themselves.

This might be an apposite place to mention the potential safety hazards of erecting antennas in proximity to electricity supply cables. A recent press release from the Electricity Council set out the circumstances of the death of two cb enthusiasts, who were killed when a vertical antenna contacted overhead cables, and some years ago a radio amateur was fatally injured in similar circumstances. Note (d) of the amateur licence states that ". . . .an aerial which crosses above or is liable to fall or to be blown on to any overhead power wire (including electric lighting and tramway wires) or power apparatus must be guarded to the reasonable satisfaction of the owner of the power wire or power apparatus concerned". The local electricity board must be contacted if antenna erection in similar circumstances to those illustrated in the August issue is contemplated.

It is also worth noting that British Rail has some lines electrified on an overhead 25kV system, and the local BR divisional civil engineer should be contacted if there appears to be any danger of an antenna coming into contact with these cables during erection or if the antenna should collapse. We apologize for inadvertently giving a superficial impression of the dangers associated with high-voltage overhead cables.

RAE news

The Society is sometimes asked whether calculators may be used in the Radio Amateur's Examination; the relevant City and Guilds regulation is as follows: "Candidates may use silent, battery-powered calculators in any examination unless this is specifically prohibited by the question paper rubric. Handheld microcomputers, devices with "QWERTY" keyboards, printers and other peripherals, magnetic media (card, tape etc) program listings or instruction books must not be taken into the examination room."

Some changes have been made to the administrative side of the RAE. In future, external candidates will be required to bring two passport-sized photographs when enrolling, one of which will be returned to the candidate and the other will be retained by the examination centre. Some form of identification, such as a passport, driving licence or bank pass book, must also be produced when enrolling. On the actual day of the examination, the candidate should produce the photograph together with a document of identification.

Slow morse transmissions

There seems to be a slight misunderstanding concerning the nature of the RSGB slow morse practice transmissions. These "broadcasts" are only possible through a historical concession granted to the RSGB, and they can be made only by members of the Society whose callsigns and schedules are published regularly in *Radio Communication*. It is, therefore, essential to obtain permission before undertaking such transmissions, since the terms of the licence are contravened otherwise. When permission has been obtained it is essential that the transmission is in the form of a broadcast, with no reference to specific listeners or to Class B stations.

Enquiries should be addressed directly to the organizer of the slow morse transmissions, M. A. C. MacBrayne, G3KGU, and not to RSGB HQ.

G-QRP Circuits Book

Low-power working is becoming increasingly popular, and the G-QRP Club is well known for its efforts in this field. The *G-QRP Circuits Book* is now available from RSGB Publications (Sales) and for those interested in this topic it should be an invaluable source of reference material and ideas.

Regional representatives

Region 8

The only nomination received to fill the vacancy of representative for Region 8 was in respect of Mr M. Elliott, G6NEY. At its meeting on 29 September, Council approved the appointment of Mr Elliott as Region 8 representative.

Region 2

Mr D. Smith, G4DAX, has resigned from the position of Region 2 representative owing to a change of work pattern. An election will therefore be necessary to fill the vacancy.

Any five corporate members resident in Region 2 (Humberside north of the Humber, and North, South and West Yorkshire) may nominate any other qualified corporate member resident in Region 2 for the office of Region 2 representative. Each nominator may not nominate more than one person to fill the vacancy.

All nominations must be made in writing and be delivered, together with the written consent of the nominee to accept office if elected, to: Mr D. A. Evans, Secretary/General Manager, RSGB, Alma House, Cranborne Road, Potters Bar, Herts EN6 3JW, on or before Monday 12 December 1983.

In the event of more than one person being nominated, a ballot will be held, details of which will be published in the February 1984 issue of *Radio Communication*.

TVI and the DTI

As the Society well knows, problems of breakthrough from amateur transmissions into domestic entertainment equipment of various types afflict many members: the technical solutions, together with the implications for the granting of planning permission, occupy a very great deal of day-to-day time at headquarters and elsewhere. Many cases come to the Society's attention when the amateur, his neighbours, the Radio Interference Service and (sometimes) the local council have become well and truly bogged down. In an effort to establish whether anything more could be done, and to clarify some of the issues, the Society recently approached the DTI and has now received a reply.

Initially, anyone experiencing interference is advised to obtain a copy of the leaflet *Good Radio and TV Reception* from the Post Office: this document is in two parts. The first gives a number of examples of possible causes, including deficiencies in the receiver, and makes suggestions which may assist in resolving the problem. The second part is a "Request for Investigation" form, which should be completed and sent to British Telecom if the complainant feels that it is necessary.

The DTI adds that, "in the case of complaints concerning amateur transmissions, the complainant is advised that frequency bands are set aside by international agreement for the amateur service, just as they are for broadcasting and other radio services. The amateur licence authorizes transmissions to be made only in the internationally agreed frequency bands, which are quite separate from those used for sound and television broadcasting."

The DTI also advises the complainant that ". . . .the significant factor in cases of interference to broadcast reception is the nature or condition of the complainant's receiving equipment or installation. Manufacturers and users of domestic receivers are not under the same constraints as the manufacturers and users of transmitters, with the result that receivers vary in the degree to which they are able to reject unwanted signals according to the make and model and to the nature of the receiving installation generally." The letter continues: "It is therefore a cardinal principle in radio interference work that anyone complaining of interference must first be prepared to minimize the interference at their own end and, since no public funds are available, meet the cost of any remedial measures required to correct the fault or inefficiency in the receiving installation."

The complainant is advised that the department's responsibility as regards the investigation of complaints of interference extends only to the reception of sound radio and television signals which are normal for that locality. Where other domestic entertainment equipment which is not designed to respond to signals from a radio transmitter is involved, such as audio systems, tape recorders and record players, the cause lies in the latter equipment. The matter of any remedial measures to ensure that the equipment is made capable of rejecting radio signals, which it is not designed to receive, is one for settlement between the owner of the equipment and its manufacturer or retailer.

In the DTI's experience, ". . . .sooner or later most complainants accept (occasionally albeit reluctantly) that the fault lies with their equipment rather than with the radio amateur or his doing something he should not. Although the question of who pays for the remedial work is important, it is not the sole factor in these cases and most complainants are happy to pay if it cures the problem. Frequently the manufacturer concerned will bear the cost, particularly where internal modifications are required, although admittedly they sometimes need to be pressed. In rare cases we find that the position is exacerbated by both protagonists taking entrenched positions from which it is almost impossible to reach any sort of agreement. BT are then required to act as mediators in what is usually no longer a matter of interference but a dispute between neighbours."

The moral seems to be that if there is nothing technically amiss with the amateur's station, there is no reason for him to assume automatically that this is the end of his amateur career—as some newly-licensed amateurs have done—and he should point out as politely as possible that the problem is one for the neighbour, in conjunction with BT, to solve. The Society is well aware that the technical problem of breakthrough is usually quite easy to solve, but the social and psychological problems can be anything but easy and can often require considerable time and diplomacy. As most members already know, the Society produces a leaflet which is intended for neighbours or others experiencing breakthrough from amateur transmissions and which sets out in non-technical language the facts of the matter and what can be done to solve the problem. Also, members experiencing intractable problems in this area are welcome to call on the assistance of the Society's EMC Committee, which has long experience of the technical and social problems of breakthrough and is often able to assist. Letters should be sent to the chairman of the committee, c/o RSGB HQ.

Oscar 10, amateur television and repeaters

From time to time there are comments from those interested in amateur television and also from the satellite fraternity that the two modes are incompatible in the 430MHz band. Graham Shirville, G3VZV, of the British Amateur Television Club, carried out some careful monitoring of the Oscar 10 downlink frequencies during the European ATV Contest held over the weekend of 10/11 September, and at no time during the observations were any tv signals detected on the downlink despite the very high level of atv activity during the period. This would suggest that the simultaneous use of 435MHz for both satellite uplinks and atv is proven entirely practicable without the occurrence of interference.

As a rider to this, the VHF Committee has stated that co-existence between atv and repeater users can be assured by adherence to the following points:

1. ATV operators should operate as high in the band as they can and use the minimum necessary bandwidth. Particular attention should be given to the bandwidth of digitally-generated signals. ATV operators should be aware that their long overs may be keeping several repeaters open for long periods, and they should be able to adjust the fine tuning of their rigs in order to reduce this effect. Polarization should always be horizontal.

2. Repeater users should always use vertical polarization (this applies, in fact, to all non-tv terrestrial transmissions above 433MHz in this band) and repeaters will always use vertical antennas. Repeater periodic callsigns should be kept to a maximum of one every 5min when the repeater is not in use. Care should be taken by repeater groups to prevent the repeater locking-up for long periods when not in use for fm traffic. It should be appreciated that UK repeater frequencies are deliberately non-standard, in an attempt to avoid interference with atv operators. There seems no reason why individual repeaters cannot be switched off during an atv contest by prior arrangement with repeater groups and the RSGB.

It is hoped that this "code of practice" will help to reduce problems of interference.

Liberian callsigns

Amateurs in Liberia are using the callsigns A81LC, A82LC, A85LC, A87LC, A88LC and A89LC for the rest of 1983 in order to call attention to the plight of the Ganta Leprosy Colony. The QSL manager for this event is SM4CWY, PO Box 134, S-67101, Arvika, Sweden.

Repeater news

The experimental pilot-ssb repeater GB3SF was licensed on 25 August 1983. The licence runs for a year with effect from the first day of operation of the repeater, and a future issue of *Radio Communication* will carry details of when it will come on the air. The object of the experiment is to determine how pilot-ssb (which is not to be confused with conventional ssb) compares with fm for mobile communication. It is hoped that a full article on this subject will appear in *Radio Communication* in due course.

The repeater is to be located in Sheffield, and will operate on 145·185/145·875MHz. The IARU has expressed great interest in this experiment, and a paper on the subject will be presented at the 1984 IARU Region 1 Conference.

While on the subject of repeater licensing, groups wishing to propose a repeater should apply to RSGB HQ **in writing** for *A Guide to Repeater Licensing,* stating the band which they wish to use and the area to be covered. This document is not available over the counter or as the result of a telephone call.

Two repeaters have recently become operational. GB3WD on R4 came on the air from Dartmoor on 8 August, and G6IEP would welcome reports. GB3OH in Linlithgow, near Stirling, became operational on RB4 on 10 August, and reports should be sent to GM4OMT.

Propagation by phone

WWV is, of course, the callsign of the time signal and frequency standard station operated by the National Bureau of Standards at Boulder, Colorado. It is well known that at 18min past the hour there is a propagation announcement giving the A and K indices and the solar flux, but the service is also available on the telephone by dialling 010 1 303 497 3235. A recorded announcement of about 30s duration carries solar flux and the A and K indices, together with a forecast for the next day. This service is useful since it is available at all times and is not subject to the vagaries of propagation.

There appears to be some confusion whether or not a special licence is required for reception of stations in the Standard Frequency Service, such as WWV and MSF. In accordance with the Wireless Telegraphy (Broadcast Licence Charges and Exemption) Regulations 1970, anyone receiving messages sent by telephony from authorized broadcasting stations (which includes stations in the Standard Frequency Service) is exempted from the requirement of a licence.

Cable television news

The White Paper on the development of cable systems and services, which was published in April 1983, was recently debated in Parliament. A Bill based on the proposals in the White Paper for the development of cable systems in Britain is to be introduced by the Government in the current session of Parliament and, in the meantime, applications are being considered from existing cable operators for licences to start providing new programme services on their systems. Additionally, the Government will consider granting licences for about 12 new cable pilot projects which ". . .would make a significant contribution to new cable technology". Cable providers will be allowed to use star-switched or tree-and-branch technology, and both coaxial cable and optical fibre would be permitted. All systems will have to be designed to high performance standards.

The Government appears to be keen to see fibre optics and switched-star systems installed, but it also recognizes that, in the short term, these are expensive. It has structured a franchising system for cable providers with an incentive to invest in the better technology of fibre optics, but the details remain to be seen at this stage.

The Society continues to monitor the situation carefully, and any comments or feedback should be sent direct to the Society's co-ordinator of material on this topic, Malcolm Appleby, G3ZNU.

405-line tv transmitters closure

The Home Secretary announced recently that all remaining 405-line BBC and IBA television transmitters would be closed down by the end of 1984. Only a relatively small number of viewers depend on the 405-line service because the 625-line services of BBC1, BBC2 and ITV already reach over 99 per cent of the population, and Channel 4 over 90 per cent. Channel 4 will eventually have the same coverage as the other services. This number is being further reduced by additional 625-line uhf relay stations which are being built at a rate of about 60 per year.

The Home Secretary recognized in his statement that some people in scattered communities throughout the UK would still be without uhf television by the end of 1986, and the BBC and IBA have invited viewers in this position to contact their engineering information departments for further information.

At the other end of the radio frequency spectrum, the Home Secretary has announced in the House of Commons that the Government is to authorize the BBC to begin its Direct Broadcasting by Satellite service, commencing in 1986. A leaflet outlining some details of the DBS service is available from the BBC's Engineering Information Department at Broadcasting House, London W1A 1AA: it is Information Sheet 5001 (1) 8204.

Administrative council for IARU

The International Amateur Radio Union was formed in 1925, broadly speaking to promote the special interests of the radio amateur and to represent the hobby at ITU conferences. In 1982 the member societies of the union approved an amendment to its constitution to create an administrative council with authority to establish overall IARU policy. Members would be drawn from each of the three regional organizations and from IARU headquarters. The IARU Administrative Council met for the first time in Tokyo during March and April 1983, and addressed various items of business: attendance of IARU observers at the HF Broadcasting WARC in Geneva in January 1984 was approved, and the Intruder Watch was reviewed.

The secretary of the Region 1 division of the IARU is Eric Godsmark, G5CO.

430MHz abuse

A few operators on the 430MHz band appear to be using frequencies spaced 12·5kHz from repeater outputs. These channels are used by the MoD's Mould system, and if these transmitters are in operation the half-channels should not be used, since interference could be caused to the primary user.

That'll do nicely

The Society intends to introduce direct debit for subscription payments during 1984. It is hoped to replace the present standing order system, which is the source of a good deal of unnecessary extra work at headquarters when banks make mistakes. In addition, it is hoped to introduce a facility for payment of subscription via Access, American Express, Diners Club and Visa (Barclaycard) cards: however, this has not yet been finalized, **so please do not try to use them yet.** We will advise as soon as we are able to accept subscriptions via credit card, although all four cards can, of course, be used over the counter at headquarters for subscription payments and for the purchase of publications.

Visitor from VU

As a result of a visit to RSGB HQ by an official from the National Institute of Amateur Radio, which is a prominent radio society in India, some interesting facts about amateur radio in that country have emerged. The son of India's Prime Minister, Rajiv Gandhi, holds the callsign VU2RG, and his Italian wife is also licensed. There are some 2,500 amateurs and three types of licence in India: Class 2 requires 5wpm cw and permits the use of 50W; Class 1 allows higher power and requires 12wpm cw, and there is also an Advanced licence. Although NIAR is not the IARU-recognized national society, they appear to have good relations with their licensing authority, although only possessing 300 members. Interestingly enough, the institute possesses 10 staff—at one staff member per 30 members, one imagines that the RSGB would provide quite good service. . . . The institute is also financed by a 75 per cent grant from the Government, apparently because of the excellent work performed by radio amateurs under emergency conditions.

News from Malta

As those who have visited the island and taken out a reciprocal licence may have found out, the Maltese PTT prohibited the importation and use of handheld transceivers. This restriction has been lifted, provided that their use is restricted to base station (indoor) operation. Details of reciprocal licensing in Malta are available to members from the membership services department at RSGB HQ.

News from Australia

Radio amateurs in Australia have been negotiating for over five years for permission to operate in the band 50-52MHz, which used to be available to the amateur service but became allocated to broadcasting some years ago. Australian amateurs were able to demonstrate to the Department of Communication that research and experimentation in other countries was producing results in this portion of the band, whereas propagation often did not extend to 52MHz. Their conditions of operation are very similar to those which are laid down for the 40 holders of research licences for 50MHz in the UK: basically, operation is outside Channel 0 broadcasting hours and secondary status is assumed. A review of progress will be made by the Department of Communication in 12 months' time.

The position in the UK is substantially unchanged, following the interim report of the Merriman Committee. The Society remains optimistic about an eventual allocation in the 50MHz band when broadcasting finally ceases.

One item of bad news from Australia is that the Customs and Excise has levied between 30 and 40 per cent import tax on hf transceivers, including those for amateur use. This is, apparently, a response to the widespread evasion of tax on marine hf equipment by modifying amateur hf transceivers for maritime use. This is reminiscent of the ban in the USA on commercially-built linear amplifiers which cover the amateur 28MHz band—the phrase about throwing out the baby with the bathwater comes to mind.

No more logbooks in the USA?

Routine log-keeping by radio amateurs in the USA has been abolished. The FCC noted on 26 May that "... there is no longer an official need for records of routine station activity", although specific individual stations could be required to keep logs if necessary.

Quarter Century Wireless Women

The Quarter Century Wireless Association, QCWA, is well known, but QCWW, Quarter Century Wireless Women, is less so. If there are any Quarter Century Wireless Women, or QCWA members or prospective members wishing to form a UK Chapter, would they please contact Sheila Gabriel, G3HCQ, QTHR.

Stolen equipment

On 14 September from a car in Weymouth: Trio TR2200GX, serial number 540122, with Yaesu hand mic. Information to Weymouth police or G8GHU, QTHR, tel Weymouth 789022.

On 24/25 September from the shack of G4MXQ: Trio TS120S, serial number 0041970, and Microwave Modules MMT/144/28. Information to G4MXQ, QTHR.

In mid-July from a boat at Walton on the Naze, Essex: Yaesu FT7, serial number 8L120737. Information to G3LSQ, QTHR.

Mobile Rallies Calendar

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

5 November—North Devon Radio Rally. Bradworthy Memorial Hall, nr Holsworthy, Devon. 10.30-5pm. Talk-in on 144MHz (S22). Bring & buy stand etc. Details from G8MXI, QTHR.

11 December—Leeds & DARS Third Annual Christmas Rally, The Civic Centre, Pudsey, nr Leeds. Open 10.30am. Admission free. All the usual facilities. Enquiries from traders to A.A. Alexander, G6CJI, QTHR.

5 February—Bury RS Ham Feast. Mosses Community Centre, Cecil Street, Bury. Talk-in on S22. Open 11am. Refreshments available. Bring & buy. Details from H. F. Bridge, G3VC, 17 Raglan Avenue, Whitefield, Gt Manchester M25 5US, tel 061-773 8824.

1 April 1984—White Rose ARS Rally, The University of Leeds. Details from A. N. Bramley, G4NDU, QTHR.

6 May—Anglo-Scottish Rally, Kelso, organized by the Kelso ARS. Junk, bring & buy and trade stalls. Full catering facilities and bar. Details from Bruce Cavers, GM4UIB, Kelso ARS, c/o Community Centre, Kelso, tel 0573 24654.

6 May 1984—Lincoln Hamfest, organized by the Lincoln Shortwave Club, on the Lincolnshire Showground (4 miles north of Lincoln City on the A15). Opens 11am-5.30pm. Talk-in on 144MHz (S22) and 432MHz (SU8). Ample car parking, caravan and camping facilities, refreshments, licensed bar. More trade stands than in previous years, many attractions for junior ops. Facilities for the disabled. Further details from G8VGF, c/o City Engineers Club, Central Depot, Waterside South, Lincoln.

20 May 1984—Drayton Manor Mobile Rally. Drayton Manor Park, nr Tamworth, Staffs. Organizer N. Gutteridge, G8BHE, QTHR, tel 021-422 9787. Full details to follow.

24 June—Longleat Amateur Radio Rally. Longleat Park, Warminster. The Bristol Unicorns Marching Band will be with us again this year, plus all the usual Longleat Park attractions for the family. Details from B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, tel 0272 848140.

1 July—Worcester & DARC Annual Mobile Rally. Droitwich High School, Ombersley Road, Droitwich. Open 11am to 5pm. Attractions will include "Strawberry Fields" and children's fancy dress competition. Details from sec A. C. Lindsay, G4NRD, QTHR.

29 July 1984—Rolls Royce ARC (Barnoldswick) Mobile Rally. Sports & Social Club, Barnoldswick. Open 11am. Details from Leslie Logan, G4ILG, QTHR.

26 August—Preston ARS 17th Annual Rally. Lancaster University. Details to follow.

Other Events

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

10 December - RSGB AGM, IEE, Savoy Place, London.

14 January 1984 - RSGB Presidential Installationm Cardiff Castle, Cardiff.

28-29 April 1984 - RSGB National Amateur Radio Exhibition, National Exhibition Centre, Birmingham.

OBITUARIES

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

Mr C. S. Anderson, G2BS
Charles Anderson died on 23 August. He started his career as a sea-going radio officer with Marconi. During the war he was an instructor to the armed forces, and then at the Marine College at South Shields. Since retiring he had been active on 144MHz, all modes, and hf QRP.

Mr J. D. Bradshaw, G3YVM, ex-VP2KD
Dave Bradshaw died on 1 September, aged 52. He was a former member of the Grafton RC, and supporter of the East Barnet Contest Club. He was active on all bands, phone and cw.

Rev E. S. Bryant, RS38718, ex-HR6EB
Eric Bryant died on 1 April, aged 56. After many years operating in Honduras on the island of Utila, especially on the YL International SSBers System, he had returned to England to continue as a minister, and had never been able to restart his hobby.

Mr W. A. Hinton, G6EPB
Bill Hinton died on 25 July, aged 75. He was an enthusiastic operator and made many friends on 144MHz. He had been a member of Reading ARC for several years, and had passed the RAE at 74.

Mr E. Hodson, G3XTJ
Edwin "Ed" Hodson died on 30 August. He was active on all the hf bands and had been a member of the First Class CW Operators Club for some years. He was a valued and enthusiastic member of the HF Contests Committee, and despite increasing ill-health took an active part in the organization and adjudication of the recent NFD and Commonwealth Contest results. He was a QSL Manager for several overseas stations, and a regular contributor to the RSGB's *Dx News Sheet*.

Mr B. Johansen, OZ7AQ
Bent Johansen died on 27 March. From 1961 until his death he had been technical editor for *Oz*, the official magazine for EDR (Experimental Danish Amateurs). He had always been in the forefront of technical innovation for amateur radio, and was a member of the RSGB.

Mr L. W. Jones, G5JO
Lawrie Jones died on 21 September, aged 79. First licensed in the mid-twenties, he was among the early telephony dxers and his call became well-known in every continent.

A strong supporter of the RSGB, and of the Cambridge & DSWC during its early years, he gave considerable encouragement to other enthusiasts in the region, his home station always being "open-house" to those interested in the hobby.

He was a keen freemason, and joined the Radio Fraternity Lodge soon after its formation, which still further widened his large circle of friends.

Professionally Lawrie spent almost all of his working life with the Pye organization where he was a senior executive and a director of a number of their companies in the UK and overseas until his retirement.

Mr J. McGregor, GM3KNX
John McGregor died on 7 September. At 91 he was probably the oldest active amateur in the west of Scotland.

Mr S. W. Morse, G3GFI
Sid Morse died on 27 August, aged 69. He was a founder member of Banbury ARS and was always ready to help fellow amateurs. He operated dx on all the hf bands, and was constructing equipment for 144 and 50MHz shortly before his death. He was a very professional designer, constructor and experimenter with his homebrew equipment.

Mr J. D. Parminter, ZL2OU
Jack Parminter died recently, at over 80 years old. He was awarded the Rotab Cup in 1951 for "consistent and long distance communication since the early 'thirties".

Also:
Mr N. K. Barber, GW3XCV, on 26 July;
Mr C. B. Bowhill, G4CBB, on 30 January;
Mr J. S. Cason, G4DFR, on 19 March;
Mr E. J. Delaunois, ON5QN, on 22 April;
Mr W. Held, DG2KX, on 21 February;
Mr W. D. Ingle, GM2BD, on 20 June;
Mr J. W. Revell, RS21121, on 21 August; and
Mr O. J. Williams, GW3YPF, on 14 August.

Members' Mailbag

PASSING THE RAE

Sir—Has the RAE really become easier to pass? A qualified "yes" is the answer, "yes" because we are now tested on the matter in hand and *not* the more esoteric items such as "reasonable command of English, legible handwriting (apologies for failing this myself, incidentally!) and remembering circuit diagrams and formulas, plus handling layout, sketches and calculations! (*qv* G3XIZ, August issue.) We all have different aptitudes, levels of intelligence etc, but the over-riding priority is that we are tested with relation to radio knowledge. On the criteria of the "old" test, a dyslexic would not pass the RAE, or at the very least would be more handicapped than now. Now concentration can be applied to understanding the question and not necessarily elegantly formulating the answer.

In addition, Mr Osborne has two unworthy thoughts which, while understanding his concern, I hope are groundless. "How much easier it is now to have a crib sheet," he says. Using his 25 per cent probability rating, if this were so then there would be a 75 per cent "distractor" rating, surely enough to invalidate this thought. However, the item that made me seeth is the conceited, conciliatory and incredible comment that "the Home Office encourage a 'simple' RAE to legalize the would-be pirate and the illicit cb fraternity, plus the additional revenue is welcome".

I wonder where the inside knowledge comes from? Is the RSGB going to set up a committee to investigate this leak, of Watergate proportions? This really is an assumption which is too extreme to be worthy of consideration, and even calling these thoughts into question debases that which we have worked for, and also the whole structure of the amateur set-up. Compare the RAE with the cw test. Has this been made easier, to prevent hf piracy, and to increase revenue? If so, the motion is carried, if not, it fails.

I feel, however, that there is a viewpoint which all amateurs must be aware of occupying. We have passed our tests, thus the memory of the difficulty tends to dissipate. The same test taken by two people has two different interpretations of whether it was difficult, or not so difficult, etc. So, now that we've joined the club, let's not have the attitude that "If I, or he, or she, can get in, then it's too easy a club to join". Can't we accept a better technical awareness, and more readiness to understand items which previously were incomprehensible. Look at how many school children are taught, use and love computers. Why shouldn't they be able to absorb radio-related subjects with the same ease? Or could it be that if too many people pass the exam, we remove ourselves from an imaginary pedestal, and just become common man again?

Bryan Ewing, G6UBB

This letter neatly summarizes the views of several other correspondents taking further issue with G3XIZ. Taking and passing an examination gives an excellent sense of achievement, but we have never thought that possessing an amateur callsign turns one into some sort of demigod! Are there any more views on this topic?

RAE PASS MARK

Sir—In his letter published in your August issue, Mr Osborne, G3XIZ, writes of the RAE: "Even a candidate with zero knowledge must by the law of probability obtain a 25 per cent pass mark." This claim, which I have heard several times before from various sources, owes more to intuition than it does to any law of probability.

In fact, if there are 100 four-choice questions on the paper and if the pass mark is 50 per cent, the probability of getting 50 or more answers correct by random selection can be obtained by expanding $(3W + R)^{100}$, where R = right and W = wrong, by the Binomial Theorem; summing the coefficients of all the terms in which R appears raised to a power of 50 or more; and expressing the resulting total as a ratio against 4^{100}.

The probability in equation form is:

$$1 \text{ in } \frac{4^{100}}{3^{100} \sum_{r=50}^{100} \frac{100}{\lfloor r \, \lfloor 100 - r \; 3^r}}$$

The numbers involved in this calculation are large enough to be far out of reach of my ZX81, but a tedious handworked approximation which I hope can be trusted suggests that the chance of getting a pass mark by ticking answers at random to be about 1 in 10 million.

Colin Smith, G3GHY

Would anyone care to quarrel with that?

OPERATING—A MIDDLE-EAST VIEW

Sir—Since I work abroad at the moment, and have experienced amateur radio from a different vantage point, may I make the following observations through your columns.

In the Middle East, the frequencies between 28·0 and 28·1MHz are often crowded with cb activity, but no amateur stations are operating. Most of the cb QRM comes from the Far East, but some originates in Europe. If their signals can zoom through the ether (and those from 28MHz beacons too), surely amateur cw can do the same. Other band users seem to be claiming "squatter's rights".

Having now had the intriguing experience of being on the sharp end of dx, I am amazed at the bad manners prevalent in some parts of the world. The most appalling aspect is that many operators appear unable to monitor a QSO intelligently: even if only one side can be heard, it should be possible to work out whether it has finished. The problem of operating standards has been with us for a long time—has anyone any ideas on how to educate some of these clowns?

I have discovered in the course of many QSOs that it is not generally realized that in Moslem countries, Friday is the holy day, equivalent to the Christian Sunday. In the Arabian Gulf area, extra activity on the air can often be found on Fridays; Saturdays and Sundays are normal working days. If you QSO someone in that region on a Saturday, don't wish him a pleasant weekend!

David Wear, G4DPJ/A4XYJ

Unfortunately, bad operating has been with us since the dawn of the hobby, and indeed there is a letter in the November 1935 issue of the T & R Bulletin (the forerunner of Radio Communication*) which makes almost exactly the same points! Human nature apparently does not change very much . . . . . Obviously, each national society must make an effort to maintain good operating standards: the RSGB publishes a book.* Amateur Radio Operating Manual, *which is specifically designed to meet this need and which we commend to all amateurs.*

LESS BICKERING, PLEASE

Sir—In recent months I have read with interest the various letters from other members giving their views on whether or not cw proficiency is really necessary for a Class A licence on the one hand, and expressing comments on the high cost of imported state-of-the-art rigs on the other.

Having been a Class B licence holder (G8ABL) before finally taking and passing the cw test I would comment as follows:

1. Original Class B licence holders did **not** have the use of the 144MHz band, only 432MHz and above! We can thank the RSGB for their efforts in getting 144MHz included, and of course in accordance with WARC '79 agreements and recommendations 70MHz should now be included (no doubt RSGB are pursuing this?).
2. At one time Class A (or as they were then Amateur Sound Licences) licence holders **had** to use **only cw** for one year after their licence was issued.
3. It is **very** cheap to get on the air using cw—just check the "Member's Ads" in any *Rad Com* to see cheap cw or cw/a.m. rigs for sale: 25W of cw into a dipole, fan-dipoles, or whatever will get you all the dx you can handle for well under £100. Checking the ads in the September issue I noticed a Minimitter for £18 covering 160/40/80m. Stick on a G5RV antenna costing, say, £15 to make, and away you go!
4. Amateur radio covers many diverse interests and is a changing art. QRO costs money, QRP does not. Personally I used to be QRP but now tend to be QRO—and QRO **can** be cheap if you build it yourself. Give and take is what our hobby is all about, and there seems to me to be too much bickering in our ranks when really we should all be supporting RSGB's efforts to protect our bands from other demands; in fact, to gain **extra** bands. Using converted cb rigs on 29·6MHz fm looks very similar to the outsider to cb rigs proper on 27MHz.
5. So stop this stupid bickering. You can operate a most effective amateur station whatever your bank balance—a local amateur, G2CP, is flying a kite with 2W and copper wire as the antenna on top band at a cost of a few pounds only!
6. Support RSGB for the introduction of a *properly* administered Novice licence; they have had one in USA for years, ask any US Extra Class Licence holder!

G. R. Smith, G4AJJ

With regard to the inclusion of the 70MHz band in the Class B licence schedule, this is not simply a matter of WARC recommendations. The 70MHz band is not an internationally recognized amateur band in the same sense as 144MHz, for example; the amateur service has access to it on the terms of the primary user, the Ministry of Defence. The Society has been informed that the MoD would not be willing to make the band available to Class B licensees at present.

CB AND AMATEUR RADIO

Sir—I have been very disheartened with the introvert and non-progressive attitude implied in the comments published with members' observations on cb. Comments such as "cb is not the same as amateur radio" and "no mention of getting together", will achieve very little in improving the public image of amateurs with cbers, the media or the general public. Such pious attitudes are in conflict with the promotion of "friendship and goodwill".

I wish to point out that, for many, cb is the first step in communication by radio. Those that become more interested in serious communication will logically turn to the more interesting hobby of amateur radio, which has unlimited scope, unlike cb. It is not just a coincidence that RAE classes are going through a boom period. Many of the aspiring amateurs are ex-cbers. I for one welcome them to amateur radio.

The RSGB should acknowledge the new source of potential members by initially adopting the appropriate attitude. This could be followed up by some positive action, such as information, specially written with cbers in mind, outlining our hobby. Perhaps this could be published in joint consultation with a national cb organization, in one of their magazines. I have no doubt that this would boost the sales of *A Guide to Amateur Radio* and other first-class RSGB literature.

Finally may I suggest that if a more friendly and less haughty attitude prevails we may be able to:

1. Educate the media on the considerable difference between amateur radio and cb, via the separate societies representing both hobbies.
2. Perhaps, having shown a desire to help, be involved in any future frequency allocation that satisfies both parties.

R. Wheeler, G3MGW

Sir—I was greatly puzzled by two letters in *Rad Com* September, referring to G4PDX's remarks (*Rad Com* July) concerning the article bracketing amateur radio with cb in *The Sun* newspaper, 21 March 83.

First, as I read, I fail to see where G4PDX claims to be "one of God's chosen people". He merely pointed out, quite rightly, the detrimental effect that such articles can have upon amateur radio. Would RS50836 have preferred there to have been **no protest** to the said article? Thus resulting in amateur radio sharing the blame—that clearly belongs solely to cb.

Second, a "great divide" most certainly does exist between amateur radio and cb; the two are worlds apart and have totally different objectives/interests. I am, to say the least, astonished that G2AYQ is seemingly unaware of this fact.

Finally, if the RSGB should, at any time, decide to "get together with the cb users" (to quote Councillor Gardener), they will certainly not see me, and I'm sure many others, for dust!

Anthony Mayers, GW6ZHY

First of all, the Society exists to serve the interests of radio amateurs and the hobby of amateur radio. We are "pro-amateur", not "anti-cb", and indeed we are no more anti-cb than anti-pmr or broadcasting or maritime mobile radio or any other use of radio for that matter —but our priority in life must be amateur radio. As part of that, we are aware that in many cases the media have confused cb radio with amateur radio—inevitably in our experience to the detriment of the latter—and the Society must ensure that this misapprehension is corrected. Whatever the merits or demerits of cb and its adherents, it is a matter of recorded fact that cb is generally regarded in a somewhat negative fashion by the media, and the Society is not prepared to see amateur radio suffer as a result. This is not a ". . . . pious attitude"—it is simply a part of the Society's job, which is to maintain the well-being and status of amateur radio.

FOR ROMEO READ JULIET

Sir—G6PUS's callsign change (August "Mailbag") reminded me of my own experience in 1974.

Armed with my brand-new callsign; G8IOR, I apprehensively pressed the ptt for the first time on 13 February 1974. My QSL cards showed a Hudson FM208 fitted to a Ford Transit motorcaravan. Nearly a year later the *RSGB Call Book* arrived, and sure enough there was my name and address. . .but under the call G8IOJ!

My logbook for 1975 shows that the last contact under the "old" call was on 2 January, followed by the signature and remarks of our local GPO engineer.

I got used to the new letter eventually, had some new cards made and wrote to the real G8IOR promising never to use his call again. Although one of the locals assumed it was my error, the majority found the situation highly amusing. It seemed that the change from Romeo to Juliet, without medical assistance, amused them most of all.

It's all a long while ago now, but the Hudson and the Transit are still on the air and the road, in that order, and my licence renewal notice is STILL for G8IOR!

Dave Martin, G8IOJ

G6ITY and G4SAY also appear to have had the same problem!

THE NOVICE LICENCE PROPOSAL

Sir—Regarding the item "In the Commons" in "Amateur Radio News" *Rad Com* September, where it was stated that the RSGB supports the concept of novice licences in principle. Does the RSGB not think that there is enough spectrum allocated to novice operation in the form of citizen's band?

I would think that there is plenty of scope for the more ambitious cb operator in the 930MHz cb allocation. The amateur bands are, of course open to anyone wishing to take up the hobby seriously. The RAE is easily passed by anyone with sufficient interest in the hobby. A further drop in standards required for the issue of an amateur licence must surely be detrimental to the hobby.

Philip S. Malme, G4PQP

Any comments?

THOSE PHONETICS

Sir—Can any "old-timer" please help by letting me know what was the very first phonetic alphabet used by radio amateurs in the early 'twenties? Did the British amateurs have their own "word list", or did they follow the example of the Americans and use the "key words" suggested by Western Union Telegraph—A Adam, B Boston etc?

This was long before the Battle of Britain days and "B for Baker" and "C for Charlie". . . . . there have been so many changes in the last half-century.

Douglas Byrne, G3KPO

QSL CARDS—A G6's VIEWS

Sir—There have been various comments concerning QSL cards in both *Radio Communication* and other radio amateur orientated magazines in recent months. In particular, on QSL cards being sent with the barest of details and often very little of interest to the recipient of the card, and on the number of QSL cards not collected from the QSL Bureau.

I wonder how many of these uncollected cards are sent following assurances given during the QSO that exchange of QSL card is 100 per cent via bureau, yet are never collected because there have never been any saes sent to the appropriate QSL bureau sub-manager. Another annoying habit is that of stations who agree to exchange QSL cards direct, yet never reply to cards even when an sae is enclosed.

When, however, cards are collected and cards sent in reply, many lack a lot of information, quite often specifically requested on the QSL card sent or asked for during QSO. For example, please confirm QTH locator, county etc, for vhf awards, yet in many cases neither the QTH or county are given. I have received cards where the county given on the card is the postal address county, usually printed as part of the address, and which is not the true location county; eg Cambridgeshire given where the QTH is actually in Norfolk, and another where Shropshire is given yet the QTH is actually in Clywd, Wales.

As QSL cards are required for RSGB vhf awards, and must show the county, region and/or QTH locator as appropriate to the award, it is extremely frustrating when, having worked stations in a particular area, one finds that none reply either direct when an sae has been enclosed or via the bureau, or that if they do the relevant information is omitted or incorrect.

The other equally annoying matter is club stations who chose to operate from a particular site because it is in a rare QTH locator, county etc, particularly in contests, yet never reply to QSL cards however sent. But of course they hope that many stations will try to work them because of the rarity of the QTH, thus giving them many useful points in a contest, but these club stations do not all wish to give anything in return. Surely by the very fact of choosing a rare QTH to operate from they must expect to receive quite a large number of QSL cards requesting one in return, to confirm the particular QTH square or county etc.

I know some stations who want QSL cards themselves to confirm QTH squares or counties, but if you are in a particularly common QTH which is an area of quite high amateur radio activity and therefore a very easy area to work, these stations do not want to exchange cards because they do not need your area confirming. Nevertheless at some stage they did require it to be confirmed, and then of course they were only too grateful to any station who would exchange QSL cards with them. Please remember that we all have to start at the beginning. When I received my licence and went on the air for the first time I decided that I would reply to every QSL card sent to me by any means, and to date I have kept to that decision. Not all my operating as been from the home QTH, and although to date I have not operated from a rare QTH I have operated from a couple of not so common QTHs, and I hope to operate from a rare QTH when the opportunity arises.

You will appreciate that at present I am restricted to vhf/uhf and therefore my views are aimed at these bands and their associated awards.

D. J. Hudson, G6OVO

This is another problem which has been with us since the early days of the hobby, and indeed two of the licensed staff at headquarters who are keen vhf dx-chasers suffer exactly the same frustrations as mentioned in this letter (does anyone know how to extract a QSL card for WL square?) There do not seem to be obvious solutions to the problem, short of continued appeals to people's goodwill—does anyone have any other ideas?

WHAT IS A BALUN?

Sir—The welcome article by G5RV in *Rad Com* August brought together the use of baluns and tuners in connection with coupling transmitters to antenna feeders and, unwittingly perhaps, prompted the question above. If a balun is any device that provides a balanced signal from an unbalanced one (or vice versa) then the G5RV split parallel-tuned circuit feeding an antenna line is a proper balun in my book, although, to its credit, it is other things as well.

Admittedly, the word "balun" conjures up an image of the aperiodic multi-filar-wound cored transformer, but other configurations can be found within the rf spectrum performing the same kind of function and bearing this name.

The point came home to me when I had to find a suitable description for an antenna coupler offering the combined facilities of impedance matching, tuning and balun conversion in the one simple network. ("A pi-tuned balun antenna coupler for the hf bands". *Rad Com* November 1980.) The fact that I used a bifilar-wound coil certainly helped to create an impression of the conventional balun, but the real purpose of the name chosen was to describe what the unit actually did rather than what it looked like.

Should we not use the term "tuned balun" more widely to describe the true function of the balanced atu?

Alan Chester, G3CCB

Any comments from other balun users?

RADIO SOCIETY OF GREAT BRITAIN

(Limited by guarantee)

Registered office

Alma House, Cranborne Road, Potters Bar, Herts EN6 3JW

FIFTY-SIXTH ANNUAL GENERAL MEETING

Minutes of the fifty-sixth annual general meeting of the Radio Society of Great Britain held at the Institution of Electrical Engineers, Savoy Place, London WC2, on Saturday 4 December 1982, commencing at 2pm

Present: Dr E. J. Allaway, G3FKM (President, in the chair); Mr R. G. Barrett, GW8HEZ, executive vice-President; Mr D. Baptiste, President-elect; Mr P. F. D. Cornish, G3COR, honorary treasurer; Mr D. A. Evans, G3OUF, secretary/general manager; and 160 corporate members.

The President welcomed members to the meeting and announced that according to the attendance book, a quorum of 50 members was present. He then introduced officers and Council members of the Society who were present. The general manager read out the apologies for absence.

Notice convening the meeting

The President stated that the notice calling the meeting was set out on page 2 of the Annual Report & Accounts which had been circulated to all members in the November 1982 issue 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 55th AGM

The minutes of the 55th annual general meeting had been circulated with the November 1982 issue of *Radio Communication*. Dr D. S. Evans, G3RPE, proposed, and Mr G. R. Jessop, G6JP, seconded that the minutes be confirmed; this was accepted unanimously.

Accounts for the year ended 30 June 1982, 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 drew attention to the auditors' formal report, which was satisfactory and unqualified. He then stated that the accounts had been in the hands of members since the publication of the November issue of *Radio Communication*, and that he would be pleased to answer any general questions which might be put in regard to them.

An unidentified member enquired as to the cost of the Society's committees and whether they had met their financial objectives. Mr Cornish said that the committee costs, in terms of actual expenses, for the year ended 30 June 1982 had been £17,700: this was slightly in excess of the budgeted figure, although Mr Cornish added that accurate advance budgeting in this area was virtually impossible. Within acceptable limits, financial objectives had been met.

Mr G. Stancey, G3MCK, commented that the audit fee of £7,500 shown in the accounts seemed high, and asked why this was so. Mr Cornish explained that, first, professional fees were expensive and that the auditors attended twice per year: they carried out an interim audit in the early part of the year in order to check the functioning of the accounting systems, and then the year-end audit after 30 June. The auditors also dealt with matters of taxation, which were sometimes complex. Mr Cornish, as a professional accountant himself, was satisfied that the fee was a reasonable one.

Mr A. Veitch, G8FRB, enquired as to why the provision for bad debts had increased by a factor of 10 over the 1981 figures. Mr Cornish said that a very mean view had been taken of the debtor position at the year-end, working on the basis of debts which were more than one month overdue—in other words, debts which were outside normal credit limits—and certain debts were provided for in full as a matter of prudence. He emphasized that the quoted figure did not imply the bad debts which had actually been suffered, and added that there had only been one bad debt incurred since the year-end, which had been provided for.

Mr T. Winchcombe, G6ZH, noted that staff costs had increased by 34 per cent, and wished to know what proportion had been due to salary increases and what proportion was due to an increase in the number of staff. Mr Cornish estimated that the overall increase in staff costs had been approximately 12 per cent, and that the balance represented additional and temporary staff taken on during the year. G6ZH also noted that, while there had been a 21 per cent increase in income from book sales, profits were down by five per cent because book costs themselves had increased by 39 per cent: postage had not been shown as an item, and this would further reduce the profit. Mr Cornish explained that the figures were dependent on the mix of RSGB and other publications sold throughout the year, and that a shift in the pattern of sales had reduced profitability. G6ZH commented that there appeared to be little point in the Society selling publications other than its own, but both the treasurer and the President considered that the provision of appropriate written material was an important service to the membership.

Mr J. Bluff, G3SJE, wondered how staffing costs would be affected by the move of headquarters to Potters Bar. Mr Cornish estimated that basic staff costs would increase by about six per cent, which was an average figure at present. Additional costs for staff for which the need had been recognized for some time had been built into the 1983 budget, so that overall he felt that staff costs would rise by about 10 per cent over the full year. He added that it was early days at Potters Bar and that the situation was being considered further. Another point had been that in 1981-2 it had been necessary to engage a considerable number of temporary staff from time to time and this was always expensive.

Mr P. Tucker, G4DWZ, asked how much of the audit fee was relevant to work in connection with taxation, and enquired whether that should not have been included under the heading of professional fees in the accounts. Mr Cornish agreed that it would have been more precise had this line been followed: he said that he could not separate the part of the auditor's fee related to work in connection with taxation from the complete sum, but he thought that it would be less than 10 per cent. He added that, rather than receive a series of smaller bills from time to time he negotiated an overall fee with the auditors, which seemed more sensible.

There were no more questions on the accounts.

Members to serve on Council for 1983

The President read the letter from the scrutineers announcing the results of the recent Council election in which Messrs H. M. Holmden, G4KCC; G. R. Jessop, G6JP; D. M. Pratt, G3KEP; and K. E. V. Willis, G8VR, had been elected. The total number of votes accepted was 4,843, and 520 unopened envelopes had been rejected, largely because of late arrivals. A special request had been received from the scrutineers to emphasize yet again that money and other items must not be included in the envelope containing a vote.

The President wished to congratulate those who had been elected, and to commiserate with those who had not and wish them better luck next time. He asked those newly-elected members who were present at the meeting to identify themselves.

The President then said that, in accordance with the provisions of the Companies Act 1948, it was necessary for the appointment of a successful candidate who was over the age of 70 years to be confirmed by the annual general meeting, and that Mr G. R. Jessop fell into this category. The President asked the meeting to confirm Mr Jessop's election, and this was done.

Reappointment of auditors

The motion to appoint Messrs Edward Moore & Sons for the 1982-3 financial year, and for their remuneration to be fixed by Council, was carried.

Any other business

The President said that one written question had been received from Mr R. Bellfield, G3SBV: it was not really relevant to this section of the meeting, but since it concerned details of the move of headquarters to Potters Bar, which would be of interest to everyone, the President would ask the honorary treasurer to deal with it at this point.

Mr Cornish began by outlining the three parts of the question, which concerned the price received for the sale of 35 Doughty Street, the price paid for the new headquarters at Potters Bar, and the legal and removal costs in connection with the move.

The basic purchase price of Alma House, Potters Bar, had been £350,000: in addition, the Society had contracted to purchase additional land and yards associated with the building in not less than 12 or not more than 24 months, and the price for this was £50,000. A deposit of £5,000 had been paid. The basic sale price for Doughty Street had been £240,000 and, when a planning permission anomaly had been resolved, a further £25,000 would become payable. The total of legal costs, including sundries such as stamp duty, surveyor's costs and agents' fees had been in the region of £25,000, and because of the manner in which the transaction had been carried out there were no agents' fees associated with the sale of Doughty Street.

The net cash cost to the Society, therefore, had been just under £110,000. For this, a building with some three times the floor area of Doughty Street, and a basement whose total floor area was almost as much as the entire London building, had been obtained, giving the Society excellent facilities for the future.

The costs of the move had been budgeted to be about £5,000, but in the event they had been about £2,000. Some refurbishing would be required at Alma House, together with some alterations in order to fit the building for its new role, and these would probably cost between £10,000 and £15,000. Mr Cornish added that Alma House was a modern building designed for offices and storage purposes, and thus very suitable for the Society's needs.

An unidentified member asked how the Society was paying for the difference between the sale price of Doughty Street and the cost of the Potters Bar building. Mr Cornish said that the move was being financed entirely out of the Society's own resources. The questioner enquired if interest was being paid to anyone and, to loud applause, Mr Cornish answered "No sir".

Mr P. Burgin, G4ROZ, asked whether the editorial offices of *Radio Communication* would also move to Potters Bar. Mr Cornish explained that the Society had a leasehold interest in the offices at Chelmsford used by *Radio Communication* so that there were no immediate plans to bring the magazine to Potters Bar although, as a long-term strategy, it was obviously most desirable that all the Society's activities should be under one roof at headquarters. He gave as an example the storage of books at headquarters rather than at printers' premises, which would save some £2,000 per year in rent and associated costs.

An unidentified member asked whether there was any intention of opening on Saturdays for book sales: the President said that there was no immediate intention of doing this and that there would be staffing problems. The member offered the services of his club members for assistance, and this was noted with thanks by the President.

Mr A. Cockle, G3IEE, considered that it was worth mentioning the proximity of the new headquarters to the M25 motorway, which was scheduled for completion in a few years' time. The general manager replied that there was a map in the December issue of *Radio Communication* which demonstrated this, and indeed the accessibility of the new headquarters was one reason why this location had been considered desirable.

Mr J. Bluff, G3SJE, asked the position of the Lambda Investment Company in the transaction: he also wondered what the Society's intentions were with regard to this company in the future. The honorary treasurer said that Lambda had now outlived its purpose: it had originally been formed to assist with the external financing connected with the acquisition of Doughty Street, but it was no longer needed for that purpose and indeed had no real purpose as far as the Society was concerned. No decision had yet been taken as to whether to keep it in existence, but it would probably simply remain dormant. He added that obviously the seller of Doughty Street had been the Lambda Investment Company, and the purchaser of Alma House was the Radio Society of Great Britain.

Some discussion then took place concerning the location of the new headquarters: the President said that continuity of staff had been essential and that all the Doughty Street staff had made the move, with one exception.

Mr R. Broadbent, G3AAJ, Region 19 representative, wished it to be placed on record that he certainly approved of the move to Alma House.

There were no more notified questions, and the President then called for volunteer scrutineers for the 1984 Council election. The various names and callsigns were recorded by the secretary.

Presentation of awards

The President began this part of the meeting by announcing that the Society had decided to honour Noel Eaton, VE3CJ, the recently retired president of the IARU, by inviting him to become an honorary member: he was not able to be present at the meeting but the secretary of IARU Region 1, Mr Eric Godsmark, G5CO, was invited to accept the presentation certificate on his behalf. The President then announced that the Society had great pleasure in inviting Mrs Frances Woolley, G3LWY, Sir Evan Nepean, G5YN, Mr Stan Cook, G5XB, Mr Ray Flavell, G3LTP, and Mr Charlie Newton, G2FKZ, to become honorary vice-Presidents of the Society.

The Founder's Trophy was awarded to Mr Pat Hawker, G3VA, for services to the Society: he stated in his acceptance speech that he was very grateful for the amount of useful ideas which were sent to him, and which helped to make the "Technical Topics" column in *Radio Communication*. The Marconi Award had been won by I0SNY and I0YLI for their 10GHz contact between Spain and Italy in July 1982, which had set a new record for the amateur 10GHz band.

Since the formal business had been concluded with the meeting running slightly ahead of schedule, the chairman elected to present the 1982 awards before the break.

There being no further formal business to transact, the meeting closed at 3.26pm

QUESTION AND ANSWER SESSION

The President, Dr John Allaway, G3FKM, opened the informal session by introducing the 1983 President, Mr Don Baptiste. In reply, Mr Baptiste said that he had been taking note of the proceedings of the meeting, and hoped that the membership would be as kind to their President next year as they had been this year.

The President then gave his opening address, and stated that he was delighted to see so many members present—there were more than last year. He said that, without the help of so many Society members, it would be impossible for the Society to continue to provide the multitude of services for the radio amateur that it did, and he expressed his thanks on behalf of the Society.

The President then referred to the staff at headquarters. They were a loyal and hard-working group who were devoted to the success of the Society, and who had endured appalling working conditions at Doughty Street towards the end of the Society's occupation of that building. The general manager had worked over 30 weekends for the Society during the year, and indeed many other staff members had been involved in working unsocial hours—the President wished to thank them all for their hard work. He made special reference to the editorial offices of *Radio Communication* at Chelmsford.

The President continued by saying that one of the chief sources of worry to the Society during the year had been the apparently unchecked number of pirates and cb stations which had been using amateur bands. The situation had seemed almost hopeless at times, and some members had complained that the Society did not appear to be doing anything about the problem. The fact of the matter was that the responsible authorities were well aware of the situation but were in a very weak position, for various reasons; among them the vast number of offenders, the shortage of available monitoring staff, and the derisory punishments which were habitually meted out to those who were caught. The other main reason for the apparent lack of action was simply the manner in which the Wireless Telegraphy Act of 1949 was written, which made the apprehension of offenders by law enforcement officers practically impossible.

However, the President stated that some relief might be in sight, in the shape of the British Telecommunications Bill which had just been published, and which was due for processing by the present session of Parliament. Part V of this, among other things, detailed new punishments for possession and importation of illegal equipment, and appeared to be a very promising start to tackling the problems. He added that perhaps it should be borne in mind that the rate of crime detection at all levels, including offences against the person, was not very high. In the eyes of those who did not understand amateur radio, and who were not sympathetic to its aims, taking valuable and scarce police manpower from other criminal areas would not be seen in a very favourable light. The Society was actively studying the Bill, and would make every effort to see that the important parts from the point of view of the radio amateur were supported in Parliament.

The President then mentioned the subject which had been briefly touched on before the interval, namely the move of the Society's headquarters from Doughty Street to Potters Bar. He said that this had been a major operation and that considerable disruption had been caused to normal working; some of this had been inevitable, but most areas were working again shortly after the move was completed. However, two areas where problems had been experienced were the book sales and despatch department, and the section where new membership applications were processed. It had not been possible to resume normal working in the despatch department until the week before the present meeting, due to extensive work required in that part of the building at Potters Bar, and temporary extra staff had been taken on to clear the backlog. There had only been one member of staff who did not make the transition from Doughty Street to Alma House, for health reasons, and she had dealt with membership applications; however, a new member of staff had been recruited and the backlog would soon be cleared. The President wished to apologise to any member who had been inconvenienced by the problems inherent in the move, and assured them that the working of headquarters would be very much more satisfactory from henceforth.

The President went on to say that the transactions involved in the move of headquarters had been very complex and had imposed an exceptional workload both on the honorary treasurer, David Cornish, and on the secretary/general manager, David Evans. Both had put in many hours of extra work. To make matters even more difficult, during the time when planning and execution of the move had been taking place Mr Cornish had experienced a quite severe illness, but the President was pleased to report that he was now recovering well. On behalf of the meeting, he wished Mr Cornish a speedy and complete recovery, and this was applauded.

The President reminded the meeting at this point of his earlier remarks to the effect that it had not been necessary to issue debentures or to borrow money in order to finance the move from Doughty Street to Potters Bar—that this was so was due entirely to the prudent housekeeping which the Society had undertaken in recent years under the guidance of the honorary treasurer. This was applauded.

Another extremely important task which had been undertaken during the

year had been the re-establishment of a good working relationship between the Society and the department at the Home Office which dealt with amateur licensing matters. Unfortunately, the death in September 1981 of Roy Stevens, G2BVN,—who during his many years' service to the Society had been largely responsible for Home Office liaison matters—had coincided with very extensive staff changes at Waterloo Bridge House. This had led to some disturbance in the relationship between the Society and the Home Office, and one most regrettable sequel had been the confusion which arose over the matter of the new schedule to the amateur licence. However, the President was of the opinion that this had had a beneficial effect in the long term, since some valuable lessons had been learned; the number of persons within headquarters who had personal contact with the Home Office had been increased, and in turn the Home Office were in almost daily contact with the RSGB.

On the subject of licensing in general, the President was pleased to observe that the restrictions on unlicensed persons passing greetings messages under supervision over amateur radio had been eased, and this had been of particular benefit to the Scout movement. The next step was to obtain permission for greetings messages to be exchanged internationally, and this was being discussed at the present time.

Other improvements to licensing conditions had been pursued during the year. Three new hf bands had been released, but two of them had temporary limitations designed to prevent interference to primary services until such time as they could be moved to other frequencies or until the bands became allocated to the amateur service as of right in 1989. Access had also been gained to new areas of the microwave spectrum. Other changes which would take effect from 1 January 1983 were: the nationality requirement for the acquisition of a British licence would be abolished; proof of age on first licence application would no longer be required, although the lower limit would remain at 14 years; Class C and D licences would no longer be issued; and foreign amateurs living in the UK would no longer have G5-plus-3 callsigns but would use G4 or G6 followed by their own home callsigns—new application forms were already available. A bonus from these changes would be that the issue of licences should be speeded up, since the time now taken up in returning documentation to applicants by registered mail could be used more productively. The President said that he understood that the issue of amateur licences, which had recently been subject to heavy delay and caused much dissatisfaction, had now been speeded up considerably and would soon be up to date.

Another change taking effect from 1 January 1983 affected a large and important section of the Society. Raynet had over 3,000 members, and had perhaps suffered more than any other from the problems associated with licensing earlier in the year. The President added that Raynet members had been extraordinarily patient, in spite of the fact that it seemed that nothing appeared to be happening in their favour. However, this did not mean that the Society had been doing nothing on their behalf, and it was a happy moment for him to be able to read to the meeting a telex which had been received from the Home Office on the afternoon before the meeting. This stated that:

(a) Raynet groups could now take part in any exercise at the request of the user services, provided that each group took part in not more than one exercise per month. This number was not negotiable.

(b) During genuine emergencies, any amateurs could pass third-party messages directly related to the emergency, but only where no other conventional means of communication was available.

(c) During emergencies when Raynet was assisting user services, third-party traffic could be passed directly by a licensee or a responsible person under his supervision.

(d) The Home Office had no strong views on the inclusion of coastguards, mountain rescue or the fire brigade in user services, but further consultation would probably be necessary before this could be confirmed. All these proposals would be effective from 1 January 1983, subject to confirmation from the Society.

The President felt that the contents of the telex represented a substantial improvement. Other improvements in other parts of the licence were under discussion, and the Society was continuing to follow up other matters which would be announced in due course.

The President ended his introduction by saying that it was customary to award trophies to winners of hf contests at this point. Unfortunately the processing of the trophies themselves had been impossible because of the disruption caused by the move of headquarters, and the HF Contests Committee had agreed that the awards would be made at the HF Convention, probably on 5 March. Consequently there were no awards to make at the present moment, and he therefore proposed to move straight on to the open informal session.

The meeting was then declared open for questions.

Mr L. Salaman, RS46145, said that he appreciated that for various reasons the National Amateur Radio Exhibition in 1983 would not take place at the Alexandra Pavilion in London but at the NEC in Birmingham. He hoped that the capital city was not going to lose the national show for all time, and that conditions would make it possible for it to return to its natural venue. The President assured Mr Salaman that there was no darkly significant reason why the show had been moved to Birmingham, and he called upon the chairman of the Rally & Exhibition Committee, Mr N. Miller, G3MVV, to explain the background to the decision to change its venue.

In reply, Mr Miller stated that it had been the committee's intention over a number of years to make the exhibition more of a convention and exhibition proper, rather than simply a trade event—but for the disastrous fire at Alexandra Palace, facilities would have been available for lectures and demonstrations there. Comments had been made that in its existing form the exhibition was just for the trade, and in an effort to get away from this the committee and staff had considered a number of venues throughout the country—chiefly in London and the Home Counties. The intention had been to find a venue which could provide both a good amount of space for the exhibition itself and an area for demonstrations and lectures. One problem had been cost: the cost at Alexandra Palace and at the Pavilion had been steadily increasing, and indeed the Pavilion had been an expensive building to erect. With this factor in mind, costings obtained from the National Exhibition Centre in Birmingham appeared to be attractive—a number of visits had been made in order to inspect and evaluate the facilities available, and it had been found that they were comparable in price with the Alexandra Pavilion. It had, therefore, been decided to stage the next Exhibition & Convention at that venue, and it was then a matter of seeing how much support was obtained from visitors and members in order to decide whether the NEC was, in fact, a good venue for it, or if it should return to London. Only 7,500 people had attended the last event at the Alexandra Pavilion, and the committee had been somewhat disappointed with that figure.

The Society's general manager, Mr D. A. Evans, G3OUF, added that he endorsed Mr Miller's comments, and that the choice of the NEC as the venue for the 1983 exhibition was regarded very much as an experiment. He said that its success was entirely a matter of how the membership and the general public responded. A four-page information sheet was available and, although it was primarily for potential exhibitors, some copies were available and he would be pleased to supply them after the meeting if anyone required one. Finally, he mentioned that the rail service to the NEC, and indeed communications generally, were normally first class, and there would be details of a special package offer involving rail travel and the cost of admission to the exhibition in the January 1983 issue of *Radio Communication*.

Dr J. Morris, G4ANB, commented that for the vast majority of amateurs in the country, the NEC was easier, cheaper and faster to get to than anywhere in London, and he congratulated the Society on the decision to move. His comment was applauded by the meeting.

Mr A. Veitch, G8FRB, enquired whether the new edition of the *VHF-UHF Manual* would soon be published. Replying on behalf of the Technical & Publications Committee, Dr Evans, G3RPE, said that the new edition was with the printers and would be published early in 1983.

Mr C. Reed, G8MFP, was concerned with the ethics of the way in which the election for the regional representative in Region 3 was conducted. He said that photocopies of the voting slip had been sent round to members of the local clubs with the suggestion that the recipients voted for a particular candidate, and he considered that, although this was not against the rules, it was undemocratic. The President said that there was little that he could say at this stage, but that the matter had been noted.

An unidentified member asked whether the new premises at Potters Bar would be used for conventions. The President explained that the headquarters building was basically office premises for a hard-working staff, and was not suited to such a purpose.

Mr Holmden, G4KCC, asked whether the Society was making representations to the Home Office with regard to the use of morse by Class B licensees in the 144MHz band. The Society's vhf manager, Keith Fisher, G3WSN, said in reply that the question of cw and Class B licensees was under discussion, and that the Society was looking at the question of allowing Class B licensees to use cw for training. He expected ideas to be clarified soon.

Mr G. May, G6JNS, said that when the changes to the amateur licence schedule had taken place earlier in the year, the Home Office had justified them by saying that it had been necessary to comply with the agreements made at WARC 79. However, looking at the text, it was noted that the whole of 430-440MHz in Region 1 was allocated on a primary basis to the amateur service and radiolocation. G6JNS asked why the Home Office had allocated part of this band to PMR, and what the Society was doing about it. The Society's vhf manager explained that the situation was, in fact, very complex, and that the amateur service in the UK had the 432MHz band allocated to it on a secondary, not primary basis. It was true to say that the WARC recommendation was that amateurs should be given primary status on the band, but each national administration was free to choose whether or not to implement WARC recommendations. In the case of the UK administration, there were other national interests which, in the eyes of the Home Office, overruled the possibility of primary-user status for the amateur service. However, The question of amateur status in the 432MHz band, and other allocations, was constantly reviewed, and the matter was receiving a good deal of attention from the Society.

An unidentified member raised the matter of the Telecommunications Bill, which the President had alluded to in his introductory speech. He considered that on the whole it should be quite satisfactory, but it could be used to do a great deal of damage to amateur radio. He noted that a committee had been set up to study the matter, and he urged that the Bill be watched very carefully; he also considered that it enhanced the need for a novice licence. Replying on behalf of the Society, the President-elect, Mr Baptiste, said that the Society had made a preliminary study of the Bill, and that at first sight it seemed very good; he did not consider that there was much risk of damage being done to the amateur movement. The effect of the Bill would be to give the police and the Radio Investigation branch of British Telecom effective powers of apprehension of both people and equipment. Mr Baptiste said that the chief difficulty with the Wireless Telegraphy Act was that it was virtually impossible to administer because it was necessary to catch offenders in the act of transmitting in order to prove the case—it was not sufficient to discover an unattended transmitter with an operator 100 yards away controlling it remotely. This situation had been the case for many years, and was clearly unsatisfactory. The new Bill gave much more power in such situations, and was to be welcomed on that account. Also, much illegal equipment was advertised and sold, and there was no legal remedy against the dealer; this was a flaw in the 1967 Act. The new Bill would cover that area, but this was not relevant to the radio amateur, since amateur activities were controlled by the provisions of Part 1 of the Wireless Telegraphy Act, and proper licensing was required. Mr Baptiste contended that the radio amateur would not be directly affected by the Bill.

The member who had asked the original question then asked whether there was, in effect, an all-embracing clause covering any equipment which could not directly be licensed but which was capable of use for amateur purposes. Mr Baptiste explained that there was no such clause—under the provisions of the Bill, the Minister would make an order which would specify the type of apparatus which it was wished to prohibit. Such an order would only cover equipment which was not capable of being licensed for use in the UK, and the terms of it would be precisely defined. In the normal course of events, Mr Baptiste thought that the RSGB would be consulted before an order was made.

Mr H. Bellfield, G3SBV, pointed out that certain equipment used by

amateurs could operate in areas of the spectrum which were not *de facto* amateur bands; he cited the case of a commercial transmitter which covered 144–148MHz, and asked whether this would be subject to the provisions of the Bill. Mr Baptiste said that it would not, since this case was already provided for under the terms of the Wireless Telegraphy Acts. Radio amateurs were licensed to transmit on certain frequencies, and if they used others they would be liable to prosecution under the existing law. In other words, amateurs were expected to use their equipment in conformity with the terms of their licences, and it was unlikely that an order would be made against equipment used in this way.

Dr I. White, G3SEK, asked whether the Society had any detailed figures on the number of licensees, and the amounts of money invested in the use of different bands. He thought that the total must be of the order of £10 million. In reply, the Society's general manager said that very detailed information existed on this subject. A survey had been instigated by the Forward Planning Group in October 1981, and about 16,000 replies had been received from members; analysis of these had just commenced. Members had been asked for details of their current activities, as well as information on bands on which they had been operational in the past and on which they intended to become operational in the future. Coupled with that, details of the approximate financial investment in the station had been sought. So some detailed statistics were becoming available, which would help the Society considerably in the future.

Mr I. Shepherd, G4LJF, said that he was appalled at the continuing situation on the London repeater network; he considered it the worst example of amateur radio anywhere in the world. He wondered whether there was any likelihood of efforts by the Home Office, assisted by the Society, to solve the problem, given that the situation did not present amateur radio in the UK in a favourable light to the overseas visitor. In reply, the chairman of the Society's Licensing Advisory Committee, Mr D. Pratt, G3KEP, agreed that the problem was very difficult and that the best hope of salvation was the new legislation to which Mr Baptiste had referred; here again, the chief difficulty was in actually apprehending offenders in the act of transmitting. The Society had in the past provided the Home Office with names and addresses of known jammers but, as Mr Baptiste had indicated, very little could be done because of the inadequacy of the legislation. It was very much the Society's hope that the Telecommunications Bill, should it become law, would ease the situation considerably. Mr C. Reed, G8MFP, mentioned that his local repeater group was working very hard with local BT inspectors and the Home Office in order to track down offenders, and said that two had been arrested and one was in prison.

An unidentified member suggested that members convicted of such offences, or reasonably suspected of them, should have their membership withdrawn by Council as a matter of course, and a list published in *Radio Communication*. On another topic, several users of the 432MHz band had received letters warning them about the use of frequencies allocated to and used by a primary user, despite the fact that the frequencies in question were those used by repeater outputs, and a list of supposedly "allocated" frequencies had not been published. In reply, the general manager said that he knew of only one case where this had occurred, in connection with GB3HR, and that it was difficult to comment further at this stage because the Ministry of Defence system in question was subject to the provisions of the Official Secrets Act. Returning to the earlier topic of spectrum abuse, Mr Evans reiterated that the difficulty had never been in identifying and locating the offenders. The difficulty, as had been said earlier, was in actually providing sufficient evidence to a court of law to bring about a successful prosecution. Even on the rare occasions when this had happened and a conviction had been obtained, the penalties had been very small and not particularly deterrent. He added that although the text of the Bill had only been available for about 10 days; a preliminary reading suggested that some good would come of it.

The President added that Council would very seriously consider expelling offenders from the Society, as was right and proper.

Mr F. Claytonsmith, G3JKS, thought that the RSGB should be in a position to give a lead to members of clubs and groups of people who were troubled by this problem, and show them how to co-operate with the authorities and help in tracking down offenders. Mr Evans repeated that the difficulty was not in identifying them but in getting enough evidence to satisfy the terms of the legislation and bring them to court. To his knowledge the cases where evidence from radio amateurs had assisted in bringing about a successful prosecution were very rare indeed. He added that if the answer to the problem was as Mr Claytonsmith had advocated, it would have been done many years ago—unfortunately, even given that many amateurs were prepared to give up their time and resources to tackle it with enthusiasm, it had not been demonstrated to be the best approach in the past.

Dr D. Evans, G3RPE, added that one of the most difficult problems which he had had to face during his term of office as President in 1978 had been the jamming of the London repeater system, which was still extant. He said that there were, in effect, only two possibilities: one was to close down the entire network, which was giving in to an unpleasant form of blackmail, and the other was to attempt to overcome it. A major effort had been made in the London area by the Home Office to try and track down the jammers; a six-figure sum of money had apparently been spent but no successful prosecutions resulted. Despite access to enormous resources and very detailed information, the wording of the Wireless Telegraphy Act was, to say the least, unhelpful. Even if someone was found actually speaking into a transmitter, that in itself was insufficient; it was necessary to prove that the transmitter was actually working. The situation was extremely difficult, and Dr Evans reiterated that if the problems had been soluble on the basis of what the average person would regard as "cast-iron" information, they would have been solved 10 years ago. He added that the new Telecommunications Bill looked the best hope of a solution to the immense difficulties presented by the inadequacies of the current legislation.

The Society's Intruder Watch Organizer, Stan Cook, G5XB, mentioned that the Society had supplied the names and addresses of 137 illegal operators in the lower part of the 28MHz band to the Home Office.

Some further discussion took place concerning various aspects of the new Telecommunications Bill, and Mr D. Baptiste clarified some of the issues which arose. Mr G. Henderson, G3RTJ, raised the question of cable television: he wondered whether the Society was making representations to industry with regard to reverse tvi and the susceptibility of various systems, and he strongly recommended that the Society act in this matter. Mr M. Appleby, G3ZNU, of the Society's VHF Committee, explained that links with the relevant Department of Industry and BSI Committees had been set up via the Home Office, and that information was being supplied to them. It was not possible to obtain direct representation, since the committees were small and its membership mainly drawn from the broadcasting and manufacturing industry, but the Society was represented by the Home Office.

Mr G. Stancey, G3MCK, wished to return to the question of malicious interference. He said that the Leicester group had obviously achieved success, even given the weaknesses of the Wireless Telegraphy Act, and he considered that the Society had not taken due notice of this. He asked them to look further into what had been achieved in Leicester. However, Mr M. Shardlow, G3SZJ, the Society's regional representative for the area, said that the person referred to earlier in the meeting was not in gaol for repeater jamming, as had been suggested; he had been arrested for causing malicious damage to other radio transmitters.

Mr R. Broadbent, G3AAJ, expressed a wish that the Society would pursue matters such as those which had been discussed with more aggression and force. In reply, Mr K. Fisher, G3WSN, said that it was unfair to suggest that the Society had done nothing or was inactive in this area; it had been looked into very carefully over the years and the problems which had been discussed at the meeting had all been considered. One problem, apart from the difficulty of actually obtaining evidence, was the very high cost of so doing—although it was quite possible for the Society, or indeed any private individual, to take out a private summons for illegal use of radio equipment if it, or they, so wished. It would cost many thousands of pounds to proceed with a summons, even if it were to be done in the name of the Society. Mr Fisher emphasized that such an option was open to any individual.

Dr D. Evans, G3RPE, added that this was an area which was of great concern to the Society, and he wished to sound a note of caution in regard to what he referred to as the "get up and punch them on the nose" approach; he emphasized that care was needed, since what appeared to be an obvious and straightforward course of action could backfire very badly. At the present time amateur radio received an excellent deal from the Home Office in terms of the money spent on amateur radio and the money put into it, and the amateur radio movement in the UK was most fortunate that the Home Office was so generous in both finance and time. He said that a large number of positive changes were taking place in the hobby at this time, and that some of them had been discussed at the meeting. Dr Evans emphasized that the Home Office had only a fixed amount of time to spend on amateur radio, and that any time which was spent on dealing with minister's questions and questions from MPs had to come out of the time which could be spent on more direct and positive matters concerned with the hobby. The attitude which he described as "let's write to MPs: let's write to ministers: let's cause a fuss" had proved to be counter-productive in most cases, since when a minister's letter arrived at the Home Office it caused all other work to cease until an answer had been produced. Dr Evans strongly advocated leaving the Home Office to get on with administering the positive side of amateur radio, and not diverting their time and effort into other channels which would not be productive at the time.

As far as the Telecommunications Bill was concerned, Dr Evans' reading of it was that it would not deal directly with the question of in-band interference with the amateur service: it would, however, give a good deal more power to the Radio Interference Department of British Telecom insofar as rights of access, search and forfeiture were concerned. Mr D. Baptiste supported Dr Evans' conclusions, and said that it represented an important step forward and one which the Home Office had sought for a number of years. One aspect which concerned him, however, was the role of the local magistrates' court. He had had a good deal of experience of seeing successful prosecutions brought before such a court and then seeing the offence treated as though it was trivial and of no account. Magistrates prized their independence, and it was impossible to dictate to them on the subject of the severity of an offence. He considered that, since the magistrate was at the same time a local citizen, the grass-roots level of the Society could do a great deal of good by getting the community to realise that offences in this category were not simply due to young people interfering with someone's hobby in an innocuous way, but that they were in fact committing a potentially serious offence which needed firm control. If this could be done, magistrates might be more willing to use the full penalties which were open to them to inflict.

An unidentified member suggested that the short answer was to get oneself elected as a magistrate. He also asked whether problems such as the susceptibility of domestic entertainment equipment to various forms of breakthrough would be covered by the Bill. The President replied that they would not, this was a difficult area and that the Bill would prove unworkable if extended into it.

Mrs H. Claytonsmith, G4JKS, asked whether the Society intended to achieve legislation on the lines of the recent "RFI Bill" in the USA which had now become law. The general manager replied that the ARRL had been fortunate to have Barry Goldwater, K7UGA, in a position to sponsor this Bill and see it through. The Society did not at present have such strong links with Members of Parliament but it was intended to develop such links in the future. He considered that it would be very difficult for a relatively small organization in the UK to get a Bill through Parliament.

Mr R. Jones, G3YMK, wished to congratulate the members of the Society who had prepared the submissions to the Merriman Committee. It appeared to him that the committee had taken note of what the Society had had to say, and had come out in favour of a 50MHz band for the amateur service inthe UK. He was also pleased to see that the Society had counselled the Home Office to allow some permits for the use of the 50MHz band before it was vacated by the broadcasters. However, he was a little unhappy about the limited number of such permits, and he asked whether the reports of 40 being available, which he had read elsewhere, were true. In reply, the vhf manager, Keith Fisher, G3WSN, said that one reason why he had not wished for publicity initially was that he had held out hope that a few more permits might have been allowed. He had been hopeful until a few weeks before the meeting, but the limit was set at 40. He was sorry if Mr Jones felt that the

withholding of the number had upset him, but it had been in everyone's best interests; 40 was the absolute maximum at present, and it was hoped that some stations would be on the air by the new year.

Mr Fisher felt that the granting of the concession was a great achievement, and he added that it was in no way connected with the possible allocation of a 50MHz band in the UK in the future—the issues were completely separate. The limited allocation at present was in the nature of an experiment and quite separate from any outcome of the report of the Merriman Committee. The Society had been pleased with their conclusions, and indeed there had been submissions for other parts of the spectrum for the amateur service as well as for 50MHz.

Mr C. Reed, G8MFP, said that he was interested in 50MHz, and had naturally written to the Merriman Committee himself. He wished the question of why the Home Office had only allowed Class A amateur licensees to have permits for the 50MHz band to be clarified. In reply, Mr Fisher accepted his concern, and stated that the WARC recommendation that no morse test was required for the use of frequencies above 30MHz, as opposed to 144MHz, had put the Class B licensee on an equal footing with the Class A as far as an allocation at 50MHz was concerned. However, Mr Fisher stressed that the granting of permits for the 50MHz band to Class A licensees only had been a Home Office decision which had not, in any way, been advised or requested by the Society. He said that if a permanent allocation at 50MHz was achieved, there should be no reason why it should not be available to both Class A and Class B licensees, but he regretted that there appeared to be no chance of a Class B licensee being allocated a permit for the present experimental allocation of 40—no reason for this basic decision had been given by the Home Office. Mr Fisher hoped, however, that Class B licensees would be able to participate in the experiment by sending reports to the VHF Committee and the Propagation Studies Committee so that this interesting part of the radio spectrum could become more fully understood. In reply to a query from the President, Mr Fisher added that there was no amateur allocation as such at 50MHz anywhere in Region 1, and it was not an amateur band in the usual meaning of the words.

Mr I. Davidson enquired as to how many applications had been received for 50MHz permits. Mr Fisher replied that approximately 280 applications had been received for the initial questionnaire, three or four of which could not be processed since the applicants were Class B licensees. Of those, some 104 completed questionnaires had been received, and he and the general manager would pass them on to the Home Office shortly. Those amateurs who had written directly to the Home Office when the experimental allocation had been announced had been sent exactly the same questionnaire as the Society had sent to those who had applied through it, and all of them would be discussed at the same meeting. Of the 276 applicants, some 14 or 15 were not Society members, but all applicants had received equal treatment and Society membership was not considered a relevant factor: any Class A licensee in the UK had been able to apply. One reason that the process had taken so long, in fact, was the overriding desire to be fair to all parties.

The President mentioned that proof of serious experimental use of the permits when they had been issued would be required.

Mr C. Newton, G2FKZ, noted that the Society had purchased additional land in the vicinity of the new Potters Bar headquarters, and asked whether this was for the purpose of an antenna installation. The President replied that there was an adequate flat roof at Potters Bar which would serve as the site for any antennas which were required.

Returning to the topic of 50MHz, an unidentified member asked whether crossband operation from Class B licensees would be permissible, bearing in mind the ruling concerning the allocation at 70MHz. Mr Fisher said in reply that the rules for Class A stations who would be permitted to operate on 50MHz would be somewhat stricter than those normally applying in the UK. There would be no portable, mobile or alternative location facilities in the permit, and no permission for other operators of the station. A particular Class A licensee would be licensed from a specific address, not necessarily his home address, for the purpose of propagation research. He thought that the finer points of crossband operation would need to be clarified when permits were issued, and the Society would take the matter up with the Home Office at the appropriate time. However, the general intention was that the 40 selected licensees would communicate between themselves, and a list of them would be published.

Mr H. Bellfield, G3SBV, asked about the fate of the RSGB amateur radio page on Oracle. In reply, Mr J. Nelson, G4FRX, of RSGB staff, stated that a survey to establish the relative popularity of Ceefax and Oracle had established that, due to the longer access time required for pages on the latter, it had been decided to cut about 87 pages so that the access time was now equal. This had been done without consultation with, or an explanation to, the Society and the pages simply disappeared overnight. Efforts were continuing to re-establish the service.

Mr P. Hawker, G3VA, added that it was not the IBA which had done the survey or removed the pages, but a joint operating company, Oracle Teletext Limited. There had been considerable adverse reaction to the dropping of the amateur radio pages, and indeed some of the others. There had also been objections to the transfer of some pages on to Channel 4 when this service could not be received in all parts of the country. Mr Hawker considered that the likelihood of the amateur radio pages being restored was remote, since the company needed to appeal to mass audiences rather than to minorities.

Mr T. Chipperfield, G3BFC, asked whether Council had considered a fresh approach to publicity for amateur radio, as mentioned in the notes of the 1981 meeting. In reply, the general manager said that this was one of the main matters which were currently exercising the Forward Planning Group. One of the major problems which had been identified was that, over the years, the establishment of links with important institutions and people had been neglected, and in fact the cb lobby had achieved more in two years than the Society had in 70 in terms of getting Members of Parliament to support their case. The Forward Planning Group had recently listed no less than 60 institutions with which the Society should have active links, and at present it had such links with only a few of them. The problem was fully recognized, although the relationship with the Home Office was proving to be more productive than would have been believed possible a short time ago.

The general manager continued by stating that the status of amateur radio was of fundamental importance, and that some basic questions needed to be asked—should the standard of the RAE be raised, should an incentive licensing scheme be pursued, and so on. Such questions needed to be addressed as a matter of urgency, and the answers pursued in the same vein, since otherwise the amateur service would continue to be vulnerable. The only reason for the continuing existence of amateur bands in commercially and technically attractive portions of the spectrum was the status of the amateur in the eyes of the professional. However competent and constructive the amateur fraternity felt itself to be, the decision-making as far as the amateur service was concerned was largely in the hands of the professionals and the national licensing administration. The general manager felt that not enough impact was being made at this level—amateur radio was a remarkable hobby and its achievements were important, but it was not being shown in its most favourable light.

Mr Chipperfield agreed, and asked whether the right people were coming into the hobby. Dr Evans continued the general manager's theme that there was a good deal to be done in such matters as the presentation of amateur radio at local level. Too often these were an excuse for local amateurs to put on a station and play with equipment: no-one was present to explain the nature of the hobby and what exactly was going on. A more serious problem, in his view, was that amateur radio apparently existed on two levels. The strength of the hobby was in the individual amateur and the local club: the Society, the central organization, was a national body with Council, the committees and the headquarters organization. In his view there was poor interaction between clubs, affiliated societies and the central body, and there was some degree of doubt concerning whether the representation system of regional representatives and a zonal manager was working. A major rethink of this system was required. Also many first-class constructional projects which had been thoroughly tested and debugged by club members were not finding wider circulation within the system: this was another example of a problem which needed to be addressed. He hoped that the move of headquarters would enable positive things to take place.

Mr I. Mitchell, G4NSD, said that in his opinion the Society needed to pay more attention to the impact that could be made on the media—its profile was very low. Although professionally in receipt of a large number of press releases, he did not remember ever seeing anything from the RSGB, and he cited a recent case wherein a group of broadcasters were setting up a representative society which almost came to be called the Radio Society of Great Britain. As an aside, and to much laughter, he announced a telephone number for Oracle to which complaints concerning the removal of the amateur radio pages could be made. He considered that if all present complained, they might bow to pressure and restore it by the Tuesday following the meeting!

Mr P. Chapman, G4IJL, said that news he was sending in on behalf of his club was not being featured in the GB2RS news bulletin, although he had sent it in good time for the deadlines. The general manager commented that his members might not be listening to the newsreader for the area, and invited the GB2RS editor, John Nelson, G4FRX, to comment further. Mr Nelson said it was unusual for news which was actually received not to be used in the bulletin; if it was necessary to leave items out for space reasons, they would usually only be routine notices of club meetings. Items sent in on orange cards would almost invariably get into the bulletin. Mr Nelson added that although he could not claim recall of every orange card he had seen in the past six months, he did not recall more than one card from Mr Chapman's club. He certainly was not in the habit of selective use of material, and was forced to assume that, for some reason, the cards were not reaching headquarters. The general manager suggested that Mr Chapman used the answering service which had been installed specifically for GB2RS news items, and explained the function of the orange card.

Mr R. Limebear, G3RWL, was pleased to see that the VHF Contests Committee had deducted points from one group with a poor quality signal in a recent contest.

Mr C. Harlow, G8BTK, asked what was the proportion of Class A to Class B licensees, and made some points about the novice licence. He stated that many B licensees were more knowledgable than Class As. He also said that he had not received his voting papers for two years running. Finally, he thanked the Society for its efforts on behalf of amateur radio, and asked whether more could be done to bring the hobby to the attention of schools and educational authorities to counter the influx of cb in this area. In reply, Mr Nelson said that the relative numbers of Class B and Class A licensees had been published in the GB2RS bulletin some three weeks prior to the meeting. The President suggested that they be published in *Radio Communication*. The general manager explained that voting papers were packed by an independent company, and apologised that they had not been received. The other subjects were complex and, as there was little time left to the meeting, the points would be considered.

An unidentified member asked why there would be no GB2RS bulletin over the Christmas period. The general manager said that the production of news bulletins presented some difficulty due to shortage of staff over the holiday period and also shortage of news at this time of the year, but an attempt would certainly be made.

The final question came from Sheila Gabriel, G3HCQ, in her capacity as chairwoman of the East London RSGB Group. She felt that closer links with the Society were highly desirable, and that there should be more affiliated groups of this type. She agreed that the zone system, which had been the subject of some comment earlier from Dr Evans, did not appear to be working, and asked whether the possibility of setting up RSGB groups across the country could be looked into and their members' views fed into a committee. Dr Evans said that he thought the entire topic should be reviewed and that, basically, there was poor communication between clubs and the Society, and also between individual clubs. He amplified his comments concerning the regional representative system by saying that they had far too much to do: most of them worked very well, but it was impossible for them to carry out all the jobs implicit in their role, and this problem needed attention.

The President then declared the meeting at an end.

THE MEETING THEN CLOSED

Scottish Amateur Radio Convention report

by IAN E. McGARVIE, GM4JDU*

This year's Scottish Amateur Radio Convention, staged by the West of Scotland ARS, attracted record support from traders and amateurs from as far afield as Northern Ireland, making it the biggest-ever event of its kind north of the Border. Cardonald College, Glasgow, a new venue, proved to be ideal, with easy access via the nearby M8, extensive car parks, spacious halls for the trade displays, excellent lecture theatres and catering facilities.

The RSGB was well represented by President Don Baptiste and a team from headquarters headed by general manager David Evans. The Society's stand provided information to numerous newcomers to the hobby, who were visiting their first convention, and also recruited a number of new members and sold a great many publications.

Glasgow's Lord Provost, Dr Michael Kelly, listens out on the hf bands. Looking on is Anne Hood, GM6PYQ (now GM4UXX). *Photo:* GM4SRL

The convention was formally opened by Glasgow's Lord Provost, Michael Kelly, who showed considerable interest in the exhibits and, as a result, may soon be coming on the air as a GM1. The Lord Provost passed the RAE several years ago but, due to the pressure of his civic duties, deferred his application for a licence.

Morse tests by Robert Dixon, GM3ZDH. Looking on are GM6NOX, GM6IWN, GM6PSN, GM6UHV and GM4DOX. *Photo:* GM4SRL

Susan McGarvie (daughter of GM4JDU) sells a raffle ticket to Ian, GM3RXU. Looking on, left: Gordon, GM4NVN, and Jack, GM4COX. *Photo:* GM4SRL

Throughout the day the lecture theatres were busy with a programme which included an RSGB forum; "Oscar 10 tracking with the use of home computers" by John Branegan, GM4IHJ; "Modern receiver front-end techniques" by Chris Bartram, G4DGU, of Mutek Ltd; "Satellite television" by Mike Withers, of Andrews Antennas Ltd—who ran a display of Moscow tv "live" from a Russian satellite; and video films of National Field Day 1982 with the West of Scotland ARS, and VHF Field Day 1983 with the South of Scotland Contest Group.

Strathclyde Raynet members who provided talk-in on S22. *Photo:* GM4SRL

A new feature of this convention was the information service provided by Scottish Television which devoted several pages of Oracle to the event. These were displayed on large monitors in the college.

Local Raynet members ran the talk-in station, and a demonstration hf station was operated all day by BYLARA. □

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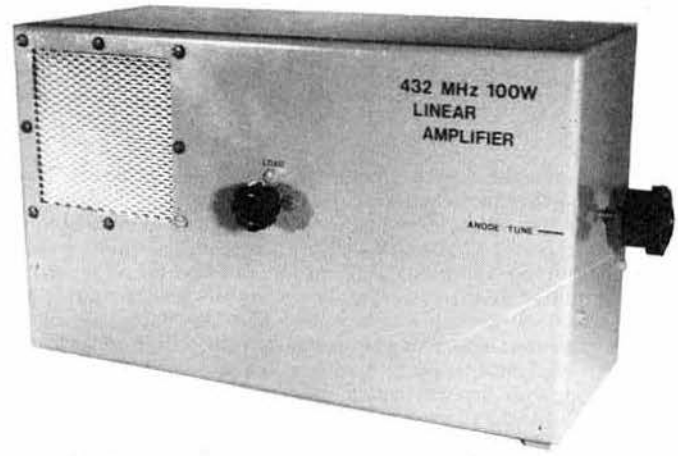
THE G8PQG 100W 432MHz LINEAR AMPLIFIER



by D.G. Hewitt, G8PQG*

G8PQG first became interested in amateur radio at the age of 13, and obtained his licence in 1978. His main interest is vhf and uhf, with home-construction playing a major part. Currently active on 144 and 432MHz, he is also constructing a transverter for 1,296MHz.

For the past four years he has been an apprentice at AERE, Harwell, and has been studying part-time at college. He has obtained TEC and HTC in electronics, and aims to pass the morse test shortly.

Introduction

Valves of the 2C39 family lend themselves to construction of simple linear amplifiers without the complexity of 4CX250 designs, but most published designs are limited to about 60W. The design presented here uses two 2C39s, is capable of 100W output, yet it is very simple to construct using only basic hand tools for all metalwork.

Circuit description

The two valves are connected in parallel and operated in a grounded-grid configuration.

Biasing for linear operation is achieved by TR1 and its associated circuitry which holds the cathode positively biased with respect to the grid. The diode ZD1 prevents the voltage across TR1 from rising above 47V on receive, which might occur if soft valves were used. Relay RLB switches the amplifier between transmit and receive modes. On "receive" RLB is not energized, and hence RLB1 holds the valve biased off. In transmit mode RLB is energized and RLB1 changes over and biases the valve with a standing current set by RV1. Contact RLB2 closes on transmit, which charges up C10 and energizes RLC which turns the blower on. When returning to receive mode, RLC remains energized until C10 has discharged through R4, resulting in the blower running for a predetermined period before switching off. The timing period will be determined by the actual gain of TR2, TR3 and TR4, and the coil resistance of RLC. For this reason RV2 is a preset resistor to allow the delay period to be set to the required length. Coaxial relays, if required, can be energized by spare contacts on RLB.

The input circuitry is a conventional lowpass pi-circuit which also matches the 50Ω input to the valves. The anodes work into a λ/2 stripline which is tuned at the far end by C5. This is a disc tuning arrangement because a high rf voltage is developed at this point and conventional capacitors may flash-over. The ht is fed to the line half-way along via RFC4 which is decoupled by C6.

The output is coupled to the antenna by a series-tuned coupling, L3 and C4, the output being taken via 50Ω coaxial cable to a bnc socket.

Power supply

The power supply provides the ht, about 900V at full load (180mA), and is of conventional design. Eight diodes are used in the bridge rectifier, two in each leg, to give the required piv. The 180kΩ resistors ensure that the reverse voltage is shared equally between the two diodes. The value of reservoir capacitors C11-13 is not critical, but the total effective capacitance should not be less than 40μF at a working voltage of over 1,000V. The resistors R13-R18 ensure that each capacitor has an equal voltage across it, and they also act as bleed resistors.

When using 2C39s it is important not to apply ht to a cold valve, hence a simple interlock system using RLA is employed. It is not possible to energize RLA and turn the unit on unless the ht switch is turned off. The user must then wait 1min before turning on the ht. Separate transformers are used for the ht and heaters so that they may be switched separately. An alternative approach would be to use a single transformer and switch the ht directly, but this would require a switch rated for this voltage.

The 10Ω wire-wound resistor R19 is provided to give surge protection to

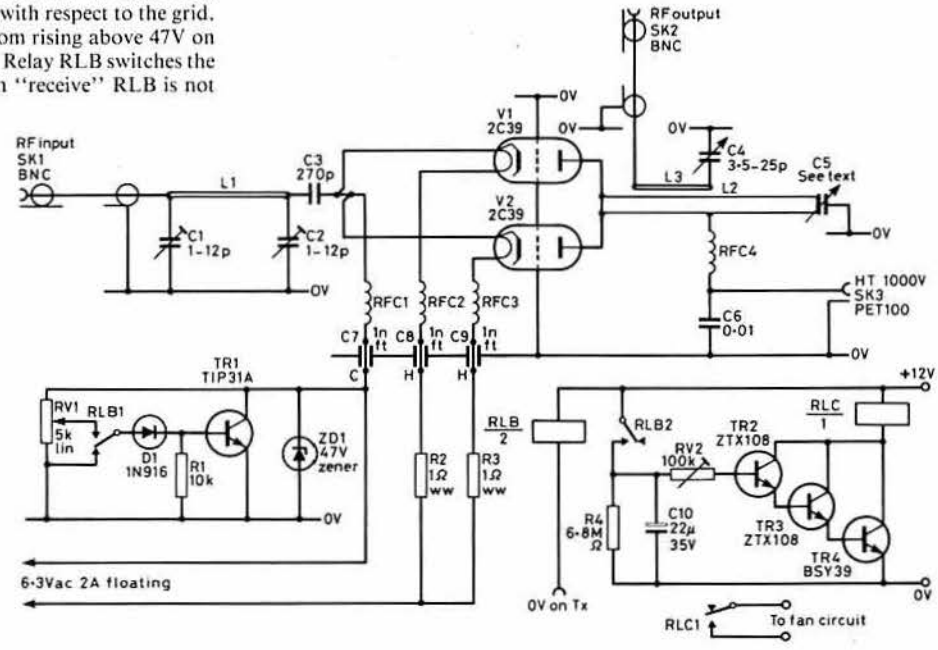


Fig 1. Linear amplifier circuit diagram

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the power supply. Another point to note with the 2C39 is that only 5·5V is needed for the heaters, and hence two 1Ω resistors (R2, R3) are included to drop the voltage down from 6·3V. In addition, the power supply also provides 12V dc to operate the fan timing circuit and control relays.

Construction

The main constructional details are shown in Figs 3–9. The case should be made from brass to the dimensions shown. All seams should be soldered and the earth plate soldered to the walls of the case. The lid and base should be removable for access to the valves. Material thickness is not important—18 gauge being reasonable.

The connection to the valves can cause problems. Ideally, finger stock should be used, but apparently this is scarce, so an alternative method was devised. Beryllium copper strip, 0·25in wide was used, which was pleated and folded around the valve and soldered to itself. This results in a small "pastry cutter" like ring which is then soldered in place as shown in Fig 7. The dimensions of holes A and B are approximate and will depend upon the depth of the pleats.

The grid connections are made in the same way. The cathode connections are made from more of the same copper strip, this time shaped as shown in Fig 6. The ends should be a tight fit around the valve connections.

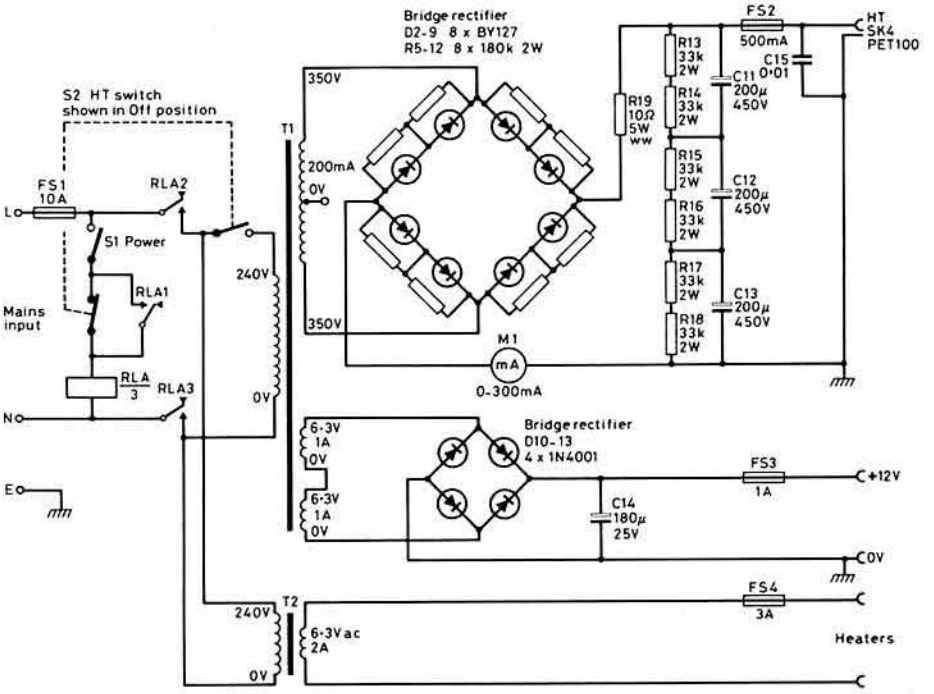


Fig 2. Power supply circuit diagram

Heater connections are made from a short length of copper strip, wound in a small spiral so as to be a tight fit in the heater sockets. The rf chokes are soldered to the centre of these spirals.

It is important to keep the construction of L1 and L2 symmetrical to ensure that the valves share the power equally. Hence, when making L1, solder the wire to C1 and C2, then mount the capacitors on their mounting brackets and solder them in such a way that L1 is along the centre line of the box. Access holes for C1 and C2 may be drilled in the rear of the case.

The anode line L2 is made from 18-gauge brass sheet. The dimensions should be adhered to as they are fairly critical. The line is supported at the three points X by polypropylene or ptfe pillars 18mm long by about 10mm diameter, drilled and tapped to accept 6BA nylon screws. The position of the mounting pillars is not critical.

The anode tuning capacitor, C5, is made from two brass 40mm diameter discs. The fixed plate is soldered to L2. Note that it is off-set as shown in Fig 8. The moving plate has a 2BA nut soldered to its centre, and a length of brass 2BA threaded rod is screwed into it. Another 2BA nut is soldered to the case. The best way of achieving this is first to file a hexagonal hole in the wall of the case so that the nut is a snug fit in it, then solder the nut in place flush with the inside of the case. The travel of the moving plate must be restricted so that the plates can never touch. In the prototype the plates can come within 0·125in of each other.

Details of the output coupling loop are shown in Fig 5. Note that L3 should be level with L2. It was found in the prototype that earthing the moving plates of C4 in the normal way was not adequate because the 1cm of wire required developed an appreciable rf voltage across it. Hence the sleeve around the spindle must be soldered to the front panel to effect adequate earthing.

Both the input and output connections are taken via 50Ω coaxial cable to bnc sockets on the rear panel. If preferred, a bnc socket may be mounted directly on the front panel in place of the stand-off insulator.

All the biasing components are mounted externally in a die-cast box; the layout is not critical. The only point to note is that although TR1 is only dissipating a few watts, even a small rise in its temperature caused a noticeable rise in standing current. Therefore it is advisable to mount TR1 on a small heatsink which must be insulated from earth.

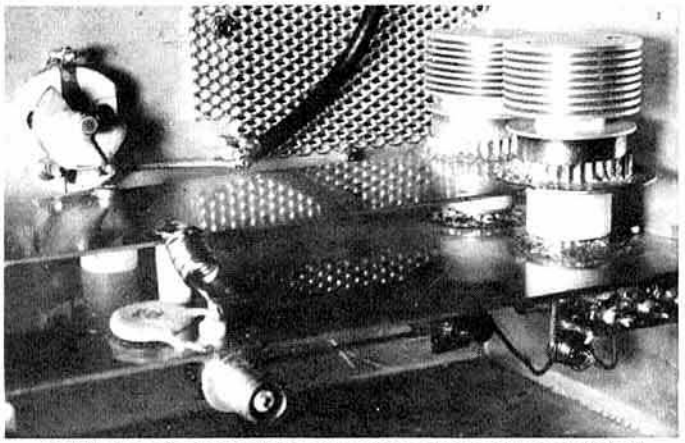
The power supply is straightforward and should present no problems. The bridge rectifier is constructed on a perspex sheet with eight pillars mounted on it and the components soldered to these.

When mounting capacitors C11–C13, beware that some types have their cases connected to negative, and, as some are operating above earth potential, they must be insulated.

Cooling

Cooling air must be provided, but no dimensions are shown as this will depend upon the fan used. The air should pass directly across the anodes of the valves by cutting two large holes in the long sides of the case at the valve end. Note that these holes must be covered with gauze for rf screening; the prototype used expanded aluminium mesh bolted in place.

This cooling arrangement is adequate for ssb, as in this circuit the peak dissipation between the two valves is 60W. Assuming ssb is used, with a



Detail of anode line showing valve connection and ht feed. Output coupling loop can also be clearly seen

The other end of the anode line showing the disc tuning capacitor

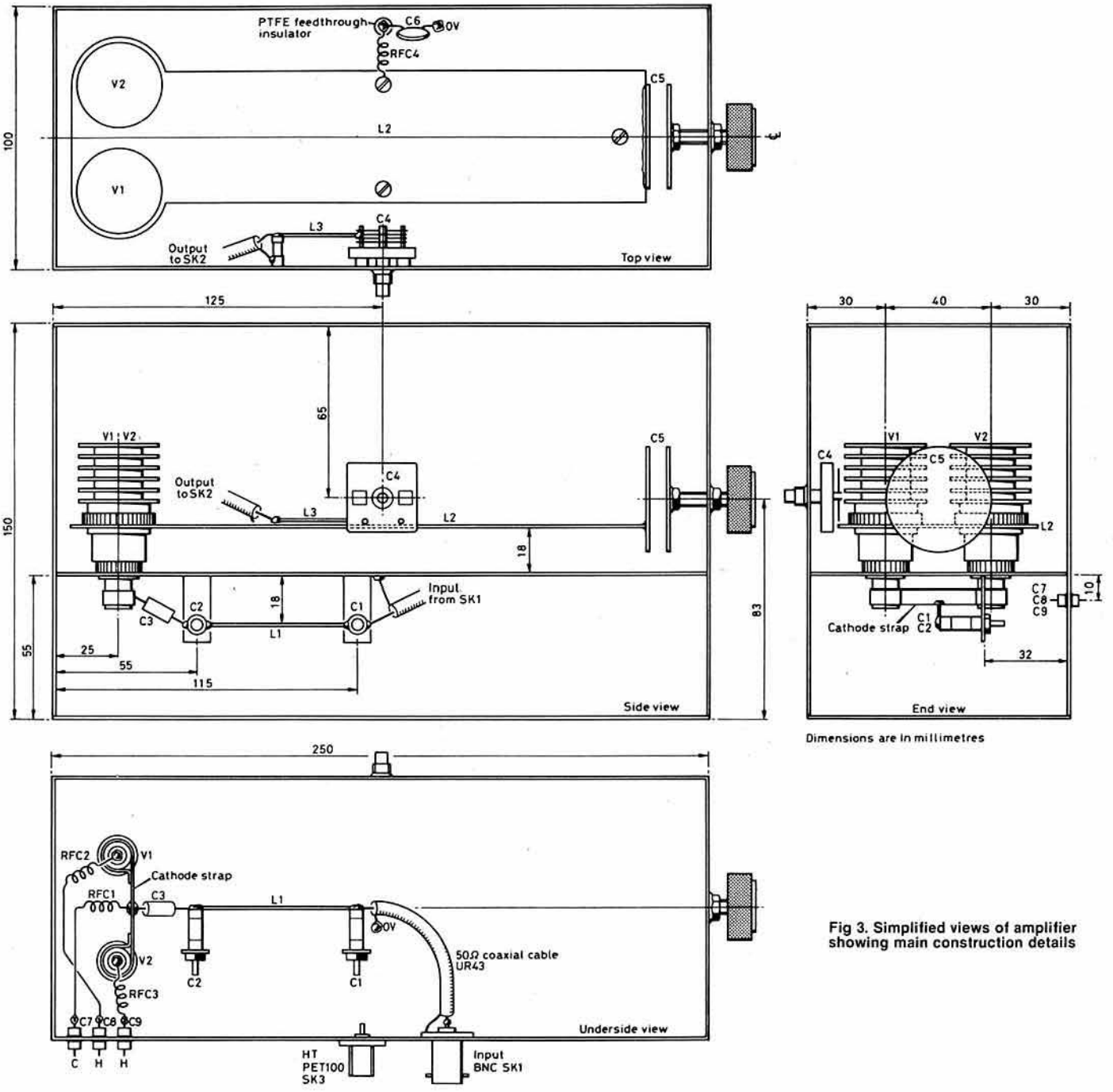


Fig 3. Simplified views of amplifier showing main construction details

Table 1. Air-cooled power triodes for microwaves up to 3GHz

Type	Uf V (1)	If (A)	Prelim heating	Ua limit unmod (V) (2)	Ua values modul (V)	P (W)	Limit values Ugp + (V)	Ugp − (V)	Pg (W)	1g (mA)	1c (mA)	$t_{(max)}$ °C (3)	SL (mA/V)	Ug (V)	Cg/p (pF)	Cg/c (pF)	Cp/c (pF)
2C39A	6·3	1 =	1min	1,000	600	100	+25	−400	2	50	125	175	25	−150	2	6	0·035
2C39BA	6	1 =	1min	1,000	600	100	+30	−400	2	50	125	200	25	−150	2	6	0·035
3CX100A5	6	1 =	1min	1,000	600	100	+30	−400	2	50	125	250	25	−150	2	6	0·035
YD1050	6	1 =	1min	800	600	100	+25	−400	2	50	125	200	27	−150	2	6	0·045
YD1051	6	1 =	1min	1,000	600	100	+30	−400	2	50	190	250	30	−150	2	6	
YD1053	6	1 =	1min	800	600	100	+25	−400	2	50	125	250	27	−150	2	6	
7211	6·3	1 =	1min	1,000	600	100	+30	−400	2	45	190	250	30	−150	2	6	
7289	6	1 =	1min	1,000	600	100	+30	−400	2	50	125	300	25	−150	2	6	0·035

(1) It may be necessary to reduce the heater voltage Uf at frequencies over 400MHz (see manufacturers' instructions). Normally, a heater voltage fluctuation of ± 10 per cent is permissible. However, a limitation to ± 5 per cent will increase tube life.
(2) Tube life is greatly dependent on the loading of the tube, especially on the plate voltage at higher frequencies. It is therefore better to obtain the required output power at the lowest possible plate voltage.
(3) The permissible maximum temperature (t_{max}) may not be exceeded at any part of the tube's surface. It is important always to remain below this temperature in order to obtain a long tube life. Approximate air volumes for sufficient tube cooling should be taken from the instructions of the manufacturers.

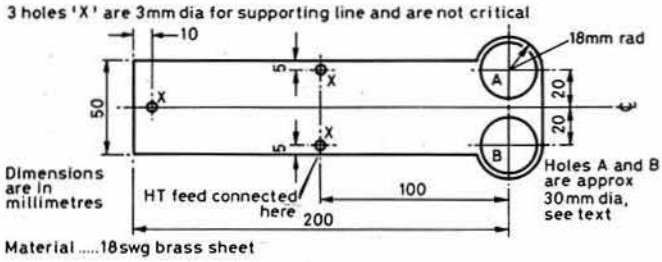


Fig 4. Detail of anode strip line L2

duty cycle of about 1/3 then the average power dissipation in each valve is only 10W.

If, however, the amplifier is required to run constant carrier; eg for fm or fsk, then better cooling would be beneficial. Some ptfe could be arranged as ducting to force the air through the fins and a "snail" type blower used instead.

One useful tip is that a 110V fan, obtainable cheaply at rallies, can safely be used on 240V simply by connecting a 2·2μF 250V non-polarized capacitor in series with it.

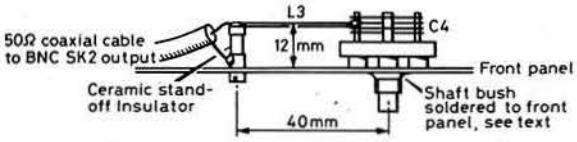


Fig 5. Full size detail of output coupling loop L3, L4

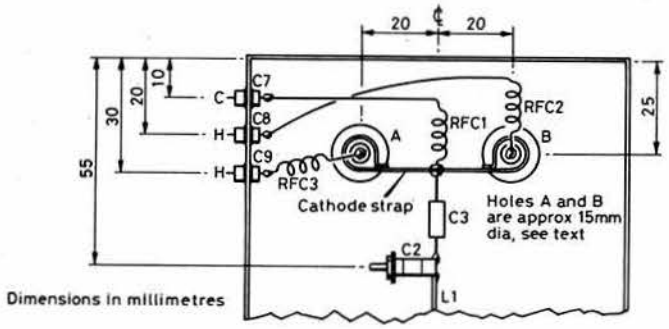


Fig 6. Detailed view of cathode and heater connections to valves. See text for details of cathode strap

Setting-up procedure

Set capacitors C1, C2 and C4 to mid-positions. Set C5 to a plate spacing of 0·375in. Apply 6·3V to the heaters via R2 and R3. Check that each valve is operating with a heater potential of 5·5V (measured between C and H terminals). Wait 1min for valves to warm up and then apply the ht. Check that Ia is very small (about 2mA).

Energize RLB (transmit mode), set Ia to 30mA using RV1. Apply 1W drive and adjust C1 and C2 for maximum rf output, consistent with a good input vswr. Adjust C5 for maximum output, which should correspond with a dip in Ia. Adjust C4 for maximum power transfer to load.

Apply full drive and re-adjust C5 if necessary. The amplifier is now ready for use.

Note that at no point during setting-up should Ia be allowed to exceed 250mA as this may damage the valves. Reduce drive if necessary to comply with this.

The bandwidth of the amplifier is relatively narrow, therefore if you QSY more than 300kHz then C5 will require retuning to compensate.

R4 is set to give the required fan delay time, about 25s.

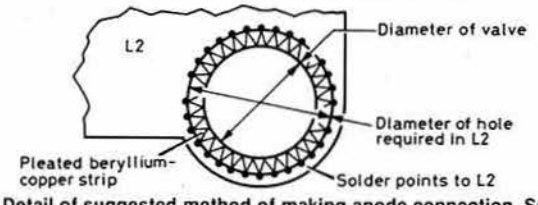


Fig 7. Detail of suggested method of making anode connection. Same for grid connections. See text for details

Components list

R1	10kΩ 0·25W carbon	D10-13	IN4001 or 1A bridge rectifier
R2, 3	1Ω 2·5W wire-wound		
R4	6·8mΩ 0·25W carbon		
R5-12	180kΩ 2W carbon	ZD1	47V zener diode
R13-18	33kΩ 2W carbon		
R19-RV1	10Ω 5W wire-wound 5kΩ linear potentiometer	RFC1-4	10t 26swg enamelled copper wire close-wound 5mm self-supporting
RV2	100kΩ carbon preset		
C1, 2	1-12pF ceramic tubular trimmers	L1	60mm 16swg silver-plated copper wire
C3	270pF tubular ceramic	L2	18 gauge brass (see Fig 4)
C4	3·5-25pF airspaced variable	L3	40mm 16swg silver-plated copper wire
C5	Two discs brass, 18 gauge, 40mm diameter (see text)	T1	240V primary. Secondary: 350-0-350 at 200mA plus two 6·3V 1A windings
C6, 15	0·01μF 2kV disc ceramic		
C7, 8, 9	1nF solder-in ceramic feedthrough	T2	240V primary. Secondary: 6·3V at 2A
C10	22μF 35V electrolytic		
C11, 12, 13	200μF 450V electrolytic		
C14	180μF 25V electrolytic	FS1	10A A/S
		FS2	500mA Q/A
V1, 2	2C39 or equivalent (see Table 1)	FS3	1A A/S
		FS4	3A A/S
TR1	TIP31A	M1	300mA fsd moving coil
TR2, 3	ZTX108		
TR4	BSY39	RLA	240V three-pole c/o
		RLB, RLC	12V two-pole c/o
D1	IN916	SK1, 2	50Ω bnc
D2-9	BY127	SK3, 4	Pet 100

PTFE Feedthrough insulator. Pillars for anode line
Miscellaneous plugs/sockets for patch leads
18 gauge brass for case, L2 and C5
Fan approx 3in square
Beryllium copper strip 0·25in wide or finger stock (see text)

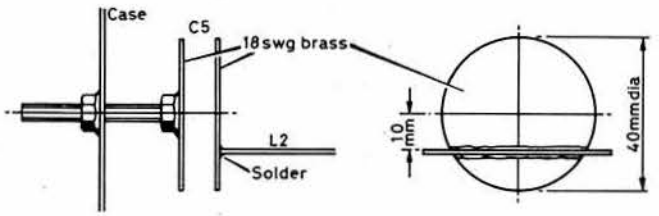


Fig 8. Details of disc tuning capacitor

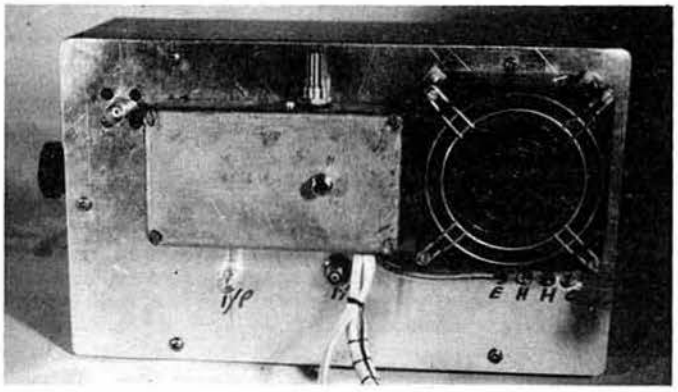
Characteristics

The prototype amplifier was operated with an ht voltage of 900V, heater voltages of 5·5V, and bias being set to give 30mA quiescent current.

In order to achieve 100W output an anode current of 180mA was required, which means an input power of 162W. This gives an efficiency of 61 per cent. To achieve this output 6W of drive was required, the input vswr was measured as 1·8:1.

The maximum output obtainable was 120W before saturation occurred.

The bandwidth of the amplifier was 500kHz between −3dB power points. This is the penalty for a high-Q anode circuit, but it should not cause problems in practice.



Rear view of amplifier

Notes on 2C39 valves

The 2C39 valves will operate well into the gigahertz region and are straightforward to use, but some care must be observed to ensure long valve life. Table 1 gives specifications for the 2C39 family of valves.

Heater voltages must be reduced as frequency and power are increased. On 432MHz a heater voltage of about 5·5V is advisable.

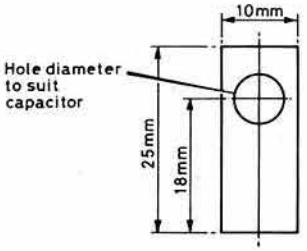


Fig 9. C1, C2 mounting bracket

The heaters must be allowed to warm up for at least 1min before applying the ht, which should not exceed the values in Table 1. The cathode current should never exceed the values in Table 1, not evenly transiently.

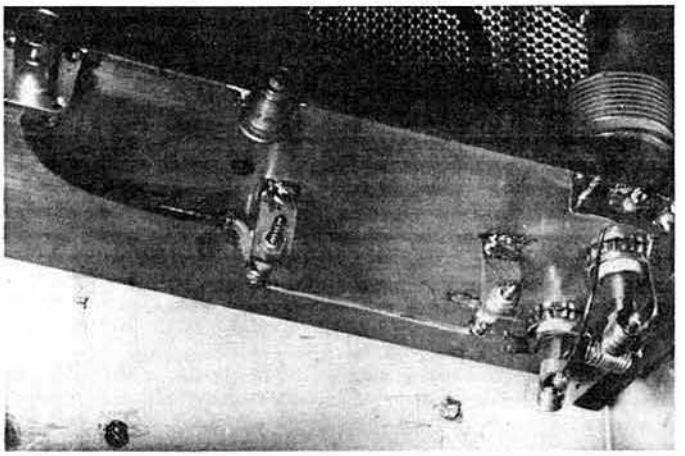
The power dissipation quoted assumes forced air cooling is in operation, and is an absolute maximum value.

Conclusion

The amplifier here should be within the ability of most amateurs, and represents a cost-effective means of generating 100W on 432MHz.

The prototype has been in use for several months and has given good service, including use in contests, and shows no signs of deterioration. Many reports have been received from local stations, particularly during contests, complimenting the cleanliness of the signal, indicating the good linearity of the 2C39s. No spurious output or parasitic oscillations could be detected with a spectrum analyser.

The author would be pleased to answer queries from anyone building this amplifier, and he can also supply beryllium copper strip for the valve connections. □



Underchassis view showing input line and connections to the valves

Noise figure by computer

by C. J. LANGLEY, G3XGK*

A c.a.d. program for the radio amateur

QUITE OFTEN the first change the amateur wishes to make to his or her station on vhf/uhf is to try to improve the receiver signal-to-noise performance. Various preamp designs have been published, and reviews of commercial models appear from time to time in radio magazines [1].

The amateur is often in a quandary as to what is best for his particular situation. Should a preamp be fitted to the masthead or the set end? The answer to this is, of course, the masthead; however, masthead preamps cost more money, and is the return really worthwhile? Soon a "what if" situation exists, and the number of manual calculations required to evaluate the effect of changes proposed often deters the amateur.

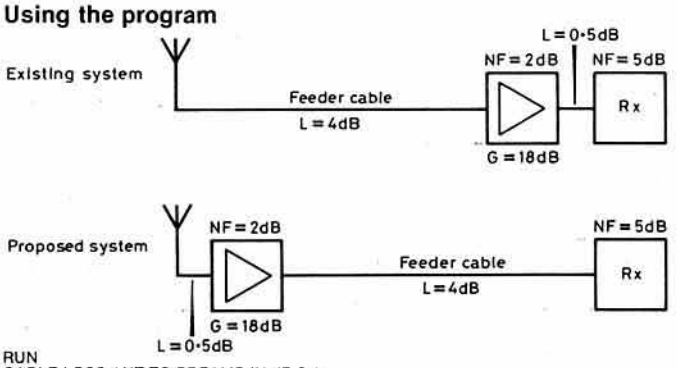
The following computer program allows quick evaluation of any proposed changes of the following:

1. masthead or receiver preamp position;
2. changes in preamp gain;
3. changes in preamp noise figure;
4. changes in cable loss;
5. changes in receiver noise figure; and
6. probably the most important, the overall signal-to-noise improvement of the above changes.

The program

```
10  REM PROGRAM TO FIND SYSTEM NF AND THE EFFECT ON SIGNAL TO NOISE OF
    CHANGE
20  REM GROUND NOISE AND SKY NOISE DEPENDENT ON SITE AND ANTENNA
    EXCLUDED.
30  K=290.0
40  X=10.0
50  DEF FNA(T)=X*((LOG(1+T/K))/LOG(X))
60  DEF FNB(NF)=((X1(NF/X))-1)*K
70  DEF FNC(TX)=X*(LOG(TX)/LOG(X))
80  DEF FND(G)=X1(G/X)
90  INPUT" (clear screen)CABLE LOSS ANT TO PREAMP IN dB.";L1
100 PRINT
110 INPUT" PREAMP NOISE FIGURE IN dB.";N1
120 PRINT
130 INPUT"PREAMP GAIN IN dB.";G1
140 PRINT
150 INPUT" CABLE LOSS TO RECEIVER IN dB.";L2
160 PRINT
170 INPUT"RECEIVER NOISE FIGURE IN dB.";N2
180 PRINT
190 T1=FNB(L1+N1)
200 T2=(FNB(L2+N2))/FND(G1)
210 TF=T1+T2
220 OF=FNA(TF)
230 PRINT"SYSTEM NOISE FIGURE =";OF;"dB"
240 PRINT
250 INPUT"PREVIOUS SYSTEM NF IN dB.";N3
260 PRINT
270 TP=FNB(N3)
280 T3=TP/TF
290 SN=FNC(T3)
300 PRINT"S/N IMPROVEMENT =";SN;"dB."
310 END
```

Using the program




```
RUN
CABLE LOSS ANT TO PREAMP IN dB.? 4
PREAMP NOISE FIGURE IN dB.? 2
PREAMP GAIN IN dB.? 18
CABLE LOSS TO RECEIVER IN dB.? 0.5
RECEIVER NOISE FIGURE IN dB.? 5
SYSTEM NOISE FIGURE = 6dB
BREAK
RUN (run again for 2nd case)
CABLE LOSS ANT TO PREAMP IN dB.? 0.5
PREAMP NOISE FIGURE IN dB.? 2
PREAMP GAIN IN dB.? 18
CABLE LOSS TO RECEIVER IN dB.? 4
RECEIVER NOISE FIGURE IN dB.? 5
SYSTEM NOISE FIGURE IN dB. = 2.76
PREVIOUS SYSTEM NF IN dB.? 6
S/N IMPROVEMENT = 5.25 dB
```

The amateur with a microcomputer, or with access to one, can thus play the "what if" situation with the computer carrying out all the laborious calculations. The program is written in a general Basic, and should run on most computers without any modifications; however, BBC Basic 1 will require a "," instead of the ";" on INPUT statements and use LN instead of LOG.

Reference

[1]. "The effects of preamplifiers on receiver performance, and a review of some currently available 144MHz preamplifiers", J. Gannaway, G3YGF. *Rad Com* December 1981. □

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Equipment Review

The Icom IC740

hf transceiver

by Peter Hart, G3SJX*

Introduction

The current Icom range of hf transceivers comprises three models—the IC720A, reviewed in *Rad Com* February 1982, giving nine-band transceiver operation with additional general coverage receiver; the IC730 eight-band mobile transceiver; and the latest addition, the IC740. (See "Postscript" —*Ed)*

The IC740 is a 12V fully solidstate synthesized 100W transceiver covering the nine hf bands and offering an extensive range of facilities. The unit is fully compatible with the standard range of matching Icom accessories, including the IC2KL linear and ICAT500 atu. Band switching for these items is controlled automatically from the IC740. An internal mains psu is available as an optional extra. The review transceiver was powered by the Icom ICPS15 mains power unit.

Principal features

The IC740 is an amateur-bands-only transceiver without the general coverage receive facility offered by the IC720A. Each tuning range is 700kHz wide, with 28MHz covered in four overlapping ranges. Twin vfos are provided, tuning in 10Hz, 100Hz or 1kHz steps, which results in tuning rates of 1, 10 or 100kHz per revolution of the 50mm diameter control knob. Split frequency transmit-receive operation within any one range is possible, and one frequency in each range may be stored in memory. Digital frequency readout to 100Hz resolution is provided by a particularly bright and easy-to-read blue fluorescent display. Operational modes are usb, lsb, cw, fm (optional extra) and 170Hz shift rtty. RTTY uses the IARU Region 2/3 tone standard of 2,125 and 2,295Hz which requires the i.f. shift to be offset when using terminal units intended for use with the Region 1 tones (1,275 and 1,445Hz).

Other facilities include receiver passband tuning and i.f. shift, multifunction controllable noise blanker, clarifier operating on receive and/or transmit, selectable receiver rf amplifier, variable speed agc plus off, notch filter and all mode squelch. Transmitter facilities include speech processor, vox, transmission monitor, extensive metering with a single meter, and a quiet fan.

The rear panel carries interface connections for auxiliary linear, transverters and receiver audio, antenna, low power output, receiver antenna input/output, cw and rtty key jacks, external speaker and memory backup. An external 9—12V supply applied to the memory backup socket will enable the vfo and memory frequencies to be retained when the IC740 is switched off. However, the current drain of 7mA precludes the use of dry batteries. As there is no auxiliary transmitter af input, rtty and sstv audio tones etc must be inserted via the microphone socket.

A number of optional extras are available. These include internal mains psu, fm board, electronic keyer board, additional i.f. filters for cw bandwidths, and marker module.

The transmitter requires a microphone with built-in preamplifier. The Icom IC-HM7 is provided as standard.

Description

This small transceiver measures 28·6 (w) by 11·1 (h) by 37·4cm (d) and weighs 8kg without internal psu. The circuitry is constructed on 10 main printed boards with several additional subsidiary boards on four sides of a sturdy supporting framework which also provides screening. The pa compartment with integral heatsink and fan is mounted at the rear, and all interconnections are via miniature multiway pcb plug and sockets and a cable harness assembly. Where options are not fitted, the relevant connectors hang loose in the wiring. The front panel is diecast, and an attractive appearance has been achieved. The control layout is very compact but people with large fingers may find some of the controls just a little too small. Horizontal slider pots are used for the i.f. shift/pbt and notch filter controls. A 9cm diameter speaker is mounted on the top of the case.

A simplified block diagram of the IC740 is shown in Fig 1. The transceiver is triple conversion with intermediate frequencies of 39·7315MHz, 9·0115MHz and 455kHz, and much of the circuitry is common to both transmit and receive. Broad band circuitry is used throughout, hence eliminating the need for a preselector or pa tuning.

On receive, incoming signals pass through band-switched lowpass and bandpass filters and a switchable push-pull grounded gate fet rf amplifier. The first mixer is a discrete double-balanced diode ring up-converting to 39·7315MHz, followed by twin monolithic roofing filters, i.f. amplifiers and second mixer. The second mixer is similar to the first and converts down to the second i.f. of 9·0115MHz. The signal then continues through the main i.f. filters, i.f. amplifiers and notch filter and is converted down to the third i.f. of 455kHz. After further filtering and amplification, the signal is demodulated in a product detector. Integrated circuit mixers are used for the third receiver mixer and product detector. Audio power is generated in an ic and additional af filtering is used on cw.

On transmit, ssb is generated at 455kHz, processed and converted via the 9·0115MHz and 39·7315MHz i.fs to signal frequency. Many of the mixers and filters are common to both receive and transmit, as can be seen from the block diagram. Four stages of broadband amplification at final frequency raise the power output to the nominal 100W p.e.p. level.

Local oscillator drive for the signal frequency mixer lies in the frequency range 41·2315—69·7315MHz. This is provided by one of four vcos,

*42 Gravel Hill, Addington, Croydon, Surrey.

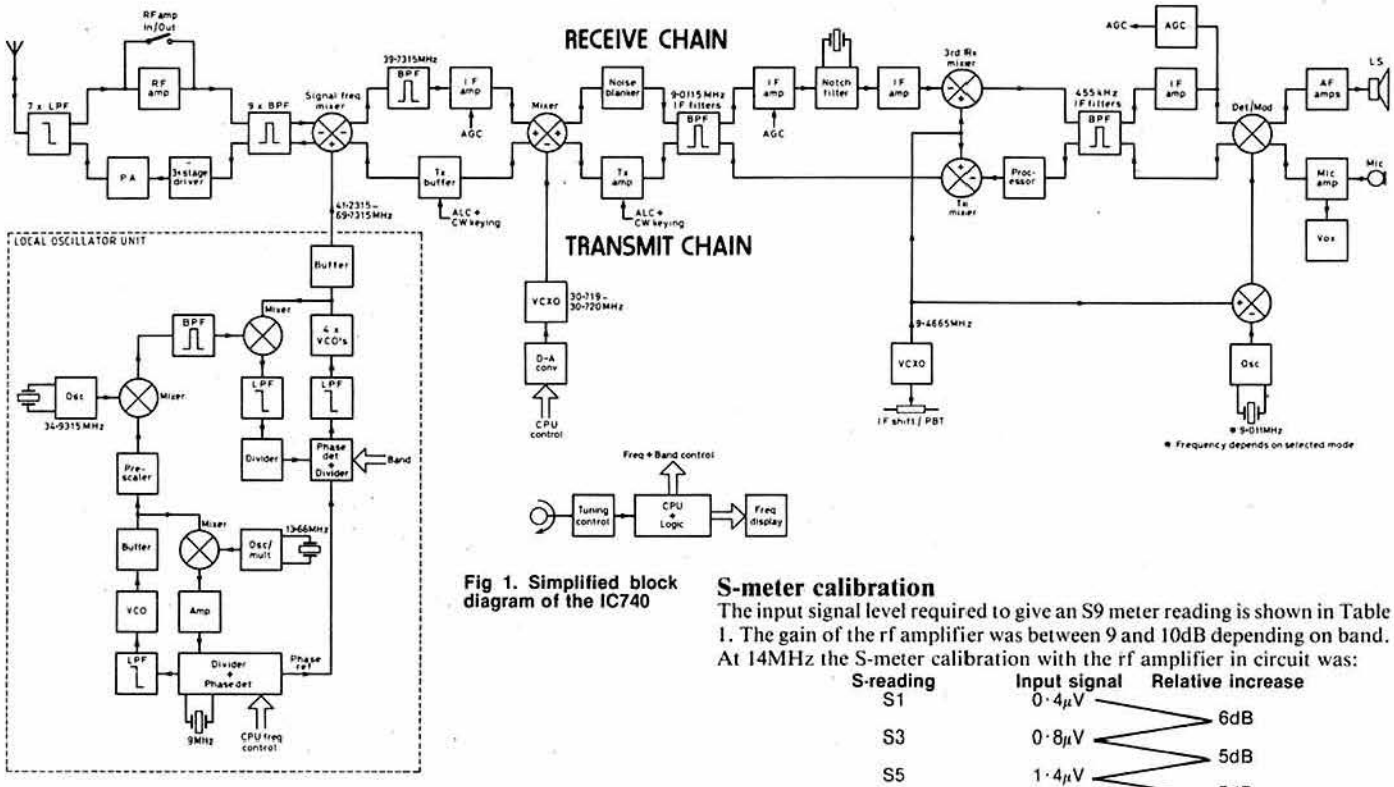


Fig 1. Simplified block diagram of the IC740

each with a limited tuning range. Two phase-locked loops are used in the local oscillator unit with frequency and band data derived from the cpu. The cpu is possibly a four-bit cmos single chip microcomputer. The local oscillator frequency is stepped in 1kHz intervals. Steps of 10 and 100Hz are provided by shifting the frequency of the second mixer oscillator injection over a total range of 1kHz. The front panel tuning knob controls a photochopper. Oscillator drive for the receiver third mixer is a vcxo on nominally 9·4665MHz which is controlled by the i.f. shift/pbt function. Product detector injection is derived by mixing this vcxo with a fixed oscillator on 9·011MHz. The precise operation of the pbt/i.f. shift facility is not obvious from the manual.

Measurement technique

The measurement technique was similar to that used in previous reviews [1]. All signal input voltages are given as pd across the antenna terminal. When performing transmitter or receiver two-tone intermodulation measurements, the amplitude of intermodulation products generated is quoted with respect to either tone of the test signal.

Unless otherwise stated, all measurements were made on ssb with the audio gain set to give about 100mW af output, shift/pbt central, tone control central and rf preamp switched in.

Receiver measurements

Sensitivity

Table 1 shows the sensitivity results obtained on ssb with the rf amplifier switched both in and out. With the amplifier switched in, these figures indicate a noise floor of around – 135 to – 136dBm or a noise figure of 5 to 6dB. With the amplifier switched out, these figures become – 127 to – 130dBm for the noise floor, and 11 to 14dB for the noise figure.

Table 1. Receiver measurements (1)

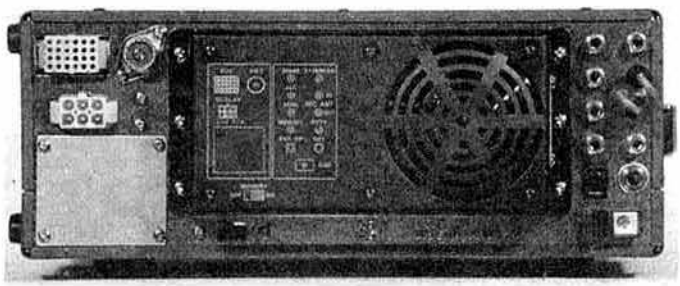
Frequency	Sensitivity for 10dB s + n:n RF amp in	RF amp out	Input for S9 RF amp in	RF amp out
1·8MHz	0·13μV (– 125dBm)	0·28μV (– 118dBm)	8μV	22μV
3·5MHz	0·11μV (– 126dBm)	0·22μV (– 120dBm)	6·3μV	18μV
7MHz	0·11μV (– 126dBm)	0·25μV (– 119dBm)	6·3μV	20μV
10MHz	0·13μV (– 125dBm)	0·28μV (– 118dBm)	6·3μV	20μV
14MHz	0·13μV (– 125dBm)	0·32μV (– 117dBm)	5·6μV	18μV
18MHz	0·13μV (– 125dBm)	0·32μV (– 117dBm)	6·3μV	20μV
21MHz	0·13μV (– 125dBm)	0·32μV (– 117dBm)	5·6μV	20μV
24MHz	0·13μV (– 125dBm)	0·28μV (– 118dBm)	6·3μV	18μV
28MHz	0·13μV (– 125dBm)	0·28μV (– 118dBm)	6·3μV	18μV

S-meter calibration

The input signal level required to give an S9 meter reading is shown in Table 1. The gain of the rf amplifier was between 9 and 10dB depending on band. At 14MHz the S-meter calibration with the rf amplifier in circuit was:

S-reading	Input signal	Relative increase
S1	0·4μV	
		6dB
S3	0·8μV	
		5dB
S5	1·4μV	
		5dB
S7	2·5μV	
		7dB
S9	5·6μV	
		24dB
S9 + 20	89μV	
		17dB
S9 + 40	630μV	
		16dB
S9 + 60	4·0mV	

With the rf amplifier out of circuit these figures are 10dB greater. The S-meter is rather over generous, and linearity fair to poor.



Rear view of the IC740

Spurious responses

Table 2 shows the rejection of the primary image frequency which occurs 79·463MHz above the frequency to which the receiver is tuned, together with the rejection of the first i.f. on 39·7315MHz, half first i.f. on 19·866MHz and second i.f. on 9·0115MHz. There was no detectable response on any band at the 455kHz i.f.

To check for internally-generated spurious signals, the antenna socket

Table 2. Receiver measurements (2)

Frequency	Image rejection	9·0115MHz i.f. rejection	39·7315MHz i.f. rejection	19·866MHz half i.f. rejection
1·8MHz	76dB	—	>117dB	—
3·5MHz	87dB	—	>111dB	—
7MHz	94dB	110dB	109dB	—
10MHz	90dB	111dB	>113dB	—
14MHz	74dB	105dB	109dB	>120dB
18MHz	83dB	114dB	>112dB	88dB
21MHz	75dB	108dB	>110dB	81dB
24MHz	88dB	115dB	69dB	96dB
28MHz	100dB	110dB	51dB	>100dB

Note: dashes signify an unmeasurable response.

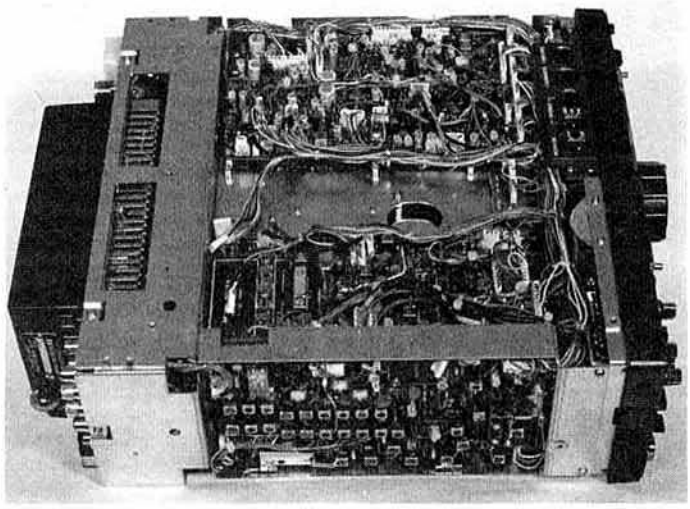
was terminated in 50Ω and the receiver carefully tuned across each band in turn. Fourteen spurii were logged, only one was strong enough to move the S-meter (3·863MHz S1) and eight were located in the 28MHz band.

Other spurious responses were checked by setting the signal generator on either side of the on-tune frequency and noting the amplitude for any responses obtained corresponding to an S1 meter reading. The generator was tuned from 100kHz off frequency down to 1MHz, and from 100kHz off frequency up to vhf. Generator harmonics, image and i.f. responses were ignored.

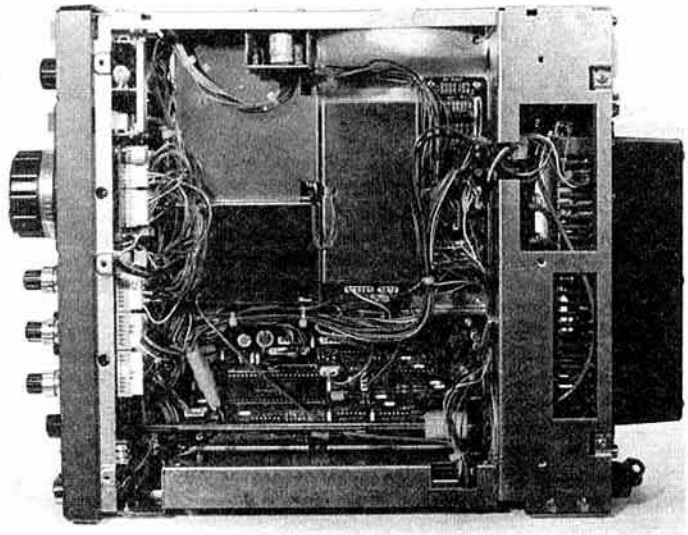
Frequency	Worst response	Other responses
1·8MHz	80mV	Two up to 250mV
3·5MHz	35mV	10 up to 250mV
7MHz	25mV	Several around 100mV
10MHz	14mV	Several around 100mV
14MHz	25mV	Several around 100mV
18MHz	22mV	Several around 100mV
21MHz	15mV	Several around 100mV
24MHz	32mV	Several around 100mV
28MHz	18mV	Six up to 250mV

AGC performance

The agc system in the IC740 exhibited a very soft threshold. AGC started to take effect at about 0·4μV. A 20dB increase in signal to 4μV resulted in a 7dB increase in audio output. The audio then remained within 1dB for a further 100dB increase in signal level. The attack time was measured as 100–150ms for a 40dB increase in signal level depending on agc speed setting and signal level. The decay time for a 40dB decrease in level varied from 1 to 3s depending on level at the slowest setting, and 0·2 to 0·7s at the fastest setting.



Top and side view of the IC740 with covers removed



Bottom view of the IC740 with covers removed

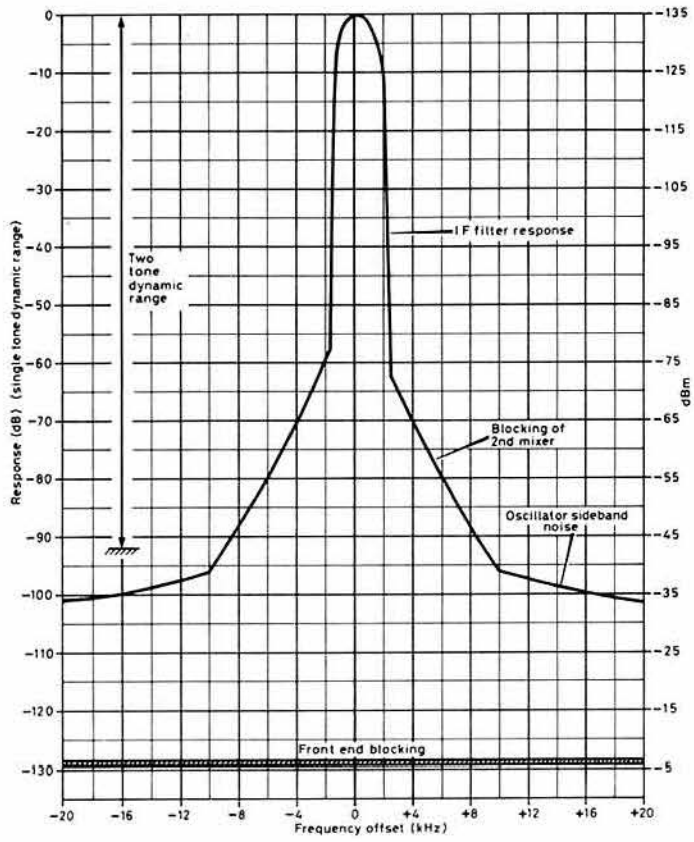


Fig 2. IC740 effective selectivity curve on usb (2·5kHz bandwidth)

Selectivity

It was only possible to measure about 60dB down the filter skirts with the conventional method of measurement due to close-in blocking of the 39·7315MHz i.f. amplifier or second mixer. The results were:

Response	Bandwidth	Response	Bandwidth
−3dB	2·15kHz	−30dB	3·63kHz
−6dB	2·82kHz	−40dB	3·80kHz
−10dB	3·17kHz	−50dB	3·93kHz
−20dB	3·46kHz	−60dB	4·06kHz

The response was a little asymmetrical. The notch filter depth was measured as about 30dB but the response was fairly broad.

Oscillator sideband noise

Reciprocal mixing measurements were made at a frequency of 21·4MHz using a signal generator and crystal filter as described in [2]. It was not possible to measure closer than 10kHz to the on-tune frequency of the receiver due to close-in blocking. Measurements on ssb (approx 2·5kHz bandwidth) were:

Frequency offset	Input level	Level with respect to noise floor
10kHz	−39dBm	96dB
15kHz	−36dBm	99dB
20kHz	−34dBm	101dB
30kHz	−28dBm	107dB
40kHz	−23dBm	112dB
50kHz	−21dBm	114dB
75kHz	−18dBm	117dB
100kHz	−17dBm	118dB
150kHz	−15dBm	120dB
200kHz	−13dBm	122dB
300kHz	−9dBm	126dB

These measurements indicate an oscillator noise sideband performance of −130dBC/Hz at 10kHz off-tune.

Blocking

Two distinct causes of blocking were identified in the receiver. With frequency offsets greater than 10kHz (measured up to 200kHz), blocking occurred at −6dBm (110mV) with the rf amplifier in, or +4dBm (350mV) with the rf amplifier out. This result was independent of on-tune signal level, as would be expected with no agc applied to the rf amplifier. At these offsets, blocking was occurring in the signal frequency mixer. At frequency offsets below 10kHz the blocking performance deteriorated rapidly due to the unwanted signal passing through the 39·7315MHz roofing filter and

blocking the second mixer. This blocking level varied according to on-tune signal level due to age. With the rf amplifier switched in the results were:

Frequency offset	Blocking level 100μV on-tune signal	Blocking level 10μV on-tune signal
8kHz	10mV	1·8mV
5kHz	2mV	400μV
3kHz	630μV	130μV

The effective selectivity curve is shown in Fig 2.

Third-order intermodulation

Measurements were made with signal spacings of 25kHz on ssb with a bandwidth of nominally 2·5kHz.

Frequency	RF amplifier	Third-order intercept	Dynamic range
7MHz	IN	+4·5dBm	93dB
7MHz	OUT	+14·5dBm	95dB
28MHz	IN	+1dBm	90dB
28MHz	OUT	+11dBm	92dB

The dynamic range quoted is the two-tone spurious free dynamic range related to the receiver noise floor. No degradation in the intermodulation performance was observed at any setting of the noise blanker. No closer-spaced tone measurements were made, but with spacings less than 10kHz a severe degradation would be expected considering the blocking results.

In-band linearity was assessed with signal spacings of 200Hz, centred in the i.f. passband [3]. With the rf amplifier in, −40dB third-order products were generated with input signals of 3μV reducing to −30dB at 70μV and −20dB at 10mV. A rapid degradation occurred with input signals greater than 10mV. Reducing the rf gain control marginally improved the intermodulation products, but reducing the age speed resulted in a severe degradation.

Audio

The maximum audio power output into an 8Ω load was measured as 1·8W before the onset of clipping, and at this level the distortion was about one per cent. Maximum audio output could be achieved with a 1μV input signal.

Transmitter measurements

Measurements on 10, 18 and 24MHz were not made on the review transceiver, as the transmitter circuitry on these bands was inhibited.

CW power output, harmonics and spurii

The maximum cw power output together with harmonics and spurii were as follows:

Frequency	Power output	Harmonics	Other spurii
1·8MHz	82W	−57dB	−72dB at ±300kHz
3·5MHz	81W	−56dB	−55dB at ±2MHz
7MHz	77W	−55dB	Three −65 to −70dB
14MHz	80W	−56dB	Four −60 to −70dB
21MHz	83W	−58dB	Six −58 to −72dB
28MHz	88W	−57dB	Several −55 to −80dB

The harmonic output quoted is the worst level, in general the 3rd, with the 2nd, 4th and 5th being a few decibels lower. The rf power control reduced the output down to about 6W minimum.

Fig 3 shows the cw keying waveform and rf envelope when keying at speeds of 40wpm. Rise and fall times are about 2ms with a constant delay of 10ms between the keying signal and the rf output.

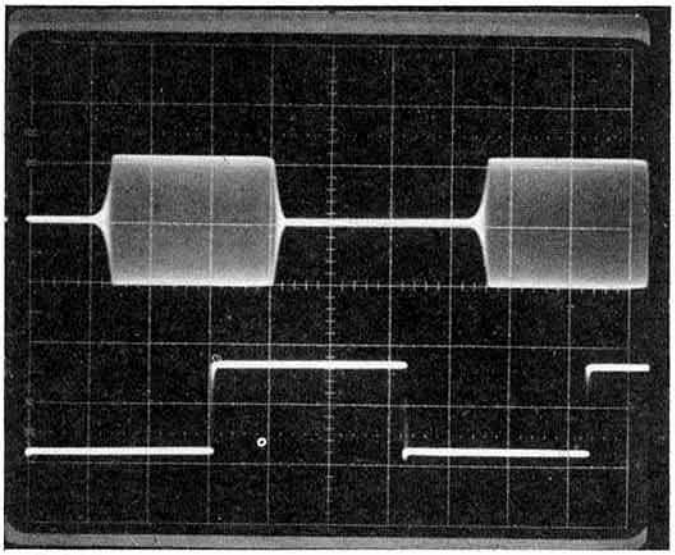


Fig 3. CW keying waveform (bottom) and rf envelope (top) at 40wpm. Horizontal scale 10ms/div

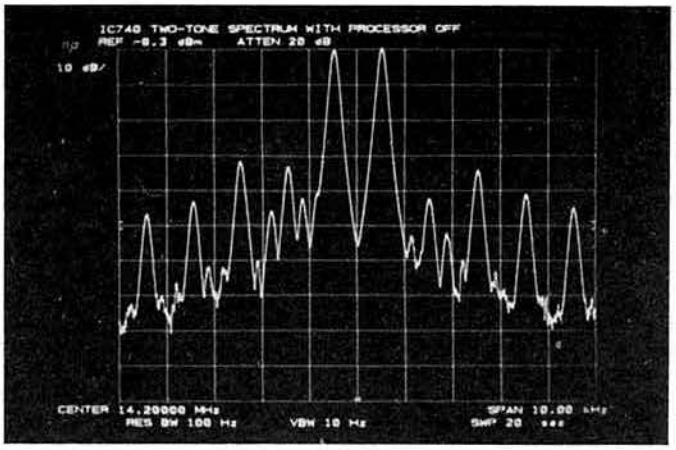


Fig 4. Two-tone transmitter spectrum with processor off. Vertical scale 10dB/division. Horizontal scale 1kHz/division

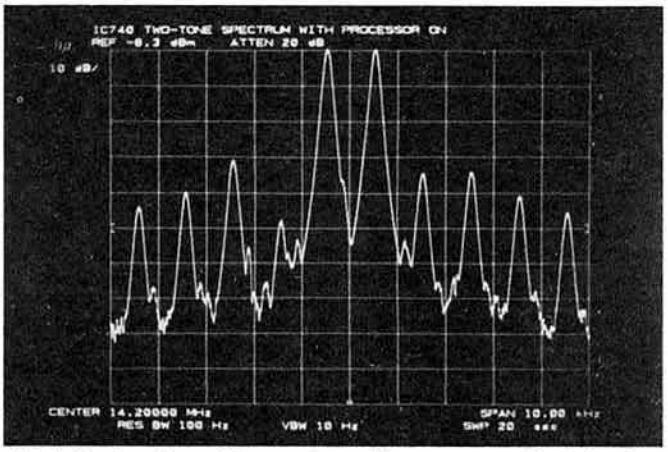


Fig 5. Two-tone transmitter spectrum with processor on. Vertical scale 10dB/division. Horizontal scale 1kHz/division

SSB power output and distortion

It is a little unclear from the manual how far into alc it is recommended to drive the transmitter. With two-tone af drive and the mic gain set to give a meter reading at the top of the alc scale, high levels of distortion were observed with the processor switched out. With the processor in circuit and the mic gain control reduced, much lower distortion levels were observed. These high levels of distortion were due to overloading of the audio or balanced modulator stages, possibly due to insufficient i.f. gain. A single 1kHz audio tone driving the transmitter to full alc with the processor out gave audio harmonics of −25dB. With the processor in, or audio drive reduced to give half alc reading, audio harmonics reduced to −60dB. Two-tone power and distortion measurements were as follows:

(1) PROCESSOR OFF

Frequency	Max alc: Power output p.e.p.	Max alc: Third order ips	Half alc: Power output p.e.p.	Half alc: Third order ips
1·8MHz	93W	−20dB	69W	−31dB
3·5MHz	92W	−22dB	69W	−34dB
7MHz	94W	−18dB	69W	−38dB
14MHz	93W	−18dB	69W	−33dB
21MHz	94W	−20dB	71W	−29dB
28MHz	98W	−19dB	74W	−25dB

(2) PROCESSOR ON

Frequency	Max alc: Power output p.e.p.	Max alc: Third order ips	Half alc: Power output p.e.p.	Half alc: Third order ips
1·8MHz	87W	−28dB	68W	−30dB
3·5MHz	86W	−31dB	68W	−34dB
7MHz	86W	−36dB	69W	−40dB
14MHz	87W	−26dB	69W	−33dB
21MHz	90W	−20dB	71W	−30dB
28MHz	94W	−20dB	74W	−25dB

1·8MHz, ips at ±10kHz were −55dB, and at ±20kHz −70dB. These figures improved with increasing frequency to −65dB and −80dB respectively at 28MHz.

The carrier suppression varied between 45 and 60dB depending on af level and selected sideband. The sideband suppression with a 1kHz audio tone was better than 60dB.

Audio

With the processor off, 370mV af input was required at the microphone socket to drive the transmitter to maximum output. This reduced to 25mV with the processor on. The audio response was rather strange. With the processor on, the audio response was 300Hz to 2·7kHz at the −6dB points, but with the processor off the lf response extended down to below 50Hz, suggesting that the carrier frequency was not positioned correctly with respect to the filter passband.

Transmitter noise output

The measurement technique is briefly described in [2]. A number of discrete low-level sidebands (−80 to −90dB) were observed up to 20kHz on either side of the carrier. These originated in the synthesized local oscillator. Noise measurements at full output on cw were:

Frequency offset	Noise output	Noise output with respect to carrier in a 2·5kHz bandwidth
5kHz	−65dBm/Hz	−80dB
10kHz	−81dBm/Hz	−96dB
20kHz	−84dBm/Hz	−99dB
50kHz	−88dBm/Hz	−103dB

The measured noise at 10kHz offset corresponds to −130dBC/Hz and agrees closely with the receiver reciprocal mixing measurements.

Frequency indication and stability

The frequency drift at 28MHz was exceptionally low, even for a frequency synthesizer. From switch-on, the frequency drifted 5Hz during the first 15min and a further 2Hz during the next hour. The digital readout was accurate to within the resolution of 100Hz, and on cw the frequency readout was correct for a beat note of 800Hz.

Low power (transverter) output

Eight volts at 50mA applied to pin 11 of the accessory connector enables the transverter output and disables the pa. A cw output of −3 to −5dBm was available on all bands, and −6dBm p.e.p. on ssb for −30dB intermodulation products. The spurious outputs on most bands were rather high. Fig 6 shows the output spectrum on 28MHz, with a number of spurii −60 to −80dB down on the wanted signal.

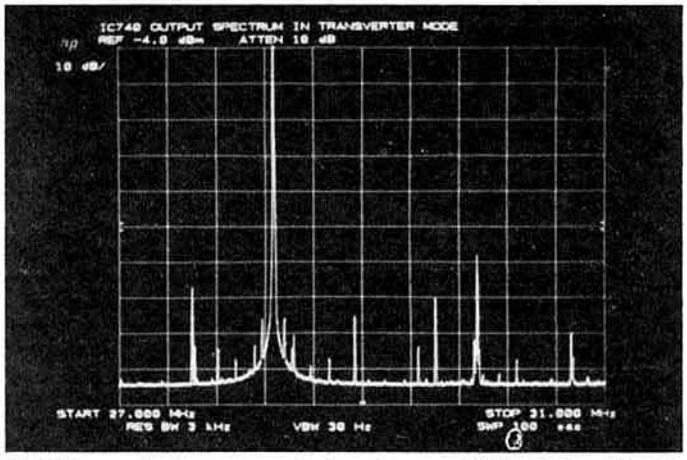


Fig 6. Transverter low-power output spectrum on 28MHz. Horizontal span 27 to 31MHz. Vertical scale 10dB/division

Low voltage supply

Satisfactory operation was obtained down to a supply voltage of 10·5V where transmitter power had dropped by 30 per cent. Below 10V, changes in frequency occurred.

On the air results

With no preselector or pa tuning, this transceiver is very convenient and easy to use. The receiver performed very well with both weak signals on 28MHz and strong signals on 7MHz. With the preamplifier out on 7MHz, signals were very clean with no trace of intermodulation products or overloading. The audio quality was very good. When tuning close to a strong carrier on a quiet band, clicks were audible, in particular when the 100Hz digit changed from 4 to 5. All step synthesizers seem to suffer from this problem, caused by an increase in oscillator sideband noise when the frequency is changing.The IC740, however, seems to be much better than many other synthesized transceivers in this respect, including the IC720A. Tuning steps of 10Hz were generally preferred for both cw and ssb, but the tuning rate is annoyingly slow. A better solution in the reviewer's opinion would be a compromise of 20Hz tuning steps but far more steps/revolution of the tuning knob, such as 500, to give a tuning rate of 10kHz/revolution. On cw, single signal reception could not be obtained unless the pbt or i.f. shift control was offset from the central position. This seemed surprising. Note that cw always tunes as in the lsb mode. The twin vfos were very useful and the age characteristic very good. The close-in blocking observed during measurements was not obvious in listening tests, but the effect of this type of problem is rather subtle. The phone jack is compatible with stereo headphones.

Good quality reports were received on transmit in conjunction with the IC-HM7 microphone. Slight distortion was obtained with the microphone gain control set high. On cw, local stations reported a clean transmission with no obvious clicks, although at some frequencies very low level sidebands could be heard.

For a short time this transceiver was used in conjunction with the IC2KL linear. With automatic band tracking and no tune-up whatsoever, this combination was a delight to use.

Manual

A 25-page instruction manual is provided which covers installation and operation of the equipment, a circuit diagram and board layouts, but nothing else. The circuit diagram is difficult to follow and appears to have errors.

Conclusion

The IC740 is a small hf transceiver ideally suited for base, portable or mobile operation. The broadband concept makes the equipment very easy to use. The receiver performance is generally good, offering a two-tone dynamic range of over 90dB, good strong signal performance and excellent sensitivity. The reciprocal mixing is good for a synthesized transceiver, but close-in dynamic range is limited by blocking. The transmit power is a little lower than most transceivers.

The current price without psu is £769 incl VAT. The fm board, keyer, marker and cw filters are extra.

Acknowledgements

The reviewer would like to thank G3RQZ and G3UFY for critical on-the-air comments, and Thanet Electronics of Herne Bay for the loan of the review equipment.

References

[1] "The Icom IC720A hf transceiver", P. J. Hart, G3SJX. *Rad Com* February 1982, pp 129-33.

[2] "The Yaesu Musen FT102 hf transceiver" P. J. Hart, G3SJX. *Rad Com* January 1983, pp 32-6.

[3] "The Trio TS830S hf transceiver", P. J. Hart, G3SJX. *Rad Com* July 1982, pp 576-80.

Postscript

Since this review was written, two further models of hf transceiver, the IC751 and the IC745 have been added to the Icom range—*G3SJX*. □

THE GB3US Mk2

A microprocessor repeater logic system

PART 2

by A. J. T. Whitaker, G3RKL*

Construction

Fig 4 shows the pcb layout, and Fig 5 the corresponding component positions, the holes for which should be drilled 0·85mm diameter, except those for X1, Z1, RG1, C15 and all the preset resistors, which should be 1mm. The board has been designed so that there are no top soldered connections at any of the ic pins, so holders can be used throughout. If holders are used for ics 7, 11 and 14, RV8, RV9 and RV11 should be mounted on Veropins, otherwise they will not clear the holders without some "adjustment" with a file. Mounting the components is quite straightforward, the recommended order being through-pins (Veropins), diodes, resistors, presets, capacitors, ic holders and the remaining components. The crystal should be mounted on fibre washers, and the lugs on SK1 and SK2 (if used) removed to prevent fouling RV5, RV6 and the board mounting holes. When all the components have been inserted, a thorough check should be made to ensure that every connection, **top** and **bottom**, has been properly soldered, with no bridges; component polarity is correct where appropriate, and that no snagging or unwanted contact is made by the presets when turned through their full travel.

Setting up

The only test instruments required are a multimeter, dual-trace oscilloscope and audio oscillator.

1. If holders are used throughout, without any ics in place, apply + 13·5V, check for shorts, and that the + 5V and + 10V lines are correct.
2. Set RV1, 2, 3, 7, 8 and 10 midway, and the rest of the presets fully counter-clockwise. Insert a 100Ω, 0·5W resistor between pins 21 and 12 in IC2's holder, and, omitting IC2 (the eprom), carefully insert all the other ics, taking due precautions with the cmos devices. Temporarily short SK1/5 (reset) to earth.
3. Apply + 13·5V, check that the current is approximately 65mA and that the + 5V and + 10V lines are (still) correct.
4. Check that the crystal oscillator is working, and that a 1,750Hz square wave appears on IC10/2, 875Hz on IC10/5 and a short negative pulse of about 200μs on IC1/36 every 9·1ms.
5. Inject a 2V peak-to-peak sine wave into the receiver audio input (SK1/8) at 1,750Hz—the frequency can be checked against IC10/2—and set RV4 to give 1V pp at its wiper. As with the Mk1, this control is set in actual operation to give 1V p-p at this point for the maximum audio signal from the receiver (5kHz deviation for fm).
6. With the scope, testing at IC13/7 (notch filter output), carefully adjust RV1, which should give a small portion of travel over which the 1,750Hz signal is reduced. Set it in the centre of this portion and adjust RV2 and RV3 alternately to give minimum signal. Re-adjust these three presets to give the best null symmetrically about 1,750Hz. IC5/13, the logical audio input, should show a 1,750Hz square wave.
7. With the scope, testing at IC8/5 (pll vco), set RV6 to give a 1,750Hz waveform (again compare with IC10/2) changing R23 if necessary.
8. With the 1,750Hz still applied, advance RV5 to give about 400mV p-p at IC8/3. The 567 should lock, as indicated by IC5/15 going low.
9. Check all the other input lines at IC5 by putting the required logic value(s) on the appropriate input(s) at SK1 and SK2, including the frequency/battery indication.
10. Testing with the scope at the "hot" end of RV9, hold a 100nF capacitor across pins 4 and 5 of IC10, to leak a little 875Hz to the keying filter, and adjust RV8 for a maximum. Holding the 100nF capacitor across pins 2 and 3 of IC10, similarly tune the 1,750Hz filter with RV7.
11. Remove power, the 100Ω resistor in IC2's holder and the shunt across reset. Insert IC2, the eprom containing the station program and power up.
12. After about 5s, the unit will begin at its initialization point. If it does not, power down and up again (or just reset) until it does. Since it is now under software control, what happens will depend entirely on the program. The GB3US version sends a long bcs (beacon callsign) at this point. Testing with the scope at the transmitter audio output, by simulating the proper receiver audio and squelch inputs, the high level keyed tone amplitudes can be set and matched to the through-audio with RV9, low level with RV11, the Q output (software generated tone) with RV12, and the overall output level to the transmitter with RV10.
13. Finally, re-adjust with the station receiver and transmitter to give the required performance. A few minutes "tweaking" soon gives a feel for the adjustment procedure, which is actually quite straightforward. As with the Mk1, the outside connections may need to be made through a combination of ferrite beads, leadthrough and decoupling capacitors.

Software

A full description of the software is beyond the scope of this article, but a detailed listing, with some explanatory notes, of the original GB3US program is available by writing to the author. The basic subroutine blocks

An extract from the RSGB/Dept of Trade & Industry Specification for 145MHz/433MHz speech repeaters

Except where marked as a recommendation, the specification below is mandatory and forms part of the licence. Groups **must** equal or better the agreed specification.

Control logic

Access: The repeater must not be carrier-accessed directly from "cold", and adequate immunity must be provided against access by speech. Access shall be by a tone of 1,750Hz ± 25Hz at half-system deviation. The acceptance time of the tone shall be between 200 and 400ms.

Re-access: Once the repeater transmitter is switched on, subsequent control of talkthrough must be by carrier unless tone re-access has been permitted in writing by the RSGB.

Timeout: Provision of a restriction on "over" length is optional. If provided, timing is at the discretion of the group. Typical times are 2min on 145MHz units and 5min on 433MHz units.

Close-down: When the repeater is no longer required (no signals on input) it should automatically close down within a recommended period of 5-15s. From this point, access must require a further toneburst. In exceptional cases, the repeater may remain carrier accessed for up to 30s after it has shut down.

Station identification: The callsign as stated on the repeater licence (or as notified to you by RSGB HQ) must be transmitted automatically at not greater than 15min intervals, preferably more frequently, in F3A. A tone frequency of 1,750Hz is recommended, at 500-1,500Hz peak deviation. RSGB recommends that 433MHz repeaters identify every time they are accessed, and at an interval of 5 to 15min, whether they are in use or not (ie "beacon" "callsign"). Procedure on 145MHz units is optional but must be within the guidelines laid down in this paragraph.

*University of Sheffield, Department of Electronic & Electrical Engineering, Mappin Street, Sheffield S1 3JD.

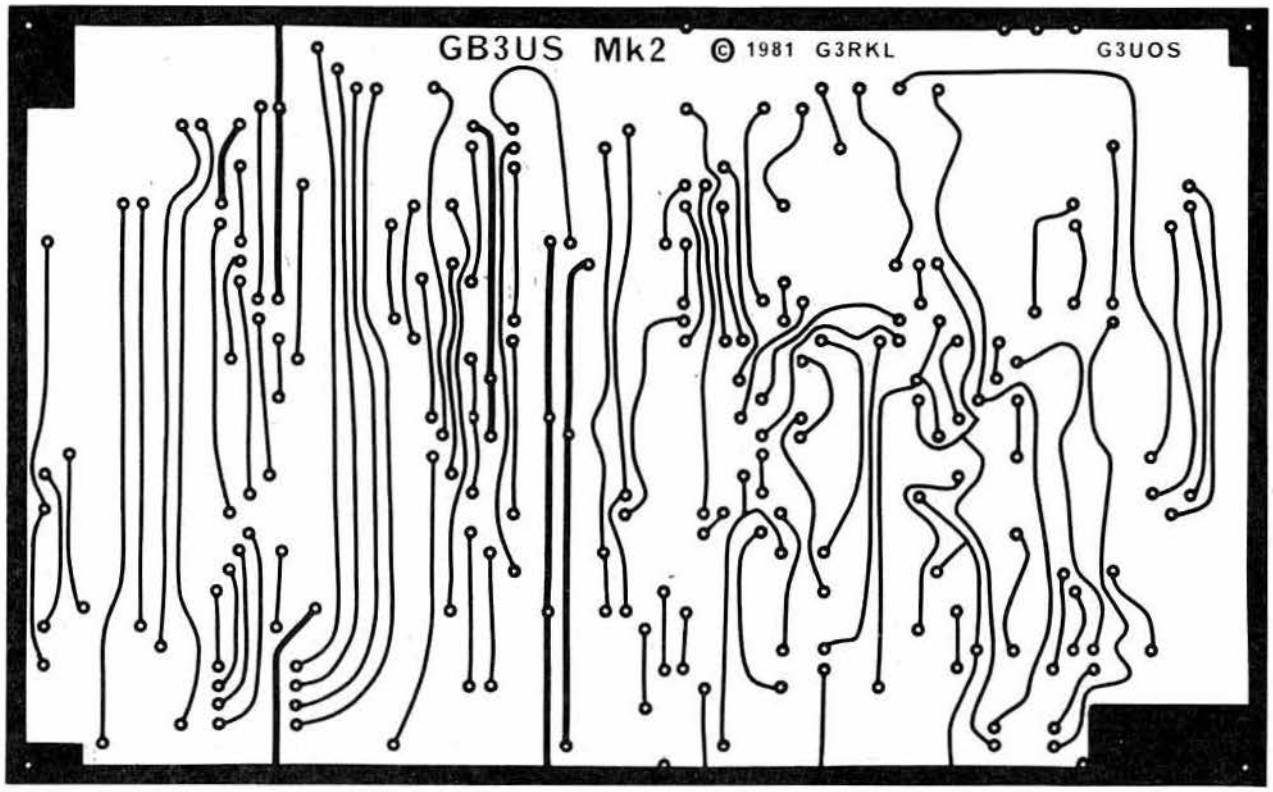


Fig 4(a) Top view of the pcb

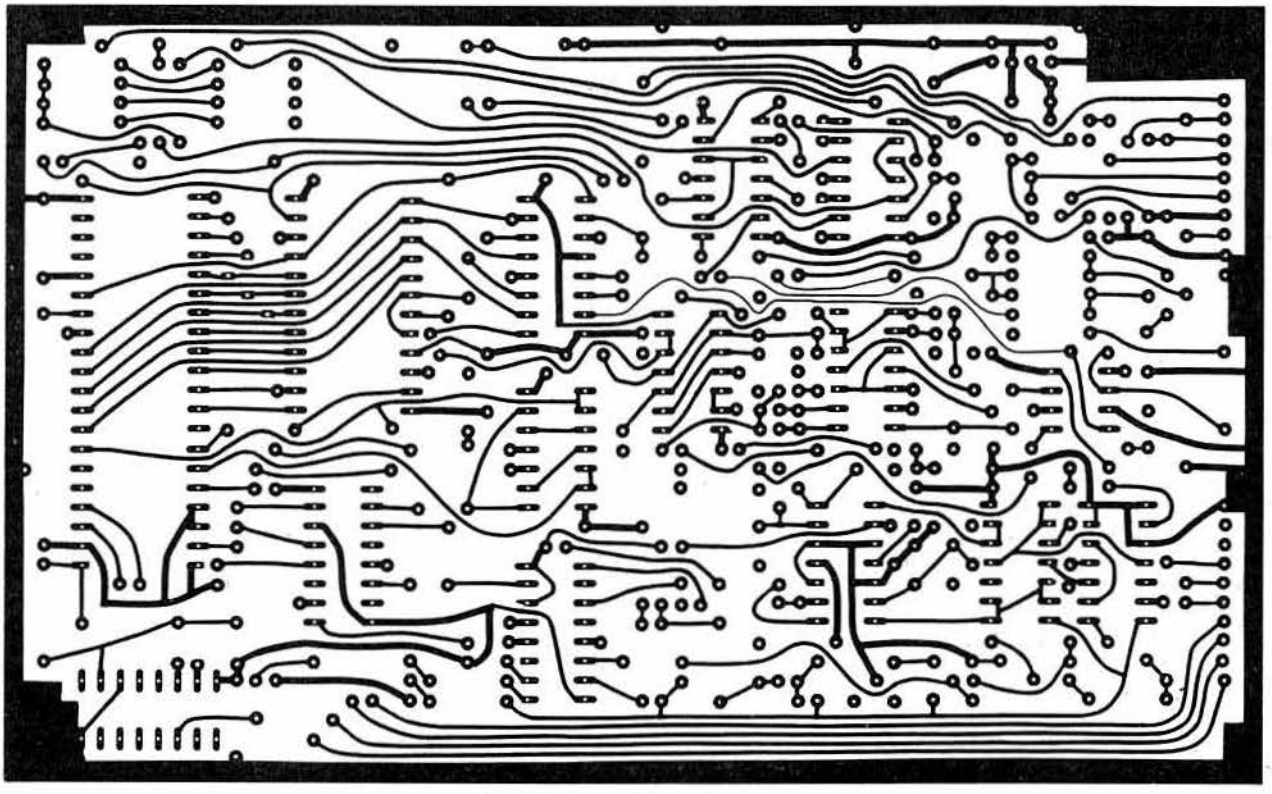


Fig 4(b) Underside view of the pcb

and their interconnection are shown in Fig 6, which give the following operating characteristics:

(a) Beacon callsign at 875Hz every 5min when not in use, sent as DE GB3US (short bcs), with every fourth one sent as DE GB3US SHEFFIELD (long bcs).

(b) Valid tone plus 5s of carrier for full initial access, success indicated by a low deviation callsign at 1,750Hz.

(c) 4min talkthrough time. (Present RWG recommended time is 5min for a 432MHz repeater.)

(d) 1s forbidden gap before reaccess, to allow other stations to break in.

(e) Carrier reaccess during a 10s reaccess period, indicated by two high-level 1,750Hz pips spaced 5s apart, the first replaceable by a status level H, L or B. Identification callsign sent when the timer is reset, if a period greater than 2min has elapsed since the last one.

The GB3US control program

```
000  7100 F800 B1F8 08A1 F89A BCBD 2D9D 3A0C
010  B5BE A2A8 ACAD AEAF F801 BFF8 4082 E2C4
020  9FFA EFBF FEFE F1FA 2032 389E FA0C 3238
030  FB0C 3238 9EF8 0C38 9E52 92F9 4082 F800
040  B1F8 48A1 E070 0000 02F8 01AE FA20 3254
050  9FF9 088F 9D3A 5F8D 3A5F 9FF9 208F 382D
060  8EFA 0132 6B92 F938 B230 7892 FA38 3278
070  92FF 0862 8EF9 01AE 8EFA 0232 8392 F907
080  B230 9092 FA07 32A6 92FF 0182 8EF9 02AE
090  82FA 803A 9E22 82FB 163A E4F8 DAA2 82FA
0A0  7F32 E422 30E4 82FA 8032 D182 FA7F 32D1
0B0  88FA 803A B8F8 B7A8 288E FA01 32CE 88FA
0C0  7F32 CA8E FA02 32E4 30CE 9FF9 10BF F800
0D0  A8F8 00A2 9FFA 18FB 183A E49E FA01 C201
0E0  86C0 0509 F800 B3F8 EBA3 D39F FA07 B18F
0F0  FA80 A1D1
100  9FFA 1032 11F8 02B7 F823 A78F F980 AF30
110  809F FA20 3247 9EFA 3032 239E FF10 BEF8
120  1F30 299E F930 BEF8 42BB F806 B9F8 66A9
130  9EF9 818E F880 BDF8 2CAD F880 B8AA 9FF9
140  40FA 5F8F C006 809F FA80 3262 8EFA 013A
150  62F8 088B F806 B9F8 64A9 9EF9 418E F870
160  303C 9FFA 403A 6B9E FA30 BE8F FAFE AFC0
170  0680
180  973A B787 3AB7 F833 B7F8 45A7 F880 BDF8
190  2CAD 9FFA 403A A4F8 0689 F866 A9F8 1FB8
1A0  F870 B8AA 9FF9 43FA 5BBF 9EFA 3FF9 43BE
1B0  8FFA 7FAF C003 E08E FA01 32BF A530 E185
1C0  FA80 3AC7 F8B7 A525 85FA 7F3A EE9F FA40
1D0  3AD7 9EFA F030 DA9E FAFD BE8F FA7F AF30
1E0  E99E F903 BE27 C006 809F FA7F BF38 27C0
1F0  0680
300  9FFA 403A 989C 3A10 8C3A 109F F908 BF38
310  2C96 FB02 3A1B 86FB 2332 4796 FF60 3A24
320  8FFA FEAF 963A 4E86 3A4E 9FFA D8F9 86BF
330  8FFA 7FF9 00AF F880 BDF8 2CAD F80C B7F8
340  D1A7 9EFA FD30 9B9F F980 BFF8 1FA9 269F
350  FA20 CA04 3697 3A5B 87CE C427 8EFA 013A
360  6CF8 6EAB 9FFA F8F9 04BF 3093 86FA 7F3A
370  938E FA18 A395 F6F6 F6F6 3387 F633 8283
380  3092 83F9 0230 92F6 338F 83F9 0130 9283
390  F903 B59F FA80 3A9F 9EF9 038E C006 809F
3A0  FAEF BFF8 03B0 F8AA A0D0 E0F8 00B1 F848
3B0  A170 0029 89FA 10CE 7A00 893A C0F8 1FA9
3C0  7BF8 5AA3 2383 3AC4 39C0 7A30 C19F FA40
3D0  3AD6 9EFA 33BE 9FFA 78F9 038F 8FFA 7FAF
3E0  F866 B6F8 8AA6 3000
400  2B8B 3A1C 9FFA 78F9 05BF 8FFA 7FF9 00AF
410  F804 B6F8 50A6 F890 A5C0 0680 8EFA 0132
420  2D9F FAF8 F903 BF8F FA7F F900 AF9F FA80
430  CA03 9FC0 0680 F833 B7F8 45A7 F880 BDF8
440  2CAD F806 B9F8 66A9 F81F BBF8 7088 AA9F
450  F940 FADF BF9E FA3F F941 BEC0 0680
500  8EFA 0132 1A25 853A 1397 3A0D 87CA 03CD
510  C001 869E F903 BEC0 0680 2696 FB04 3A49
520  86FB 4E3A 4995 FA03 FC60 A9F8 0689 F804
530  B8F8 6088 AA9F F940 BF9E FA3F F941 BEF8
540  9ABC F800 ACB5 C006 8096 FB02 3A53 86FB
550  2832 2896 3A96 863A 968F FA01 3269 9FFA
560  F1BF 8FFA 7EAF C004 369F FAF7 BF8F F981
570  3065
580  9FFA 10CA 0186 9FFA 403A 179F FAF9 BF8F
590  FA7F AFC0 0167 F890 A59E FAFD 3016
600  8EFA 013A 0885 3211 2530 2797 3A23 873A
610  239F FA40 3A43 9FFA F8F9 058F 8FF9 80AF
620  C004 3627 F86E A59F FA40 3A43 9FF9 40BF
630  F806 B9F8 49A9 F80C B8F8 2088 AA9E FA30
640  F941 BEF8 0085 C006 80AA AA55
660  808A AAEA 5EE5 7A27 E3A8 A8CA CA92 A2A8
670  8AE2 88A2 2E8E 95
680  9FFA 403A 8CF8 0080 F820 A0D0 9B32 E288
690  3295 2B30 8598 F6F6 F6F6 AB8A FA0F C649
6A0  BA8A FA03 3AC2 9AFE BA38 DF9E FE38 B7FE
6B0  3BBC 9EF9 0D30 BF9E F905 30BF 9EF9 098E
6C0  30DF FB01 3AD1 9AFE BA33 DF8A F903 AAF8
6D0  02FB 023A DF9B FF01 B89E FAF3 BE30 DF1A
6E0  3085 9FFA BF8F 9EFA 3FBE 3085
```

(f) Pulsed pre-timeout warning tone, under the through-audio, during the last 5s of relay.
(g) Non-reaccessible timeout indicated by a trimfone type tone (the famous 'HH "strangled parrot"), with 30s maximum default time.
(h) Tone reaccessible, high-level callsign (1,750Hz) at the end of timeout or first end-of-reaccess.
(i) Initial access conditions during second end-of-reaccess callsign, if less than 15s of relay have elapsed inbetween.
(j) Automatic Mode 2 during a "jammed" input, indicated by a reversal of the usual keyed tone frequencies. This allows the timer to be reset at any time by a valid tone. Automatic return to Mode 1 when the input clears.
(k) Software determination of a valid tone virtually eliminates false triggering on speech. Nominal acceptance duration is 200ms minimum to 1,000ms maximum, followed by 500ms of carrier.
(l) Letter "C" sent (1,750Hz) to indicate that the input has cleared after timeout and the transmitter has closed down.

The program is written in 1802 machine code, as shown in the listing. By copying this **exactly**, with the appropriate changes to the message store and length parameters, an eprom can be "blown" for a unit to work to the above specifications. The bcs message is stored (start address = 666) as a series of two-bit characters, 00 = interletter gap, 01 = interword gap, 10 = a dot, and 11 = a dash, the dot and dash characters automatically containing the one dot space. Thus the sequence "DE" will be coded as: interword gap, dash, dot, dot, interletter gap, dot, ... which equals 01, 11, 10, 10, 00, 10, ... which in hex is 7A,2-. The message length parameters, as a (two-bit) character count are located as follows: short bcs (and all other callsigns) at 120, 19E and 449 (= 1F for the 'US program), and long bcs at 128 (= 42 for 'US). The talkthrough timer is set at: high byte 3E1, low byte 3E4 as the number of 9·14285ms interrupts required, eg 4min = 26,250 = 668A. Location 04A should be 01 for a logical squelch (1 for carrier), and 00 for a relay squelch (0 for carrier). To help groups get started, on receipt of a 2516 the author is willing to program it as above, with the requested bcs message.

Program development

All the software for this unit has been developed using the RCA COSMAC evaluation kit (CDP18S020), by electrically substituting the kit's micro and ram for the unit's micro and eprom. This enabled the program to be edited in situ with the kit's monitor, but it is unlikely that many people would be able to use this very effective method. However, it might be possible to interface the unit to any of the popular home computers to give the same result, but probably the easiest way to develop a program is to actually blow an eprom and try it, since most home computers have eprom blowing capabilities. With the low cost of 2516s and of the unit itself, it is quite practical for a group to build at least two units, using the spare(s) for standby and program development.

Conclusion

The GB3US Mk2 logic unit is a completely self-contained board suitable for the control of any single channel phone repeater. It is small, easy to build, cheap, economical on power and very flexible in its method of operation. It is particularly suitable for groups running more than one repeater, as it offers the capability of hardware standardization between stations, but individual mode of operation determined solely by one replaceable eprom chip.

The actual program can be made as simple or as complicated as desired, giving the group complete control over the behaviour of their repeater(s), and it can be changed at any time to incorporate additional facilities or Department of Trade & Industry/Repeater Working Group requirements

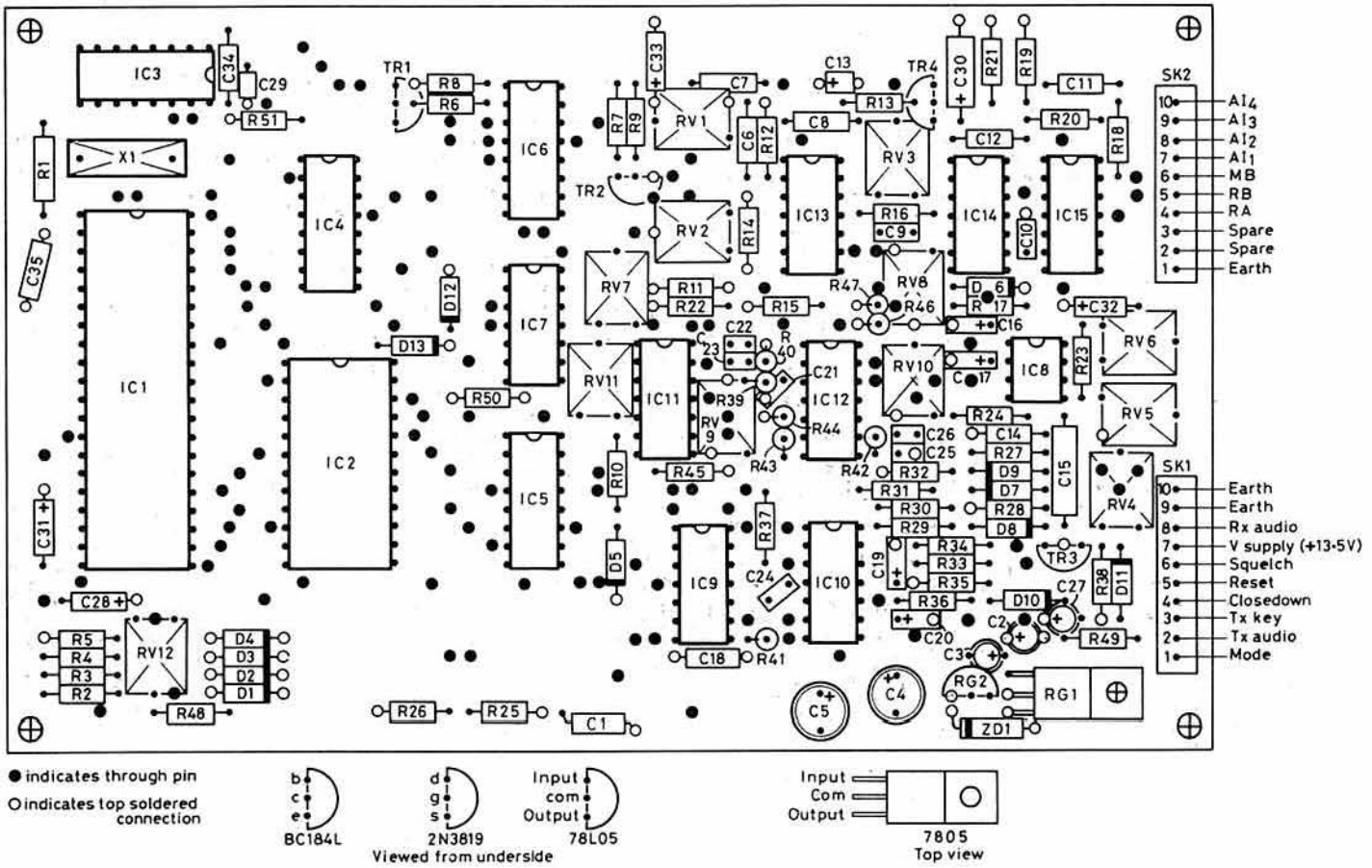


Fig 5. PCB component layout

as necessary. Program development should be possible on any of the popular home computers, providing they have a 2516 eprom programming board. For the many groups already using GB3US Mk1 logics, the Mk2 is a direct physical and electrical replacement, which will enable them to upgrade their control system to any desired level with a minimum of effort. Two units have been running on GB3US and GB3HH for over a year, and have given very satisfactory and reliable service.

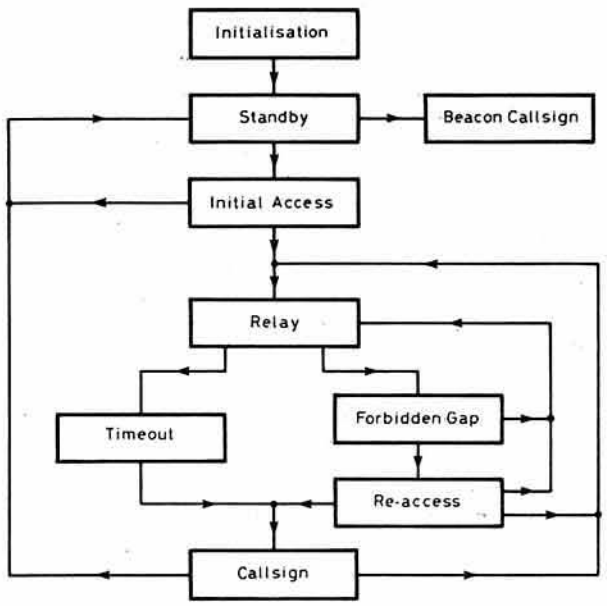


Fig 6. Software block diagram

References

[1] "A basic repeater logic system (the GB3US Mk1)" A. J. T. Whitaker, G3RKL. *Rad Com* Vol 56, No 1, January 1980, pp34-40.

[2] "Some additions to the GB3US basic repeater logic" A. J. T. Whitaker, G3RKL. *Rad Com* Vol 58, No 1, January 1982, pp30-31.

[3] *The CDP 1802CD Microprocessor Data Sheet—File Number 1023.* RCA Solid State Division, Somerville, NJ, 08876.

NEW PRODUCT

Datong automatic "Woodpecker" blanker

All hf bands users will be only too familiar with the Russian "Woodpecker". This over-the-horizon radar system operates at phenomenal strength and wipes out all other signals when it appears. Until now the only effective reaction to it with most receivers has been to close down!

Now Model SRB2 from Datong Electronics Ltd provides a major advance in dealing with this scourge of the hf bands. It blanks out the interference pulses at both rf and af, and is unique in featuring fully automatic operation.

No synchronization, pulse width, or in/out adjustments are required. Model SRB2 uses novel circuitry (patent applied for) to analyse the "Woodpecker's" signals and then tailor the width, number, and position of the blanking pulses to match. It can even remove more than one "Woodpecker" at the same time (a situation which occurs fairly often).

Built into a smart extruded aluminium case measuring 180 by 90 by 48mm and weighing 500gm, the unit connects in series with the antenna and loudspeaker terminals of the receiver or transceiver. No internal modifications are required. An automatic antenna changeover relay is built-in, which will handle the output of most popular hf transceivers.

Model SRB2's rf blanker circuit stops the "Woodpecker" pulses from reaching the receiver's antenna input (and therefore avoids desensing), while the af blanker removes any remaining cliks from the loudspeaker. This combination allows good copy of ssb, a.m. and cw signals even with the severest of "Woodpecker" interference. When the "Woodpecker" interference is not present no blanking occurs and the receiver or transceiver operates exactly as normal.

The price of Model SRB2 is £86.25, incl VAT, and it can be obtained direct from Datong Electronics Limited, Spence Mills, Mill Lane, Bramley, Leeds LS13 3HE, or through Datong dealers.

Technical Topics

by Pat Hawker, G3VA

THIS MONTH

Valve longevity
Home-made components
Processing cw
Mixing bandwidths
Reviewing operability
High current psu with discrete regulator
First large dish in a garden
Impedance of vertical antennas
Notes and news

ALMOST THREE YEARS AGO, the journalist Richard North wrote an article about amateur radio: "Obscene, political or religious talk is out of the question" (*The Listener* 18/25 December 1980). As an interested "outsider" he found much to praise in our hobby, but he was clearly puzzled about the minimal nature of what he felt was being communicated. He wrote: "The curious thing about amateur radio is not that there might be 25,000 people *(now only three years later about 50,000—G3VA)* with transmitting licences in the UK, but that they've gone to all the bother in order to communicate astonishingly little. There are exams to pass and there is equipment to buy; and the end result seems to be about the equivalent of leaning over the garden fence and discussing what a lousy day it is to get the washing dry."

Most amateurs will feel that Richard North failed, despite talking to a number of enthusiasts, to grasp that amateur radio is as much or more about the science, the engineering and the operation of two-way radio as about "communication" as such. Yet, if we are honest, we have to admit that the "communication content" of the hobby is indeed rather low, and is diminishing rather than increasing: expedition contacts, contest exchanges are, from the information viewpoint, far less rewarding than chatting over the garden fence. Traffic lists and masters of ceremony etc, not to mention the space shuttle operation in regarding a list of calls heard as "two-way contacts" seem a *reductio ad absurdum* in terms of human communication.

Amateur radio, of course, depends on much more than just intercommunication for information-exchange: technical investigations, an interest in radio physics and electromagnetic propagation, developments in radio and electronics, radio construction, and exercise of radio operating skills etc. We need to hang on to this wide spread of interests if the hobby is truly to remain absorbing to generations that now take inter-continental "live" television, world-wide subscriber dialling telephones, computer-controlled cellular mobile radio systems and the like in their stride. Above all we need to hang on to our sense of curiosity and willingness to plod unfamiliar routes using basically simple but novel equipment, *before* it becomes readily available from the factories.

An American visitor recently showed me the circuit diagram of the TS430: it fills, very fully, no less than eight large pages of the manual. The component count must run into many hundreds. "Imagine trying to trace an elusive intermittent fault, possibly caused by just a single dry joint" he said. The way ahead, as evident in the latest colour television designs, must surely involve a dramatic reduction in the number of discrete components, by the use of more large scale integrated circuit devices. Alternatively, for the home constructor, a greater recognition that you can still enjoy, and play a useful role in, amateur radio with very much simpler equipment.

In a wartime lecture to the RSGB, H. V. Griffith, who was then engineer-in-charge of the old BBC Tatsfield frequency measurement station, said: "Simplicity of method and of apparatus must be placed first. It is often forgotten in our too-complex civilisation. A good thing cannot *always* be simple but, of any two systems or devices of otherwise fairly equal merit, the simpler one will always be the better—not to mention, in all probability, the cheaper. So often this tremendously important truism is neglected." Integrated circuits of course now make it possible to have enormous circuit complexity in relatively simple form—but the principle surely remains valid.

In a 1938 issue of the *RCA Review*, R. S. Burnap wrote: "The work of amateurs and experimenters has always been important to radio progress. This is largely because many amateurs are highly endowed with a driving curiosity which leads them to prefer the byways and the unknown regions of their hobby rather than the beaten paths." It was this aspect of amateur radio that rather escaped Richard North in his article in *The Listener*. It is up to all of us to show that this pioneering characteristic still survives.

Valve longevity

Last year (*TT* June 1982, p498; and August, pp686–7) I attempted to set out advice for the many who have come into the hobby in an era of solidstate yet need to know how to get the best out of the increasingly-expensive transmitting valves that still provide the most cost-effective approach to legal-limit linear amplifiers etc.

TT June 1982 stressed the extra life that can be expected from thoriated tungsten filament valves (eg 3–500Z) with very careful regulation, to within ± 3 per cent, of the filament supply. Much of this information was based on an article in one of the professional broadcasting journals by Robert Artigo of Varian Eimac. In *QST* William I. Orr, W6SAI (also a member of Varian Eimac) draws on the same article, but also provides a good deal of additional advice, in "Long life for your transmitting tubes" (*QST* April 1983, pp11–13). For example, W6SAI covers also filament voltage management of oxide-coated indirectly-heated valves (eg 4CX250-family, 8873/4/5/7); the problem of switch-on current in-rush into cold filaments and heaters; mains supply variations; and arc protection.

Among his many points is the need, with high-power valves having oxide-coated cathodes, not to apply the high-voltage supply to the anode until the cathode temperature has stabilized, noting that a suitable warm-up time is normally provided on manufacturers' data sheets. This can be achieved by a manual switching sequence, but there are (or were) various forms of mechanical and thermal delay devices that can take care of this requirement. The use of a delay device was essential with the old mercury-vapour high-voltage rectifiers, but the desirability of delaying the application of high-voltages to indirectly-heated power valves has seldom been mentioned.

Valve filaments and heaters, like electric-light bulbs, have a "cold" resistance little more than about a tenth of the value at their operating temperature. The result is a heavy in-rush current when the equipment is first switched on. W6SAI notes that such in-rush currents not only overload the filaments/heaters but also create strong magnetic fields that can *warp the filament and grid structures* of very high power valves.

In practice in-rush currents tend to be limited to some degree by the mains transformer: this is one of the fairly rare cases where a higher-than-required

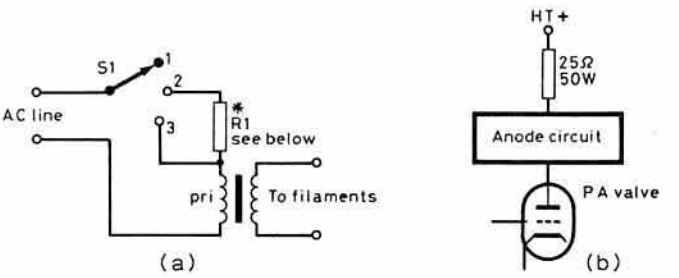


Fig 1. (a) Hand-operated make-before-break rotary switch to limit initial in-rush of current to heater or filament. Suggested resistors and time delays: 3–500Z, 2s, 50Ω 50W. Two 3–500Z 2s, 25Ω, 50W. 4CX250B 4s, 150Ω, 50W. Two 4CX250B 4s, 75Ω, 50W. (b) Series resistor in the ht lead of the pa protects the valve and related components in the event of a flashover

rating of a component should be avoided in the interests of reliability! W6SAI also notes that various forms of in-rush current protection include: (1) variable-voltage autotransformer (variac-type transformer) used to supply the filament transformer and brought up gradually from zero; (2) series-connected current-limiting power resistor in the primary circuit of the filament transformer or in the main ac line, shorted-out after 2–4s by a time-delay relay or manual switch, limiting initial filament voltage to about 70 per cent of the nominal value; (3) a similar high-wattage resistor can be used with a shorting type (make-before-break) rotary switch having three positions (ie off, on with resistor in circuit, and on without resistor) with the user making a 2–4s pause before going from the second to the third position (Fig 1(a)).

W6SAI also comments on a problem that affects European perhaps even more than American amateurs: the significant "wandering" of mains voltages depending upon the total load being drawn in the neighbourhood at the time and how far you are from the sub-section transformer. This can easily exceed the ±3 per cent or ±5 per cent needed for valve longevity (or even the ±7 per cent which I believe is the statutory figure). To keep track of the voltage variations usually involves visual inspection of an accurate ac voltmeter combined with some method of adjusting the mains voltage actually applied to the equipment (see for example *TT* May 1982, p413).

The need to remove heat from high-power amplifiers (valve or solidstate) is widely recognized, though some operators fail to take care not to impede ventilation by pushing equipment back into a recess or putting books and other objects on top of ventilation holes and louvres etc. If you intend to use equipment designed for temperate latitudes in a really hot climate you may need to modify equipment, for example by fitting a more powerful fan.

The final topic mentioned by W6SAI is arc-over of a power valve when it has been out of service for some time. This can result in serious damage where there is a lot of energy stored in filter capacitors. The answer is to place a low-value, high-wattage resistor (eg 25Ω, 50W) in series with the anode-circuit of the pa valve(s), connected *after* the psu filter and *before* the anode rf choke/bypass capacitor: Fig 1(b). Note that the resistor values are based on 110V mains supplies.

Home-made components

An increasing problem, as we move more firmly into the all-solidstate era, is that of acquiring components suitable for high-voltage, high-power operation. Such components are needed not only for valved equipment but also often to cope with the high rf currents and voltages generated in solidstate equipment, even when this operates from a 12V power supply. High-voltage transformers, fixed and variable capacitors, rf switches etc are all becoming scarce or expensive or both unless you have a junk box stocked with the components of yesteryear.

In *QST* June 1983, pp25–6, Thomas Stephens, KD6ED, shows how to build high-voltage variable capacitors using templates to cut out half-hard aluminium sheet to form the plates and then assembling them on brass rods with washers as spacers etc—techniques more familiar in the 'twenties than 'eighties but improved by the availability of much better quality rf insulation for the end plates etc.

In *TT* April 1983, pp327–8 and Fig 3, details were shown of a home-constructed 230pF feedthrough fixed capacitor effective up to at least 500MHz (measured with vector impedance meter at 100MHz as 1Ω, −65°). This was based on a paper presented by William Ammons of Broadcast Electronics Inc at NAB82. Now, a similar form of construction has been used by George Jessop, G6JP, who provides additional information on sources of material etc. He writes:

"One of the more difficult components to obtain these days is a high-voltage bypass or blocking capacitor. Suitable units can be made using 'penny washers' together with sheets of insulating material as insulation. 'Penny washers' can usually be obtained from good ironmongers. A suitable size is 1·5in (381mm) diameter with a small centre hole about 0·06in (15mm) across; the material is not important, although brass is to be preferred. Alternatively blanks can often be obtained from a local press shop. Pressed washers as supplied usually have a burr on one side; this can either be polished off or left on provided that this face is on the outside of the assembled capacitor.

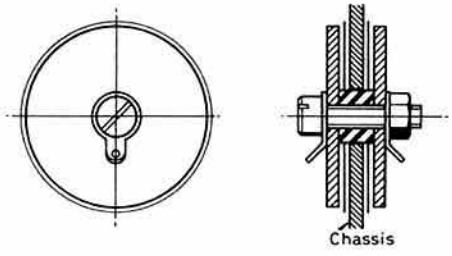


Fig 2. G6JP's home-made, high-voltage by-pass capacitors suitable for use up to uhf

"The insulating material should for preference be mica, as this has a high dielectric constant, typically 6, but other materials such as ptfe can be used provided that it is remembered that its dielectric constant is only about half that of mica. Hence, for a given size of plate, the capacitance will be only half that obtainable using mica.

"A significant advantage of using this type of construction (Fig 2) is that the capacitors have very low self-inductance and tend to be appreciably more effective than conventional ceramic capacitors which have appreciable self-inductance; rf performance is thus improved.

"The capacitance of parallel plate capacitors can be readily calculated: $C = 0{\cdot}224\ KA/d$ pF where K is dielectric constant (air 1), A is the area of the plate in square inches and d is the thickness of the dielectric in inches. For metric dimensions, $C = 0{\cdot}885KA/d$, with A and d in centimetres. The basic reactance of a capacitor (ignoring effects of self-inductance) at 144MHz and 432MHz is:

	Reactance (Ω)	
Capacitance	**144MHz**	**432MHz**
200pF	5	2·2
300pF	3·5	1·8
400pF	2·5	1·2

"A capacitor having 1·5in (381mm) diameter plates on each side of a chassis, ptfe dielectric 0·01in (2·5mm) thick, will have a capacitance of roughly 230pF. With 0·005in (1·27mm) thick mica it would be roughly 460pF."

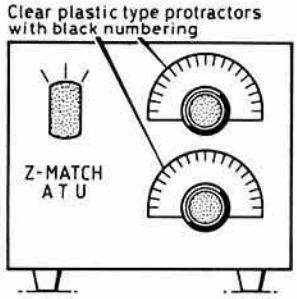


Fig 3. EI9DX provided reference scales for an atu by modifying two school protractors giving plenty of reference points for knob resetting

G. E. Birkhead, EI9DX, recently constructed a Z-match atu and encountered the problem of finding a presentable-looking reference scale on the front panel for the "tune" and "load" controls. He purchased two "school" protractors from a local newsagents and cut the outer reference scale off and then carefully filed it semicircular again with a junior hacksaw and file. When fitted to the front panel with "superglue" (the panel is sprayed white) this gave a professional finish with many reference points for re-setting the knobs: Fig 3.

Processing cw

One of the continuing attractions of cw is that this mode still offers considerable scope for improving results in ways that do not depend upon great circuit complexity. A few years ago several amateurs showed that "coherent cw" systems, where the "synchronized" receiver knows the exact timing and duration of the incoming signals, can provide effective communication even on very weak signals. Unfortunately this system does not fulfil the requirement of inherent simplicity, can be implemented only with the full co-operation of stations at both ends of the link, and cannot be readily applied to casual operation: in other words it is a non-compatible system and is unlikely ever to come into widespread use.

Another, more promising, approach is to make effective use of the remarkable properties of the human operator, as with the pseudo-stereo system, devised originally by G6CJ, in which a differential time delay is added to one of two channels having cross-over frequency responses. Such systems can give an impression of the frequency spectrum being spread between the listener's ears and enable the operator better to distinguish between wanted and unwanted signals.

Another way of achieving this effect is described by Douglas A. Kohl, W0THM in *QST* April 1983, pp32–4, using what he terms a "dichotic detector". In his system two bfos with slightly different frequencies are

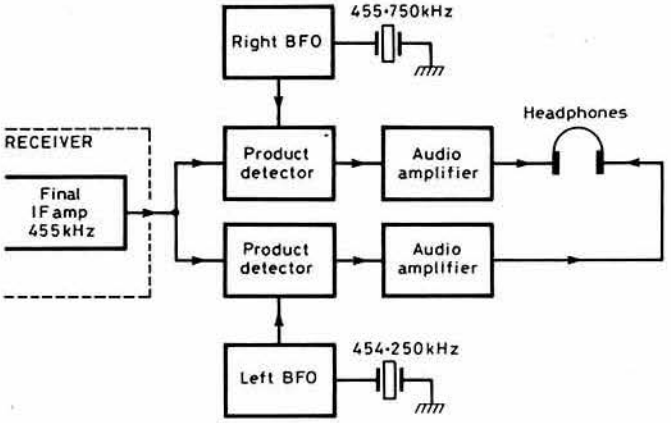


Fig 4. Block diagram of W0THM's dichotic detector for cw reception

used with two product detectors: Fig 4. The idea is that tones of different pitch are produced for the left and right ears and that the tone of a wanted signal changes differently with tuning to that of an adjacent unwanted signal: Fig 5.

W0THM points out that although the human ear is often capable of detecting very small changes of pitch—as little as 3Hz at 100Hz or 9Hz at 1,500Hz—this is true only when listening to a single tone. He suggests that when two or more tones impinge simultaneously on the eardrum, if one tone is 800Hz then the second needs to be at least 800 ± 125Hz for the ear to distinguish clearly between them, a psycho-acoustic factor that limits the effectiveness of conventional crystal and audio filtering.

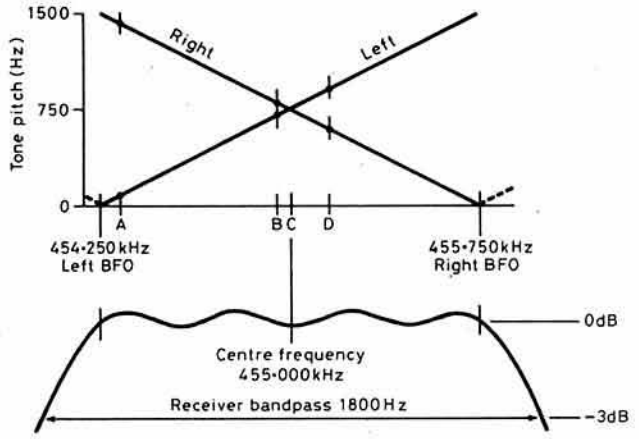


Fig 5. With the dichotic detector, signals present at points A, B and D produce tones of different pitches for the left and right ears

Thus pseudo-stereo and dichotic detection techniques seek to overcome these basic human limitations by introducing a spatial factor to help the brain sort out the wanted from the unwanted signals. However, inevitably this tends to involve some degradation of the signal-to-noise ratio due to the wider noise bandwidth that is usually involved. In a very crowded band, psycho-acoustic filtering would probably give significantly improved results; for very weak dx in a relatively empty band it is useful to have narrowband filtering available, provided always that both the distant transmitter and the receiver are sufficiently stable.

Mixing bandwidths

When using a narrow af filter there is a useful technique that has been known for many years yet seldom seems to be mentioned in print. Indeed it is only "with some reticence" that Ian Braithwaite, G4COL, contributes his experience of using this idea "since I expect it dates from the days when radio was wireless" (it may be news to G4COL that even in the UK the term "radio" actually pre-dated "wireless"). He writes:

"I have built a number of audio filters over the years for cw. The best design I have come across so far was that published by G4BWE in *Rad Com* March 1983. This has an excellent skirt response and can produce quite dramatic cleaning-up of the audio band. Such a filter, however, introduces an operational difficulty which gets worse as the filter quality improves. When listening for signals, adjacent ones can be missed if the filter is in circuit. Also, if frequencies are changed slightly during a contact (for

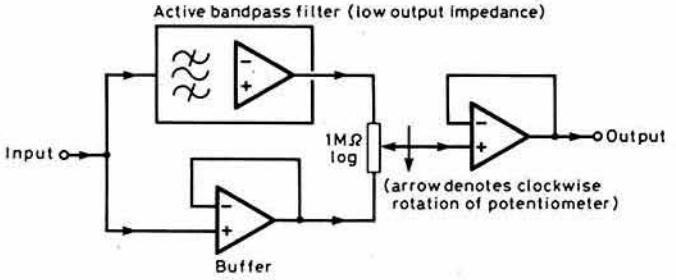


Fig 6. G4COL's simple "mixer" to provide a "stopband level" control by bypassing to an adjustable degree a steep-sided narrowband filter

example, due to drift), reception can be lost until the centre frequency of the filter coincides once again with the wanted signal. Switching the filter out of circuit may prove a rather drastic remedy when interference is heavy, since it can be difficult to pick out the wanted signal again.

"These problems can be alleviated with the arrangement shown in Fig 6. This relies on low-output impedances from the filter and the buffer amplifier, such as would be found in active filters using op-amp devices. The buffer amplifier provides a similar gain to that of the filter (in this case shown as unity). The filtered and unfiltered signals appear at the two ends of the potentiometer, which should have a relatively high resistance. As the pot is turned clockwise, the level of the stopband signals increases, enabling one to take a 'look' at adjacent signals while still being able to tell where the filter is tuned. When the pot is fully clockwise, the filter is out of circuit. When fully anticlockwise, all signals come through the filter. The most appropriate name for the control seems to be 'stopband level'."

It so happens that about six or seven years ago I used for a time a very similar technique for mixing the af-filtered and crystal-only-filtered outputs from a receiver, although in my case I did not find it necessary to use any form of buffer amplifier in the unfiltered channel, as the af-filter, although including active devices, did not provide gain and the impedances were moderately high.

I can certainly vouch for the operational value of this A–B mixer technique; the only reason I discontinued using it was that the af filter I used ran from small 9V batteries, and I found that I constantly forgot to switch off the filter when I turned off the rest of the rig. At the time, like G4COL, it puzzled me that this simple technique did not appear to be widely known. Unlike G4COL, however, I never got round to advocating it for *TT* readers! The beauty of the system is the ease with which you can lift a wanted signal out of interference yet still be able to listen at other times to what is going on immediately around the frequency. It is an illusion to believe that one always wants to listen to cw signals with an "ideal" very steep-sided response curve.

Reviewing operability

In *TT* (July 1983, pp611–2) I attempted to indicate some of the plusses and minuses of modern equipment, based partly on the January *QST* article by W1FB and W7ZOI, but partly also on some views of my own. One result was that several readers sought my views on specific current models—an impossible task since I had not personally operated any of the models on the air.

But the item also provoked Laurie Margolis, G3UML, to raise the valid point of just how can members best be provided with guidance on equipment before they commit themselves to purchase. To find that instead of having a "good buy" you are saddled with an unsatisfactory or fault-prone equipment can be compared with the trauma of finding that the gleaming new "A-registration" car is a rogue model.

G3UML feels that too often equipment reviews provide detailed measurements of power output, intermodulation products, spurious responses and the like, but fail to convey to the reader what the rig is like to use on the air, in terms of its operability in various typical situations and roles. He writes:

"Let's face it, most modern gear reaches a reasonable specification—and, if not, reviewers should indicate this in no uncertain terms. What we never learn is what gets on an operator's nerves after 10h contest operation. What is the quirk that makes it take too long to get on frequency? Why do some transceivers just never *feel* right? Are the controls badly placed? In other words, does the complete package function satisfactorily in the man-machine, human-engineering sense?

"What I seek to know is what the rig is like to *use*. Before I shell out £1,000 + , I would like to read an amateur radio equivalent of those 10,000-mile tests I find in motoring publications. A few sentences would tell me that the rig met or fell short of its published specification, but the reviewer

would then concentrate on telling me how it performed in a contest, or when chasing dx on 3·5MHz, or rag-chewing on 7MHz. And where detailed measurements are given I suspect many readers would welcome a little more guidance on what these imply in practice and how they compare with other current models."

G3UML subsequently agreed that it would be difficult for a Society publication, without its own test laboratories, to give the full 10,000-mile treatment to every new model; but he still feels that it should be possible to select models that seem destined to make a real impact on the scene for several years. He points out that, for example, the TS430, FT757 and IC751 hf transceivers are similarly specified and of roughly the same price—yet possibly differ in operating aspects that will not emerge from advertisements or even on a test bench, no matter how well equipped, followed by limited use on one or two bands. He adds:

"I have an Icom 701 of which I am fairly fond. Yet there are certain points about it which I would have liked to have known about before I bought it. For example, the swr really *must* be below 1·5:1 or I lose too much power; it returns to X·000MHz every time I change band or switch it off and then on again; it tunes in 100Hz increments which may look reasonable on paper but in practice is too coarse, though to be fair the rig has a neat irt system; incredibly there is no built-in changeover system for operation with a linear amplifier, so you have to fit an external relay when you want to use an SB200. On the plus side, however, the receiver is fabulous, and the dual-vfo system a dream when in a dx pile-up or for low-band dx.

"The point I am making is that I would like to see these features and foibles described before purchasing—and I would like to have read about them in *Rad Com.*"

These seem fair comments, though personally I feel that some of the Society's reviewers do attempt to provide such information, even if falling short (for valid practical reasons) of a "10,000-mile test report". Indeed, it is not so many years since test reviews of new cars were viewed with deep suspicion by some readers, who often felt that the loan of a free car for several months, and sometimes a rather cosy relationship with the manufacturers, tended to result in reports unduly soft on serious faults, severe only on trivial defects! The production of independent comparative reports—for example, by the Consumers Association in *Which?*—is a major undertaking often involving lengthy tests on more than one sample of randomly purchased models, together with much consultation with advisory panels etc, made possible by the very large circulation.

In the 1981 IERE Conference paper to which I referred in the August 1983 *TT* notes, I wrote:

"Communications receivers and transceivers currently available to radio amateurs are generally effective, are on the whole reliable and represent good value for money (though it is curious that Japanese-made equipment marketed in the UK costs significantly more than it does in some other countries, even when VAT, transport etc are taken into account).

"But the features provided on these equipments tend to be influenced by consumer-marketing and stylist considerations as much as by any desire to improve communications effectiveness in typical amateur situations. The technical information on which an amateur has to base his choice, in the absence of his own laboratory facilities, does not in practice provide him with the means to assess reliability and/or consistency.

"The assistance that can be provided by 'reviews' in technical journals is often limited by the circumstances under which these normally have to be prepared (generally based on a single receiver selected and loaned for the purpose by the manufacturer or importer) . . . ."

There is also the problem that was mentioned in the August issue: not all amateurs need to spend money on equipment having a specification and features required only for the most stringent contest/dxpedition-type operation. Finding equipment that really suits *you* is not a task that can be safely handed over to a third party, no matter how disinterested, conscientious, or knowledgeable he may be. It's rather like believing unquestioningly in computer-dating bureaux and marriage brokers!

One further point is underlined by a letter from J. L. Bone, G4PXW (ex-G8KKJ). He recently acquired an FT7 and remembered the useful modification described by LA8AK (*TT* March 1983, p234) who had pinpointed the reasons for the failure of one of the zener diodes to stabilize over the full range of input voltages. But on examination of that part of his FT7 circuitry, G4PXW found his model was definitely not as described by LA8AK, and the zener functioned entirely satisfactorily. Clearly Yaesu had recognized the problem themselves and introduced an effective modification. Reviews or comments based on early models do not always apply to later production, one reason why suggested modifications to specific models are only rarely included in *TT*. This, of course, is less true of the basic operability characteristics of a model, an argument in favour of G3UML's desired type of equipment reviews.

High-current psu with discrete regulator

Dave Gordon-Smith, G3UUR/W3, contributes to the debate on design practices for 12V high-current power supply units. He is surprised, for instance, that so many British amateurs appear to be following ARRL practice in specifying 100,000μF reservoir capacitors in 20A units (see also June *TT*). His objection to such large values is not based solely on the question of the initial large in-rush currents. He writes:

"I think this practice is ill-advised. The peak current drawn when such capacitors charge on the positive peak of the input cycle is so many times greater than the dc load current that the IR drop in the transformer and increased drop across the rectifier diodes reduce to a large degree the peak voltage obtainable. I feel 50,000μF is a good compromise for a 20A unit.

"One area where the use of ic regulators with external pass transistors (as in the G4HYD unit in *TT* last April) is creating an added problem is the increased voltage differential required for maintaining voltage regulation. This differential is typically 4·5V for the ic plus pass transistor. Allowing

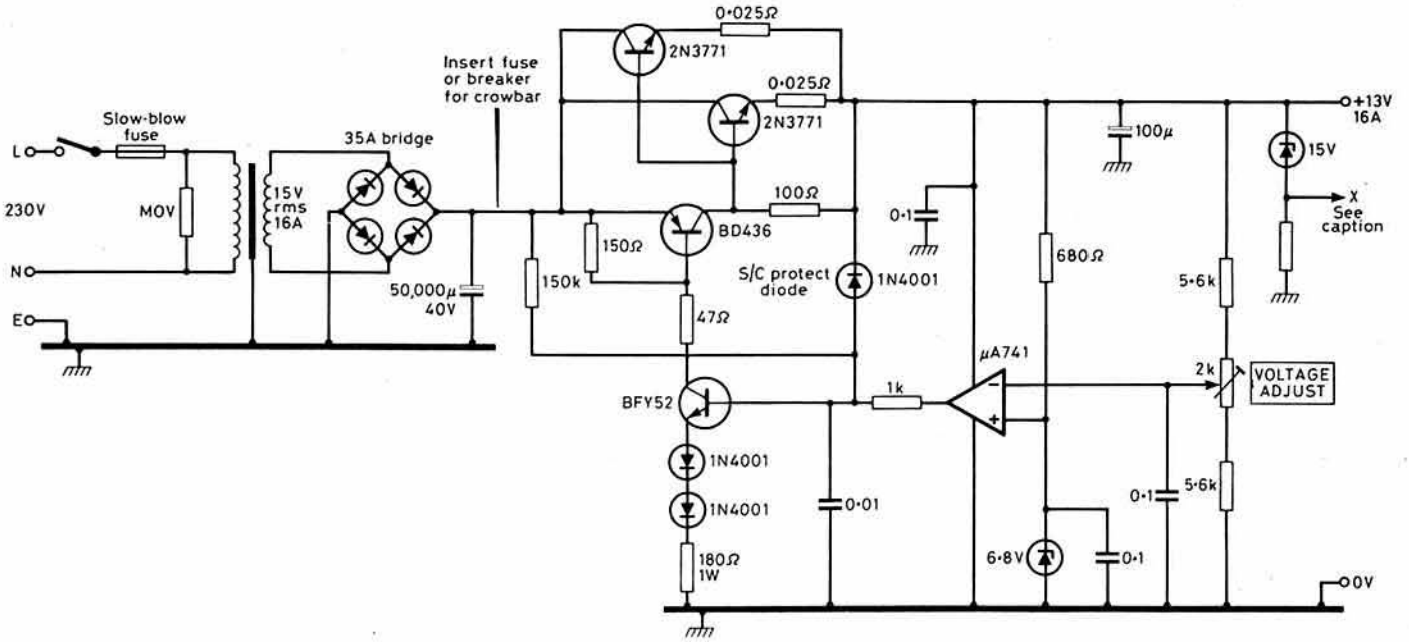


Fig 7. G3UUR's low-differential high-current psu (nominal 13V 16A). Point X goes to crowbar circuit if one is used. Otherwise a 10W zener can be used without a series resistor to provide over-voltage protection. An NKT401 or NKT404 geranium device could be substituted for the BD436. The more recent 2N5301 could be used with advantage in place of the 2N3771 (see text). The short-circuit protection arrangement is crude, but G3UUR considers it works well

for a ±10 per cent variation in mains voltage, then a worst case situation (with mains supply 10 per cent up on nominal) means a differential of around 9·5V. For a continuous duty 20A output, 170W would have to be dissipated in the pass device, calling for a very large heatsink etc, and it is lucky that most people only need 20A peak for ssb equipment!

"I use a 13V, 16A (nominal) psu based on a discrete device regulator which has a worst-case differential of 5·5V, representing a 42 per cent reduction in power dissipation at 20A continuous output: Fig 7. This also enables me to use a transformer with a 15V secondary rather than the more common 18V winding.

"This uses a pair of 2N3771 pass transistors. Owing to the fact that I could not acquire a suitable pnp device at a reasonable price, I was forced to use a lower-power pnp device (a BD436) to drive the 2N3771 devices. The V_{be} drop of the 2N3771 matters in this application since it adds directly to the $V_{ce(sat)}$ of the pnp device. The V_{be} increases quite sharply with collector current, and this is why I used a pair of devices in an effort to keep the differential voltage low at high currents. The voltage drop across the equalizing resistors is much less than the increased V_{be} when using one npn pass device.

"Recently I have been considering using the 2N5301 (which could also be used as a substitute in G4HYD's arrangement). This device has one of the lowest V_{be} characteristics at a collector current of 20A yet available. It also has an h_{fe} of over 25 at a collector current of 20A and 150°C; use of this device in my regulator circuit would reduce the minimum differential from about 1·5V to 1·2V."

The inherent problems of high-current supplies is one reason why it might be better if more solidstate power amplifiers for amateur transceivers were designed for 24-28V operation rather than 12-14V. For some modern power mosfets, this figure could usefully be increased to 50V or more. The 12V ht rail has become standard largely because most early all-solidstate transceivers were designed with mobile operation in mind. With modern bipolar and mosfet rf power devices significantly better linearity and considerably higher stage gains can be achieved with higher voltage supplies. Of course this does *not* mean that you can simply increase the voltage on rf power transistors designed for 12V operation, but most semiconductor manufacturers offer similar but better devices for higher voltage operation, particularly as most aircraft electrics are based on 24-28V supplies. Admittedly, if such models were operated mobile it would be necessary to use a dc-dc converter. But it seems curious to assume that all all-solidstate transceivers are required for mobile use.

First large dish in a garden

In the September *TT* I mentioned briefly that the world's very first steerable radiotelescope was the one built in his garden by Grote Reber, W9GFZ, while working for a Chicago radio firm in the 'thirties. However, I gave no details of this pioneer work. The story deserves to be told, since it provides a good example of determination and innovation, as part of amateur radio, yet one that has seldom been published in amateur journals.

It began in 1936 when W9GFZ, wishing to follow up Karl Jansky's discovery that signals could be detected that appeared to arrive from space, designed on paper a movable high-gain antenna with a large parabolic reflector. He approached a local construction firm, but after looking at his design the firm wanted $7,000 (no mean sum in those days) to build it.

Ruefully, Grote Reber decided that if he were ever to have his big dish he would have to tackle the job himself. In four months of his spare time, with just a little part-time assistance, he built his steerable radiotelescope: 72 wooden radials supported a thin galvanized-iron reflector. The overall diameter was a massive 31ft 5in (9·57m) and total weight about two tons. At dawn and dusk his new antenna emitted audible "pops" due to unequal thermal expansion and contraction of his materials.

His neighbours seem to have been reasonably tolerant of this monster upturned dustbin lid that outgrew first the hollyhocks and giant sunflowers and ultimately the trees. They decided that he must be a trifle crazy—a view that seems to have been shared by several of the local radio amateurs when they discovered what this erstwhile hf dx enthusiast had built!

Grote Reber seems to have shrugged off any of the comments that may have reached him. In 1938 he began what was to prove to be a five-year study of what to most of us would be just written off as "noise" but to him were intriguing signals from space. At first he listened around 3,300MHz (in 1938!), then around 910MHz, but later mainly around 150MHz. At this latter frequency he made, as the world's only radio-astronomer, a painstaking plot of the incoming direction of the noise signals.

Similarly, it was in 1937 that Denis Heightman, G6DH, wrote in the *T&R Bulletin* (as *Rad Com* was then called) the remarks that were instrumental in arousing Sir Edward Appleton's interest: "A strange phenomenon first observed by the writer in 1935 was the appearance . . . of a smooth hissing sound. It was pointed out by G2YL (the late Nell Corry) that on the days when hiss was heard there had frequently been fade-outs . . . it has been suggested that it is caused by a stream of particles shot off from the sun during abnormal activity".

G6DH also placed on record the 28MHz "whistles" later found by J. S. Hey and his TRE team to be caused by meteor trails.

Impedance of vertical antennas

Dave Gordon-Smith, G3UUR/W3, in a follow-up letter to his remarks in the September 1983 *TT*, writes:

"After some deliberation, I decided that I ought to calculate the radiation resistance of the λ/2 dipole from basics; I had previously taken it for granted that it was somewhere in the 72-73Ω region. My calculation shows it should be 73·13Ω. The elevated groundplane radiation resistance should thus be 18·28Ω and the ground-mounted λ/4 vertical 36·56Ω. These figures should be substituted for those given in Table 1, page 799, in the shortened formulas. This also affects the optimum angle of droop for the radials of an elevated gp antenna to obtain a match to 50Ω; this angle now becomes 54° rather than 55°.

"Another point worth mentioning is the effect of dropping the radials of the inverted-gp. The figures I gave for 45° and 30° drooping radials were for free space. In practice the igp is tuned against ground, and therefore the radiation resistance may be as low as half the figures given. This will result in a very low efficiency system if thin wire is used for the antenna and radials".

G3UUR also comments on several other myths concerning antennas, including the question of quad versus Yagi gain. These will have to wait for another time, although it is clear that he believes that the gain claims of some quad enthusiasts continue to be doubtful, if not "fraudulent". He believes that the extra gain of the quad, often claimed, can only be achieved at vhf and uhf where round rather than square loops can be used.

Notes and news

"I feel there's an antenna for every location—meaning that what works well in one place may work poorly somewhere else. Antenna experimentation for a given location is worth the effort. The question of which antenna is better is really not applicable; the question of which antenna, *for a given location,* will perform better, is more precise."—KW2W, quoted by Bill Orr, W6SAI, in *Ham Radio*.

Jim Macphee, GM3VNW, spotted some confusion in my notes on the elongated vertical loop antenna used by GM6RI and himself on 21MHz. I gave SM5AGM's calculated gain for a horizontally-elongated loop. The figure for a vertically-elongated loop of the type used by GM3VNW was 2·37dB relative to a λ/2 dipole (4·52dBi). The two Scottish amateurs remain highly satisfied with the results achieved on their loop with 18ft (5.48m) sides and 6ft (1·82m) horizontal spans.

John Goodacre, G6GO, recalls that in the 'thirties when he used Eimac valves with tantalum anodes, the makers provided a colour chart showing anode dissipation versus anode colour. In a period when there was no talk of reflected power or vswr etc, he found he could accurately trim and adjust his antenna systems by noting the colour of his anode for a given dc input. Nowadays, despite his black boxes and swr meters, he doubts if they provide him with any better or clearer indication of the efficiency of his system.

Bill Jarvis, G8APX, has been seeking a system whereby an incoming 144MHz signal would over-ride the audio output from his broadcast car radio. Purely as an initial step he connected an 0·1μF capacitor from his IC2E earpiece output to the DIN socket (which has a jumper linking two terminals) on the back of his Blaupunkt car radio. To his intense surprise he found this simple modification completely did the trick. The broadcast output fades right out and gives priority to the 144MHz receiver even when there is no modulation on the 144MHz transmission. It also quietens but does not completely fade out the broadcast radio when transmitting on 144MHz. When the IC2E is not receiving, there is no perceptible deterioration in the audio quality of the car radio. Serendipity indeed! Now G8APX is wondering how such a simple modification can provide so many desirable features, and whether car radios other than his Blaupunkt model would prove equally co-operative.

R. W. Micklewright, G3MYM, noted the comments on the pioneer work in September 1954 on *solar-powered* transistor transmitters by G3JMO etc (*TT* May 1983). He believes that the 90-mile contact made on 21 February 1954 at 1340gmt between G3CMH (Yeovil Amateur Radio Club), using a dc input of 30mW to a point-contact transistor, and G3CAZ of Haslemere, Surrey, can claim to be the *first sky-wave* hf contact ever made with a transistor transmitter. Any challengers?

EPHEMERIS
Satellite news and views

*by R. O. Phillips, G4IQQ**

WE BEGIN THIS MONTH with news just released from the University of Surrey of their ongoing participation in the amateur space programme. As a result of an unexpected launch opportunity in February 1984, the UOSAT team has hurriedly prepared a proposal for a UOSAT-B experimental spacecraft. The time available for design, construction and testing is extremely short, and hence a minimum-risk approach has been adopted. The system design philosophy of UOSAT 1 will be taken as an initial objective, though this may require change depending on the progress of the project. The mission objects are intended to complement those of the existing UOSAT programme as well as those of the recently launched AMSAT Oscar 10. A brief summary of the four proposed payloads is given:

1. A total of four particle detectors will be flown, three geiger counters and a multi-channel electron spectrometer, which will allow extensive evaluation of particle distribution and density within the energy range 1-100KeV. The data will be available either in real-time or in a store-and-dump mode to allow evaluation of measurements in regions out of normal coverage range.

2. The ccd camera carried on the first mission generated a considerable amount of interest but unfortunately the results were somewhat disappointing. An improved version of this type of imaging device will be flown on UOSAT-B and should provide a real opportunity for the large number of stations with the appropriate decoding and display equipment. As with the particle detector data, the image data can be transmitted immediately or at a later time. A further option would be for repeated transmission of selected images.

3. The digitalker on UOSAT 1 has been a tremendous success. The Mark 2 version will have an extended vocabulary and will be used to provide news bulletins as well as spacecraft telemetry data.

4. During recent months I have referred to the tests carried out by the university using packet radio transmission techniques. The inclusion of a store and forward digital communications package on the satellite will provide the first opportunity for large numbers of amateurs to experiment with this mode of transmission by satellite. An onboard 96kbyte cmos random access memory will allow messages transmitted from the ground to be stored until interrogated by the intended destination station. Relatively simple equipment will be required, with transmission to and from the satellite at 300, 1,200 or 9,600bits/s. This will be an ideal application for the growing number of home computers, though considerable work will need to be done in preparing the signalling protocols and frame architecture for the system to ensure compatibility between users.

It is doubtful that any commercial organization would even attempt such a complex programme in a period of less than six months. Whether or not the project team achieves all its objectives will not be known until shortly before the launch, but if earlier endeavours are anything to go by, no effort will be spared to obtain maximum results. Good luck to all concerned.

Satellite status reports

AMSAT Oscar 10

Since its activation on 6 August, the mode B transponder (435-145MHz) has been used to relay many thousands of contacts, over distances that were previously impossible via amateur satellites. Newcomers to the subject would be well advised to avoid the weekends for their initial attempts in order to avoid disappointing results. There is still unfortunately a minority of operators who like to have the strongest signal on the satellite, and whose selfishness only serves to suppress the signals from weaker stations. It is worth repeating that for ssb signals the downlink signals should not exceed the level of the general beacon on 145·810MHz. Experience has shown that in the absence of these so-called alligators (big mouths and small ears) communication is quite possible with ground erp values of 10W or less. In an effort to allow lower power stations to access the satellite, Monday has been declared a QRP day, when eirp should be kept as low as possible and in no event greater than 100W.

On Wednesday 21 September the mode L transponder (1,269-436MHz) was switched on for experimental purposes for one hour either side of satellite apogee. At the time of writing, reception reports were rather scarce, though G3AAJ copied a short news bulletin on the general beacon, 436·020MHz. The transponder has an operational bandwidth of around 80kHz, with input in the frequency range 1,269·05-1,269·85MHz and output in the range 436·95-436·15MHz. Note that the transponder uses a mixer oscillator at a frequency of around 1,706MHz, and consequently the output signal is the inverse of the input. As well as the general beacon on 436·02MHz there is an engineering beacon on 436·04MHz. There have as yet been no proposals to segregate the passband into different transmission modes, nor is the operating schedule for the transponder known. It seems likely, however, that—at least for the first few months—operation will be limited to Wednesdays.

As reported last month, the major orbital elements of the satellite should remain constant for some considerable time, with the exception of the argument of the perigee. This parameter, which indicates the point in the plane of the orbit when the satellite is nearest to the earth, has exhibited a drift of around 8°/month, increasing. At this rate, the perigee (and also the apogee) will occur over the equator by May 1984. After this time the satellite will be available for significantly shorter periods each day for stations in the northern hemisphere; however, prospects for operators in the southern hemisphere will correspondingly improve.

Late news The mode L transponder is operational on Wednesdays and Saturdays for 1h before and after apogee.

UOSAT

As a result of feedback from users of the satellite, a revised operations schedule has been implemented:

Saturday and Sunday ...	1,200 baud bulletin, telemetry, digitalker
Monday	...High speed, whole oribit radiation scan
Tuesday	... Check-summed telemetry data
Wednesday	... CCD imager data
Thursday	Whole orbit telemetry data scan
Friday	Load bulletin, digitalker and telemetry schedule.

Further information on the mid-week transmissions may be obtained from the university.

RS

In spite of the great attraction of AMSAT Oscar 10, there is still a considerable amount of interest in the two Russian satellites RS6 and RS8. The satellites, which are the only active ones with Mode A transponders (144-28MHz), both continue to function very well.

Other news

First, I have received some feedback on interest in the use of packet radio transmission techniques in amateur radio. Peter Robinson, G6GIX, has written from the Cambridge University Computer Laboratory to provide information on a proposed packet radio experiment. The project will initially be limited to local area communications using 144MHz fm, but there would seem to be no reason why the techniques could not be extended to satellite use in the future. Again computers feature predominantly in the project, and initial plans will be developed around the BBC micro, though it should be possible to develop suitable software for other machines. Further information can be obtained from G6GIX at the university (Corn Exchange Street, Cambridge CB2 3QG).

After the success of AMSAT Oscar 10, there are reports from reliable sources that we can expect similar development from the very active group of amateurs in the USSR. For geographical reasons that country has for many years made extensive use of the highly elliptical satellite orbit for communications and broadcasting purposes. In fact the orbit is widely referred to as the Molnya orbit in recognition of such use. As yet no details are available as to expected launch dates or payloads, but the prospects for more amateur satellites look very good.

I would be interested to receive more reports of activity on AMSAT Oscar 10, particularly in regard to dx contacts as well as general reaction to the new satellite. □

*170 Shirehall Road, Hawley, Dartford, Kent DA2 7SN

4-2-70

*by Ken Willis, G8VR**

THERE IS A SAYING about one man's meat being another's poison, and this was well-illustrated in my postbag following the notes on the use of calling channels in September *4-2-70*. Roughly half of those writing took me to task, while the other half were in full agreement with what I wrote. Most of the objections were based on my suggestion that "beaming to the east" was redundant information, or usually so, though I did make the point that there "would be times when calls only from a specific area are sought". Others said I was attempting to introduce rubber-stamp contacts into our operating. I firmly believe that calling-channel procedure *should* be "rubber stamp". What happens on a clear channel in the subsequent QSO was never part of my argument—except for Es openings when, as agreed by an overwhelming majority, things should be kept very short to enable as many stations as possible to take advantage of what might be a once-in-a-lifetime opportunity to work a certain country or square.

But enough of that. My job, as I see it, is to represent your views, and sometimes the best way to do that is to introduce a controversial subject such as calling channels, and then wait for the skies to fall on me! I keep hoping to find enough space to set out a reasoned request for readers to tell me what they expect from this feature. Do they prefer a list of "Who worked what" or dissertations on some of the interesting basics of our hobby such as propagation modes, antenna systems, state-of-the-art technology, or both? In the final resort my copy must depend on input from readers, unless I am to generate it myself. Do you see this as my rôle also? It would be useful to know, since with the growth of the amateur body my correspondence increases, and without the proper format many will think their contributions have been rejected if they do not see them in print. So, over to you.

Tropo

The good tropo to Scandinavia which occurred at the end of August, mentioned very briefly last month, was enjoyed by many stations as far apart as Devon, Wales, Scotland, Northern Ireland and most of the south. Conditions were good on 432MHz also, and during the same period G4BPY was watching good tv pictures from Norway, Denmark, W Germany, Holland and Sweden on channels E5, E6, E10 and E11.

The weekend 24/25 September brought some outstanding tropo conditions on 144 and 432MHz. The best were on the 25th when stations in OK, OE and even Italy were worked on 2m, with almost the whole of France audible. Some of the signals from squares as far south as BE were copied several decibels over S9 in the south of England, and G4FRX worked many French squares and had his first contact with OK. I2FAK was the Italian station best heard in the UK. On 28 September, the 2m band went wide open to Eire during the evening, with some experienced operators remarking that they had never previously heard such signals from that area before.

Meteor scatter

Although the time between the Perseids (12 August) and the next major showers (Geminids (12 December) and Quadrantids (3/4 January)) is lengthy, those interested in this mode should not neglect sporadic meteor operation. There is little or no activity on random ms channels "between showers", but with skeds contacts on almost any day of the year are possible using sporadic meteors. Proof of this is to be found in the ms QSOs made by G8ECI (AN) in his short visits home from overseas on leave, and since he uses ssb his success rate is little short of phenomenal. On the cw front, G4IJE is running a weekly sked on Saturdays with I3LGP (GF) using 1,000 lpm, and this usually goes through to completion in the minimum possible time. So, as said several times here previously, try to set up some skeds via the vhf net to succeed in this mode. For those seeking some exotic squares, the following list of stations worked on ms by G4DHF (ZM) in July and August may suggest a few new ones. He completed with OH5IY/P4 (NV), OH5LK (NU), OH1ZAA (KV), OH3MF (MU), OH6CH (MX), OH3AWH (LV), SM3JGG (HV), LA1K (FX), I4MKN (GE), I1KTC/4 (EE), I4XCC (GD), EA3LL (AB), YU3EW (IG), YU2JL (HD), YU1EV (KE), YU3TSB (HF), DL1MBV (FI), DL7YS (GM), F9HS (BD) and OK1KTL (HK). This list is very useful in identifying stations active on ms, and if contact with them on the vhf net is not possible, a short written note to any of them proposing a sked and enclosing an irc will, in most cases, be met by an acceptance or the suggestion of an alternative date and time. Some of the squares listed would be difficult to work by any other mode except eme, especially as major auroras are somewhat scarce at the moment!

During the Perseids, G4HUP was out portable with the assistance of other members of the British Telecom Technical College ARC, and several of the team had their first experience of ms working. Complete contacts were made with YU7NTU (KF), Y22UL (GN), HG4XTP/P (JH), HG6KUB (KH), OE1APS (II), YU2JL (HD), YU7AR (KF), YU7AU (KE), I2FHW (EE) and DK0TU (GM). They were unsuccessful with YO2IS, OK2KAU, UR2EQ, YU3TYZ, EA7AJX, SM7FMD, OE3PUW, OK1VLA, DL7YS, SP9AI and EA5DFY.

Another station active during the Perseids was GM4CXM (XP) who had complete contacts with HB9CRQ (EH), YU1POA (KE), TO6DMD (DD), SK6HD (GS), SM3JAW (JX), OE5EFU (HI), F5DE (AF), UQ2GCG (LR), TF3YH (PY), OH6CY (MW), OH6CH (MX), OH2AUK/0 (KT), UK2RDX (MT) and OH7UE/7 (PW), plus a number of the better-known ms stations. From the above lists the growth of interest throughout Europe and the USSR in ms operation is obvious. The Icelandic station is particularly interesting.

Repeater news

Chris Lorek, G4HCL, has sent information relating to the Cambridgeshire Group's repeaters. He says that GB3PI, Barkway, on R6, which was Britain's first-ever repeater, has fared very well indeed over the years, but now needs some attention due to deterioration in the feeder. The opportunity is being taken to install a single antenna, fed by heliax, which should improve performance considerably. GB3PY, Madingley, on RB14, will change its location, if approval is granted, to a new site within the Pye Telecommunications complex in Cambridge itself. Tests have shown that this site would give better overall coverage, especially within the city. Chris suggests that anyone with handhelds in the area gets them out of cold-storage when the repeater is on its new site.

GB3PT, Barkway, rtty on RB12, is being modified to add data-relaying facilities, with message store and forward, to form an "electronic post-box". It is planned to use standard European CCITT telephone modem frequencies at 300 baud, pending approval from the licensing authority. Chris thinks that the home-computer explosion could make GB3PT a very busy repeater shortly, but says that there is no truth in the rumour that access to the "machine" will only be possible after "zapping 10 Klingons"!

GB3PS, Barkway, on RM3 1,297·075MHz, is currently on soaktest. More information on this later in *Microwaves*.

Membership of the Cambridge Repeater Group is open to all. They publish four newsletters per year. Details from G4HCL, QTHR.

Dave Evans, GW4GTE (Clwyd), has reported an amusing incident at the end of August when tropo into Scandinavia was good and his local uhf repeater GB3CR on RB6 decided to do some dx-chasing on its own. It linked up with OZ5REB repeater, operating on the same frequencies but in reverse! GB3CR is located at YN75a, and with OZ5REB at EP09h, some 200m asl at the highest point in Denmark, the path was 879km. 'CR received good signals from the 100W erp of the Danish repeater, but 'REB had some difficulty at times in hearing the 20W erp from the UK repeater. Dave says that while one might expect the two repeaters to "howl around" when linked in this way, they did not do so, though receiver noise sounded very hollow—"like someone blowing across the mouth of an empty bottle". He thinks that the path delay tended to prevent the return signal being in phase with the orginal; the deviation of 'REB also seemed rather low. As for the results of all this, at 2040gmt GW4GTE (YN) worked SM6GLL (GR) via GB3CR and OZ5REB repeaters, the route being GTE→CR, CR→REB, REB→GLL. SM6CLL was located some 214km from the OZ repeater.

Shortly before this, GW4GTE hooked up with an OZ in the same way, but before contact was properly established, GB3CR, which had been "locked up" for some time, decided to time-out, and promptly closed down. Ironically, GW4GTE, who is the repeater-keeper, had only recently

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shortened the time-out period! When GB3CR returned a few minutes later, G8AWS got in first to work OZ8CY (FQ) via the two repeaters to make the first complete contact between the two repeaters. Dave asks if these two contacts, the OZ and the SM, are in any way "firsts" for contacts via *two* uhf repeaters. It seems most likely!

Barry Titmarsh, GM8SAU operates from the remote island of St Kilda (VR18g) and in July was able to access GB3AY (S Ayr), GB3LY (Londonderry) and GB3MD (Clwyd), working some EI stations through these repeaters. He was using only 10W erp. On the same occasion he had many two-way ssb contacts with G and GM stations, so he is a rare square to look out for on simplex as well as via repeaters.

Other repeater news is that GB3SF, the pilot-carrier ssb experimental repeater to be based at Sheffield, has been licensed for a one-year period, operating just above R7. GB3TY (Tyne Valley) has also been licensed (R6) but is not yet operational due to site access problems.

Repeater enthusiasts who do not know about *Central Scotland & Borders FM News*, published by the Central Scotland FM Group, should write to its editor, Colin Dalziel, GM8LBC, QTHR. This is a most interesting publication containing a wealth of news and information, available free to group members, who, incidentally, need not reside in the area covered by their repeater network.

Auroras

There is something very exciting about a big aurora, speaking in radio terms, and this applies particularly to cw operators who can often work over incredible distances using the mode. However, as mentioned previously here, greatly increased band occupancy resulted in some remarkable auroral contacts on sideband during 1981–2 when we were fortunate enough to experience some really massive auroral events. Since these appeared to come to an end with the decline of solar cycle 21, I asked Charlie Newton, G2FKZ, the IARU auroral co-ordinator, to up-date the information he gave in *4–2–70* August and December 1982, and this is what he says:

"Most of us think of solar cycles only in terms of sunspots, but in fact these are secondary to the causes of auroras which arise from particle emissions from the sun; these, in turn, often being caused by events not visible to observers on earth. Coronal holes are typical examples of such events, certain types of "flare" being another. A Meudon Index of 50 is regarded as minimum for a widespread aurora, while a figure of 100 may mean that stations as far south as Italy can be worked from the UK."

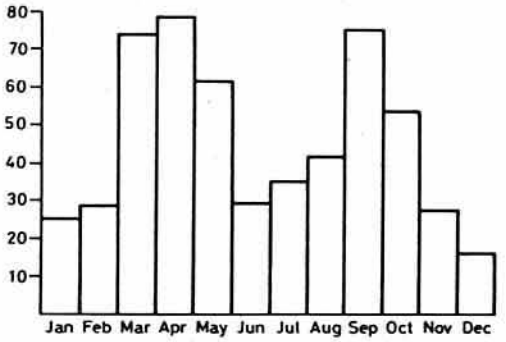


Fig 1. Incidence of auroras, month by month, with index 50 or greater, between 1932 and 1982, compiled by G2FKZ

So what are the chances of some more "big ones" in the next few years? Charlie has plotted all indices of 50 or higher from 1932 to 1982, (see Fig 1) and confirms his previous views that the probability of an aurora occurring in any given month is:

April	80%	October	56%	November	28%
September	76%	August	43%	February	27%
March	73%	July	37%	January	24%
May	62%	June	30%	December	19%

G2FKZ interprets this by saying that April, September and March, in that order, are the most likely months for significant auroral activity. However, he goes on to emphasize that all solar cycles are different. Cycle 19 had a high sunspot number (200), while Cycle 20 was low (120). The current Cycle 21 is a "medium" one (165 at December 1979). Statistically, high cycles are followed by lower auroral activity, low cycles by auroras of more significance, so if Cycle 21 was a "medium" one, what can be expected as it declines?

The magnetic activity of the sun does not go in step with the sunspot number, there being an auroral cycle which peaks at a different time from that at which the maximum sunspot count is recorded. Based on previous cycles, Cycle 21 has so far behaved very much as expected. If this continues, the sunspot minimum should come in late 1986–7, with lowest magnetic activity about a year later in 1987–8. To sum up, Charlie forecasts (a very difficult thing to do!) that 1984 should produce about 10 auroras, half of which might reach an index of 50. Then things get a little gloomier. He suggests a figure of six total auroras for 1985, two in 1986 and only one in 1987. As he mentioned in previous issues, those stations situated in more northerly locations will be able to operate during auroras of lower index, many of which may well be inaudible further south. There is one ray of sunshine, if the pun can be forgiven, in that sometimes the sun behaves abnormally; in 1976, a minimum year, there were two events of Index 100 in the months of March and April. However, the next ones did not occur until 1978, some two years later. By the time we get the sort of activity taken for granted in 1981–2, many of the operators who enjoyed those halcyon days may be old-timers themselves, recounting to new licensees the dx worked "in the good old days".

50MHz

In August the Home Secretary announced that by the end of 1984 all 405-line vhf BBC and IBA transmitters would be closed down. In fact the schedule of closures started in the first half of 1983 and continues until the end of the *first week* in 1985. This may, of course, have repercussions on the issue of 50MHz permits in the UK on a more general basis, though no official discussion of these matters has yet taken place. However, there is pressure being brought by some 6m operators for both an extension of the present number of permits and a more liberal operating-time schedule. The reason is that this autumn is probably the last chance in this solar cycle for making transatlantic and other F2-layer contacts, so not only would more operators be useful but the opportunity to operate in daylight hours would greatly enhance the possibility of such contacts.

QSL card confirming the first-ever 50MHz contact between the UK and Gibraltar, when G5KW worked ZB2BL on 6 May 1983 to set a current record for the mode and band

News from overseas

Graham Rogers, VK6RO, writes from Bunbury, W Australia, that as from 24 July 1983, VK6 stations had unrestricted use of 50·000 to 50·150MHz. All *other* Australian call areas can use this same part of the 50MHz band only *outside* television hours. Channel 0 television passband in that country is 45 to 52MHz apparently. All VK amateurs retain unrestricted use of 52 to 54MHz in addition to these new allocations.

Bernard Zweifel, HB9RO, the Swiss vhf manager, enjoys reading this feature in *Radio Communication* and wonders how so many UK amateurs can be persuaded to send in such detailed reports. They are an enthusiastic lot, Bernard, and one of the better things which the controversial "Class B" licence has done is to promote vhf/uhf operation in the UK. We look forward to Bernard keeping us in touch with events in his country.

Jim Foster, K7ZFG, who operates from Oregon, USA, reads *4–2–70*, and is a dedicated 50MHz operator, has commented on the appearance of sporadic-E on that band. He has noticed many openings during the night, as late as 0300 local time. Some openings were associated with auroral conditions, particularly one when only signals from the New York area were workable. To anyone knowing the USA, the distance between Oregon and New York State is an astonishing one for 50MHz Es signals to traverse during the hours of darkness. Jim judges whether "six" is going to open by listening to 28MHz for short-skip conditions, as many of us do here. He also is lucky to have broadcast and tv signals close to 50MHz to use as indicators, plus fire truck radios etc. These are all very important in a country where, in Jim's case, his county covers an area of 100 by 125 square miles yet boasts only 70,000 inhabitants and about 200 amateurs. His nearest town with a population in excess of 500 is 75 miles away. He is much in favour of the introduction of "squares" in the USA, since he feels it will promote much-needed vhf activity.

Bob Sroczynski used to sign G3URY, but for some years has lived in Spain where he operates from YC square as EA1TH. Bob was Spanish

champion for 1982, largely, he says, because he is a confirmed "mountain-topper", plus being in the right place in August 1982 when a major tropo-lift coincided with a contest weekend. He also won the March and May contests in Spain. This year in nine sporadic-E openings he has worked no less than 32 new squares to bring his total to 178. On 2 July this year he worked 14 G-portable stations during VHF NFD, but in *every case* had to call the UK stations who were not looking towards EA. Sometimes he had to call for half an hour to attract attention, and was frustrated that the Gs simply called CQ all the time with only brief listening periods between calls and replies to the stronger signals. When he finally made contacts his reports varied from 51 to 59, the majority being above S5. He says next year *please* remember that there will be EAs on the band looking towards UK. During the same event, EA1EH/P was operating "Shanks' Pony Portable" from YB, 1,800m asl with 25W to a 16-element Yagi. He heard at least 10 G stations but none heard him. Bob hopes for some good EA openings in September via tropo, so turn the beam that way now and again when the weather map looks right for it.

OY9JD (WV) is a keen vhf operator who is always looking for tropo contacts outside the Faeroes. He is thinking of building a 50MHz converter for reception. He also says that the beacon OY9VHF (144·885MHz) currently beams towards Denmark, but an additional beam pointing north is planned, to act as an auroral indicator, since it seems that many stations are unaware of auroral openings to OY. This is interesting in view of what was said in *4-2-70* August 1983 about OY being too far north for most auroras. (Thanks to G4MLM for this information. He was one of the G5YC Faeroes expedition team.)

Martin Macgregor, VE7CGM/G4EZG, has been researching old copies of *QST* and quotes from the issue of January 1933:

"A real fever of 56-mc. work seems to have enveloped most nations recently, with the unique possibilities of this band being fully appreciated for perhaps the first time. In Great Britain, on September 25th, the first organized 56-mc. field day was held by the four London districts. G6YK, G6CL, G6UT and G2NH were the active stations. Several contacts were established, a full account of the work appearing in recent issues of *The T & R Bulletin*."

This was of course the old "Five Metre Band" and the *T & R Bulletin* the first name of the RSGB's journal. Martin says it looks as if recent 50MHz activities in the UK are "putting us back to where things were 50 years ago!"

More expedition results

Imperial College Radio Society, G5YC, had a team in the Faeroe Islands in June and set up in WV square where the only other amateur active is OY9JD. The site was very good from a take-off point of view—400m asl yet only 2km inland with a clear view to the southeast. However, this was another group to suffer bad weather, and the winds proved too strong for the intended antenna systems. The mast height had to be reduced, which solved the problem, but the tent blew down in a gusting Force 8 gale with rain—and at 0500gmt on VHF NFD. the group worked some GM stations under flat conditions, including GM4HIG in Aberdeen who was using only 10W. GM6LXN was a regular on the OY repeater from his northern coast location. They tried an rtty ms contact with G8SFM on 2m, and with no shower present copied 21 pings from him, which encourages them to want to experiment further with this mode. They comment that the site looks very good, and with better weather and conditions many good dx contacts should be possible from there.

Further information is now to hand relating to the Albatross Contest Group's expedition to XJ square in August. They operated two quite separate 2m stations, one using an 8877 amplifier to two 16-element Tonnas, the other a 7213 final stage into eight nine-element Tonnas fixed in an easterly direction. On 432MHz they had two 4CX250Bs into four 21-element Tonnas, plus hf band equipment. Calls used were G4NFD, G8KWX and G4PVM, and in six days of operation, 63 2m and one 70cm ms contacts were made, plus many tropo QSOs. They plan next year to operate during the Perseids from Eire in WL, VL and UL squares using the call G4ULX. The group, which also included GW4LXO, G4OPC, G8KQP, GW6UTP, G4NOY and GM8OFV, wishes to thank the University of Liverpool ARS for the loan of antenna poles.

Another successful expedition during August was mounted by the Oxford University Radio Society which activated two sites in YQ and XO squares. Operators were G3YGF, G4GCM, G4KNZ, G8LYB and G8RPV. On 2m over 1,600 stations were worked from the two sites using 400W to two 16-element Tonnas at 35ft. Conditions were particularly good on 7 and 8 August when numerous distant squares were worked, the best dx being SM7FJE (GQ) over a distance of 971km. Two weak auroras were encountered on the same days when several SMs were worked in squares GQ and HS, LA1K in FX and DF8LC in FN. In a short Es opening, EA4QR was worked from YA44h, making a total of 61 squares and 14 countries worked from YQ without using ms. At the second site some ms was used,

The OURS expedition team. Standing, l to r: G4GCM, G8LYB, G3YGF. Seated, l to r: G8RPV, G4KNZ. *Photo:* G4KNZ

however, and two stations worked, Y22UL on cw and EA3ADW on random ssb, the latter in only 15s!

On 432MHz over 400 stations were worked. Full eme capability was provided by an array of eight 21-element Tonnas at 20ft plus a K2RIW amplifier and masthead GaAs fet preamplifier. At the second site, two of the Tonnas were used at a height of 40ft. Again conditions were very good on 7 and 8 August with many squares worked, with some LA stations peaking 60-80dB above noise. Two eme contacts were made—with ZE5JJ and DL9KR, both stations visibly moving the S-meter. Altogether some two tonnes of gear were carried to the two sites. QSLs should go to Robert Henshaw, G4GCM, QTHR. He is also handling the QSL situation arising from previous expeditions of the group to Scotland and Alderney.

These expedition reports indicate how complex some expedition stations tend to be these days, not to mention the enormous amount of planning and hard physical labour involved in getting equipment to the site and erecting antennas etc.

Records

Graham Kimbell, G3TCT, has challenged the 70MHz ms distance record by sending details of a contact with GM3WOJ/P in the Orkneys (YT75j) on 12 August 1982 when he was operating from Fleet in Hants (ZL56d). The contact appears to have been over a distance of 878km, which exceeds the previous claim by GM4CJG/P-G8VR for a contact over 836km. Until further claims are received which improve on this new one, it will stand as the record for the mode and band.

From here and there

Keith Bainbridge, G6HHV (Merseyside), says that his call is being pirated by someone in the London area who gives his name as Mark. Since Keith operates only on 432MHz and above, anyone hearing this call on 2m can assume that it is being used unlawfully.

Two cases have occurred recently of apparent pirating which turned out to be badly-written QSL cards. Stations with a "V" in their calls received cards meant for a station with a "U", read as a "V" by the QSL sub-manager, so it is always worth checking with the call book for clues to see if this sort of error has occurred.

Among cards received by G5UM from LA8AE recently in connection with a 432MHz award, was one for a cw contact during an aurora with UP2BJB. This is excellent auroral dx for so high a frequency, and any information on such dx, especially from readers overseas, would be greatly appreciated.

Nigel Hydes, G4OPB, thought that the Society had finally got its priorities right when he was approached in Ipswich recently by a young lady wearing an "RSGB" label and invited to try some draught bitter "on the house". It turned out to be the "other" RSGB however, Research Surveys Great Britain Ltd!

Kris Partridge, G8AUU, has pointed out an error in the Alternative VHF Net item in the September *4-2-70*. The "window" quoted for "USA" contacts should have read "USSR" contacts. Kris has also made some very useful comments on the choice of an alternative net frequency, and these will be printed later when all correspondence on the subject has come in.

For information on a small booklet giving hints and tips and component sources for vhf/uhf amplifiers, write to Geoff Brown, GJ4ICD, QTHR.

Both GM4IPK and GM4JJJ are working moonbounce using four 16-element Tonnas and appropriate low-loss feeder and masthead preamps. They have worked K1WHS and heard many other signals "off the moon". More details later. □

Microwaves

*by Charles Suckling, G3WDG**

A high efficiency dish feed for 1·3 and 2·3GHz

G3LTF has supplied details of a high-efficiency dual-band dish feed that he has developed for 1·3 and 2·3GHz. It consists of a dual-dipole feed for 1·3GHz combined with a circular waveguide horn feed for 2·3GHz. It was designed so that the two antennas have minimal interaction, and has been used with excellent results with a 6ft diameter dish (0·6f/D ratio) on both bands. The feed relies on the fact that the 2·3GHz waveguide is below cut-off on 1·3GHz, and thus the 1·3GHz dipoles effectively "see" a continuous groundplane behind them. Replacing the 2·3GHz horn with a continuous piece of metal had no effect on the performance of the 1·3GHz antenna.

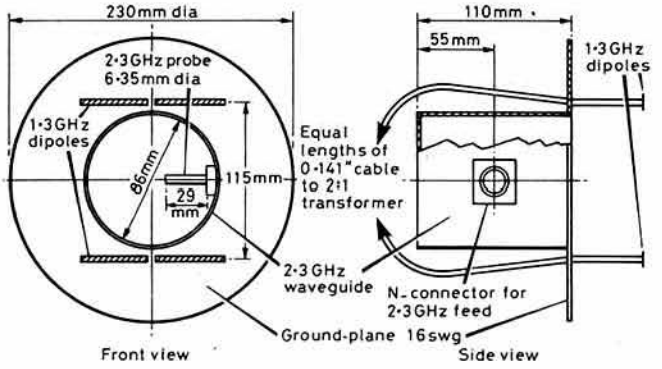


Fig 1. Constructional details of the 1·3/2·3GHz dish feed

Constructional details of the feed are given in Figs 1–3. The 1·3GHz power divider is built inside a waterproof can mounted on the back of the 2·3GHz feed horn. The 2·3GHz feed probe is drilled at one end to accept the inner pin of the connector, and soldered in position flush with the ptfe insulation on the socket. The length of the probe is measured from the end of the probe to the ptfe insulation of the N socket.

Provided that the dimensions specified are followed carefully, the feed should require little or no setting-up. If suitable test equipment is available, it may be worth optimizing the vswr of the 1·3GHz antenna. This can be done by first setting-up each dipole separately for minimum vswr, by squeezing the dipole support strips. The power divider/2:1 transformer can then be adjusted for minimum overall vswr with the two dipoles connected.

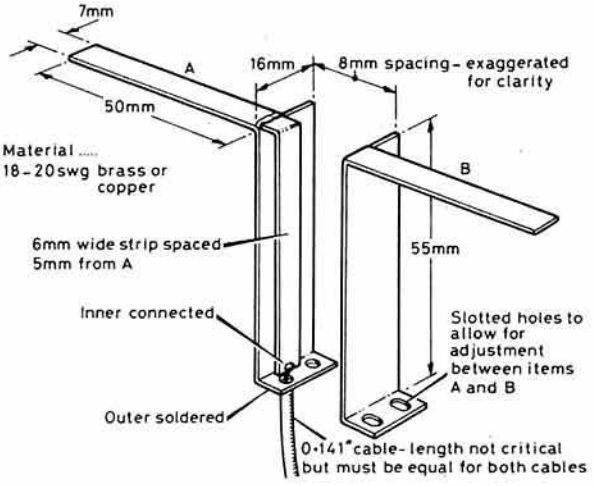


Fig 2. 1·3GHz dipole assembly

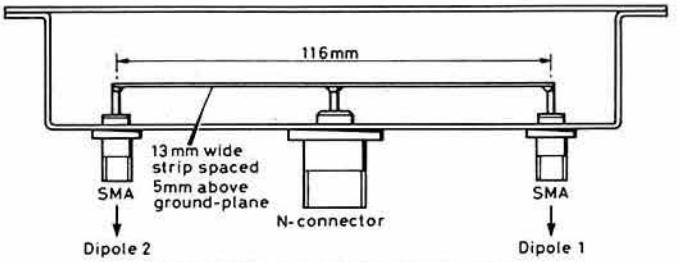


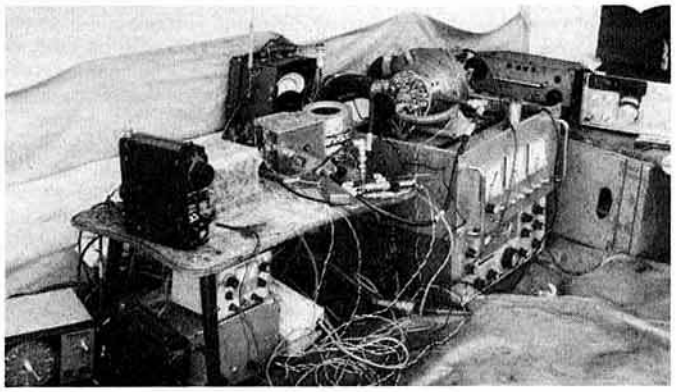
Fig 3. 1·3GHz power divider /2:1 transformer

The antenna should be weatherproofed before final installation. A convenient way of doing this is to mount a plastic bowl (Woolworths) approximately 230mm in diameter on the front of the antenna, to enclose the dipoles and the open end of the 2·3GHz waveguide. If a bowl with a lid is used, the lid can be bolted to the groundplane, after cutting a hole in the lid to allow the dipoles to pass through, and the bowl simply clipped into place. Small holes should be drilled at the lowest points of the bowl, the 2·3GHz waveguide section and the power divider housing, to prevent condensation occurring.

Expedition news

The Oxford University RS expedition this year activated two sites in Scotland, YQ07j in NE Scotland, and XO19a, during the periods 2–8 August and 10–14 August respectively. The operators were G3YGF, G4GCM, G4KNZ, G8LYB and G8RPV.

On 1·3GHz the equipment consisted of a 300W pa feeding a 4 × 23-element Tonna array, with a GaAs fet preamp on receive. Over 100 stations were worked on this band, using the callsign GM4KNZ/P. Most of the contacts were made from the YQ location! A total of 21 squares in six countries was worked: XN, YR, YO, YN, YM, ZP, ZO, ZN, ZM, ZL, AM, AL, BL, CS, CN, CM, CL, DN, DM, DL and FO squares in G, LA, DL, PA, ON and GM. About 20 stations were worked from the XO site.



The 1,296MHz station of GM4KNZ/P in YQ07j.

On 10GHz, GM3YGF/P tried with PA0EZ on 8 August over a 650km path with some success: PA0EZ copied Julian's signal for a few minutes. Unfortunately conditions seemed to be deteriorating at the time of the test, otherwise a QSO might have been made. G3LQR also listened for GM3YGF/P, but with nil results. From XO, a contact was made with G8AFC/P (Witherington Pike, near Winter Hill) over a 150km + path. The path is non-optical and has been somewhat difficult to work in the past. On this occasion there were no problems, and good signal levels prevailed on narrowband. GM3YGF/P was using 10W to a 4ft dish, while G8AFC/P had only 50-100μW output.

Anyone wanting to QSL direct should do so to Robert Henshaw, G4GCM, QTHR. He is also handling cards from the previous G3OUR expeditions to Scotland and Alderney.

2·3GHz "mini" expedition

G4FRE assisted by G4ERP put the rare (as far as 2·3GHz is concerned) square of YN on 2·3GHz just before taking part in the August 70MHz contest. On the Saturday night they heard G3LQR, and on the Sunday morning they worked G3WDG. With the increasing interest in 2·3GHz, this type of activity is extremely useful, and perhaps some more expeditions could be tempted to take 2·3GHz next year! □

* 46 Windsor Close, Towcester, Northants.

The Month on The Air

*by John Allaway, G3FKM**

FOOD FOR THOUGHT comes in statistics provided by G4JZ who spent a few hours in the All Asia DX Contest a few months ago. As readers will know, part of the contest exchange is the operator's age. Frank analysed the contacts he made, with the interesting discovery that participation in such events seems to peak in the 30 to 40 age group! Actual figures are: 16-20 12; 21-30 20; 30-39 41; 40-49 7; 50-59 2; and 60-69 1.

Overseas news

WB6GFJ (FO0FB) has recently returned from French Polynesia and has supplied a lot of information on QSL routes for a number of stations. Ross says that 5T5JD is now living there and has the callsign FO8JD—he also used FO0JD for a short time. QSLs for either call can be sent to the address in "QTH Corner" and the routes for other stations are also listed there. FO8s and FO0s were allowed to use the TO8 and TO0 prefixes during the Tiurai Celebration which took place from 10 to 17 July 1983, and any station using either prefix now and claiming to be in French Polynesia would be questionable. Enquiries can be made to the Radio Club in Tahiti. Ross reports that the current wait for an FO0 licence is six months, and that he will be sending out information on a planned expedition to Clipperton Is in due course.

Iris and Lloyd Colvin have written a very interesting letter. They have been back home in California since May and are in good health, having raised the total of countries they have visited to 154 (DXCC list)! Their original intention was to visit all DXCC countries, but they now realize this to be impossible and they have a new target—to try to visit all countries of the world having representation in the United Nations. It seems that there are only 157 of these. They have tentatively decided to visit one continent per year, and finish visiting the countries they have so far missed; they will, of course, try to operate in all countries where permission can be obtained. They were due to go to South America last month where they have seven countries to visit and they hope to do this during the six-month trip.

The Summer 1983 *N California DX Foundation Newsletter* contains a wealth of information. Some of this refers to the beacon network on 14,100kHz, and once again more reporters are being sought—sample report forms are still available from G3FKM (sae please). All eight beacons are now in action, and this means that it is possible to do a really useful evaluation of band conditions in the course of the 8min occupied by the cycle of beacons. W6RQ has noted that the only times that all eight signals have been copied was when the "A" index was less than 10 (WWV transmits solar terrestial indices at 18min past each hour—solar flux and "A" index are updated daily at 1818, and the "K" index every 3h). Beacon QSLs will be available soon, and NCDXF would appreciate applicants applying after they have heard and logged all eight signals. The foundation receives many QSLs for dxpeditions it did not sponsor, and a list of correct QSL routes for calls which are most often misdirected include CR9AK(4-8 Dec 1975 only) to W6ISQ; FM0GA to N6ZV; KP4AM/D to W6KNH; KP6KR, KP6PA, and W6WX/KJ6 to K6DC; WA6EWI/TI9 to K6DC; XU1AA (24/25 Nov 1973 only) to W6ISQ; and 3B9ZV to N6ZV. Membership of the NCDXF costs US $10 per annum—details can be obtained from PO Box 2368, Stanford, Cal, 94305, USA.

The Spanish society, URE, has recently elected a new board of directors. The president is EA5TD, first and second vice-president/treasurers are EA4OX and EA4ZP respectively, and the third vice-president and public relations officer is EA9EO. The secretary is EA4WC, and members of the board are EA7LQ, EA4RB, EA4KC, EA4FX, EA1OX, EA4NQ, EA4RN, EA4TO and EA4ZO. One of URE's most important projects is trying to get the Spanish regulations modified in order to include the passing of a morse test by those seeking hf licences. In order to celebrate World Communications Year, URE has asked permission to use the prefixes AM, EE and EF, in place of EA, EB and EC—this will probably apply for the last three months of the year.

A bulletin from the Amateur Radio Society of India contains a number of most interesting pieces of information on activities in that country. Stations in India have now been permitted to operate on 18 and 24MHz —but not on 10MHz yet. The Indian Government allocated a sum of $20,000 to sponsor a world study tour by a group of amateurs during WCY, this included VU2MY whom the RSGB was pleased to welcome at its HQ in Potters Bar. Of particular interest to dxers is the news that although amateur radio operation is not at present permitted in the Laccadive or Andaman Is groups, citizens of India are now allowed free entry—and even foreign visitors are permitted on a 14-day permit provided that their travel and lodging are sponsored by an authorized travel agency. ARSI is trying to open the door to Indian amateur activity from the islands as a special WCY event during November and December to develop communications infrastructure there.

Welcome

. . . to the following who joined the Society during August: EI8FE, KA4DKH, KA6UXR, N8XX, PD0NBN, VU2MY, WB4YJC and V. McGetterick (EI).

Expeditions

AD1S/KH5 will be on the air about 5 November. The expedition will consist of about five amateurs and a government biologist. The stations will be on the air for five days on cw and ssb on 28 to 1·8MHz with financial support from the North California DX Foundation. Included in the list of operators are WA2MOE and H44SH, and according to the *DX News Sheet* the former has been heard talking of visiting Kingman Reef for one or two days on the return trip. A brief T32 operation may also take place.

The Alaska DX Association successfully completed its expedition to the Pribilof Is about 1900 on 30 August. The five-day operation netted over 10,000 QSOs despite poor propagation conditions. About 40 per cent of contacts were made on cw, and some tvi problems, which caused some curtailment of operations during peak periods, were resolved by diplomacy. The operators were KL7RA, KL7PJ, AL7CG, KL7Y, NL7G and WL7E. A petition for country status has been presented to ARRL. QSLs should be sent via KL7GNP (see "QTH Corner").

DX news

On 18 November Oman will celebrate its 13th National Day and this year it is dedicated to "Youth". Officially, 1983 has been designated "Youth Year" in Oman. ROARS will celebrate the occasion by using the special callsign A4YYY on the air from 0900 17 November to 2000 20 November. A special QSL card and award will be sent to those who make contact.

Legal activity from Bangladesh may be expected in the not too distant future.

From 1 January 1984 New Zealand will use its prefixes in the following way: ZL1-ZL4, as at present; ZL5 Antarctic bases; ZL6, Intruder Watch and emergency stations; ZL7, Chatham Is; ZL8, Kermadec Is; ZL9, Auckland and Campbell Is; and ZL0, visitors. The Tokelau Is will use ZK3 instead of the present ZM7.

Tim Chen, BV2A/BV2B, is now signing /0 from a new location in Kaoshing which is located 350km from Taipeh. He visits there once weekly on Friday or Saturday. Tim believes that there will be more BV stations on the air soon. Look for him around 14,025, 14,040, 14,218, 14,250, 21,030 or 21,370kHz between 1200 and 1630.

The new Chinese station BY4AA should be on the air by now from Shanghai, using both cw and ssb. More stations are likely to come on the air from China as more equipment becomes available. The writer was delighted to meet operators from BY1PK and BY8AA recently and to see the great interest which is developing for amateur radio in their country.

Paul, 9M8PW, is now back on the air after returning from leave in the UK. He keeps a schedule with his QSL manager, G4DXC, on Monday, Tuesday, Thursday and Friday on 14,268kHz at 0830 or 0930. VK9NS is expected to continue to sign as VK9WCY until 15 November.

DXpress reports that JA1FBD, who is an airline pilot, visits Fiji for about 10 days each month and has the callsign 3D2TI. FO8JD, located on Rapa Is, 750 km from Papeete, is hoping to obtain separate DXCC status.

A71AD hopes to have antennas for 7, 3·5 and 1·8MHz before the end of the year. New operators are expected to arrive on Crozet Is on 10 November,

*10 Knightlow Road, Birmingham B17 8QB.

and they should include FR0GGL (who will be FB8WJ) and F6EAY (who will be FB8WK). F6EAY was formerly FL8BH, 5T5AY and FB8ZM.

N4NW now has the callsign TU2NW, and tends to use the following frequencies: 14,155, 21,300 and 28,555kHz with 10kHz split, and 7,070 and 3,795kHz split on ssb, and on cw he will operate about 20kHz above lower band edges. He uses his 3,795kHz frequency every Friday and Saturday after 2300. Tom's equipment consists of a TS830S, Alpha linear, and KT34A, KLM40-10V, and slopers and inverted-Vs for the lower frequency bands.

DX-NL reports that NL7K will be active at dawn time in the UK on 3,795kHz.

The visit to Albania last spring by a group of Finnish amateurs has now been reciprocated by the visit of an Albanian delegation to Finland. The delegation was presented with a TS130S for the use of the university in Tirana.

ZD9BV is now active daily from 1730 on 21,265, 21,275 or 21,335 kHz, and on 14,275kHz from 2030 onwards. VP8ANT should have left Antarctica by now; he is returning to the UK via the South Shetlands and the Falklands, but any amateur radio activity from either place is unlikely. Richard's QSO total since November 1981 is about 21,000.

QSLs for 6Y5FS which were previously dealt with by the late G3XTJ should now be routed via G3YDX. 9V1VP also has a new address—please see "QTH Corner".

A82LC is active on 21,300kHz at 1600 Mondays to Fridays for those looking for contacts for the Ganta Leprosy Colony Award.

Anguilla

The Anguilla Contest Team will be active from the West Indies island of Anguilla (VP2E) from 21 November to 14 December. This will include operations in the CQWW CW DX Contest, the ARRL 160m Contest, and the ARRL 10m Contest. During non-contest periods it will be active on all bands 1·8 to 28MHz on cw and ssb. On the group's three previous trips they have used the callsign VP2E as a multi-operator single-transmitter entry in the CQ WPX SSB Contest (1980), the CQ 160m SSB contests in 1981 and 1982, the ARRL SSB DX Contests in 1981 and 1982, and the ARRL CW DX Contest in 1982. In all they have made over 46,000 QSOs from Anguilla, mostly with W and VE, but this time they plan to make VP2E more available to dxers in the rest of the world.

During the CQ WW DX Contest several single-operator single-band contest efforts will be active simultaneously, all using the callsign VP2E. They will be running 1kW into monoband Yagi beams on 7 to 28MHz, and verticals on 1·8 and 3·5MHz, and the VP2E signals should be looked for 20 to 30kHz above the bottom of each band. Note that sunset will occur at about 2110, and sunrise at 0950, during the CQ WW DX Contest.

In the ARRL 10m Contest there will be some operation above and below the USA phone bands. Calls to be used at non-contest times include VP2s EV, EAA, ESE, EEW and EZ. Schedules for 1·8 and 3·5MHz can be arranged by contacting Jeff Maass, K8ND, 4410 Norwell Drive, Columbus, Ohio, 43220, no later than 20 November.

Jeff has listed QSL routes for previous operations by the group and its individual members, and these are as follows: VP2E (since 1980-K8ND); VP2EAA (W0RLX); VP2EB (KW8N); VP2ED (AD8J/3); VP2EDX (WA8CZS); VP2EE (AA4NC); VP2EEV (K8ND); VP2EEW (KU8E); VP2ES (K8CV); VP2ESE (WB4QBB); VP2EU (K8MR); VP2EV (K8ND); VP2EX (WB8VPA); and VP2EZ (AA4GA). Note that QSLs for VP2E in 1979 should go via WA4MAV, and for earlier activity to K2FJ.

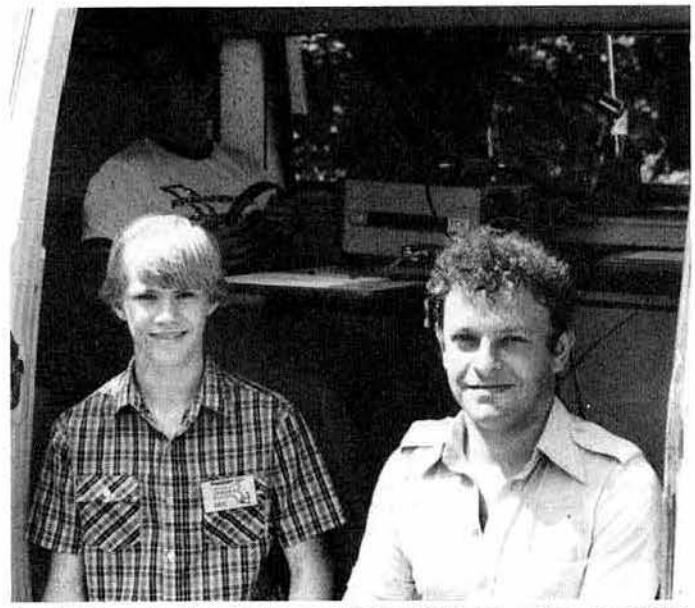
3·5MHz

A special request, in view of the approaching peak winter "dx season", for users to remember a number of points which will be of mutual benefit to all occupants of the band. First, at least the top 10kHz (and preferably the top 25kHz) should be reserved for inter-continental working. Second, during December and January Scandinavian stations can work dx throughout the whole 24h, so other Europeans might remember this even during the mid-day period. Third, during the same period it is possible to work dx from the UK from about 1430. The 3,500-3,510kHz segment should also be reserved for intercontinental working according to the IARU Region 1 Band Plan.

28MHz Countries Table

Scores notified by 30 September were:

G3VOF—173	G3SXW—96	G3XTJ—66 (cw)	G3KSH—30
G3XQU—161	G4MUW—86 (ssb)	G4EHQ—56	G3PSM—26 (cw)
G3KHZ—156 (141 cw)	G3TXF—84	G4PKP—49	GM4RFE—26
G3GIQ—151	G4GGY—82 (ssb)	G4RPX—37	G4PXT—25
G3JFH—135	G4OBR—81	G3XBM—35	G3JFF—23
G3KDB—117 (cw)	G4GOF—78 (ssb)	G4SDZ—34	G4FVK—17
G3XBY—101			



Framlingham Amateur Radio Association field day station on 14MHz. Background: March Stern N1BLH; foreground Dave, KA1IKV, (1) and Robert Finley, G3UAN/KJ1Y

28MHz

WIA has advised that the Sydney beacon on 28,262kHz, formerly VK2WI, has changed callsign to VK2RSY. It is located at the WIA's NSW Division's transmitting station at Dural, 25km NW of Sydney at 220m asl. Output power is 25W to a vertical λ/2 antenna at 20m above ground. It seems that the frequency of 28,335kHz for VK2WI was only used for a short period of tests in 1981, and should be deleted from any lists.

In order to discourage the use of the 28MHz band by those not licensed to do so, GW6ZHY suggests that a point should be made of using frequencies which normally appear on cb equipment but are inside the amateur band. These start at 28,005kHz (Channel 12) and go up in 10kHz steps to 28,305kHz (Channel 40). Although only some equipment has provision for slight frequency change, more occupation of these channels by amateurs could only be a good thing.

Commonwealth Century Club

The Commonwealth DX Certificate has now been in existence for many years, and has proved extremely popular with amateurs in the UK and overseas. However, it represents only a limited challenge to the dedicated dxer, and the opinion has been expressed that the Society should establish a new award the attainment of which will recognize a greatly increased dx achievement.

The new award will be known as the Commonwealth Century Club and will require proof of communication on any of the hf bands (excluding 10, 18 and 24MHz)—using any modes (single or mixed)—with at least 100 of the current Commonwealth call areas. It will be in the form of an attractive wooden plaque with a brass plate detailing the winner's name, callsign, and the date and number of the award. There will be a charge, which will be announced when final details are available. It is suggested that the starting date for QSOs counting towards the Commonwealth Century Club should be 1 January 1984.

Consideration is also being given to the awarding of a special trophy to any amateur proving two-way communication with all the Commonwealth call areas—the ultimate challenge! Comments and suggestions regarding this proposal will be welcomed by the HF Committee and should be addressed to its chairman, G3NKS, QTHR.

Thanksgiving Day

A special event station with the callsign WA1NPO will be active on 14 and 21MHz from Plymouth, Mass, on Thanksgiving Day, 24 November, as part of the community's holiday celebration, and will be looking for contacts with the UK—particularly with the West Country. WA1NPO will be located at Plimoth Plantation, a living museum devoted to re-creating the life style of the early New England settlers, and will be alongside a full-size replica of the *Mayflower*. An attractive certificate, suitable for framing and featuring the *Mayflower* will be available for all confirmed QSOs. Operating schedule will

QTH CORNER

AP0CCX	via JA1UNA
C30AAL	via F6EYS, P. Bittiger, 28 rue de Madagascar, 90000, Belfort, France
FO8DF	via WB6GFJ (see below)
FO0FB	via WB6GFJ
FO8HI	via WB6GFJ, Ross Forbes, PO Box 1, Los Altos, Cal, 94022, USA.
FO8HL	Richard Ley, BP 5872, Pirae, Tahiti
FO8HO	J. Ina, 25 rue Yves Martin, Pirae, Tahiti
FO8IW	via K1CC, 1563 Boulevard, West Hartford, Conn, 06107, USA
FO8JD	Jose Dumoulin, BP 85, Papeete, Tahiti
FO8KB	Gabriel Lan San, BP 926, Papeete, Tahiti
IR0ITU	IS0LLJ, Anna Mischi, Via Amsicora 89, I-07046 PortoTorres, Sardinia
KG4 QSL Bureau	**(correction)** GARC, Box 73, FPO, NY, 09593, USA
KL7GNP	John Bierman, 4304 Garfield, Anchorage, Alaska, 99503, USA
TR8KMG	BP 129, Port Gentil, Gabon
WA1NPO	G3ADV, 32 Brown Av, Parkfield, Nantwich, Cheshire, CW5 7DH
ZF2HE	via W0RAO, Edward Cox, 222 Shady Hollow, Casselberry, Fla, 32707, USA
3V8DC	via IN3ASP, S. Boselli, Corso Italia 22, Bolzano 39100, Italy
3Z0SAB	via SP9KZ, W. Kuciel, ul Stanislawa Ziaji 9 m 3-A, 31-114 Krakow, Poland
LA2WW/9L1	via N0AFW, P. Meyer, RFD 1-Box 86, Verndale, Minn, 56481, USA
9V1VP	**(new)** 355 Bukit Timah Rd, 12-01 Naga, Singapore 1025

be: 14,180 or 14,255kHz from 1300 to 1600, and 14,345kHz from 1600 to 2000, and 21,260kHz from 1300 to 1430, and 21,285kHz from 1730 to 2000. Further details are available from QSL manager G3ADV (see "QTH Corner"). Applicants for the certificate should send QSL and three ircs to Whitman ARC, Box 48, Whitman, Mass, 02382, USA.

Contests

PA0DIN has kindly submitted results of the **Fourth EUCW Fraternising CW QSO Party**. GW3MPB was 10th in the Class A (members) QRO section with 148 points, and G8IB came eighth in Class B (members) QRP section. Winners of the two sections were PA3ADM (268 points) and DK9OY (144 points) respectively. In Class C (non-EUCW members) GM3SID was third with 159 points.

TOPS Activity Contest

1800 3 December to 1800 4 December

3,500-3,585kHz cw only, the lowest 12kHz being used only for dx contacts. (All contacts made in this segment with the same continent will be removed from logs). Single-operator entrants must have one 7h break which must be clearly marked in the log. Exchange RST plus serial number (from 001). TOPS members will also give their membership number. QSOs with own country count one point, with own continent two, and with other continents six points. QSOs with TOPS members give two bonus points. Total score is points multiplied by number of prefixes worked. There are single and multi-operator and QRP (up to 5W input) sections. Send logs to Bertil Arting, SM3VE, Bergesvegen 26, S-823 00 Kilafors, Sweden, to arrive by 31 January.

Results of the **1982 CQ WW DX Contest (CW Section)** have been received from W1WY, and UK scores are as follows:

SINGLE-OPERATOR

G5CFJ	**(All band)**	1,778,480	points	**G3PVA**	**14MHz**	154,850	points
G3MXJ	"	1,630,280	"	**GM3ITN**	"	138,690	"
G3XTT	"	808,353	"	G4KRS	"	39,060	"
GM5EMM	"	200,796	"	**GW3MPB**	"	35,154	"
G4MVA	"	164,604	"	**G3FXB**	**7MHz**	207,480	"
G3AJB	"	146,828	"	G3IGW	"	86,184	"
G3OLU	"	59,589	"	**GM3YOR**	"	36,630	"
GW3JI	"	42,210	"	**G3BUE**	**3·5MHz**	84,561	"
G4OKN	"	21,087	"	G4CNY	"	77,004	"
G4BUO	**28MHz**	222,905	"	G3KPY	"	76,380	"
G3UFY	"	113,040	"	**G3SZA**	**1·8MHz**	18,821	"
GM4LHA	"	34,188	"	G3XWZ/A	"	17,232	"
G3XQX	"	19,366	"	G3BDQ	"	4,560	"
GM4FDM	**21MHz**	128,466	"	**GW3GWX**	"	1,058	"
GM3RAO	"	121,948	"				

In the **QRP Section** G5DEH came 21st with 62,832 points (all band), G3VMY was 5th on 28MHz with 17,343 points, and G3CWL also 5th on 21MHz with 8,820. On 14MHz G3DOP was 17th with 1,104 points. In the **multi-operator single-transmitter** section, **GB2MM** scored 2,143,198, G3SSO 1,994,448, G3RRS 1,619,215 and GW4BRS 1,071,640 points.

Results of the **1983 Bermuda Contest** were received shortly after last month's *MOTA* went to press, and UK scores were as follows:

Callsign	Points	Callsign	Points	Callsign	Points	Callsign	Points
G3UKS	256,500	GW3NNF	79,925	G4FJT	1,110	G4IJW	378
G3VPW	132,275	G4CNY	45,750	G4GFH	400	G3YBD	140
G5CMX	93,600	G3KKJ	4,980				

Congratulations to **G3UKS**, who will have visited Bermuda to collect his trophy by the time that this is being read. In the other sections the winners were VE3JSZ (21,730 points), VP9IX (1,001,160), DL7OK (116,520), and W1RR (157,750). VP9TAD, with 294,480 points, was Bermuda cw winner. Next year's contest will take place on 17 and 18 March and full details will be given later—however, two minor rule changes have been notified: (1) in order to encourage cw operation it will be possible to work each station on both cw and phone on each band provided that the contacts are separated by at least 30min, and (2) the period of eligibility for major prizes for previous winners has been extended by one year.

All OE 160m CW Contest

1900 19 November to 0600 20 November

CW only. Each QSO counts one point and double QSOs will count zero points. A multiplier of one is gained for each prefix worked, except Austrian prefixes which each count as two multipliers. Exchanges consist of RST and serial number (starting from 001). There will be a plaque for top world score, and certificates and flags for the top world five and top country entrants. There is no listener section. Logs should be sent before 31 December to: OVSV-Austrian 160m Contest, PO Box 999, A-1014 Vienna, Austria.

Awards

Worked All QST Award

Sponsored by the Canadian Radio Relay League. The "QST" suffix has been assigned to CRRL stations in all Canadian call areas. VE-QST calls are used by Official Bulletin stations and are also active during some contests. The award is available in five categories: cw, phone, rtty, mixed and QRP, with four endorsements for VE0, VO2, VE8 and VY1. To qualify one must work all eight stations from VO1 and VE1 to VE7 and send the QSLs to the award manager: John Gowron, VE4ADS, 229 Kisil Bay, Winnipeg, Man. There appears to be no charge. The licensees who control the use of "QST" calls and keep logs for QSL purposes are as follows: VO1-VO1AW; VE1-VE1WF; VE3-VE3IBV; VE4-VE4PG; VE5-VE5WM; VE6-VE6ABC; and VE7-VE7CSD. The four endorsement calls will be active from time to time.

The J2 Award

Issued by the Association des Radioamateurs de Djibouti in two classes —the first requires confirmed contact with eight J2 stations using at least two bands, and the second is issued for making five QSOs on telegraphy and an additional 10 QSOs with J2 stations using any mode using two or more bands. The same stations may be worked on different bands. Send photocopies of QSLs plus eight ircs to: ARAD Award Manager, PO Box 1076, Djibouti.

The Salisbury Area Award

Issued by the Salisbury Radio & Electronics Society for contacts on and after 1 August 1983. Ten points are required and are acquired by working club members (two points each), any other amateur in the area of OS map 184 (Salisbury and Plain), or club station G3FKF. Send log details plus £1 or five ircs to G2FIX or G4POF, QTHR. All bands and modes may be used and listeners may also apply.

Around the bands

The G8KG review of August and September reads as follows: "It looks as if the minor peak in solar activity during the summer months is now over and the slow decline of Cycle 21 continues. By the last week in September the 27-day average solar flux had again fallen below 110 sfu, as it did in March, and there had been relatively little variation in the daily values over the past 30 days.

"The effect of declining solar activity is likely to be much more noticeable in the 1983-4 dx season than it was a year ago, but this does not mean that we are yet at all near to the kind of conditions that occur near to solar minimum. It is worth noting that the mean sunspot number for 1983 is likely to be between 70 and 80, which is close to the value of 78 recorded for 1928—which was the *peak* year of Cycle 16!"

Almost no activity is being reported on 18 and 24MHz in spite of attempts to encourage contacts. Please keep trying—and report results to G3FKM.

Thank you to the following for providing log information: G2HKU, G5JL, G3s GHY, GVV, IMW, KSH, YMC, ZVK, G4EHQ, G4s LDS, NXG/M, OBK, GM4RFE, G5CFJ and GJ5EML.

Stations listed in italics were using A1A.

1·8MHz. 0400 *AA1K, K1ZM.* **2100** *OZ1W, UK2GKB.* **2200** *G6ZY/EA6, WA9SJL, 4X4NJ.*

3·5MHz. 0200 *FM7CD.* **0500** *LU6EIY,* **0600** PY1HE, *W5XZ,* ZF2HE. **0700** HK5BCZ, V2AN, ZL4LZ. **2100** C30AAL, 4U1ITU. **2200** VS5DB.

7MHz. 0000 *CT3DJ, KG4CD, LU, PY, PZ1VDK, UA9, UA0, VU2HQ.* **0300** *8P6MJ.* **0500** *FG7AM,* ZL (to 0700), 6Y5MJ. **0600** *W1,2,7,9,0.* **0700** VK. **2200** *A87M,* C30AAL, VK6HD, YB0CR, *4K1GDW,* 6Y5IC. **2300** *YB5ASO, 6W8CW.*

10MHz. 0400 *W1-W0, ZL.* **0500** *XE1FFY, 9H1BB.* **0600** *AD0C, KW6J, VE3ENY, VK2PA, ZL3BJ, ZM3RK.* **0700** *HB0/DL1GK, VK2QL, VK4DU, ZL1BSG, ZL3BJ.*

14MHz. 0600 *FB8WF, KH6, KL7, LA2WW/9L1.* **0700** *AP0CCX, JA*(to 1000) JD1BBR, *JY5DT,* KH6BZF, KX6OR, T2GSH, VK0GC, ZL (to 1000). **0800** AL7CD, SU1ER, VS6DO, VY1CC, ZK2IK, 9M2CK, 9M8PW, 9V1TS. **0900** KF6ME/DU2, VK. **1300** AP2HA, VK2BKD/M. **1400** W6, YK1AN. **1500** 3V8DC. **1600** HZ1AB, JA,

YB5AQD, YI1BGD, 9V1VP. **1700** VS5GA. **1800** OX3SG. **1900** *TA1UA*, ZL1PV. **2000** A4XVM, 9Y4RO/ST0, SU1ER, DH2JL/T5, *VP8ANT, 4K1GDW*, 5Z4RK. **2100** *K4II/VP9, 4K1F, 4S7WP*, 5H3DM. **2200** *HB9AAX/ET3, KP2J, TU2NW*. **2300** *CO2HQ*, FY7YE/FM7, HJ3LR, VU2BK.

18MHz. 0800 *DL, F, G, OE, OZ.*

21MHz. 0600 *A92DR*. **0800** *BY1PK*, JA (to 1700), ZK2JS. **0900** *HL4CBI*, HM0U, *8N1WCY*, 9L1DR. **1000** *J28DX*. **1100** *BY8AA, FR7BT/FH8*, JY9TS. **1200** KC6RN, 9Y4RD/ST0, VK, YB. **1300** AH2AN, H44DX, *8J1HAM/1*. **1400** DK8OT/C6A, KC6IN, VK, VS5GP, *3B9FK*. **1500** AP2NB, TL8ER, TR8KMJ, VK, W6-W7 (until 1800), *XE1FFA*, YI1BGD, 1Z9B. **1600** A82LC, VE4-VE7. **1700** HC8GI, OX3OA, *VP8ANT*, 4X4MS/5N0, 5R8AL, 7Q7LW. **1800** AP2MQ, S79WHW, VS5s PP, RB, YC3CEV, ZD7BW, 8Q7BT. **1900** VP8NY, 9H5ODC, 9X5MB. **2000** VP8MT, ZL4JO. **2100** VP8AQA, W5, W6, W0. **2200** *FG7BP, T77C, WH0AAG*.

24MHz. 0800 *OE, OZ.*

28MHz. 1000 *TR8JD*, ZS5IV, *3B9CF*. **1200** *C21s BD, RK*, FH8CB, *TL8EC*. **1300** A4XCB, *J28DM, TZ6FIC*, ZC4EPI, *5R8AL*. **1500** *W1*. **1600** *HB0NL*, S83H, 3D6AN, 7Q7LW. **1700** A82LC, *C53EV*, CE8ABF, VP8AQA (Ant.), VP8ZV. **1800** CE, *CY0SPI*, PY, VP8JB, 9L1BR. **1900** HC1KN. **2000** CE. PY, ZP. **2100** KA4EIN/TI4. **2200** *W0RLI*, 6Y5SG. **2300** YS9RVE.

Thanks to the following for items extracted: the *Ex-G Radio Club Bulletin* (GI3OEN/W6), *Long Skip* (VE3GCO), *Lynx DX Group Bulletin* (EA2JG/EA3CBQ), *DX'press* (PA0GAM), *CQ Magazine* (W1WY), *DXNL* (DL3RK), the *DX Bulletin* (K1IM), the *Long Island DX Bulletin* (W2IYX), and *DX News Sheet* (G3XTT/G3ZAY).

Please send all items for January issue to reach G3FKM no later than **24 November.** □

HF propagation predictions for November 1983

Using the table

The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band, ie $\frac{0}{0}$ = 0000, $\frac{0}{2}$ = 0200, $\frac{0}{4}$ = 0400 etc.

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

	28MHz				21MHz				14MHz				10MHz				7MHz				3·5MHz			
GMT	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122
	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802
EUROPE																								
Moscow	.	47	751	.	.	89	996	.	.	688	889	51	552	766	568	965	987	533	346	899	††	4	2	3	†††
Malta	.	46	442	.	.	89	897	1	11	687	789	831	674	865	568	986	998	632	236	899	†††	3	.	3	†††
Gibraltar	.	4	321	.	.	58	887	1	.	98	889	83	463	576	567	985	998	853	335	899	†††	†2	.	2	5††
Iceland	.	1	331	.	.	6	886	.	.	68	889	71	23	87	678	962	886	464	446	788	†††	†3	23	5††
ASIA																								
Osaka	.	2	.	.	.	72	.	.	.	376	321	.	1	353	335	423	.	21	14	773	.	.	.	44
Hong Kong	.	67	3	.	.	288	72	.	.	266	664	2	2	33	346	753	1	1	14	785	.	.	.	4†2
Bangkok	.	78	82	.	.	379	873	.	.	136	668	31	3	3	346	864	2	.	14	787	.	.	.	4†4
Singapore	.	156	54	.	.	478	885	.	1	136	668	511	3	3	346	875	1	.	14	786	.	.	.	4†3
New Delhi	.	177	71	.	.	478	86	.	1	225	566	11	631	2	346	767	72	.	14	788	4	.	.	4††
Teheran	.	288	76	.	.	678	895	.	212	533	568	522	864	21	246	877	872	.	14	788	†4	.	.	45†
Colombo	.	278	861	.	.	468	896	.	11	114	568	622	52	1	246	887	51	.	14	788	2	.	.	4††
Bahrain	.	287	65	.	.	677	885	.	22	422	568	632	74	1	246	888	62	.	14	788	4	.	.	45†
Cyprus	.	188	873	.	.	698	998	2	443	766	678	953	997	533	357	998	996	21	125	788	††3	.	2	5††
Aden	.	287	773	.	.	666	898	2	512	311	368	864	964	.	136	898	862	.	13	788	†4	.	.	45†
OCEANIA																								
Suva (S)	.	.	21	.	.	3	662	.	.	56	677	3	.	153	346	4	.	221	114	2	.	.	.	.
Suva (L)	.	21	.	.	1	76	42	531	112	575	556	731	1	542	235	4	.	22	13	2	.	.	.	.
Wellington (S)	.	2	2	.	.	47	742	.	.	76	677	2	.	253	346	41	.	121	114	2	.	.	.	.
Wellington (L)	.	.	.	.	1	21	.	1	112	275	323	531	1	353	235	41	.	12	3	1	.	.	.	.
Sydney (S)	.	44	42	.	.	388	873	.	.	476	678	3	.	143	346	72	.	21	14	51	.	.	.	2
Sydney (L)	.	.	.	.	.	33	1	1	1	76	442	652	.	153	235	73	.	2	12	41	.	.	.	.
Perth	.	155	42	.	.	578	874	.	1	236	568	621	1	13	246	874	.	.	14	762	.	.	.	43
Honolulu	.	.	.	.	.	.	.	1	1	31	2·5	61	23	52	326	41	4	421	113	1	.	2	3	.
AFRICA																								
Seychelles	.	244	54	.	.	556	785	2	522	111	468	864	952	.	136	899	83	.	13	788	†	.	.	45†
Mauritius	.	156	663	.	.	456	788	3	641	111	368	975	851	.	136	899	72	.	13	788	4	.	.	4††
Nairobi	.	176	673	.	.	566	788	41	742	311	268	987	984	1	36	899	872	.	13	788	†4	.	.	4†5
Harare	.	35	675	1	.	455	689	621	772	311	148	998	984	.	15	899	862	.	3	688	†4	.	.	4††
Capetown	.	34	776	2	1	255	678	742	872	411	126	899	985	2	3	799	872	.	1	488	†4	.	.	5†
Lagos	.	88	888	3	11	186	679	842	882	641	126	999	998	51	3	799	888	3	1	588	5†5	.	.	2††
Ascension Is.	.	47	656	1	1	87	667	622	786	362	113	799	999	63	.	489	888	5	.	168	†††	2	.	3†
Dakar	.	48	878	4	1	88	668	851	786	273	114	798	999	741	1	589	878	62	.	278	55†	3	.	4†
Las Palmas	.	38	877	2	.	89	989	82	464	387	667	996	999	864	335	799	989	741	112	589	†††	4	.	2††
S. AMERICA																								
South Shetland	.	13	445	2	1	67	777	641	575	275	533	356	567	653	2	123	344	42	.	1	.	.	.	.
Falkland Is.	.	14	477	4	.	68	766	641	676	276	311	256	788	753	.	24	577	62	.	2	244	3	.	.
Rio De Janeiro	.	5	334	2	.	38	655	63	676	275	111	367	999	652	.	37	888	62	.	15	†††	3	.	2
Buenos Aires	.	14	446	3	.	58	655	641	566	176	211	146	899	653	.	15	788	62	.	2	4††	3	.	.
Lima	.	.	877	4	.	.	876	53	334	14	521	124	789	443	2	4	688	621	.	1	35†	3	.	.
Bogota	.	.	876	4	.	1	876	53	223	15	521	145	888	343	2	15	787	621	.	2	455	3	.	.
N. AMERICA																								
Barbados	.	2	876	4	.	7	866	64	224	26	511	266	888	443	2	37	887	621	.	15	†54	3	.	2
Jamaica	.	.	677	4	.	.	876	63	222	24	531	144	778	243	2	15	787	621	.	2	555	3	.	.
Bermuda	.	.	677	4	.	4	887	73	222	26	532	464	778	243	31	137	888	621	.	15	†55	3	.	2
New York	.	.	377	3	.	.	888	72	111	15	654	563	777	143	321	236	888	531	.	14	555	3	.	.
Mexico	.	.	66	3	.	.	187	52	111	2	562	122	577	152	33	2	488	531	1	.	5†	3	.	.
Montreal	.	.	376	2	.	1	788	72	111	15	665	563	776	143	332	346	887	531	1	15	555	3	.	2
Denver	.	.	4	1	.	.	48	51	11	1	165	442	576	141	233	113	488	531	1	1	5†	3	.	.
Los Angeles	.	.	3	1	.	.	7	5	11	1	56	421	465	42	133	12	268	431	11	.	3†	3	.	.
Vancourver	.	.	.	.	.	.	3	3	11	1	27	641	464	42	135	323	367	431	12	1	35	3	.	.
Fairbanks	.	.	.	.	.	.	.	.	11	22	236	621	453	53	346	643	345	421	113	322	3	3	.	.

The provisional mean sunspot number for August 1983 issued by the Sunspot Index Data Centre, Brussels, was 71·9. The maximum daily sunspot number was 131 on 1 August, and the minimum was 40 on 20 August. The predicted smoothed sunspot numbers for November, December 1983 and January, February 1984 are, respectively: (classical method) 74, 73, 71 and 69; (SIDC adjusted values) 70, 69, 67 and 66.

SWL News

*by Bob Treacher, BRS 32525**

14MHz beacons

W6RQ has responded to the mention in this column of the NCDXF 14MHz beacons. He sent a sample QSL card (reproduced below) which is available for reports on all eight beacons. Reports should give the date, time and signal quality of each of the beacons. Callsigns are sent at 22wpm, but they are timed to come up in precise sequence. A beacon heard, say, between the sixth and seventh minute would be CT3B: full callsigns were given in *Rad Com*, April 1983, p336. This is certainly an area in which the swl can provide a valuable service to the amateur fraternity. W6RQ is anxious to receive reports either direct or through the bureau, so why not tune down to 14,100kHz right now and get your reports in the mail. The beacon network should stimulate listeners' interest in the subject of propagation, and will provide a handy guide to the dx capabilities of the band at any particular time.

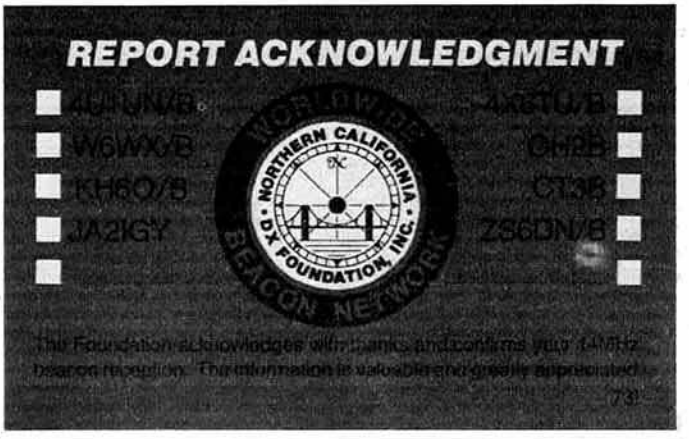
HF news

At last some good conditions to report. Late August and early September had plenty to make the mouth water; 7MHz in particular provided good openings into the Pacific around sunrise. C21RK, FK0AQ, ZK2RS, 3D2DM, T32AF, VK0GC, KC6RN and YJ8RG all being copied in G-land. VK9NS and VK0GC were heard at sunrise on 3,795kHz. On the higher frequency bands I2MQP/BV was good copy on 14,195kHz, while N2EDQ/KH7 was also a welcome addition in several logs. KD7P/KH2, 9M8PW, T2ADE, 3D2ER, A35PG were also reported. On 21MHz XU1SS, BY8AA, KC6IN, 3B9FK, 5W1EJ, TL8TX, 9V1VP, YJ8TT and ZK2JS were reported. Even 28MHz produced some dx signals—VP8AQA, VP8JB, 7P8CM, ZD7BW, 3X4EX, 3B9FK, A81LC, ZY5EG, and an assortment of CEs, CXs and LUs. With so much reported, only the best has been included here, taken from dx logged by BRSs 25429, 8841, 1066, 62088, 48909, 52543 and 44395. QSLs received during the period, again from various sources, include F6DZD/FH8, TZ8DC, 3B9FK, DF8MP/XZ, 1Z9A, F5RV/FC, DJ6QT/CT3, CE3AA and HH2CQ.

QSL card competition

The item on QSL procedures in the August issue has prompted some correspondence. Brad Bradbury, BRS1066, used to provide wx information on his cards, but decided against it for the reason stated in the item. He provides a list of the stations being worked by the dx station to whom he is sending the card, together with the reports given. He seldom reports on stations in Europe, except on 1·8MHz, and does not report on dx stations working Gs. His QSL return suggests his methods pay dividends.

Peter Lincoln, BRS42979, admits to including all the information which was said to be unnecessary, but he points to a satisfactory return for his troubles. With much of his listening done on sstv and rtty, his hard work in preparing reports must be commended. His cards are written in semi-italic with a broad-nib pen, and a two-page letter is sent which gives station and personal details. He has had many complimentary remarks about the standard of reporting, including some from several QSL managers. On sstv, Peter has 100 per cent QSL return. The message which comes home loud and clear is that if any report is worthwhile, accurate and well set out, the dx station will invariably provide the desired card.



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By way of something different, and as a result of the comments above, I will run a competition for the best swl QSL report to be judged by a panel of well-known amateurs. Simply send me a completed report made out to an amateur station giving the details which you normally provide. The panel will consider all the entries received, and there will be a prize for the entry judged to be the best report. Entries should be sent to me at the address below to be received no later than 30 November.

VHF corner

Dan Guile, BRS35070, wrote concerning the QTH locator system. This grid system indicates the position of stations and is used primarily at vhf. It consists of two letters, two figures and one letter, eg DG51a. The first two letters signify the square between 2° longitude and 1° latitude, and each square is subdivided into 80 smaller squares numbered continuously 01–80 from top left to bottom right in eight horizontal lines of 10 squares. These squares are again divided into nine even smaller squares and are identified by letters from a to h and j. Hopefully, that has not confused too many readers! QTH Locator maps are obtainable from RSGB Publications (Sales), and any listener considering getting equipment for 144MHz in readiness for next summer's dx season should have one.

Colin Watson, BRS46598, updated his fm dxing. From his QTH in XP square he reported his scanner receiver pulling in GB3s AS, AY, PR and SB.

Martin Parry, BRS52543, has housed his 70, 144 and 432MHz converters in one neat box, and upgraded the coaxial cable on both the 144 and 432MHz antennas. The UR67 has been transferred to the 70MHz station, where a four-element ZL has been superseded by a four-element Yagi.

The 144MHz September contest provided only one F in AJ square, due to the low pressure area centred over the NW of England which was accompanied by gale force winds. Dave Whitaker, BRS25429, had a ball during the tropo opening over 28–30 August. Fifty-one squares were logged in 11 countries, with the only new one being EI5AOB in VN19e. Best Scandinavian stations logged were LA9LS (DS70d), SM4AIQ (HT51j), LA6ZW (ES54h) SM4CJK (GT49f), SM7IWG (HR54c), SM7BHM (HQ71e) and SM7NNJ (IQ22j). Rotator problems plus the gales made Dave's entry for the September contest poorer than he would have liked, but he managed F1KNO in BH20c as his best dx at 700km. In London during the same event, we were lucky enough to be on the edge of a "high" which produced some effective ducting into northern Spain and southern France. EA1RCR/P (YC78j, 1,035km) was the best dx, together with F6GZC/P (BC33f) and EA2LY/P (ZD74d). DXing on 144MHz is certainly a compelling pastime during the summer months, even more so with the continuing decline in the sunspot cycle, and it is hoped that the dx mentioned in this column over the last few months will inspire some listeners to get equipped for the band in time for next season.

Finale

The hf table has been pruned this month to the top 10 to accommodate the large amount of news. News and dx reports for the January 1984 issue should be received by your scribe no later than **Tuesday 15 November**, with late copy no later than Wednesday 23 November.

1983 UHF/VHF SQUARES/COUNTRIES TABLE

Station	QTH loc	70MHz Squares	70MHz Countries	144MHz Squares	144MHz Countries	432MHz Squares	432MHz Countries	Total	Via*
BRS32525	AL	—	—	99	25	16	7	147	a,b,d
BRS25429	ZN	—	—	110	25	—	—	135	a,b
BRS52543	YN	21	6	70	18	13	5	133	a,b,c
RS49875	YN	—	—	41	12	14	8	75	a
RS49327	YN	—	—	39	12	14	8	73	a
BRS62088	AL	—	—	43	14	8	3	68	a,b
ARS53844	YN	—	—	28	10	11	4	53	a

* a = tropo, b = Es, c = Ar, d = ms

1983 HF COUNTRIES TABLE

(Top 10 entries only)

Station	28	21	14	7	3.5	1.8	Total	Mode
BRS8841	140	207	220	136	124	32	859	ssb/cw
BRS48909	126	199	208	127	109	29	798	ssb
BRS52543	118	190	193	125	125	28	779	ssb/cw
BRS25429	132	165	154	115	122	39	727	ssb
BRS44395	106	168	150	100	60	33	617	cw
BRS44703	102	113	134	90	110	34	579	ssb
BRS50134	88	128	137	95	97	26	571	ssb
ARS53844	83	161	150	78	69	14	555	ssb
BRS1066	73	134	134	103	69	41	554	cw
RS49327	99	140	163	66	47	12	527	ssb

Duplicate cross-checking

by D. J. LAWLEY, G4BUO*

BOTH AS an active contester and, more recently, as a member of the Society's HF Contests Committee, the author has been aware of the importance of the checklog, or dupe sheet, in a contest entry. Some time ago the committee introduced severe penalties for unmarked duplicates in logs, so this article should be of particular interest to those who still lose large numbers of points in contests, as well as to newcomers seeking guidance on this important part of contest operation.

Duplicate, repeat or "dupe" contacts are hard to avoid in contests, and there is no objection to contacting a station any number of times so long as the repeat contacts are marked as such in the log and no points claimed for them. In fact it is often easier to work a station again than to attempt to explain that a QSO has already taken place, and where no checklog is kept memory can be unreliable. In the author's particular case much confusion and loss of points occur in contests when G4BOU is also active. Stations, sometimes needed for multipliers, are adamant that a contact has taken place, until they look back and discover their mistake, by which time many minutes may have been lost or, even worse, the station stubbornly refuses to make a contact. Additionally, under crowded band conditions an over-zealous speed merchant may have logged one call but exchanged reports with another, leading to difficulties when trying to work him later on. The objection, then, is not to dupes taking place, but to leaving them in the contest entry and claiming points several times for contacts with the same station.

Keeping a checklog

As with all aspects of contest operation, some preplanning is advisable. It should first be decided whether a dupe sheet need be kept during the contest, or if it will suffice to spot dupes when writing up. This question is related to the type of contest and your expected performance in it: the well-equipped station in CQ worldwide needs no dupe sheet, since the operator will expect to call CQ for most of the time, and we have seen that it is easier to work dupes when they call. On the other hand, if you expect to be searching and calling you will be wasting your own time working stations more than once. A certain amount of practice is needed to operate the rig, keep the log and maintain a dupe sheet, but it is worth getting to the point where the nature of the contest is the factor which decides whether to keep a dupe sheet, not your ability to cope!

In certain contests, such as the RSGB 21MHz CW Contest, a compromise solution may be reached where a dupe sheet is maintained for EU calls only. The reasoning here is that JAs and Ws will hopefully be worked at a quick rate, but when the band is not open to these areas, or if poor conditions reduce activity, more time may have to be spent searching for new, mainly European stations. In this particular contest the better-equipped stations would most probably not maintain a dupe sheet, but would always keep a running list of multipliers to ensure that no easy ones are missed. In field day contests all but the smallest groups should have sufficient resources to keep a dupe sheet.

Whatever strategy is adopted it is essential to check the log for duplicates while writing up after the event. If a full dupe sheet has been maintained during the contest this may be done by going back over the sheet, ticking off the callsigns as they appear. It is surprising how many will have been missed in the heat of the moment! Ticking off against an existing dupe sheet also helps to spot callsign errors made while writing up the contest entry, often the cause of unnecessary lost points.

The same style of dupe sheet may be used whether the check is made during the contest or afterwards. In all cases callsigns must be arranged in a set of tables so that as a new contact is made the call can be added to the table and checked against the others to see if the contact is a dupe. The most common choice of dupe sheet is one in which there are 26 "tables", one for each letter of the alphabet.

The next question is whether to make entries according to the first or last letter of the callsign suffix. For many years the author used the last letter, which—particularly in contests such as AFS and NFD—leads to a larger number of calls in the "C" column (for club) and "S" (for society). More importantly, when searching for new stations to work during a slow period, the entire call had to be copied before it was known where to look in the dupe sheet. For these reasons, and to make it easier to derive an alphabetic list of stations worked, it was decided to change to use of the first letter of the suffix, and it has now been found that there are a surprisingly large number of suffixes starting with the letter "A".

Types of checklog

Many styles of checklog are in use, and several of these are presented in the *Amateur Radio Operating Manual*. The chapter on contest working contains a great deal of useful information, and is highly recommended to contest operators of all levels of experience.

The dupe sheet layout adopted by the author for use in most single-operator contests is shown, in part, in Table 1. This consists of a sheet of A4 paper laid sideways and divided into nine columns and three rows, providing 27 spaces: one for each letter in the alphabet, with one spare which can be used for overflow, or for recording "gotaways" to be chased later. The sheet is taped to the shack table to the right of the logbook, so that the callsign may be recorded immediately after logging the contact. Despite its small size, this layout has proved useful for up to 400 contacts, and has the advantage of not requiring much space. Another popular style is shown in Table 2, where successive lines of the page are used for each letter of the alphabet. In the example shown, suffixes only have been recorded. This technique can be of use in inter-G contests, but in its basic form does not allow distinction between, for example, G3FAS and G4FAS. A possible compromise is to represent G3s by suffix only, but record G4s, GMs etc in full.

In the larger, multi-band multi-op events such as a field day, a bigger sheet, say 30 by 20in, should be used, divided into 26 columns, as shown (in part) in Table 3. Mount the sheet on hardboard and make maintenance the responsibility of the checklogger. Note that in a cw contest he need not be able to copy morse, so long as he can see the calls entered in the log. Callsigns should not be added to the dupe sheet until the contact has been completed, otherwise corrections will make the list hard to read. If a callsign is found to be entered incorrectly or unclearly, cross it out and write it again, do not attempt to amend the existing entry. Use pen rather than pencil, and do not be tempted to use correcting fluid which takes a relatively long time to dry and may come off. When calling CQ the position of the checklog is unimportant, but when searching and calling it should be in full view of the operator. An overhead projector providing a head-up display of stations worked may be of use here, and the author would be interested to hear from anyone who has tried this idea.

When plenty of space is available in the shack, it may be possible in a multi-op contest to use a dupe sheet divided into 26 by 26 squares, with callsigns entered according to the first and second letters of the suffix, Table 4. Following the unwelcome introduction of the 2 + 1 USA calls, 27 by 26 squares may now be more appropriate. Another form of checklog makes

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Table 1

A	B	C	D	E	F	G	H	I
Y30ABF/A	DJ6BW	SM0CCE	EI5DI	YU4EJC	DL6FAW	DK5GD	DK2HQ	Y24IF/P
PA3AWI	Y30BUB	EI7CC	SM0DJZ	DL1EAL	DK0FN	OZ1GRS	DK2HH	DF7IS
PA3AMA	PA3BLU	DL9CE	PA2DXY	ON4EG		UQ2GDL	Y22HF	LA1IE
UK2ABC	DK5BJ	PA3CCF	PA0DIN	ON4EV		PA0GVK		SM6ID
OK1AGA	UP2BHC	SM5CSS	SM6DED					
DL1AM	DJ3BG	Y30CCM						
Y30AYA								
F6ACV								
UA9AFO								

J	K	L	M	N	O	P	Q	R
PA2JDB	DF1KF	DL9LAI	LA2MA	SM7NDX	OH3OS		DL8QS	Y49RF
DL1JE	DF8KY	ON7LB	DJ1MU	SM0NBC	DL1OO		Y25QL/A	
DK1JX	DL5KC		SM0ML		DF5OS		DF3QN	
Y26JD	YU1KQ				UP2OX			
DL5JQ	HA5KDB							
OE5JDL								

Table 2

A	ARI						
B	BPM	BOU	BEG	BNP	BAU		
C	CEF	CNY	CCZ	CAZ			
D	DBW	DRQ	DYO	DXS	DTM	DUF	DI
E	EBL	ELZ	ED	EF	EA		
F	FNK	FXA	FXB	FUH	FYQ		
G	GC	GIR	GIQ	GKA	GFF	GMM	GKM
H	HVX	HK					
I	IUK	IGW	IGQ				
J	J	JDL	JJG	JGV			
K	KDY	KL	KGG	KFQ	KQ		

use of a small exercise book or address book with a thumbnail index, where successive pages represent the first letter of the suffix. Very many calls can be recorded by using this method, but the disadvantage is that some manual searching of the book has to take place, which will be hard work in a single-op cw contest. In an event such as the Commonwealth Contest the dupe sheet can be divided into call areas: most QSOs are with VE, VK, and ZL, so that space can be reserved for each call area VE1–7, VK1–8, and ZL1–4, with additional space for all the others. For BERU this year the author designed a check sheet along these lines which held dupe and bonus point information for all five bands, and which could hold about 80 calls/band, only to suffer conditions described by old hands as the worst ever!

Computer checklogging

The checklogs so far described have been paper-and-pen affairs, but increasing use is now being made of computers in the amateur shack, to the extent that rtty and cw contacts can be handled almost entirely by machine. At present the author is confident of being able to beat a computer in an amateur contest, and has resolved to give up the hobby if this situation ever changes. Nevertheless home computers of very modest size can be extremely useful in checking for duplicates, mostly after the event. Those considering the use of a machine for real-time duping should bear in mind the recent experience of a well-known contester who developed a comprehensive program on a microcomputer to take most of the hard work out of a 24h contest. The program kept the log as well as a running check for dupes, but was only in its prototype stage when first used. In the rush to get the system working there had been no time to disable the escape key, and after six hours of contest operation the inevitable happened: escape was pressed, causing the erasure of all the log. On this minimal system there was no floppy disk backup and no printed output, and all was lost. Even if the escape key had been disabled there was no guarantee that a temporary loss of power would not have had the same disastrous effect. It is clearly unwise to attempt to keep a running checklog on a computer unless a hard storage medium is available—even then there may be a problem with rf getting into the works and corrupting data, and in the reverse direction rf from the microprocessor circuitry can cause QRM in the receiver. Nevertheless these problems have been overcome by those who now use micros with success during contests.

Table 3

A	B	C	D	E
Y30ABF/A	DJ6BW	SM0CCE	EI5DI	YU4EJC
PA3AWI	Y30BUB	EI7CC	SM0DJZ	DL1EAL
PA3AMA	PA3BLU	DL9CE	PA2DXY	ON4EG
UK2ABC	DK5BJ	PA3CCF	PA0DIN	ON4EV
OK1AGA	UP2BHC	SM5CSS	SM6DED	UH8EAA
DL1AM	DJ3BG	Y30CCM	YU3DOX	UB5EDJ
Y30AYA	EA3BHA	UL7CBM	YU5DST	UB5ENV
F6ACV	OK2BMA	CN8CY	EI3DY	YU2EU
UA9AFO	UP2BCR	HA8CH	UD6DKW	YU4EGZ
UA3AGX	TO6BBJ	UA4CDL		YU1EA
ON5AZ	EA3BEW	UA9COB × 2		ZB2EO
OK1AHQ	OK2BPF	HB9CLM		K1EFI
OH6AK	OH2BFV	UB5CBA		
YU7ACO		EA2CR		
YU2ADE		SM3CBR		
UB5AEW				
UA6AUZ				
HB9AAQ				
HB9AQS				
UB5AER				
UC2AFF				
YU1AMI				
YU1AGP				
VE1ATJ				
SM5ALJ				

Note the dupe contact with UA9COB.

Table 4

	A	B	C	D	E	F	G	H	I	J
A	HB9AAQ	Y30BF/A UK2ABC	F6ACV YU7ACO	YU2ADE	UB5AEW UB5AER	UA9AFO UC2AFF	OK1AGA UA3AGX YU1AGP	OK1AHQ YU1AHI		
B		TO6BBJ	UP2BCR		EA3BEW	OH2BFV	DJ3BG	UP2BHC EA3BHA		DK5BJ
C		UL7CBM UB5CBA SM3CBR	SM0CCE EI7CC PA3CCF	UA4CDL	DL9CE			HA8CH		

Perhaps the most straightforward method of computer duping involves maintaining callsigns in a large table in memory, and for each contact checking that the callsign is not already in the table and, if not, adding it to the end. If we ignore suffixes such as /A and assume that no callsign exceeds six characters, we can store about 170 calls in 1k. Some saving is possible if we attempt to encode the callsigns, observing that if each character in a call must either by 0–9 or A–Z then there are only 366 possible callsigns, which can be represented uniquely in four bytes, allowing 256 calls to be held in 1k. However, in a simple system such as this the calls are not sorted into alphabetical order, so the time taken to search for a call increases steadily as a contest progresses. If duping is to be done after the event, however, this may not be considered a problem.

A significant improvement in search time may be had by dividing the calls into tables, much as for the manual dupe sheets. However, simply splitting available memory into 26 divisions may lead to unacceptable wastage of storage, because of the essentially random nature of callsigns. A technique called "hashing", widely used in computer applications, may be used to enter callsigns in the tables with more even distribution, but the capability to produce a list of calls worked in alphabetical order will then be lost. Alternatively, calls may be entered into a table together with a pointer to the next entry in that table. Thus a number of intermingled "chains" can be built in memory, with no gaps. Of course additional space will be required to hold the pointers. At this stage we have not considered how to handle band changes when duping on a computer during the contest period. Clearly if duping when writing up, the program can be run once for each band.

After mulling over some of these problems and having access to machines in which storage is not of primary importance, the author has developed a program for duping a log after the event in which only the callsign suffix is recorded, together with the QSO serial number. The starting number is entered and thereafter incremented automatically, with the capability to enter a new number following, for example, a band change. Memory is divided into 26 tables much as for a manual dupe sheet, and in order to save space the suffix and serial number up to 10,000 are encoded into four bytes. When a repeat suffix is detected, the serial numbers of both occurrences are printed out, and the user then has to look back in the log to see if the full call is repeated. The principal saving is that prefixes, which will always be composed of numerics as well as alphabetics, do not have to be keyed in, reducing the time taken for data entry by about 50 per cent. The system has proved extremely useful in contests where serial numbers are sent and not too many Ws are active, but in the ARRL contest the "serial number" has to be converted to log page number, and the dreaded 2 + 1 calls throw up far too many "phantom" dupes. However, the system works very well for contests such as NFD and VHF Field Day.

Summary

Duping has two uses: first, during a contest to avoid wasting time working stations twice, but more importantly after the event to ensure that no points will be lost unnecessarily. Duplicates, if found, should be marked in the log, and if possible references given to the previous occurrence(s) of the callsign, to assist the checker. It quite often happens during adjudication that it is the second contact with a station which becomes the scoring contact, the first being ineligible perhaps because of a callsign error. It is often a help if dupe sheets are included with the contest entry. The adjudicator then has proof that some attempt has been made to check for dupes, and can use the dupe sheet as the basis for his own dupe check. To those who have lost points in the past because of duplicates, please remember that a Contest Committee member will be putting in up to about 100h of his own time to check a contest, and will not therefore have much sympathy with anyone who has not taken the time to spot dupes.

The ideas presented here are by no means the last word on duping, but are intended primarily to encourage prospective contesters to think about and plan duplicate checking in the same way that equipment, antennas and overall strategy must be planned for best results. □

Contest News

The Commonwealth Contest 1984 rules

TRANSMITTING SECTION

1. When. From 1200gmt on Saturday 10 March 1984 to 1200gmt on Sunday 11 March 1984.

2. Eligible entrants. Members of the RSGB resident in the UK and radio amateurs licensed to operate within the British Commonwealth or British Mandated Territories. Entries from GB, aeronautical mobile or maritime mobile stations will not be accepted.

3. Contacts. CW(A1A) only in the 3·5, 7, 14, 21 and 28MHz bands. Contacts may be made with any station using a British Commonwealth callsign, except those within the entrant's own call area. UK stations may not work each other for points. In accordance with IARU recommendations, contestants are requested to operate within the lower 30kHz of each band, except when contacting novice stations that operate above 21,100kHz and 28,100kHz. A contact exchange consists of RST and a three-figure serial number commencing with 001 and increasing by one for each successive contact throughout the contest, irrespective of band in use. Serial numbers when sent from non-competing stations, must be recorded.

The Commonwealth Contest is a single-operator, single-transmitter event. Evidence of simultaneous operation on more than one frequency may result in disqualification.

4. Scoring. Each completed contact will score five points. In addition, a bonus of 20 points may be claimed for the first, second and third contacts with each Commonwealth call area (as listed in the accompanying table) on each band. All British Isles prefixes (G, GB, GD, GI, GJ, GM, GU and GW) count as one call area.

5. Logs. Separate logs for each band must include gmt, callsign of station worked, RST/serial number sent, RST/serial number received and points claimed. Separate band totals should be added together and the total claimed score entered on the cover sheet. It is important that logs are carefully checked for duplicate contacts. Unmarked duplicate contacts for which points have been claimed will be heavily penalized and logs containing **in excess of five** will be disqualified.

6. Entries. Entries may be single- or multi-band. Single-band entries should show contacts on one band only; details of contacts made on other bands should be enclosed separately for checking purposes. Multi-band entries will not be eligible for single-band awards.

Each entry will consist of the separate band logs together with a cover sheet and declaration that the rules and spirit of the contest and the terms of the entrant's licence were observed.

Entries should be addressed to R. L. Glaisher, G6LX, 279 Addiscombe Road, Croydon CR0 7HY, UK. Adjudication of this contest will commence on Monday 14 May 1984. Any entry received after this date may be excluded from the contest. Overseas stations are therefore advised to forward their logs by airmail.

All entries become the property of the RSGB. In the event of any dispute, the ruling of the Council of the RSGB shall be final.

7. Awards. To the winner, the BERU Senior Rose Bowl; to the runner-up, the BERU Junior Rose Bowl and to the leading UK station, the Col Thomas Rose Bowl. Certificates of merit will be awarded to (a) first, second and third placings in home and overseas multi-band sections; (b) the leading home and overseas single-band entries on each band; (c) the leading station in each overseas call area.

RECEIVING SECTION

1. When. Times and dates as for transmitting section.

2. Eligible entrants. Members of the RSGB resident in the UK and all swls resident in the British Commonwealth or British Mandated Territories. Only the entrant may operate his receiving station for the duration of the contest. Holders of transmitting licences covering frequencies below 30MHz are not eligible to take part.

3. Scoring. To count for points, a station outside the entrant's own call area must be heard in a contest contact. CQ or test calls will not count for points. A station may be logged only once on each band for the purpose of scoring. When both stations in a contact are heard, they should be logged separately and points claimed for both entries provided that the stations are outside the entrant's own call area.

Each completed log entry will score five points. In addition, a bonus of 20 points may be claimed for the first, second and third stations heard in each British Commonwealth call area on each band. All British Isles prefixes count as one call area.

4. Logs. A separate log is required for each band. Logs should show the date/time gmt, callsign of station heard, RST/serial number sent by the station heard, callsign of station being worked and points claimed.

5. Entries. Each entry will consist of the log sheets, cover sheet and a signed declaration that the receiving station was operated in accordance with the rules and spirit of the contest and that the entrant does not hold a transmitting licence for frequencies below 30MHz. Entries should be addressed and sent as in rule 6 of the transmitting section. All entries become the property of the RSGB. In the event of any dispute, the ruling of the Council of the RSGB shall be final.

6. Awards. The BERU Receiving Rose Bowl to the winner. Certificates of merit to the leading entrant in each continent.

COMMONWEALTH CALL AREAS

The following call areas are recognized for the purpose of scoring in the 1984 Commonwealth Contest:

A2	Botswana
A3	Tonga Is
A5	Bhutan
C2	Nauru
C5	Gambia
C6	Bahamas
G/GB/GD/GI/GJ/GM/GU/GW	
H4	Solomon Is
J3	Grenada
J6	St Lucia
J7	Dominica
J8	St Vincent
P2	Papua New Guinea
S2	Bangladesh
S7	Seychelles
T2	Tuvalu
T30	W Kiribati
T31	C Kiribati
T32	E Kiribati
V2	Antigua
V3	Belize
VE1	
VE1	Sable Is
VE1	St Paul Is
VE2	
VE3	
VE4	
VE5	
VE6	
VE7	
VE8	
VK1	
VK2	
VK2	Lord Howe Is
VK3	
VK4	
VK4	Willis Is
VK5	
VK6	
VK7	
VK8	
VK9	Christmas Is
VK9	Cocos Is
VK9	Norfolk Is
VK0	Heard Is
VK0	Macquarie Is
VK0/VP8*	Antarctic
VO	Newfoundland
VP2E	Anguilla
VP2K	St Kitts, Nevis
VP2M	Montserrat
VP2V	British Virgin Is
VP5	Turks & Caicos
VP8	Falkland Is
VP8	S Georgia
VP8	S Orkney Is
VP8	S Sandwich Is
VP8	S Shetland Is
VP9	Bermuda
VQ9	Chagos
VR6	Pitcairn
VS5	Brunei
VS6	Hong Kong
VY1	Yukon
VU	India
VU	Laccadive Is
VU7	Andaman & Nicobar Is
YJ	Vanuatu
Z2	Zimbabwe
ZB2	Gibraltar
ZC4/5B4	Cyprus
ZD7	St Helena
ZD8	Ascension Is
ZD9	Tristan da Cunha
ZF	Cayman Is
ZK1	Cook Is
ZK1	Manihiki
ZK2	Niue
ZL1	
ZL2	
ZL3	
ZL4	
ZL	Auckland & Campbell Is
ZL	Chatham Is
ZL	Kermadec Is
ZM7	Tokelau Is
3B6/3B7	Agalega & St Brandon
3B8	Mauritius
3B9	Rodriguez Is
3D2	Fiji
3D6	Swaziland
4S	Sri Lanka
5H	Tanzania
5N	Nigeria
5W	Western Samoa
5X	Uganda
5Z	Kenya
6Y	Jamaica
7P	Lesotho
7Q	Malawi
8P	Barbados
8R	Guyana
9G	Ghana
9H	Maltese Is
9J	Zambia
9L	Sierra Leone
9M2	W Malaysia
9M6/9M8	E Malaysia
9V	Singapore
9Y	Trinidad & Tobago

*All calls operated from Commonwealth controlled areas of the Antarctic (VK0, VP8, ZL5 etc) count as one call area.

August 70MHz Trophy Contest 1983 results

It is difficult to understand why 70MHz contests fail to capture the imagination of so many hf and vhf operators when the distances worked under normal propagation conditions compare so favourably with those obtained in daylight hours on other bands. Whether it is the lack of Continental activity, the non-availability of 70MHz to Class B licensees, or merely that hf and vhf amateurs tend to confine their major interests to their own ends of the spectrum, is open to debate. The fact remains that 70MHz has much to offer, is under-rated and under-used.

Nevertheless, 37 entries overall, with an average of 52 QSOs per entry represents a small improvement on last year. The propagation conditions were generally quite good although very little sporadic-E materialized; 75 per cent of the portable stations claimed their best dx in excess of 500km. For once, the weather smiled on the event and even those on high places thought it ideal.

Very many competitors commented upon how much they had enjoyed the contest, and undoubtedly the keen but friendly rivalry between the leading stations contributed to this significantly. There were no reports of bad signals or splatter that could be confirmed; the adjacent channel QRM was almost negligible, and the standard of operating was excellent. As one contestant remarked, "What a pleasure to be given 5 and 9 without a request to repeat the QTH". It was also pleasing to note that stations in the north and west made no complaints about others failing to beam in their direction.

The VHF Contests Committee have never had less incentive to change the rules of a contest and 70MHz fans can rest assured that this event, which provides a temporary refuge from the usual contest rat-race, will be retained in 1984.

Congratulations to the South of Scotland VHF/UHF Contest Group, GM3WOJ/P, who take the 70MHz Trophy by a narrow margin from the runners-up, the Parallel Lines Contest Group, GM4LIP/P. GD4IOM and G4ANT take first and second places respectively in the Fixed Station section.

G2HIF

OPEN SECTION

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
1	GM3WOJ/P	1,212	95	XO26	GU2HML	594
2	GM4LIP/P	1,130	84	YP42	GU2FRO	600 +
3	G4ADV/P	972	77	XK57	GM4LIP/P	563
4	GW4ERP/P	741	95	YN75	GM4SDG/P	502
5	G3KUE/P	701	79	YO78	G4ADV/P	438
6	G4MTL/P	577	81	ZM80	GM4SDG/P	619
7	G3VER/P	516	84	ZL17	EI9Q	424
8	G3JEQ/P	513	73	ZL77	GM4LIP/P	510
9	GW3UAX/P	432	42	XL07	GM4DIJ	455
10	G3PJX/P	319	50	ZL69	GM4LIP/P	519
11	GI4AHD/P	282	22	WP77	G4ANT	593
12	G4TUI/P	191	35	YM60	GM4LIP/P	358
13	G4CMZ/P	107	23	ZN72	G4ADV/P	360

FIXED STATION SECTION

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
1	GD4IOM	844	72	XO67	GU2HML	536
2	G4ANT	672	71	AM27	GI4AHD/P	592
3	G4TSJ	461	51	AM27	GI4AHD/P	591
4	G3TBK	453	68	ZN77	GI4AHD/P	430
5	G3TCT	447	49	ZL59	GM4LIP/P	515
6	G3UVR	434	54	YN55	G4DCV	387
7	G3VIP	414	52	ZN40	EI9Q	487
8	G4MKF	404	60	ZL44	GM4LIP/P	474
9	G4FOH	382	60	ZM60	GM4LIP/P	400 +
10	G4RCD	365	40	YO38	G4ADV/P	489
11	G3EDD	333	47	AM62	GM4LIP/P	443
12	G4FRO	327	43	YL48	GM4LIP/P	442
13	G3SSO	322	48	YL10	GM4LIP/P	404
14	G3VNQ	284	38	YN39	G4ADV/P	404
15	G3ONP	271	41	YM40	GI4AHD/P	404
16	G4CIZ	260	37	ZL55	GM4LIP/P	483
17	G4AFJ	238	38	ZM05	G4ADV/P	385
18	G3OIC	234	39	ZM41	GM4LIP/P	355
19	G4EYD	206	35	ZM41	GM4LIP/P	355
20	GW4HBK	202	24	YL25	GM4LIP/P	415
21	G3BOC	156	30	YM16	GI4AHD/P	356
22	G4CAX	141	23	YN68	G4ADV/P	355
23	G5UM	135	25	ZM35	GM4LIP/P	315
24	G3MOB	120	28	AL32	GM3WOJ/P	484

SWL SECTION

Posn	Station	Points	QTH
1	BRS52543	336 points from 46 stations heard.	YN15

Check log gratefully acknowledged from G2DHV

Equipment

GM3WOJ/P	**TX**	Final stage, 4CX250B, 130W p.e.p output, ssb.
	RX	First rf stage, 3SK88, 3N204 mixer.
	Ant	14-el NBS Yagi at 35ft above ground.
GD4IOM	**TX**	Final stage, QQV06-40, 100W p.e.p. output, ssb.
	RX	First rf stage, 2N3819, 40673 mixer.
	Ant	4-el Yagi, 15ft above ground.

144MHz/432MHz Contest March 1983 results—errata

The adjudicator regrets and apologises for the fact that there were some errors in the published report of the above contest.

Overall results—Fixed Station section
G3PBV should be shown in 10th position with 92 points on 432MHz. GW6MLN should not be shown in the overall results since this was a check log.

Overall results—All Other Stations section
The Parallel Lines Contest Group should be shown in third position with 849 points on 144MHz and 892 points on 432MHz.

The East Kent Radio Society should have been shown in 10th position with 305 points on 144MHz and 529 points on 432MHz.

144MHz Fixed Station section
DK3UZ was in 10th position and not DK3UX as shown. G4MUT should have been shown in 19th position. The positions of G3UKC and G6ECM should be reversed. G3FRE should have be shown as G4FRE.

144MHz All Other Stations section
G3GWB/P was incorrectly shown in this section and should be deleted.

432MHz All Other Stations section
The entry of the Parallel Lines Group, under the call of G4CLA/P, was omitted and should be shown in 3rd position with a score of 3,036 points from 254 QSOs operating from AN61.

G4POL/P should have been shown in 13th position with the score of 801 points.

The entry from the Northampton Radio Club, under the call of G3GWB/P, should have been shown in 18th position, with a score of 502 points from 90 QSOs.

The positions of all other stations should be adjusted where necessary to accommodate these corrections. *G3LCH*

Verulam ARC Transmitting and Receiving Contest 1983 rules

Section 1. 1·8MHz—2000 to midnight, Saturday 19 November
Section 2. 144MHz—0900 to 1300gmt Sunday 27 November
The rules for the contest are the same as those for previous years.
Those who do not have copies of these rules should obtain them from H. Claytonsmith, G4JKS, 115 Marshalswick Lane, St Albans, Herts, tel 59318, after 6.30pm.
Separate logs for each section of the contest should also be sent to the address above, postmarked not later than **12 December 1983.**

White Rose RS Fourth SWL Lower Frequency Bands Contest rules

1200gmt 14 January—1200gmt 15 January 1984
The rules for this contest are the same as those published in the October 1981 issue of *Radio Communication*. Copies of these rules can be obtained from Mr John Hart, G3ZGA, c/o White Rose ARS, PO Box 73, Leeds LS1 5AR.

Entries should be sent to White Rose RS, PO Box 73, Leeds LS1 5AR, to arrive not later than 3 March 1984. Contestants wishing to receive a copy of the results should enclose an sae or two ircs if outside the UK.

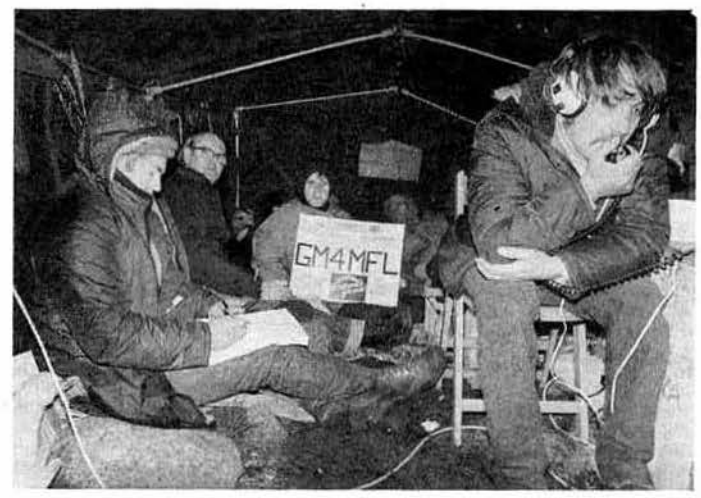
Contests Calendar

October/ December	1,296MHz Cumulative *(Rules in July issue)*
November/ December	28MHz Activity Contests *(Rules in October issue)*
5-6 November	144MHz CW *(Rules in August issue)*
5-6 November	Marconi Memorial 144MHz CW *(Rules in October issue)*
6 November	LF CW *(Rules in April issue)*
12-13 November	Second 1·8MHz *(Rules in October issue)*
12-13 November	WAE RTTY Contest *(Rules in November* MOTA*)*
13 November	OK DX Contest *(Rules in November* MOTA*)*
19 November	Verulam ARC Contest (1·8MHz) *(Rules in November issue)*
19-20 November	All Austria Contest *(Rules in November* MOTA*)*
26-27 November	CQ WW DX CW *(Rules in October* MOTA*)*
27 November	Verulam ARC Contest (144MHz) *(Rules in November issue)*
3-4 December	TOPS Activity Contest *(Rules in November MOTA)*
4 December	144MHz Fixed *(Rules in October issue)*
1984	
14-15 January	White Rose RS SWL *(Rules in November issue)*
22 January	Swale ARC 144MHz *(Rules in October issue)*
29 January	Swale ARC 432MHz *(Rules in October issue)*
4-5, 25-6 February	7MHz *(Rules in September issue)*
10-11 March	Commonwealth *(Rules in November issue)*

HIGH FLIERS

Easter Ross and Kinloss Radio Clubs took part in the 144MHz Trophy and SWL contest, operating from the summit of the 4,084ft Cairngorm Summi Mountain. The winds were in excess of 85mph at times, with driving rain and at the same time thick cloud covering reducing visibility to 10ft. The temperature was only one degree above freezing. The conditions became so severe that the tent nearly took off on a number of occasions, with the seven becoming the first hang-gliding radio hams in Britain!

The group, from l to r: Jimmy Plunkett, GM6VAC; Derek Murgatroyd, GM3PGX; Hamish Stuart, GM4SFW; Ian Cowan, GM6WQC; Robert Cameron, GM4OHY; Philip Gane, GM4SUF; and Dick Drake-Cameron, GM8YLG. ***Photo*** **DGS Studios**



The group in action

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 in the January 1984 issue.

RSGB affiliated organizations are requested to report all programmes and news items to their regional representatives regularly. Information for inclusion in the **January** issue should reach them by **12 November** and for the **February** issue by **10 December**.

Club programmes are given in order of date, subjects, time and place of the 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 W. R. Parkinson, G3FNM,141 Norris Road, Sale, Cheshire M33 3JR. Tel 061 973 1472.

Accrington (NW Repeater Group)—17 November, 8pm. Globe Bowling Club, Willows Lane, Accrington, Sec Howard Aspinall, G3RXH.

Barnoldswick (Rolls Royce ARC)—2 November, 7 December. Details of programme on GB2RS News. Rolls Royce Sports & Social Club. Sec Leslie Logan, G4ILG, tel 0282 812288.

Blackburn (East Lancs ARC)—6 December (AGM), 7.30pm. Shadsworth Leisure Centre. Pro Graham Pountain, G4MWY, tel 0254 678933.

Bury (BRS)—8 November ("Japanese morse", by Norman Kendrick, G3CSG). Informal meetings on 1, 15, 22 and 29 November. Details from sec Brian Tyldsley, G4TBT, 4 Colne Road, Burnley, tel Burnley 24254.

Eccles (E&DARS)—Club now meets every Tuesday, 8.30pm. The Duke of York Hotel, Church Street, Eccles. Sec Chris Harrison, G8KRG, 53 Peveril Close, Whitefield, Manchester M25 5NS, tel 061-773 7899.

Fylde (FARS)—1 November ("Nucleonics", by John Ball, G4DPI), 15 November (An informal evening with morse class), 6 December (Christmas party), 7.45pm. Kite Club, Blackpool Airport, Sec Wally Poupard, 14 Beach Street, Lytham, tel 0253 734596.

Kendal (Westmorland RS)—Second Tuesday in each month. Strickland Arms; located on the A6, nr Kendal. The club officers are chairman, E. A. Robinson, G6MGP, treasurer, Peter Atkinson, G4AAS, and sec Neil Martin, G6OPO, tel 0539 31476.

Leyland (LHARG)—14 November, 7.30pm. Astley Sports Club, Hallgate, Astley Village, Chorley. Sec Arthur Jolly, G4JCO.

Manchester (SMRC)—4 November (Club quiz), 11 November (Mystery lecture), 18 November (Annual dinner, Bowdon Hotel, Altrincham, 7.30pm for 8pm), 25 November ("Contest organization and development", by David Yorke, G4JLG), 2 December (Lecture, to be arranged), 8pm. Sale Moor Community Centre, Norris Road, Sale. Informal meetings Mondays in the club shack. Sec David Holland, G3WFT, tel 061-973 1837.

Maryport (Solway RC)—Club officers now are chairman, D. Bowden, treasurer, A. Thorne, and sec J. Aldersey. The Educational Settlement, High Street, Maryport. Details of venue etc c/o the Educational Settlement.

Oldham (OARC)—Mondays, 8pm. Devonshire Arms, 13 Elliott Street, Lees, Oldham. Details from sec Mrs F. Butterworth, G4SPX, 26 Torwood Road, Chadderton, Oldham, Lancs OL9 0RA, tel 061-652 8862.

Preston (PARS)—10 November (Hot pot supper), 24 November ("Fire arms", a talk by Jim Carrol, G3KCC), 8 December (Christmas party). Lonsdale Club, Fulwood Hall Lane, Fulwood, Preston. Details from George Earnshaw, G3ZXC, tel 0772 718175.

Thornton Cleveleys (TCARS)—7 November (Talk on modern heating controls by G8KBH), 14 November (Talk on computers, by G3GIY), 21 November (Club operating night), 28 November (Talk on small bore rifles), 7.30pm. Norbreck 1st Scout Hut, Carr Road, Bispham. Details from sec Janet Atkinson, 26 Lancaster Avenue, Thornton Cleveleys FY5 4NN, tel Blackpool 826451.

Warrington (UKFM Group Western)—3 November, 1 December. Grappenhall Community Centre, Bellhouse Lane, Warrington. Sec Gordon Adams, G3LEQ, tel 0565 4040.

Wirral (W&DARC)—Formal meetings 9 and 23 November. D & Ws on 2 November at The Harp, Lower Neston, 16 November—The Primrose, Liskeard, 8pm. Irby Cricket Club, Irby Mill Road, Irby. Sec Gerry Scott, G8TRY, tel 051-630 1393.

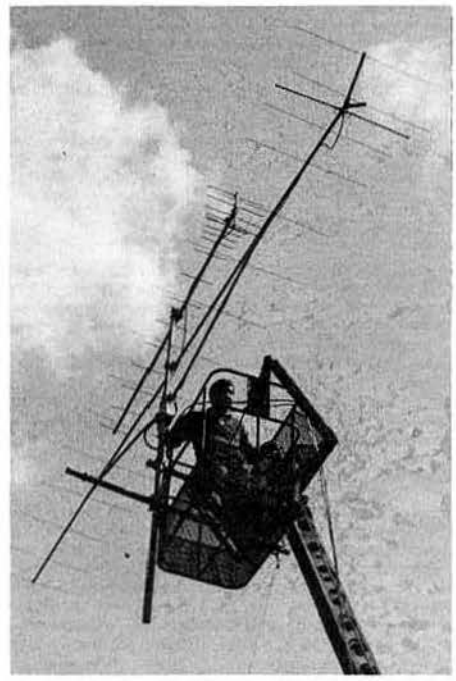
REGION 2—RR D. S. Smith, G4DAX, Red Roof, Goathland, Whitby, North Yorks YO22 5AN. Tel 094-786 333.

Barnsley (UK FM Group Northern)—6 November, 4 December, 7.30pm. The Royal Hotel, Church Street, Barnsley. Sec G4LUE.

Goole (G&DARS)—1 November (Natter night), 8 November (Open evening—come and visit), 15 November (Video evening), 22 November (Colour sstv), 29 November (Surprise item), 7.45pm. Goole Junior Chamber of Commerce, Boothferry Road, Goole. Sec G8IOH.

Halifax (Northern Heights ARC)—2 November (Home brew 23cm), 16 November (The sun), 30 November ("Traffic signalling", by G4KAX), 8pm. Bradshaw Tavern, Bradshaw, Halifax. Sec G6CJL. Club net frequency 145·275MHz.

Hull (H&DARS)—Mondays, 7.30pm, cw classes. Tuesdays and Thursdays, 7.15pm, RAE classes. Fridays, club night. West Park Recreation Centre, Walton Street, Anlaby Road, Hull. Sec G6VOM.



Gordon Southwell, G4HVR, of Sefton ARC, at the Wigan Motor Show. Ford's latest traffic-beating model?

Maltby (MARS)—Fridays, 4 November (Amateur photography), 11 November (Project night), 25 November (Music synthesis), 2 December (Novelty electronics). Methodist Church Hall, Blyth Road, Maltby. Sec G3ZHI, tel 0909 814911.

Spen Valley (SVARS)—10 November ("Equipment alignment", by G4EZV), 24 November ("The madcap fringe of amateur radio", by G6WEF), 8pm. Old Bank Working Men's Club, Mirfield, W Yorks. Sec G4MNW.

Wakefield (NWRC)—Thursdays, 17 November (Junk sale and pie & pea supper), booking in from 7.15pm. Carr Gate WMC, Wakefield. Sec G4RCH, tel 0532 536633.

Wakefield (W&DARS)—1 November (On air/natter night), 15 November (Film show), 29 November (Equipment alignment), 8pm. Holmfield House, Denby Dale Road, Wakefield. Sec G8PBE.

York (YARS)—Following the various special event stations this summer, the club followed up with GB3GW to celebrate a member's golden wedding. A good time was had by all. Fridays, 7.30pm. United Services Club, Micklegate, York. Sec G3WVO.

Following a change in shift working pattern from August, I find I am no longer able to perform the duties of Regional Rep in a satisfactory manner. Consequently it is with great regret that I have forwarded my resignation to Council, effective from 30 September.

May I thank all those amateurs who have welcomed me to their clubs and rallies, and have helped to make the duties both pleasant and satisfying. *G4DAX*

Sefton ARC club members at the Wigan Motor Show, where they operated a special event station, GB4WMS. L to r: Bob, G8ZWZ; Pete, G8YPL; Terry, G6NIN; Mike, G6ICR; Paul, G6PZW; Phil, G4KIN; Paul, G6EXC; Arthur, G6NRK; and Frank, G6WFE

REGION 3—RR L. W. Craven, G4EQI, Grass Moor, Radford Road, Alvechurch, Birmingham B48 7DT. Tel 021-445 1347.

Atherstone (AARC)—17 November (AGM), 8pm. Tudor Centre, Coleshill Road, Atherstone. Sec G6BEO, tel Hinckley (0455) 212051.

Birmingham (Midland ARS)—15 November (Surplus sale), 7.30pm. 294a Broad Street, Birmingham B1 2DS. Sec G8BHE, Tel 021-422 9787.

Birmingham (South Birmingham ARS)—2 November (AGM). 8pm. Hamstead House, Fairfax

Organizers of special event station GB2RAE, which celebrated 10 years of RAE courses at the Airedale and Wharfdale College, Leeds. L to r: Diane, G8TEJ; Geoff, G3FCW; Ron, G3YEE, and Dorothy, G4OAT. Ron has taught the RAE for 10 years at the college, while Geoff has taught cw for the past eight years. ***Photo:*** **G4OWF**

Road, West Heath, Birmingham B31 3QY. Sec G8RGQ, tel 021-459 8312.
Halesowen (MEB RC)—8 November ("45 years in amateur radio", by Tom Douglas, G3BA), 22 November (General meeting), 8pm. MEBHQ Social Club, Mucklow Hill, Halesowen. Sec G4RWH, tel 021-747 8784.
Hereford (HARS)—4 November ("Old Hereford photos", by Basil Butcher), 18 November ("Electro-magnetic compatibility or how to cause other people problems without really trying", by Rev S. A. Evason), 7.45pm. Antelope Inn, Barton Road, Hereford. Sec G4CNY, tel Hereford (0432) 273237.
Kidderminster (K&DARC)—8 November ("23cms", by Fred Smith, G6FK), 22 November (Surplus equipment sale), 8pm. Aggborough Community Centre, Hoo Road, Kidderminster. Alternate Tuesdays (Informal evenings at Viaduct Public House). Sec G8WOX, tel Kidderminster (0562) 61584.
Solihull (SARS)—15 November (Junk sale, auctioneer G3RGD), 7.30pm. Manor House, High Street, Solihull. Sec G4NRR, tel 021-744 8672.
Stourbridge (StARS)—7 November (Informal meeting). 21 November (Annual surplus sale), 8pm. The Garibaldi, Cross Street, Stourbridge. Sec G8JTL, tel Lye (593) 4019.
Sutton Coldfield (SCARS)—14 November (Computer and discussion evening), 28 November (AGM and slide evening). Central Library, Sainsbury Centre, Sutton Coldfield. Sec G8TUR, tel 021-353 2061.
Warwick (Mid-Warwickshire ARS)—1 November (Natter night), 15 November ("Mobile interference suppression", by Roy Medcalf, G8XDL), 7.30pm. 61 Emscote Road, Warwick. Sec Carol, G4TIL, tel Southam (092681) 4765.
Worcester (W&DARC)—7 November (Demonstration of Yaesu equipment by SMC at Oddfellows Club), 8pm. 25 November (Informal evening at Old Pheasant Inn, New Street, Worcester). Sec G4NRD, tel Evesham (0386) 41508.

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

Buxton (BARS)—8 November (AGM), 22 November (Informal meeting), 8pm. Egerton Hotel, 36 St Johns Road, Buxton. Sec Derek Carson, G4IHO, tel Buxton 5006.
Derby (D&DARS)—2 November (Junk sale), 9 November (Visit by SMC (Jack Tweedy) Ltd), 16 November (Technical topics), 23 November (Visit by John Birkett Ltd), 30 November (Film show), 7 December (Bring & buy sale), 7.30pm. 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.
Grantham (GRC)—15 November (AGM), 8pm. Shirley Croft Hotel, Harrowby Road, Grantham. Sec John Kirton, G8WWJ, tel Grantham 5743.
Grimsby (GARS)—3 November (Junk sale), 7.30pm. Cromwell Social Club, Cromwell Road, Grimsby. Sec Reg Scarlett, G4HZF.
Lincoln (LSWC)—9 November ("Aerials", by G8CTG), 23 November (Activity night/night on the air), 8pm. City Engineers Club, Waterside South, Lincoln. Sec Pam Rose, G4STO, tel Gainsborough 788356.
Newark (N&DARS)—3 November (Film evening), 1 December ("Computers in amateur radio", by G4FUO), 7.30pm. Palace Theatre, Appleton Gate, Newark-on-Trent. Sec Roger Hiscock, G4MDV.
Nottingham (ARCON)—3 November (Forum), 10 November ("Op amps", by G8FWH), 17 November (Activity night), 24 November (Grand autumn junk sale), 1 December (Forum), 7.30pm. Sherwood Community Centre, Mansfield Road, Nottingham. Sec Phil Barber, G4OSL.

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

Cambridge (C&DARC)—4 November (Informal, morse classes, operating club station G2XV), 11 November (Film show), 18 November (Informal evening, morse classes), 25 November (Talk by Ray Flavell on "A guide to propagation"). Visual Aids Room, Ground Floor, Coleridge Community Centre, Radegund Road, off Coleridge Road. Sec Dave Leary, G8JKV, tel Swavesey 31120.
Leighton Linslade (LLRC)—21 November, 7-10pm. Vandyke Community Centre, Room A64, Vandyke Road, Leighton Buzzard. Sec Pete Brazier, G6JFN, tel Heath & Reach 270.
March (M&DRC)—At the time of going to press this club was looking for new premises, so if anyone in the area knows of any suitable hall please contact sec G4KPZ.
Northampton (NRC)—10 November (RSGB video film "The Secret Listeners"), 24 November (Visit by the Regional Representative), 8pm. Kingsthorpe Community Centre. Sec G3VMU, tel Northampton 28516.
Peterborough (GPARC)—24 November ("Satellite working", by Ian, G3NRW), 7.30pm. Southfields Junior School. Sec Frank Brisley, G4NRJ.
Shefford (S&DARS)—10 November (Constructor's contest), 12 November (Annual dinner), 8pm. Church Hall, Shefford. Sec Alan, G4PSO.
St Neots (StN&DARS)—Mid-November (A visit to Radio Cambridge). Further details from new sec, G8XFO.
Wellingborough (Nene Valley RC)—2 November (Junk sale and auction), 9 November ("Wheatstone's greatest invention", by G4ODI), 16 November (Natter night and hf transmitting), 23 November ("Why do radio communications perform better than might be expected?", a lecture by G8TTF), 30 November (Buffet and social evening at the Dolben Arms in Finedon), 8pm. Lectures and natter nights at Finedon. All transmitting from club room, First St Mary's Scout Hall. Sec Lionel Parker, G4PLJ, tel Wellingborough 79539.

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HA3 7EA. Tel Penn (049481) 4240.

Aylesbury (AVRS)—1 November ("Semiconductors and transistors", by Nigel Pritchard, G8AYM), 29 November (Lecture by Angus McKenzie, G3OSS), 8pm. Stone Village Hall, Stone, nr Aylesbury. Details from sec Cathy Clark, tel 0844 61461.
Harwell (HARS)—In November the HARS are holding a constructional contest. Details from Cliff Sharpe, G2HIF, tel Wantage 3497.
Maidenhead (M&DARC)—10 November (Visit and talk by Don Baptiste, CBE, RSGB President), 1 December (Home construction contest). Details from Roger Hemmings, G3VCT.
Newbury (N&DARS)—8 November ("Long Yagis", by Alan White), 13 December (Christmas social). Sec Mike Fereday, G3VOW, tel Newbury 43048.
Oxford (RAFARS)—November ("A social evening" with a meal. At the time of going to press no details of this event). Please contact E. C. Palmer, G3FVC, tel Maidenhead 20107.

REGION 7—RR to be appointed

Biggin Hill (BHARC)—15 November (BBC Radio News), 13 December (Sale of surplus equipment), 8pm. Biggin Hill Memorial Library. Sec Ian Mitchell, 37b The Grove, Biggin Hill, Westerham, Kent TN16 3TA, tel 09594 75785.
Coulsdon CATS (G4FUR)—3 December (Third Christmas bazaar, St Swithun's Church Hall, Grovelands Road, Purley, from 1030am. Talk-in S22, G4FUR/A. Traders and flea market. Details from Frank, tel 073 781 2807.

GB2HGC operating during Anchor Chain, part of the centenary celebration of the Boys' Brigade, at Holmer Green, High Wycombe. It was the first time the brigade had operated with amateurs. Dave, G4UII, put the station on the air along with Chiltern ARC. ***Photo:*** **Courtesy of *Bucks Free Press.***

Crystal Palace (CP&DRC)—19 November ("Clandestine radio", by Pat Hawker, G3VA), 17 December (Film show and social evening arranged by Tony Holroyd, G6PFZ). All Saints Church Parish Rooms, Beulah Hill, SE19 (opposite IBA television mast). Details from sec Geoff Stone, G3FZL.

Redhill (Reigate ATS)—15 November ("Performance and measurement of hf receivers", by Peter Hart, G3SJX), 8.15pm. Constitutional & Conservative Centre, Warwick Road, Redhill. Details from sec C. Barnes, G8FEE.

REGION 8—RR M. Elliott, G6NEY, 20 Haysel, Sittingbourne, Kent ME10 4QE.

Horsham (HARC)—3 November (Talk on "Oscar" by Phil Stride, G2BUY), 8pm. Guide HQ, Denne Road, Horsham. Details from Tony Wadsworth, G3NPF.

Kent Repeater Group—The group, by annual subscription, supports five repeaters: GB3KN; GB3KS; GB3NK; GB3EK and GB3CK. Details of meetings and subscriptions etc from Martin Stoneham, G4RVV, QTHR as G6CVG. The group can also provide speakers for other clubs in the area.

Thanet (RCT)—8 November (Social evening and presentation of cups), 22 November (Talk on NFD by G3LCK), 8pm. Birchington Village Hall. Details from I.B. Gane, G4NEF.

Tunbridge Wells (West Kent ARS)—4 November (Junk sale), 18 November (Talk on airline communications systems), 8pm. Monson Road, Tunbridge Wells. 8, 22 November (Informal), Drill Hall, Victoria Road, Tunbridge Wells. Details from Brian, G4MXL, tel 0892 32877.

REGION 9—RR W. J. Colclough, G3XC, "Highview", Indian Queens, St Columb, Cornwall TR9 6LL. Tel 0726 860485.

Axe Vale (AVARC)—First Friday in each month, 7.30pm. Cavalier Inn, Axminster. Sec Peter Peach, G3GOS, The Firs, Goldsmith Lane, All Saints, Axminster EX13 7LU. Tel 0297 34259.

Camborne (Cornish RAC)—3 November (Sale of surplus equipment); Computer section: 21 November (Open evening), 7.30pm. Contact Simon Rodda, G4PEM, tel Penzance 3948, for further details of locations of meetings.

Newquay (N&DARS)—9 November ("Organizing Field Day", by G3XC), 23 November (Surplus equipment sale, and "Tuning antennas for hf"), 7.30pm. Drill Hall, rear of Crantock Street. Contact Pat King, G4GFU, tel 0872 71133.

Plymouth (PRC)—14 November (Video or slide show (RSGB)), 28 November (DF contest), 7.30pm. Tamar School, Paradise Road, Millbridge, Plymouth PL1 5QW. Contact Dave Whitbread, G6EQM, tel 0752 20224.

REGION 10—RR E. J. Case, GW4HWR, 2 Abbey Close, Tyrhiw, Taffswell, Mid-Glamorgan CF4 7RS. Tel 0222 810368.

Cardiff (CRSGBG)—14 November ("Interference from amateur radio", by Graham Barry), 7.30pm. Pantmawr Hotel, Tyla Teg, Pantmawr Estate, Whitchurch, Cardiff. Sec Cyril Laws, tel Cowbridge 3212.

At a recent presentation dinner at Loch Watten Hotel, Dr Clive Smith, GM4FZH, and his wife Helen, GM4KNQ, both active members of the Caithness ARS, are shown receiving a Caithness Glass bowl from the club's president, Mr Sandy Oliphant, GM3SFH, on the occasion of their leaving the area. *Photo:* GM4MIM

A MARTS meeting in 1933. The photo shows G2MI, G6XB, G6MM, G6AI, G6NU, G6VV, G6RQ, G6KT, G2AFT, G6QC, G6FN and G2TN

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

Colwyn Bay (Conwy Valley ARC) (GW6TM)—10 November (Annual junk and surplus sale), 7.45pm. Green Lawns Hotel, Bay View Road, Colwyn Bay. Sec Mr J. N. Wright, GW4KGI, 46 The Dale, Woodlands, Abergele, Clwyd LL28 7DS, tel 0745 823674.

REGION 12—RR M. R. Hobson, GM8KPH, 4b Tummel Crescent, Pitlochry, Perthshire.

Benbecula—Jim Thomson, GM4CXF, is trying to form a club in the Uist/Benbecula area. Interested parties should contact Jim on 0870 2051, ext 25, during office hours, or 0870 2413 at other times, or write to him at No 2 Bungalow, Balivanich Aerodrome, Benbecula, Western Isles PA88 5LA.

Kirkwall—Members on Orkney are now meeting under the banner of "The Orkney Group of Radio Amateurs" in the Lynnfield Hotel, Kirkwall, on the first Wednesday of the month at 7.30pm. Further details from Bill, GM3IBU.

This is all the up-to-date information to hand at the time of writing. Club secretaries please send your club's details by the date at the beginning of Club News. *RR12*

REGION 15—RR J. T. Barnes, GI3USS, Whitegables, 95 Crawfordsburn Road, Bangor, Co Down BT19 1BJ. Tel 0247 3948.

Ballyclare (East Antrim ARC) (GI4KKK)—Second Tuesday in each month, 7.30pm. Fairview Primary School. The club held its agm on 13 September and elected as chairman GI4JXM. They re-elected sec GI4LKA and treasurer GI4KIS, with a committee of GI4BWM and GI4PRH.

Bangor (B&DARS) (GI3XRQ)—4 November (Annual surplus sale and auction), 7pm. Talk in on S22. Co-op Hall. The club held their agm on 5 September at their usual venue, the Sands Hotel, Bangor, and elected a committee of 12 who elected GI4NAE as chairman, GI4POC as vice-chairman, GI4OCK as sec and pro, and GI3USS as treasurer.

Belfast (BRSGBG)—Third Wednesday in each month, 8pm. 90 Belmont Road. The club held their agm on 21 September and re-elected all officers. AR GI6DGP.

Belfast (College of Technology ARS) (GI2BX)—Almost certainly the oldest active GI callsign is now used by this society on 144MHz and hf at lunchtimes. An interesting programme is being arranged. For details listen to GB2RS or contact sec James Barr, 121 Kitchener Street, or at college, tel Belfast 227244, ext 243.

Enniskillen (Lough Erne ARC)—Third Monday in each month. Railway Hotel. The club held their agm on 19 September at Lakeland Forum and elected GI4NRE as chairman, GI6UHA as sec, GI6ZCC as treasurer and three other committee members—GI4PCY, GI4UHP, and GI4CZW.

Lisburn (Lagan Valley ARS) (GI4GTY)—Second Monday in each month. Rathvarna Teachers Centre, Pond Park Road. The club held their agm on 12 September and re-elected as chairman E. D. Campbell. GI4RCF was elected vice-chairman, GI6UFU as sec, GI4GNC as treasurer and a committee of GI3HXV, GI4NEZ, GI4PSK, GI4DOM and GI8SXN.

The RR and zonal manager would be very pleased to attend clubs' agms if invited. Terry Barnes, GI3USS, would also like to point out that he can only submit news that is sent to him, so club secs, get writing!

REGION 16—RR T. D. Howe, G3PLF, 18 Vange Hill Drive, Basildon, Essex SS16 4DD. Tel 0268 24453.

Braintree (B&DARS)—7 November (Construction contest), 21 November (Junk sale), 7.45pm. Braintree Community Centre, Victoria Street. Details from Jeff Roberts, G6OIX, tel Braintree 44857.

Colchester (CRA)—3 November ("Slow scan colour tv", by G4BCH), 17 November ("600 miles up the Nile", by G4PAY), 7.30pm. Colchester Institute, Sheepen Road. Details from Frank Howe, G3FIJ, tel Colchester 70189.

Ipswich (IRC)—16 November (Autumn social), 8pm. Club Room, Rose & Crown, Norwich Road. Details from Jack Tootill, G4IFF, tel Ipswich 44047.

Loughton (L&DARS)—11 November (Informal), 25 November ("Mods for the IC240", by G6ESL), 8pm. Loughton Hall, Rectory Lane. Details from R. Mills, G6AMY.

Norwich (Norfolk ARC)—2 November ("80m receivers", by G4LDG), 9 November (Short meeting), 16 November (Open evening), 23 November (Short meeting), 30 November (Bring your xyl/yl evening). Details from Peter Forster, G3VWQ, tel Norwich 37709.

Stowmarket (S&DARS)—7 November ("Raynet", by G3WXZ), 7.30pm. Red Cross Hut, Station Yard. Details from Jim Lowe, G8SCB, tel Needham Market 721296.

Vange (VARS)—3 November (Junk sale), 10 November (Talk and demonstration by G3LST), 17 November ("Aerials", by G3PEN), 24 November (Wine and cheese night, G4OJN), 7.30pm. Main Hall, Barstable Tenants Community Association, Long Riding, Basildon. Details from Mrs D. Thompson, 10 Feering Row, Basildon SS14 1TE.

REGION 17—RR H. G. Cunningham, G8FG, 235 Station Road, West Moors, Wimborne, Dorset BH22 0HZ. Tel Ferndown (0202) 876018.

Andover (ARAC)—1 November (Brains trust), 16 November (Natter night), first Tuesday and second Wednesday in each month, 8pm. Contact sec G4OZL for venue.

Basingstoke (UK FM Group Southern)—2 November (AGM), 7.30pm. Chineham House, Shakespeare Road, off Popley Way, Basingstoke. Sec G3KWU, tel 0703 812435.

Bournemouth (BRS)—4 November (Surplus equipment sale), 18 November ("Investigating chordal hop", by G3MYM). Second and third Friday in each month, 7.30pm. Kinson Community Centre, Bournemouth. Sec G4EKE, tel Ferndown (0202) 877945.

Fareham (F&DRC)—9 November ("QRP operation", by G3CCB) 23 November ("SSTV", by G8VOI). Wednesdays, 7.30pm. Portchester Community Centre, Portchester. Sec G4ITG, tel Fareham (0329) 234904.

Farnborough (F&DRS)—9 November (AGM), 23 November (Chairman's evening), 7.30pm. Railway Enthusiasts Club, Access Road, off Hawley Lane, Farnborough. Sec G4BJQ, tel Farnborough (0252) 543036.

Swindon (S&DARC)—3 November (Electrical safety in the shack", by G4LDL), 10 November (RAE course and natter night), 17 November (Construction contest), 24 November (RAE course and natter night), 7.30pm. Oakfield School, Marlowe Avenue, Swindon. Sec G4IYW, tel Swindon (0793) 27227.

Weymouth (SDRS)—1 November (Development of radar), 27 November (Skittles evening at the Prince of Wales, Puddletown). First Tuesday of each month, 7.30pm. Army Bridging Camp, Wyke Regis, Weymouth. Sec G3ZGP, tel Weymouth (0305) 812893.

Wimborne (FRARS)—6 November ("Health and safety at work", by C. Harris), 13 November ("Turkey and the Near East", by G8CEZ), 21 November ("Nick's rambles", by G8MCQ), 27 November (AGM), 7.30pm. Flight Refuelling Social Club, Merley, Wimborne. Sec G8VFY, tel Wimborne (0202) 882271.

Winchester (WARC)—19 November (Demonstration by Wood & Douglas). It is hoped that an RAE course will be available commencing this autumn. The Scout Log Cabin, Stockbridge Road. Sec G3SHQ, tel Twyford (0962) 713003.

REGION 19—RR R. J. C. Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ. Tel 01-989 6741.

Cheshunt (C&DARC)—2 November (Natter night), 9 November (Quiz—at home to Harlow RS), 16 November (Natter night), 22 November (Quiz—away to Harlow RS), 23 November (AGM), 30 November (Come and meet your new committee, have a natter), 8.15pm. The Church Room, Church Lane, Wormley, nr Cheshunt, Herts. Details from Roger Frisby, G4OAA, tel 0992 464795.

Ealing (E&DARS)—Tuesdays, 8pm. The club has now moved back to Northfields Community Centre, 71A Northcroft Road, Ealing W13 9SS. Details from sec Brian Greenaway, tel 01-450 8259.

Edgware (EARS)—2 November (Evening visit to British Aerospace at Harfield), 10 November (Informal), 24 November (To be announced). The Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. Sec Howard Drury, G4HMD, tel 01-952 6462.

Harrow (RSH)—4 November (Informal and practical), 11 November (Annual dinner at Grimsdyke Hotel), 18 November (Informal), 25 November (CAD systems of pcbs), 7.30 for 8pm. Roxeth Room, Harrow Arts Centre, (opposite Alma pub), High Road, Harrow Weald. Details from Chris Friel, G4AUF, tel 01-868 5002.

Havering (H&DARC)—2 November (Informal), 9 November ("The G4ZU mini beam", by G3KFW), 16 November (Informal), 23 November (Details to be announced), 30 November (Junk sale), Fairkytes Arts Centre, Billet Lane, Hornchurch, Essex. Details from A. Negus, G8DQJ, tel Upminster 24059.

London (Civil Service ARS)—7 November (Aurora—part 2), 21 November (Lunchtime natter). The club holds its meetings mainly during the lunch hour. Civil Service Rec Centre, Monck Street, Millbank, SW1. Details from G. Costin, G4GFU, tel 01-632 6444, daytime.

Southgate (SARC)—10 November (G6QM Constructors Trophy and social), 7.30 for 8pm. St Thomas's Church Hall, Prince George Avenue, N14. Pro John Fitch, G8EWG.

Stevenage (S&DARS)—1 November ("Slow scan tv", by G4BWU), 8 November (Constructors evening), 15 November (Navigational satellites), 8pm. TS Andromeda, Fairlands Valley Park, Shephall View, Stevenage, Herts. Morse classes at 7.15pm. For details contact pro Trevor Tugwell, G8KMV, or sec G4BGP, tel Baldock 893736.

REGION 20—RR B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, Bristol BS20 8NQ. Tel 0272 848140.

Cheltenham (CARA)—4 November (Rev George Dobbs, G3RJV, secretary and founder of the G-QRP Club, will be talking about building simple equipment; ideas, circuits and techniques), 18 November (Natter night), 7.30pm. Stanton Room, Charlton Kings Library, Cheltenham. Details from sec Gill Harmsworth, G6COH, tel Cheltenham 25162, or chairman John Holt, G3GWW, tel Witcombe 3435.

Gloucester (GARS)—Wednesdays, 2 November (Talk by a retired ship's radio officer on his experiences in the days of "spark"). Please note that there will be no meeting on 23 November. 7.30pm. St Barnabus Hall, Stroud Road, Gloucester. Details from sec Tony Martin, G4HBV.

Portishead (Gordano ARG)—23 November ("Equipment testing"), 7.30pm. Ship Hotel, Down Road, Portishead. Details from Bob Coles, G8ROC, tel 0272 691685.

Thornbury (T&D ARC)—2 November (Beginners night), 7.30pm. White Horse Inn, Groves End (A38). Details from Alan Jones, G8AZT.

Yeovil (Y&DARC)—3 November ("Modulation", by G3MYM), 10 November (Junk sale), 17 November ("Fun radio quiz", G3GC), 24 November (Natter night), 7.30pm. The Recreation Centre, Chilton Grove, Yeovil. Details from sec Eric Godfrey, Dorset Reach, 60 Chiltern Grove, Yeovil BA21 4AW, tel 0935 75533.

Members' Ads

CONDITIONS OF ACCEPTANCE

These subsidized 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 *Rad Com* to the advertiser: this will automatically provide proof of membership and should not be more than two months old. No acknowledgement of receipt will be sent, and advertisements not clearly worded or punctuated, or which do not comply with the conditions of acceptance, will be returned. No correspondence concerning this service will be entered into.

Trade or business advertisements, even from members, will not be accepted for "Members' Ads" but should be submitted as classified or display advertisements in the usual way. Traders who are members must enclose a signed declaration that the items for sale or wanted are part of, or intended for, their own personal amateur station.

The RSGB reserves the right to refuse advertisements, and accepts no responsibility for errors or omissions, or for the quality of goods offered for sale. Advertisements for citizens band equipment will not be accepted.

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.

The current rate is £1 for 40 words or less: advertisements containing more than 40 words will cost an additional £1 for every additional 40 or less words. Each advertisement must be accompanied by the correct remittance, either as a cheque or postal order made payable to Radio Society of Great Britain.

Closing dates in 1983 for issues in brackets, are **17 November** (January); **15 December** (February).

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS
Do not post to RSGB HQ or Advertising officer.

Chesham & DARS scored a hat trick this year when three xyls of club members passed the RAE with credits in both papers. L to r: Linda Alldridge, G6ZWG; Liz Cabban, G6ETU; and Debbie Orgill, G6WYU. *Photo:* G6LKS

FOR SALE

TS700S, mint, no mods, orig packing, just back from check-up at Matlock, 10 xtals fitted, £350 ono. SB2M ssb portable, nicads, no charger, £65. Two stage matching linear, 20W, 5641 and 2N6082, £30. G2ATK, QTHR. Tel 038-655 3735.

Morse tutor, Datong, used for only six weeks, £45, p&p paid. G4TLP, QTHR. Tel Wells (Somerset) 77250.

Icom IC730, 100W eight-band hf mobile tx/rx, mounting bracket, hardly used, genuine reason for sale, £400 ono. G6SJK. Tel 0279 506976 (Herts).

Datong PC1 up-converter, hf on 2m rig, £95. Okidata matrix printer, 80 col, Centronics and RS232 interfaces, wired for Dragon 32, works most micros, good cond, bargain, £90. Reace swr/power meter, 6/2/70 ranges, £10. G6HQK, QTHR. Tel Wolverhampton (0902) 69796.

Gee rx R1355, orig cond, £20. R1155, wkg, unmodified, £28. *Wanted:* indicator 62A, amplifier A1134, comp spy set, any considered, perhaps exchange for above. Datong morse tutor or similar. Ken Brooks, G3XSJ. Tel Bristol (0272) 685280.

Microwave Modules MTV435 atv tx, as new, £120. FDK Palm 4, 70cm, fully xtalled, case, charger, £110. Jaybeam ugp groundplane, £6. Miers eight-track stereo deck, and tapes, £15. G8ZXG, QTHR. Tel Gravesend 55667.

RTTY, Creed 7ERP teleprinter, autoreader, beautifully built ST5 terminal unit, all ready to plug into your rig, will demonstrate to serious buyers, £85 ono the lot. Tel Grays Thurrock (Essex) 71475, evenings and weekends.

TS120V, hf tx/rx, mint cond, never used mobile, £275. PS20 matching psu, mint, £40, or £310 together. Both boxed with handbooks. *Wanted:* Redifon GR286 marine tx/rx. Pye PF1 rx data, buy or borrow. G4LMJ, QTHR. Tel 051-336 4359.

New! TS430 and psu, genuine reason for sale, offers round £720. SEM Transmatch Ezitune, like new, £65. Collins KWM380, as new, offers. Tel Derby 557705.

ST700E ssb tx, 3·5-09·1, £75. Taylor valve tester

35A, £40. Codar tx/rx, RQ10 multiplier, T28 bfo, atu, power supply, 80, 160, £75. Buyer must collect or make arrangements for transport. G4IAV, QTHR for G2ASR. Tel Atherton 870954.

Yaesu FRG7700, hardly used, in orig box, £220. SP102, new, £30. Tel 01-370 1000, after 6pm.

FT708R, PA3 car adaptor, mobile bracket, YM24A spkr/mic, as new, £195. G8ESK, QTHR. Tel 0274 45611.

Yaesu FT102, mint cond, fitted cw filter, £475. Might part exchange Trio SM220 monitorscope. Tel 01-390 5444, ask for S. Frampton.

Racal RA17 rx, as new case, circuit diagram, £140. G6UHD. Tel Eaststoke 531.

Yaesu FT1, all boards, filters provided, full memory back-up, approx seven months old, £950. Tel 0526 42918.

G4MH mini beam, used little, in good cond, operating frequencies 10/15/20m, power rating 1,400W p.e.p., £55. Icom IC22A 2m tx/rx, nine simplex, three repeater channels, £75. G6DHN, QTHR. Tel 0484 863818, evenings.

Atari games system, 12 cartridges, incl Space Invaders, Super Breakout Championship Soccer, and many more, keyboard controllers also incl, £225 plus p&p, ono. G4UHM NOT QTHR. Tel 0245 468149, after 6.30pm.

2m rig TR9000, brand new cond, 14 months, owner G4KFW again fed up with 2m, £250 or offers. *Wanted:* Opidosope, price, particulars. G4KFW, QTHR. Tel 021-357 2009.

Atlanta tx/rx, 400W, 80-10m, new pas, £180. FT75B, ac and dc psus, vfo, spare valves, £150. G4FQS, QTHR. Tel 01-459 2543.

Save £90: 2-el tri-band Gem quad antenna, dismantled and ready for collection, £100. Home-brew 20m cw QRP tx/rx, full break-in, nicely packaged, £10. G3TXQ, QTHR.

Four-el tri-band hf beam, Mustang Mk2, extra director fitted, £85 ono. Buyer collects. G3CON, QTHR. Tel Cheltenham 580959, anytime.

Oskerblock SWR200B power meter, £22. Yaesu YH55 phones, 8Ω, £5. *Wanted:* IC202S 2m ssb tx/rx, up to £100 max. G4DIC, QTHR. Tel 0455 38111, ext 2193, day, 0455 636315, evenings or weekends.

Chart recorders, 10in scale flat bed, 10mV sensitivity, eight-speed chart drive, three available, two with peak integrators, all with spare chart rolls and handbooks, incl service info, £30, £35, £40. G6HSC, QTHR. Tel Earls Colne (07875) 2846.

Palm 4 70cm handheld tx/rx, 1W output, Simplex or rep use, fitted toneburst, six channels, three extra spare xtals, BNC output for rubber duck ant (included) or base station ant, £75. G3DZW, QTHR.

Trio TL911 linear amp, all new valves, £250. G4SGV NOT QTHR. Tel Redditch 41158.

Kenwood TS830, as new, with DFC230, or swap for 130S with power supply. Tel Derby 557705.

Archer nicad, charger, ABCD cells, £4. Shure 444D mic, £25. Shack of junk bits, books, etc, sae details, offers, etc. G4RSA, QTHR. Tel 0253 405271, after 7pm.

Hammarlund SP600 gen cov rx, 540kHz-54MHz, the amazing Super Pro, a really quality piece of equipment, this one in immac cond, recently revalved, realigned, handbook, £125. G4DEP, QTHR. Tel Bristol 427954.

KW Atlanta 10-80m tx/rx, £220. MM dfm, £30. Daiwa CN1001A auto atu, £120. JWR 10m fm, £30. Daiwa rx, 110G preamp, £20. Trio 8400 70cm fm, £150. Pye F27AM 4m, £35. Enq junk, etc. G4RSA. Tel Bill, 0253 405271, after 7pm.

Receiver FRG7700, tuner FRT, vhf converter FRV(E), all in superb cond, still under warranty, must be seen in use, reason for sale, RAE passed, tx/rx needed, £360 ono. G6XGC. Tel Leeds (0532) 585806.

Icom IC215 3W fm portable 2m tx/rx, 30W linear, preamp, helical stub, case, xtalled S18-23, R2-7, £110. Deliver Scarborough/Newcastle area. G8UZM, QTHR. Tel 0723 76732.

Kenwood 7400, 5W, 25W, 144-148MHz, comp with mic, leads, handbook, exc cond, £125. G4JHM, QTHR. Tel 0522 791114, evenings.

Computer dot matrix printer, Anadex DP8000, manual, £120 ono. MZ80K, interface to suit, £40, or £150 the lot. GW3UOO, QTHR. Tel 0244 542595, after 6pm.

Yaesu FT230R, comp with orig packaging, £195. G4NPA, QTHR. Tel 021-476 1161.

Yaesu FL2110 10W linear, £30. MMB11 mobile mount for FT290, £15. Jaybeam 8-el cross Yagi, 11ft long pole, glass fibre support, £25. All as new. G4TDR, QTHR. Tel 0902 765374.

Cambridge 2m AM10D dashmount, fitted channels R6, R0, S20-22, spare xtals, R5, R7, toneburst, spare valves, mic etc, £35. Carriage extra. G3YDC, QTHR. Tel 0278 733 038.

Trio 8400, £180. Trio 7730, £180. Duplex R SMC CHS770, £13.50. SMC 70N2M dual band mobile antenna, £15. All only few weeks old, in new cond. Tel Fareham 236906, weekends or evenings only please.

Creed 7E, silencer cover, lovely cond, offers. Commodore "basic-Basic" programming course, three cassettes, £12.50. *Wanted:* rotator. Bencher key. Fax receiving equipment. YO901P. Commodore 64. Modem. IEEE to RS232 bi-directional interface. Thruline 250H. G3AZI, QTHR. Tel Preston (0772) 37815.

Microwave Modules 2001 rtty to tv converter, eight shifts and speeds, ASCII, manual, all plugs, leads, as new, £150. G6BGY, QTHR. Tel John, Clevedon 871039.

Trio 7200G, S20-24, R3-7, good cond, £95. Two Storno 500 handhelds, S20-21, R6, spare nicads, £60. Tasco refractor, astronomical telescope, £60. Texet miniature cassette recorder, £15. G4EBQ. Tel 061-620 7868.

Yaesu FR101D 160-10m, 2m, 6m, £350. Icom IC2E, spare set nicads, 12V pod, £100. FDK multi 700EX, £100. FT480R, £300. Rotator Channel Master, £40. Oscar Special, £12. 2m preamp, £20. MMC 435/600, £20. Portable mast, £20. All ono. G8TKU, QTHR.

FT101ZD Mk1, fan, mic, FC902 antenna tuner, Hokushin HSHF5 five-band trap vertical antenna (without ground plane kit), FF501DX low pass filter, SMC150PL 50Ω dummy load, financially embarrassed, £450. G6MZI. Tel Bishops Waltham 2065, after 7pm.

Yaesu FRG7700, hardly used, in orig box, £220. SP102, new, £30. Tel 01-370 1000, after 6pm.

Icom equipment: IC740, fm, £650. ICR70, fm, £430. IC290E, £320. Tono linear type 2m 50W, £50. All exc order, orig boxes. Buyer to collect unless local. Ken Black. Tel Gateshead (0632) 787313, if na, Felling (0632) 381441.

Akai stereo cassette deck, £15. Sharp radio alarm tv, £75. ST8 rtty scope, £15. ST5 tv, £48. Creed 444, £35. SSTV hb unit, £200. 625 line camera, £45. Icom 290H multi-mode, £295. Olivetti TE300 free for collection. G4RSA, QTHR.

Hellschreiber printer, ex-Govt, type 10G/13089, variable speed, 250V ac, requires 20V 20mA signal, wkg order, £25 plus post or collect. Great Northern Telegraph Co morse tx to 240wpm, mechanical, model 112, wkg, collectable, £20 plus post or collect. G3IVI. Tel Cheltenham 41666.

Sony CRF320, mint cond, £480. Sony ICF2001, mint cond, £80. Gould & Farnell switched mode 10A power supplies, £50 each. SMC 144MHz base colinears, £5 each. Tel Paul, 0932 48070 (Surrey).

Icom IC2E 2m handheld, new July 1982, used little, battery charger, external spkr/mic, £140. G6KNY. Tel Basingstoke 770421.

Morse Master, reads cw and rtty, almost new, £125. Hygain vertical antenna model 14AVQ/WB, comp with roof mounting radial kit, £60. Buyer collects. G4UJW. Tel 01-346 8597.

1,296MHz transverter UKW-Technik, made by Sota, 28MHz i.f., £120. Airmec wave analyser 853, 30kHz-30MHz, £25. G4AAH. Tel 0623 642719.

Old brass ammeter, Paterson & Cooper, old ammeter, wood case, same make, old brass telegraph meter by Telegraph Works, Silvertown, £12 the lot plus post. G3IVI. Tel Cheltenham 41666.

Marine antennas: C&S type GMD, 156-164MHz, £12. Danish HMP CX2, 145-175MHz, £19. CX3, 155-165MHz, 3dB, £25. Handbooks: SCR522, HX50, KWM2, HRO60, PRI55, STR12, MC150, IMR5000, 19 set, Pye SSB125T, FM25B, Hudson AM661/663. G3JMJ, QTHR. Tel 0732 863467.

B44 Mk2, tunable rx, £10. B44 Mk3, 70-26 a.m., £10. Sinclair Mk14, psu, £7. Jap bug key, £5. 4m converter, 28MHz, i.f., £7. 450-0-450 250mA, 6·3V, 10A, £3. 1,100V, 150mA, 6·3V, 6A, £3. *Rad Com* 1971-81, £5 lot. Buyers collect. G4AWB. Tel 01-864 8656.

FRG7700 with atu, FRT7700, all boxed, as new, no mods, £200 ono. G6RGM. Tel Kettering 516547.

IC4E, external mic, spare nicads, 12V regulator, λ/4 whip, charger, £180 ono. *Wanted:* FT790. G6HEL, QTHR. Tel Milborne St Andrew 301.

30ft lattice mast, 3 x 10ft bolted sections, tilt-over but not wind up, comp with wall brackets, £85. Buyer collects. Tel Stamford 52504.

Printer dot matrix, Logabax, detachable stand, heavy so cheap, £65. Hazeltine (Texas) printer, small thermal so also cheap, £50. Frequency counter, 50MHz, £18. Disc drive 8in Calcomp with circuit, £75. G4TTZ, QTHR as G6GSH. Tel Bob, Yateley (0252) 871077.

Electron, Oric, BBC programs: superb morse tutor and morse keyboard to 50wpm, £4.50; locator, gives distance, bearing, points, £4.50; BBC rtty (requires tu) with auto cr/lf, memories etc, £5; Texas TI99 locator, £5. G8KMV, QTHR. Tel 0438 354689.

Dressler D2000S 4CX350A QRO linear, vgc, £550. Icom 201 144MHz multimode base station, wkg but needs some attention, £140. G6ATW NOT QTHR. Tel 0442-41848, after 7pm.

10m fm dnt, 40ch, handbook, boxed, £25. 80W (actual) pa, MRF450A, suitable above, £35. Pair, £55. Low-band 6ch MF25FM Europa, £50. High band W15FM Westminster, 3ch, £60. High band MF5AM Pye Motophone, 3ch, 3W, £40. PF70 3ch, converted to 70cm, xtal RB0, £50. GPO radio telephone, 9ch, £50. High band W25FM 10ch boot mount, £80. G4NPY, QTHR. Tel 05436 76101, day, or 05436 5737, evening.

FT101 Mk2, with G3LLL clipper, £240, no offers. Buyer collects. G4DLN, QTHR. Tel 04012 4233 (Yorks).

RTTY (ZX81) pcb for interface, 8251 chip, software cassette, new, unused from Scarab systems, £12. *Wanted:* rtty program and interface details for Colour Genie. G4RMY. Tel 01-697 3445.

Boomless quad spider, £15. 18swg aluminium tubing, 0·75in, 0·875in, 1in, 1·5in, presently forming 10m, 15m beam elements, offers. G3TMU, QTHR. Tel Yateley 877485.

Shack clearance: Yaesu 7700, £225. Sony CRF320, £325. Sony 2001, £110. Panasonic DR49, £200. All mint cond with manuals. Exc Eddystone 750, £89. Hallicrafters SX110, £55. Hallicrafters SX43, offers. Hallicrafters SX100, needs slight bfo attention, £75. Tel York (0904) 59035.

External vfo, suitable for TS520 series, £45. Buyer collects or pays carriage. G4HXB, QTHR. Tel 061-483 0776.

IC2E synthesized 2m handheld, one year old, immac cond, soft case, two BP4 battery packs, each fitted with AA nicads (lasts longer than standard pack), charger, modified for 10MHz coverage, £130. Mutek halo, offers, w.h.y? G8PQG, QTHR. Tel Dave, Oxford 67165.

Lowe SRX30D digital comm rx, 11 months old, £120. GW8SGA. Tel Holywell 713708.

DBX model 118 stereo dynamic range expander/compressor, over 100dB variable, virtually eliminates record surface noise and improves Dolby noise reduction by many extra dB, cost £175, exchange for computer VIC20 or similar. G6MEF, 97 Redland Drive, Northampton NN2 8UG.

Heathkit HW12, 3·5-3·8MHz, 200W tx/rx, matching ps, to be collected, £50. G3HSC morse code records, £4. SWR427H auto swr/pwr twin meter, £30. Above plus postage. G3JBU, QTHR. Tel 0604 401800.

Daiwa CNA2002 auto atu, £175. Welz AC38M atu, £50. HF5 vertical with gp kit, £55. G4PFR NOT QTHR. Tel Jim, Wendover 623802.

HF5 vertical with radial kit, 10-80m, exc cond, less than one year old, currently costing £90, will accept offers around £40. G3WUD, QTHR. Tel 01-423 5809.

Yaesu FT290RD ARE mods, nicads, charger, case, flexi whip, matched compressor, mic 7ON2 colinear, £230 ono. Part exchange IC201. FT221, TS700G, FDK750E, 3A psu, £8. SU2000 rotator, £35. G4EZZ NOT QTHR. Tel 01-863 3978, evenings, weekends (Harrow).

Trio 599CS rx, 160 through 2m, £140. Yaesu 707, £350. Telequipment dual trace scope D61, £95. QM70 2m/10m transverter, £35. JVC tv/radio/cassette, £85. All boxed, as new, and ono. W.H.Y? G3MXQ. Tel 021-788 0518.

FT225RD, used little, no mods, orig packing, handbook, accessories, one of the last of this great 2m multimode, £475 ovno. Good used Jaybeam 10XY/2, 12XY/70, D8/70, AR40 rotator, half current advertised price. G8TKI NOT QTHR. Tel Crowthorne 773252, evenings.

Icom ICB1050, full 40ch, 10m fm, many mods, incl repeater downshift, digital frequency readout, fitted 20W pa, £45. Europa hf/2m transverter, matching psu, new QQV03/10 valves, mosfet devices, £45. *Wanted:* 2m 40W or larger linear, preamp, preferably MM 2m mobile transceiver, ssb only. 20A or larger power supply, preferably protected, exchange with cash differences either way, offers and straight purchases considered. G4NPY, QTHR. Tel Keith, 05436 76101, daytime, 05436 5737, evenings.

Morse key, brass, heavily chromed, wood base, £7.50. 100pF tx variable cap, ex-LG300, £5. *Wanted:* two coaxial relays suitable vhf. G3RB, QTHR. Tel Whitley Bay 530504.

Yaesu FT7 solidstate 10W cw/ssb, 10-80m tx/rx, incl mic, mobile mount, manual, circuit diagram, power cable, hb 13·8V 5A power supply, vgc, £235. Tel Glenboig 874393.

Wood & Douglas 2m synthesizer kit, half price,

£30. Old 25in b&w tv, Ekco export model, ok dx tv, believed wkg, £10. Hallicrafters S27 rx, scruffy but wkg, £10. 4EP7 scope tube, £5. Buyers collect please. G8LIU, QTHR. Tel Uxbridge 30006.

Western Ultimast, 30ft, telescopic, tiltover, £150 or exchange for 2m portable or valve amplifier. Cue-Dee 15-el, slight damage, £20. 14-el Parabeam, £30. G6NWF. Tel Crewe (0270) 68222.

Icom IC451E, £450. Tono 250W 2m linear amp, £250. Tono 2m 150W linear, £140. All 15 months old, exc cond. Tono 50W linear, unused, in orig wrapping, £60, offers considered. Buyer collects or carriage extra at cost. G6HUG, QTHR.

SEM Europa C vhf transverter, Stolle 2010 rotator, eight-el crossed Yagi antenna, all hardly used, cable, offers? G4KDN, QTHR. Tel Iver (0753) 655570.

Drake MN7 atu, mint cond, used for one month, swr/pwr meter, rated by Drake at 250W op, £90. MK1024 iambic memory keyer by Katsumi, stores over 90 characters, built-in twin paddle 12/240VAC, perfect cond, £90. G4OBK. Tel Chorley 74451.

R&S Polyskop SWOB rf sweep generator, display, 0·5 to 400MHz, £75. Muirhead Decade af oscillator D890A, £20. HP wave analyser 302A, 0 to 50kHz, £50. Advance pulse generator PG5002D, £35. Hergem oven, amb to 220°C, £75. Airmec high power rf sg type 304, 2 to 50MHz, £35. R&S rf selective voltmeter usvh, 10kHz-30MHz, £75. Buyers collect. G3JKF, QTHR. Tel 0293 28080.

Silent key sale, equipment of G4MYJ: Trio 2m TR7730, mic, cradle, £150. Mobile mic, Adonis MM202H, TR7730, £15. Power unit Phihong PP1205GS, 13·8V 5A stab, £15. Trio 2m handheld, TR2500, nicads, charger, helical, whip ants, £150. Mobile stand for TR2500, MS1, rig, £15. Spkr mic SMC25, rig, £12. Desk mic MC60, £15. Trio TS530S, mic, £450. Dummy load SMC150L, £12. Antenna tuner Yaesu FC902, £70. Buyers collect. Enquiries and offers to G3JKF, QTHR. Tel 0293 28080.

Yaesu FT107 hf tx/rx YM35, good cond, £400. GW4RPU, QTHR. Tel 0222 495375.

Badgers vintage book sale. SAE for list. *Wanted: Signalling without wires,* Lodge 1896. W.H.Y. pub before 1930? Badger, G3SSJ, QTHR. Tel Alresford (096273) 3816.

Yaesu FRG7 communications rx, atu, mint cond, orig packing, used little, £125. G8ZRQ, QTHR. Tel 0634 721120.

New! TS430 and psu, genuine reason for sale, offers round £720. SEM Transmatch Ezitune, like new, £65. Collins KWM380, as new, offers. Tel Derby 557705.

CWR610 Codemaster, few months old, £120 ono. Pye Cambridge AM10D 70MHz xtals, 70·20, 70·26, 70·45, £25 ono. Tel Aberdovey 367.

KW2000A, mains psu, Shure mic, KW serviced, vgc, £200. Realistic DX100L rx, 150kHz, 30MHz, brand new, £70. Carriage extra. G3OAZ, QTHR. Tel 0256 65126.

Sansui D99D twin cassette deck, black, immac cond, used very little, £115, no offers, £50 off new price, Consider swap for 2m portable or Sinclair 48k Spectrum. RS84627. Tel Norman, 0423 60431.

Icom IC720A gen cov tx/rx, immac cond, £675. Drae 24A psu, perfect, £85. Both for £750, incl delivery. GM4PRO (ex-GM6HDK), QTHR. Tel 02364 51476.

Jaybeam 8XY/2m antenna, assembled, mast clamp, £15. PMH2C harness for circular polarization, £3. 12ft steel mast, £7. 9ft ally mast, £5. Buyers collect. G8SSI. Tel Martin, 01-686 9646 (Croydon).

Burglar alarm (Notecalm), unused, acoustic and/or hardwired, cost £375, sell £200. Sentinel 2m 100W linear, preamp, £55. SEM 2m preamp, £10. G4LZK, QTHR. Tel Burgh Heath 61426.

ZX81, psu, manual, orig packing, guaranteed, used 10min, £20. Two 15in stand-off brackets, never used, £5. AF attenuator, variable 0-100dB, 600Ω in/out, £5. 12AVQ antenna, £20. Prefer buyer collects or plus postage. G3ZOH. Tel Brian, Farnborough (Kent) 58413.

FR50B rx, 80-10m, £40. G4ADE, QTHR. Tel 04012 4365.

Yaesu FT290R, 25W linear, psu, nicads, charger, case, helical, swr meter, wavemeter, dummy load, 5λ/8, gutter mount, HB9CV, various coaxial, package deal, £275. GW8YYZ, QTHR. Tel Conwy (049-623) 6474.

AR88 spares, incl coils, capacitors, tubes, selection of other tubes available, all new cond, give away prices. GM4AOP, QTHR. Tel 0779 70240.

HF beam, 3-el TH3, slight attention, £45. G4MH minibeam, rotator, £70. 2m Cambridge, 6ch toneburst, £35. Small tower, £25. 4CX250B bases, chimneys, ptfe/silver, £22 pair. Mini Tang blower, £4. AR88LF, £40. Buyers to collect most items. Tel Dave, 051-924 4228.

FRDX400S, 160-10m, 2 and 6m converters, a.m., fm, ssb, two cw filters, KW204 tx, 160-10m, both vgc, no mods, instruction manuals, £200. Prefer buyer inspects, collects. G2BCA, QTHR. Tel 01-367 3793.

Trio 9R59DS rx, 0·550-30MHz, exc cond, £45. Heathkit solidstate 5in oscilloscope, dc to 5MHz model, 10-102, comp with manual, pwo, £75. Tel 01-467 5351.

Belcom LS102L 26-30MHz continuous, all modes, good cond, boxed, £250 ono. Bremi BRL200 200W (p.e.p.) output, suitable 10/10·55m, £65. Tel Wilmslow 527250, after 4pm, weekdays.

Morse tutor, Datong D70, £30. Speech processor, Datong D75, £30. G4MH mini beam, £60. G4UIK. Tel Ashbourne 70657.

Centronics dot matrix printer model 306, full service manual, ASCII code, ideal for computer printout, £180. Buyer collects or carriage at cost. G3NWL, QTHR. Tel Winchester 53593.

Icom IC701 tx/rx, absolutely mint cond, 1·8-30MHz, dual vfos, digital, speech processor, 200W, narrow cw filter, passband tuning, noise blanker, attenuator, IC701PS matching psu/spkr, all plugs, cables, offers around £550. HyGain model TD1 tape doublet, can be set for any frequency between 3·5 and 30MHz, terrific portable antenna, £25. G3UML, QTHR. Tel 01-202 7071, anytime.

Icom 202S portable ssb/cw tx/rx, fully xtalled, as new, used little, orig packing, £100. G4AYV, QTHR Coventry.

FT707, FP707 psu, swr bridge, Shure hand mic, Dentron Jnr monitor antenna match, hardly used, exc cond, £525. G4ENL. Tel Morpeth (0670) 514242.

Homebrew 500W p.e.p. tx/rx based on Swan rx, fb but fault in tx audio; tx ok on cw, £35 ono. HF balun, £4. SWR bridge, £4. Mechanical bug key, £8. G3VGK, QTHR. Tel Sheffield 662313.

HW8 QRP tx/rx, comp with manual, £100 ono. G4OIC. Tel 0803 552002.

TR2300 portable, nicads, charger, case, mobile mount, rubber duck, good cond, £120. Catronics CT600 for TRS80, offers. G6JEY, QTHR. Tel Mike, Worthing 504615.

Sony ICF2001 rx, £110 ono. Typewriter, Remington, document carriage, £60 ono. Glass fibre dinghy, 4hp outboard motor, life jackets, oars etc, £230 ono. Reel-to-reel tape recorder, £15 ono. G3WRI, QTHR. Tel 0539 25616.

Microwave Modules MMT432/144R transverter, £100, postage extra. G6JXA, QTHR, Morden, Surrey. Tel 01-648 0028, evenings.

Trio R1000 communication rx, mint cond, £195. *Wanted:* Trio 2300, charger, nicads, etc to buy. Will consider part exchange and cash adjustment. G4STY. Tel Colin, Worcester (0905) 356673.

Trio TS120S, boxed, comp five-band G-whip, mic, leads, £285. KW107 Supermatch, £65. Satellite converter MMC432-144S, £15. Europa 4m transverter, FT101 type fittings, £55. All ono. G4JHM, QTHR. Tel 0522 791114, evenings, or 0522 40808 daytime, ask for Nick.

Datong FL3 filter, like new, £110. *Wanted:* I need to borrow or buy, probably from an old timer, an EMI solariscope. G4LXN, QTHR. Tel Chipping Sodbury 318528.

Woodpecker blanker, AEA Inc model WB1A, £45. Osker Block swr/pwr meter, calibration chart, 2W fs to 2kW fs, 52Ω, 72Ω, 3·5-150MHz, 1 to infinity, 1-3 expanded, model SWR200, £37.50. MM2000 rtty to tv converter, £75. Standard SRC830/M15 handheld marine, Ch5, 6, 9, 16, 25, base charger, extra hand mic, accessories, leather case, handbook (cost £200), £80. Cannon 110ED, flash, leather case, £45. Minox B, £50. Polaroid 350, portrait kit 581A, flash gun 268, £100. Audio/visual IFR training course, approved FAA, projector, manuals, records etc, £125. MM converter, marine band to 28/30MHz, £10. Aiwa W208S, 208R wireless, remote control mic, £12. Midland fm wireless mic, £5. SMD100 stereo table mic, £15. Philips ultrasonic burglar alarm, £10. 52Ω 1kW dummy load, £10. Mond Electro Co (Japan) electronic keyer model DA1, ac or dc, £10. Calrad dynamic mic, 50kΩ, model DM31, £5. Ameco (USA) model PT tunable preamp, station controller, 1·8-54MHz, 220V ac, £15. Scubapro professional regulator, 0-300kg/cm² pressure gauge in zip bag, practically unused, £30. May, G3AAG. Tel Liss 2143, after 1 November.

Tandy model three 48k computer with sound, word processor, many other programs, games books etc, pristine cond, model 7 printer, cost over £1,000, accept £600 ono. Tel Peter, 051-428 6231, evenings (Merseyside).

Trio communications rx R1000, 1980, mint cond, £190. Tel Folkestone 42263.

Eddystone 888A, £45. Heathkit DX100V, £40. CR100, £30. All good cond. CR300 needs psu, £10. Minimeter ham bands converter, £5. Now own G2DAF. A. Watkins, G4ULB, 5 Culmore Road, Halesowen, West Midlands. Tel 021-552 1838.

813 homebrew linear psu, not wkg, 19in rack, two VCR97 tubes, Soundmaster tape recorder (museum item), offers. Heathkit vhf radio/phono, teak cabinet, £25. TA33JR, suspect trap, £25. Pye Cambridge mobile and base, £15. G3JIZ, QTHR. Tel 0962-91 263.

Heliax low loss cable, each length comp with connectors, LDF550, 22ft, £40. CU2Y (similar LDF450) 22ft, £20. LDF250, 45ft, £20. Modern 19in rack cabinets, 6in high, £15. GEC625 mid-band radio telephones, £15. *Wanted:* xtal filter type QC1121P. G8APV, QTHR. Tel 01-732 8319.

TS830S, VFO230, SP30, MC50, additional YK88C, YG455CN cw filters, used very little, £300 off list price at £750. All boxed with handbooks, deliver reasonable distance. Tel Mrs Furness, 0333 26582 (xyl G3RUI).

FT101E, fair cond, offers around £300. Prefer buyer inspects. G3HDO, QTHR. Tel Coventry 74385.

60ft Western tower, telescopic tilt-over, comp with heavy mounting post, new auto brake winch, new rope, £360 ono. GI4PGN, QTHR. Tel Greyabbey 455.

Trio R600 gen cov synth rx, immac, few hours only, giveaway to the first £195. Securicor free. Rush to avoid disappointment. *Wanted:* AR88LF, wkg. G4NTX, QTHR. Tel 020881 3386.

88mH coils, 3AF type, suit BARTG ST5 etc, £2 each or £3.50 per pair inc. Mr T. Sherman, 23 Tylecote Close, Marston Mortaine, Beds MK43 0QA. Tel Bedford 766183, for availability.

Trio TR7500 2m fm mobile rig, 15W, mobile mount, all orig packaging, £150. Trio HS4 headphones, mint, £5. 2m 7/8 whip, guttermount, £15. 2m 5/8 whip, magmount, £10. 70cm 5/8+5/8 whip, £10. 13·8V, 6A psu, £10. G4IZL, QTHR. Tel Northwich 48424.

TS520SE, cw filter, boxed, super rig, any demo, £350. Datong D75 rf speech processor, £25. New Cambridge kit, tunable audio notch filter, £8. G4MET, QTHR. Tel 0457 64322.

Transipack inverter, 24V dc input, 230V, 200W sine wave output, converted to full auto battery charge, £70. BTH 'cats whisker" xtal set, dated 1923, variometer tuning, orig Browns phones, vgc. *Wanted:* 240V ac 2kW alternator, any cond. Shaw. Tel Swindon 750130.

Yaesu FT480R 2m multimode, 20h use only, boxed, not used mobile, £300 ono. Pye Bantams less mics/batteries, £10. Labgear 50W a.m./cw tx/hf, offers. 2m rotator, beam, £40. Slim Jim, £3. *Wanted:* QRP tx/rx, hf band, cw. G4RYF, QTHR. Tel Cleveland (0642) 553726.

Sony ICF2001 rx, Atari 400 computer printer, cartridges, etc, Sord eprom programmer TI59 programmable calculator, lots of pre-1930 2V valves, all must be cleared. Reasonable offers please. Tel Hastings 444415.

TS130S, all WARC bands, MC35 mic, mobile mount, mint cond, boxed, incl G-whip, 80-10m, £475. Icom IC25E, nine months old, 7/8 mag, whip, £220. Part-ex for 2300 considered. Trio 2200, all repeaters, nicads, £75. G4EOT, QTHR. Tel 0942 41385.

Robot 800 rtty unit, Tandy green screen monitor, £500, negotiable. G4OAX. Tel 09273-76489.

Hirschmann rotator, 10m three-el beam, used one week, comp in box, with control cable, £50. Tel Swanage 425509.

Realistic DX200 five-band gen cov communications rx, mint cond, less than year old, £70. G4ROG. Tel Camborne (0209) 713992.

Redifon R551N 10kHz/30MHz solidstate, all modes, digital, four filters, synthesized circuitry, superb stability, new cond, high orig cost, £265. Trio 770 vhf uhf Mutek preamp, cost £750, mint, boxed, £460. *Wanted:* R820 rx. G4LW, QTHR. Tel Trowbridge 3166.

Sentinel 2m preamp, £10. Switchable 2m to mw converter, £15. Sentinel rf-switched 70cm preamp, SO239, £14. SM71 70cm preamp, £11. QM70 432/6MHz to 144MHz converter, £15. QM70 2m to 70cm tripler, tx, and converter, rx, SO239, £30. Sentinel 1·5-30MHz auto preamp, SO239, £14. Datong FL2 audio filter, £60. Hamgear atu, preamp, calibrator for rx, £20. Mains/battery 13·5/12V 2A psu, automatic changeover, £12. Set of new valves for FT401 tx/rx, £20. G4ALV, QTHR. Tel 01-460 3852.

Disposal of vhf accumulations crowding the shack: xtals, valves (eg EF91 at 25p), mains

transformers, tx chassis (eg 50MHz one, £15), ancient 144MHz valve converter, many similar leftovers. For list please send an sae to G5UM, QTHR.

Portable 10m telescopic alloy mast, guys, pegs, 9-el portable Tonna, 2m, good cond, used /p only, £30. G6TXC, QTHR. Tel West Hanney 498 (Oxon) after 3pm.

Scope, EMI type WM16, dual beam unit, two plug-in amplifiers, high gain, wide band, manual, £45. Tel 01-337 2384.

Rad Com 1975-82, comp, various *Bulletins, Rad Com, SWM, WW,* 1965-82, £1.50 for 12 issues, p&p extra. G3USE, QTHR. Tel Luton 20312.

Multimode Trio TR9000 with accessories, BO9 system base, PS20 power unit, all boxed, as new, £350. *Wanted:* perfect AR88D and/or HRO mx with accessories. G8LQL. Tel Preston (0772) 862438, evening.

FTV250, SEM preamp, as new, £90. BC906E, vhf frequency meter, £18. G4RWL, G8HBW, QTHR. Tel 09655 466.

IC260 2m multimode, £230. MML/100S 100W 2m linear, £95. IC240 2m fm, £85. G8IFN, QTHR. Tel Chelmsford 441504.

TR9000 multimode 2m rig, 10W, fm/ssb/cw, vgc, £275 ono. *Wanted:* Yaesu FT221R, vgc, would swap with cash adjustment. G6ELM/G4TSE, QTHR. Tel Tim, Sittingbourne 75093.

FT790R, new February, hardly used, comp with nicads, charger, carry bag, 2 × 5/8 mobile whip, gutter mount, 3 × 5/8 colinear, £290 ono. Tono 150W 2m linear amplifier, £125. FT480R 2m multimode, GPVS colinear, £295. G4TOJ. Tel 061-320 0931, office hours only.

Yaesu FT101E with FC707 antenna tuner, G4MH mini beam, rotator, rig virtually as new, spare pa, driver valves, no split, £625 ono. Tel Peter, 051-428 6231, day or night.

Generator, 1·5kV Briggs Stratton petrol, used little, ideal for contest group, £95. G4LRI, QTHR. Tel 01-894 0798.

SX200 scanning rx, 26-58, 58-88, 108-180, 380-514, mint, one owner, £155. IEEE-Centronics parallel Aculab interface, £30. G3VGO, QTHR. Tel 0872-864255.

Trio 7200G, 18 channels, 10W fm mobile, orig packing, £135. FT202R handheld, 6ch, £65. Microwave Modules converter, 2m-2MHz, £20. Trio model 9R59DS rx, mint cond, orig packing, £70. G8KWR, Killick, 6 Hampshire Close, Congleton, Cheshire.

Drake TR4C, remote vfo, spare valves, KW204 tx, both good electrical cond, air test and collect. Sensible offers to G3ADZ, QTHR Rugby.

Morse tuition program tapes for Commodore 64, VIC20, Spectrum, ZX81 (specify). No hardware required. Comp with full operating and learning instructions. Checks and scores your copy. Characters are introduced in stages for easy, fast learning. You control this and the speed and amount sent. Sends character groups which accurately duplicate GPO test conditions and will take you up to higher speeds if you want. The best program to get you that A licence. £5 each. GW3RRI, QTHR. Tel 0286 881886.

FT901DM 160-10m a.m./fm/usb/lsb/cw with a.m./cw filters, dc/dc converter, matching atu FC902, vgc, comp with manuals etc. £585 ono. G6HQJ, QTHR. Tel 01-393 9115.

Trio TR7800 mobile tx/rx, 1yr old, as new, boxed, £175. Datong D75 speech processor, used once, £40. FX1 wavemeter, never used, £25. G4MUJ. Tel 0903 753102.

CR100/B28, wkg, £20. 1392 chassis, without dials, for spares, £3. Elizabethan 150 wall cw tx chassis, pushpulls 807s, as *RSGB Bulletin* July 1953, info available, offers. Buyer to collect. GM4LBN, QTHR.

88mH toroids, American open pattern, suit BARTG, ST6, DT600 etc, £2.25 each (inc). *Wanted:* 14AVQ or 18AVT. Chris Pedder, G3VBL, Canford School, Wimborne, Dorset BH21 3AD. Tel 0202 884778.

PET 3032 computer toolkit, Amtor Supermon, more in eprom, £350. New disk drive 2031, £350. Two cassette decks, £25 each. Programmes, sae for details. HQ1 minibeam, £60. G4AWO, QTHR. Tel Ron, 0703 35381.

Bass guitar amp, HH Combo, 100W, cover, nearly new, unmarked, used little, cost £230, accept £140. Could deliver 100 mile radius of Sheffield. Bass guitar, Hondo Fender copy, De-Marzio pickups, vgc, £50. G4EBT, QTHR. Tel Rotherham 70021.

Radio Communication issues 1952 to 1968, all in first-class cond, offers, please, to Mrs B. M. Tucker, xyl of the late L. E. Tucker, G4IQ, 68 Borrowdale Avenue, Harrow, Middx HA3 7PZ.

Yaesu FRG7700 rx, matching atu FRT7700, both boxed, as new, £260. G4UJS. Tel Nantwich (Cheshire) 627620.

HF rig, Trio 120V, cw filter, mobile mount, psu, atu, MC35S mic, £430 or split. Keyer, cmos, £20. Freq counter, Microwave Modules MMD050/500, £50. SMC HF5V trap vertical antenna, 10-80m, £30. G4TBF/G6FIF. Tel Ted, Blackpool 700637.

Liner Two 144MHz ssb tx/rx, mobile mounting bracket, Shure mic, manual, £70. 144MHz 9-el Tonna beam, four months old, £12. GW6BMP, QTHR. Tel Llangefni (Anglesey) 722279.

Rad Coms 1958-78 *Wireless World, SW Mag, Radio Constructor, Electronics, Radio,* ar books, various tx, rx valves, high and low voltage transformers, sae for lists of your needs. G3CBU, QTHR.

IC25E 25W mobile fm tx/rx, £175, no offers. Peter Crosland, Red Lion Cottage, Holt Heath, Worcester. Tel 0905 620041, evenings, or 021-454 8585, during business hours.

KW Atlanta tx/rx, external vfo, good cond, £175. G3GLX. Tel Chesterfield (0246) 34715.

Station of the late GW3YPF: HF Trio TS130SE tx/rx, SP120 spkr, £500; Eurosonic PP1335 psu, (13·8V, 35A), £80; Daiwa CNA1001 automatic ant tuner, £90; QED 6/4B mains interference suppressor (1,500W), £5; G-whip with extension rod and coils for 80-10m, £40. 2m: Trio TR9000 tx/rx with mic, £225; Mirage B108 linear (80W) with remote control, £60; Microwave Modules MML144/25 linear, rx preamp, £30; 6-el X-Yagi beam, £6; Super Slim Jim, £8; ASP 670/660 magmount, £10; 5λ/8 mag-mount, £8; Phihong psu (13·8V 6A), £7. Antenna items: KW107 ant tuning system, £35; RF swr/power meters—Oskerblock SWR200B (with calibration chart), £20; SML SWR25, £8; T435N (vhf/uhf), £20; SMC multiband dipole, 10-80m, £30; CDE AR44 rotator (three years' use) with AR30/40 controller, £30; Medco 30MHz lpf, £8; Antex KSW1 coaxial switch (two-way), £4; AEC coaxial switch CX3 (three-way), £4. Audio: Minitenna Alando compressor/amplifier, £15; fist mics—Kenwood MC30S, £8; Radio Shack 21-1171 (int preamp), £10; Yaesu dynamic, £5; table mics—Yaesu YM38, £15; Yaesu YD148, £15; Shure 444, £15; headphones—Boots dynamic stereo, £7. Contact GW3MZY, QTHR. Tel 0248 680034.

Icom 260E, £275. SMC 2m colinear, wall bracket, £30. Mobile 2m λ/2 magmount, £15. Nine-el 2m Tonna, £10. 2m antenna for maritime mobile, £30. G3NDO. Tel 07016-5121.

Deceased G3GFI: FRG7 dig dial, £110. FT200, PF200, mic, spare valves, £180. SB102 hb psu, mic, spare valves, £135. AR40 comp, £25. HB atu, 80-10m, £10. 50Ω dummy load, £5. G4GWM, QTHR. Tel Tysoe 209, after 6pm.

R1000 rx, mint cond, no mods, digital display, clock timer, manual, orig packing, all connectors, dc kit fitted, new 2m converter not fitted, £220. GM6NAM NOT QTHR. Tel Dave, 041-886 2627.

FT102, one year old, unmarked, £550. FC102, sell together, £150. *Wanted:* KW2000B. G3DPR, QTHR. Tel 028577 514, evenings.

Trio TS130V, new June 1983, VFO120, TL120, SP120, all perfect, comp all cables, manuals, orig packing, cost £720, sell £550. *Wanted:* Yaesu FL101, must be perfect with all cables etc. G4OLC, ex-G8XZM, QTHR. Tel 0670 813352, Northumberland.

New, boxed, antique and semi-antique valves, 3x AC/P, KK32, KF35, KBC32, VP41, PEN45DD, FW4/800, GT1C, UU5, UU6, 2 × EL38, EL37, 10C14, EL41, X61M, UBL21, UF41, QS150-15, the lot, £15, p&p extra. Enquire for individual valves. G3LTU, QTHR. Tel Cleethorpes 696412.

Icom 1050 10m fm tx/rx, mic, manual, neat, works well together with Zetagi B35 25W amp, £36. Above tx/rx with alternative Bremi BRL40 70W amp, £48. G3KZU, QTHR. Tel Oxford (0865) 63000.

KW202 rx, Q-mult, KW Vespa Mk2 cw/ssb tx, xtal mic, spare valves, both wkg but tx output a bit low on ten, £185 the pair ono. Buyer inspects and collects. G2CMH, QTHR. Tel 0273 559752.

MM2001 rtty/ASCII converter, £150. FRG7 (digital) comms rx, £120. Heathkit ID1290 weather station (115V), £60. Heathkit IG37 fm stereo generator, £55. MMS1 morsetalker, £85. G4ROA (ex-G6ADC) QTHR. Tel Adrian, Coventry (0203) 412201, evenings.

Icom ICR70 rx, boxed, as collected on day of purchase, now sadly surplus to requirements, £395. Can deliver within 60 miles otherwise carriage extra. Tel Northampton (0604) 407840.

Leson TW232 good quality power mic, cost £35 new, but will sell for £19. Three pcbs for the Antennalab, £4.75, including p&p. Selling due to financial loss. Tel Tisted 306, ask for Darren.

Sinclair Spectrum tapes, four morsecode tutor programs, QRA locator with distance and European map, £3.50. Trio 9R59DS rx, voltage stabilizer, xtal calibrator, £50. R. Jones, G4SWH, 8 Cowper Road, Worthing, Sussex BN11 4PD.

2m tx/rx, Icom 240, 10W converted to full 80 channels, modified front end, £110 ono. Five-el Jaybeam. G6XRP. Tel Radlett 7398, evenings, or Radlett 2411, day.

Pye marine vhf radio telephone, Ch6, 12, 14, 16, £65. New mains unit for same, £20. GU3HKV, QTHR. Tel 0481-47278, 6-7pm only, Mondays-Fridays.

Cossor 1035 Mk3 oscilloscope, immac, manual, £20. 12 vols *Radio and TV Servicing,* 1956-68, £18. G6AIT, QTHR. Tel Somerton (Somerset) 72162.

Hitachi colour tv, 22in, remote control, part exchange FRG7700, or any hf equipment considered. My R107 a bit old now so my interest genuine, all letters answered. R. G. Jones, RS54209, 1 Southampton House, Avon Road, Tidworth, Hants SP9 7RT.

TR9000, four hours use only, mobile mount (not used), matching BO9 base housing memory psu and control interfacing, £280. HRO unmodified, scruffy, good performer, 1·7-30MHz, psu, £20. Prefer buyers collect. G3CRH, QTHR. Tel 05436 6364.

Collector's item: "Gibson Girl" distress transmitter as used by ditched American aircrew in second world war. In working order, comp with antenna, signal lamp, item not normally available on surplus market, offers around £50 incl postage. G3JDK, QTHR. Tel Wickersley 541606.

Collins S-line rx 75S3 No14334, tx 32S3 No10970, psu, all in good cond, best offer around, comp with instruction books, £650. No time wasters please. G4RGJ, QTHR. Tel Worcester 421908.

KM4000 memory keyer, pcb, new, unused, fully tested, £35. Robertson. Tel 0908 653961, daytime, 029 672 340, evening.

Icom 730 eight-band hf tx/rx, cw narrow filter fitted, Icom PS20 power supply, bargain, £450. HF xtal suitcase set (123), spare valves, xtals, offers please. G4LRG. Tel Burgess Hill (04446) 42727.

Hi-fi Ferrograph 60 + 60W stereo amp, two tape inputs, two spkr outputs, £50. Ortofon MC20 moving coil cartridge, MCA76 preamp, £50. Ford push button car radio, as new, with spkr. £10. Tel Derby 515061.

Eddystone gen cov communications rx, model 840C, good cond, £60. Buyer collects. G6CGP, 4 Hardy Avenue, Duckmoor Road, Ashton Gate, Bristol BS3 2BP.

MML 432/50 linear, £80. Heathkit Mohican rx, £15. Appreciate contacting whoever bought my Pye Cambridge with multiturn tuning pot for £11 and Heathkit HW17 for £5 at Woburn flea market. Need fm rx conversion notes. G8MNZ, QTHR. Tel 0604 862178.

Yaesu FT200, FP200, ac psu/spkr, all 10m xtals, matching UD844 desk mic, handbook, good cond, Magnum 2m transverter, £200 lot. GM4NC, QTHR. Tel Edinburgh (031) 339 5126.

FT708R, in mint cond, comp with spare nicad pack, charger unit, current cost over £250, now £185. Tel Peter Crosland, 0905-620041, evenings, or 021-454 8585, during business hours.

TS510 hf tx/rx, built-in cw filter, psu, £190. Pye Cambridge, dash mount, six channels, £35. G3ZPD, QTHR. Tel 0246-476781.

IC402, nicads, case, £200. FT707 hf tx/rx, £400. Both with orig packing. G8MJD, QTHR. Tel Leeds (0532) 674721.

Power supplies, Kingshill 12V 20A, 15V 30A, fully protected, chassis built with makers manual and circuit, no outer cases, £30 each. G6OLS NOT QTHR. Tel Stevenage (0438) 722451.

TS830S, Yaesu mic, £525. FT200, psu, £210. KW204, £130. Codar AT5, £30. SEM Transmatch, £20. Hallicrafters Cyclone tx/rx, £175. Katsumi keyer, EK121, £10. Hansen swr bridge, £5. 12V psu, £5. AEG lpf, £5. Gear of late G3YVM. All ono. Equipment in London. Tel G3RFS, 01-889 1150, evenings, or G3RPB, 047337 584, evenings.

Alltron 30ft wind-up mast (wall mount), comp, cost £250, accept £150. Andy Emmerson, G8PTH NOT QTHR. Tel Northampton 844130.

PRO2002 vhf scanning rx, 68-512MHz, 50 memories, a.m., fm switchable, £125, post paid, or free vhf wideband antenna if collected. GM4FEO, QTHR. Tel Helensburgh (0436) 2539.

G3ZVC 9MHz ssb board, SE1 filter, number of SL600 series ics, ZX81 computer, with hb psu, as new, £40. Mirror sailing dinghy with launching trolley, £225. G3YGM, QTHR. Tel Falmouth (0326) 311506, or 313053.

B28 rx, 60kHz-30MHz, £20. R475 rx, 250kHz-24MHz, £25. Electronic valve voltmeter,

0·1mV to 1000V, Philips GN6020, £8. All above wkg. Buyer inspect and collect. G3JTU, QTHR. Tel Daventry 2909, after 6pm.

Trio 2200G, comp with charger, nicads, carrying case, mobile mount, λ/4 whip, fully xtalled, manual, £60. G4LYH, QTHR. Tel Gosport 88579.

AR88 rx, comp with handbook, spkr, can be heard wkg, £35. G3MKU, QTHR. Tel 0509 502611.

RX type B28, good wkg cond, rather heavy, £25. G4LAV, QTHR. Tel Crewe 68471.

TX 1154N, good cond, £75. Shure 450, £10. *Wanted:* manual for HT37 tx. Late model Collins KWM2A. G3GBB. Tel 0284-66496.

Yaesu FRDX400, FLDX400, Leson DT252A mic, good cond, £250 ono. Eddystone 730/4 gen cov rx, £65. No offers. Buyer collects. BRS84317. Tel Bill, Milton Keynes (0908) 368761.

Icom 720A, new, unused, all filters, £795. Trio R1000, late model, vgc, £190. Marconi TF1066B sig gen, 10-450MHz, a.m./fm, fully working, £295. Data Precision 585, 250MHz freq counter, battery pack, charger, £55. G8NTH, QTHR. Tel Guildford (0483) 34954.

G4MH mini beam, used two years, £40 plus carriage. GW4BDS, QTHR. Tel Llanelli 59422.

Icom IC251E 2m multimode, Mutek front end, comp with mic, all leads, handbook, orig packing, first-class cond, £460. Will deliver within 50 miles of Worcester. G3GHB, QTHR. Tel Inkberrow 792582, after 6.30pm or weekends.

FT7B Yaesu ssb/cw 100W, a.m., 25W tx/rx, 10m xtals, mobile mounting bracket etc, only used as base station, vgc, £325. G3MDH, QTHR. Tel 042-54 77431.

TS830S cw filter, vfo 240, SP230, £675. Drake R4C, 1·5kHz, 500Hz filters, T4XC, MS4, FS4 synthesizer, £600. FL2100Z, WARC, £350. Dentron 2kW super-super tuner, £150. Trio TR2200 2m fm pin, co us, £25. ETM2 keyer, £10. ETM2B keyer, £12. MFJ cw filter, £15. Shure 201 mic, £8. 20,000op V multimeter, £8. RAF pattern brass morse key, £5. Bencher paddle, £20. 600Ω step attenuator, 50dB in 0·5dBs, £5. New 5λ/8 2m whip, £10. All plus carriage. Effects of deceased amateur. Tel Mold 740101, evenings/weekends.

Icom 251E multimode, 2m, fm, usb, lsb, cw, vgc, £375. G6TWV. Tel Barnsley (0226) 89578, after 6pm.

Standard C78 70cm fm portable, nicads, λ/4, λ/2 portable antennas, 5/8 + 5/8 mobile antenna, power lead, £150. 70cm 1-15W class-C amp, homebrew using Motorola 710-2 module, Mutek preamp, £25. G8FQT NOT QTHR. Tel Horsham 56256.

Going overseas so clearing shack: FL200/FR100 tx/rx, atu, vswr bridge, manuals, no mods, £180. Q-multi, spares, AVO7, £20. Creed 444 teleprinter, only 50h use, manual, £50. 2m fm FDK Multi 700E, £130. Box tx valves, transistors, £10. Large No Dolby cct boards, set of three, £1.25, or the lot, £10. Large welding transformer with diodes, will produce 6-40V at 20A plus, £10. All buyer collects or carriage extra. G3NEF, 8 Ivy Grove, Pitcorthie, Dunfermline. Tel Dunfermline 728332.

Yaesu FT301, FP301 psu, FC301 antenna coupler, cw and a.m. filters fitted, exc cond, no mods, only 200 QSOs in four years, £550, no offers. G3ZYN, QTHR.

Labgear transistor test set E5121, £8. Heath 80-10m SB401, fully xtalled tx, SB303 rx, SB600 spkr, £275. Anglian 2x 4CX250B hf linear, needs attention, £30. Pye ssb 800V psu, £10. All ono. G3WW, QTHR. Tel March 740255.

IC4E, two BP4 battery cases, AA nicads (last longer than standard pack), BC30 drop-in base charger, 16h timer built-in, soft case, spkr/mic, all vgc, £220 the lot, may split. G8PQG, QTHR. Tel Dave, Oxford 67165.

FT207R 2m handheld, spare nicad battery, external mic, workshop manual, λ/4 antenna, £110. G8FQT NOT QTHR. Tel Horsham 56245.

Linear Hallicrafters HT41 10/80m 1,200W p.e.p. input, 117V ac, auto transformer for 240V, perfect cond, no tvi, manual, regularly reported 5/9 + in ZS, £200 plus delivery mainland, £20. Replacement valves available cheaply. GD3TIU, QTHR. Tel 0624 3417.

Ten fm rigs, choice of three tx/rx, 29·310 to 29·700MHz, DNT M40 fm or LCL 2740 fm or Icom 1050, modified, tested, warranted unused, perfect, talk to the world for £33 each ono. G4SNO. Tel 0562 884824, evenings.

FT101ZD Mk3, fm board, fan, YD148 dual imp desk mic, mint cond, boxed, £525. SP901P matching spkr, phone patch, £15. MMS1 morse talker, mint cond, £55. HF5 vertical antenna, 10-80m, £30. G6FDO, QTHR. Tel Studley 4679.

Icom IC2E handheld 2m fm, two spare battery packs, spkr mic, ac charger, mobile charger, λ/2 wave antenna, £140. ZX81 with Memopak 16k ram, boxed, very little used, £45. G4RVR. Tel Sheffield (0742) 656880.

Sony fm/a.m. pll synthesized rx, model ICF2001, brand new, must sell, £95 ono. Tel Leeds 892756.

FTDX401 ssb/cw 300W output, exc cond, £200 ono. Can deliver Manchester or Blackpool area. G4KTE, QTHR. Tel 0253 736684.

PF1 charger—charges up to 12 of each battery, £15. Vega 6in tv, mains or 12V dc, occasional dry joint on rf amp, ideal monitor, £20. Bipak ZX81 sound unit, as new, hardly used, £20. Pye Whitehall control head (10ch) comp with spkr, £12. P. Bridges, G6DLJ, QTHR. Tel Southampton (0703) 891975.

Semiconductor curve tracer, Telequipment CT71, vgc, £275 ono. Consider swop for FT101B or w.h.y. Deliver within 30 mile radius. *Wanted:* manual for LG50 tx to buy or borrow. G4EQX, QTHR. Tel Portsmouth 816176, after 6pm or weekends.

Icom IC202S with nicads etc, £115. FDK Multi 700EX 144MHz fm tx/rx, 25W, IC202S, £115. Multi 700EX, £125. Both ono. Tel Nailsworth (Glos) (045383) 3411.

Morse tutor, Datong D70, as new cond, £35. G6IWK, QTHR. Tel 0202 697046.

FT7 10W cw/ssb, all 10m xtals, mobile mount, mic, cable, vgc, £250. TS700G 2m all mode tx/rx, works mains or mobile, vgc, £300. Palomar Engineer ic keyer, £50. G4FKL, QTHR. Tel 673350.

NRD515 professional gen cov rx, outstanding performance, indistinguishable from new, comp with NVA515 loudspeaker, orig packaging, enclosures, £550. G8XOS, QTHR. Tel Formby 76180.

Three paper condensers, 10μF, 1,000V dc working, three 8μF paper, 600V ac, one 0·5μF 2,500V dc, paper, offers. Mains transformer, 350-0-350V, 4V, 7A, 4V 3A, 6·3V, 2A, 6·3V, 8A, believe 200mA, £4. Gilson 6·3V ct, 4A, 6·3V 1A, 5V, 2A, 300-0-300V, 150mA, £4. G3MBL, QTHR. Tel 01-445 4321.

Icom RM3 key pad, in mint cond, to suit IC24SE, IC211E, IC701, home brew key pad with rs keys, centre zero meter, cable, and plug to suit IC24SE, IC211E. G8NRR, QTHR. Tel 084421-2161, after 7pm, ask for Roy.

Trio TS520 reliable five-band tx/rx, 12V or 240V input, exc cond, handbook, mic, orig packing, ready to go at £265. G3MP, QTHR. Tel Nottingham 602634.

MMT144/28 tx/rx, handbook, circuits, bnc sockets, no mods, good performer, £85. External FT7 interface to above (hb), £10. No offers. G4ORF, G8SKW, QTHR. Tel 0703 864962.

PET RS232 interface kit, pcb, components, unit connects to user port, cable, connectors not supplied, £31.50. Morse send program on cassette, £5. Receive program, £6. *Wanted:* Commodore 64. Thruline 250H. Microscope slides. FV901. YO901P. G3AZI, QTHR. Tel 0772 37815.

TR9000 2m multimode, £260 ono. fully expanded Acorn Atom, utilities rom built into steel case with integral power supply, green display, modem, does rtty, ASCII etc, morse tutor prog, others, £250 ono. G4RWM, QTHR as G6GYW. Tel 0323 846577 (Sussex).

Icom IC720, has unit added by Thanet making equal IC720A, wonderful tx/rx, nine ham bands, gen cov, 13V dc mic, cables, guaranteed mint, used little, ssb reported perfect, offers over £600. Delivery mainland, £11. GD3TIU, QTHR. Tel 0624 3417.

FT101Z, fitted a.m., nine band, WARC, fan, mic, hardly used, mint cond, boxed as new, £400 ono. Will consider part exchange for 480R or similar. 62 set, untested, £10. G6CJX NOT QTHR. Tel 021-360 0408.

Transformers, mains, inputs, Gardners 6·3V, 5A, 6·3V, 1A, £3. 6·3V, 3A twice, 5V, 100-0-100V, 250-0-250V, 350-0-350V, 80mA, Admiralty, £4. 35V, 1A, 35V, 2A, 4V, 2A twice, 13V, 6A, 475-0-475V, 250mA, £5. American 6·4V, 6·7A, 5V 4A, 235-0-235V, 200mA, £4. Several If chokes. G3MBL, QTHR. Tel 01-445 4321.

IC720A power supply, new, £775. IC720 power supply, exc cond, £650. TS430S, £625. Tono 9000E, new, £525. GW4ACO, QTHR. Tel 0492 515240.

Trio TS130S, PS30, MC35S cables, hbs, one year old, mint, £525. Buyer arrange transport. Can deliver 30 miles Manchester at petrol cost. CW filter FT101, £12. G2DCF, QTHR. Tel 061-301 2496, after 8pm.

Teletype 33 with stand, £70. *VHF/UHF Manual,* third edition, £5. 2C39A (glass), £7. Several transformers and capacitors for low-voltage high-current power supplies. G4NVA, QTHR. Tel Holmes Chapel (Cheshire) (0477) 33011.

Drae 6A 13·8V regulated power supply unit, in new cond, £30. G4NTJ, QTHR. Tel 0509 842936, evenings and weekends only.

Daiwa swr power meter CN620A, 1·8MHz/150MHz, mint, £35. Yaesu MD1, 600Ω to 50k, up/down mic, mint, £30. G4HKL, QTHR.

RTTY. Most QSOs are still at 45 bauds. If you have a 444 machine you can come on to 45 bauds by changing one gear, which costs £9.25. Simply ring and the gear and instructions are despatched. G3PPD, QTHR. Tel 01-422 4153.

Cushcraft A3 trap beam, 20-15-10, 3-el, all instructions, collect, £100 ono. G4MH, QTHR. Tel 0484 654650.

Silent key sale for G8FFQ: FT101ZDFM Mk3, WARC, mint, not used on transmit, £475. FT221, Mutek front end, immac, £300. Eddystone 940, £125. Microwave Modules preamplifier, £10. 144MHz converter, £10. Datong D70 morse tutor, £35. CDR rotator and control box, £10. Stolle rotator and control box, £15. Simmonds auto transformer 5kVA, £7.50. BPL Super Range test meter, £10. G3EHG, QTHR. Tel Wolverhampton 762194.

Brand new, boxed Commodore 8032 (80 column, 32k) computer, value £895, second demonstration unit, both available for cash offer or exchange for top quality hf equipment. G3NXO. Tel 042-050 362, evenings.

Heathkit 10-18U 5in single beam scope, good wkg cond, manual, £55. Eddystone 898 dial, £5. G3TRB, QTHR. Tel Worcs (0905) 775206.

FT101Z, fm, WARC, 600Hz cw filter, mic, fan, a.m. board, all items boxed, in mint cond, £425. G4KUC, QTHR. Tel John, 061-427 5931.

Yaesu FT480R 2m multimode, FT207R 2m fm portable, nicad, accessories, 5-el Yagi, 13·8V psu, 15A, £420 or will split. Tel Disley 4840.

Robot sstv 70 monitor, spare tube, 80 camera with 61 monitor, professionally modified with frequency spectrum analyzer, 0·25 and 0·5 frames and close-up work, £300. Davis Electronics HFC600 freq counter, £50 ono. Thurlow, G3WW, QTHR. Tel 0354 740255.

Yaesu FRG7700M (full memories), FRT7700 atu, mint, £295. Yaesu FT290R, nicads, Mutek front end, mobile mount, £205. 13V 25A psu, metered, ovp, homebrew, £30. MMT432/144R transverter, MM overhauled, £120. Tonna Oscar Special, 9-el 19-el, new, unused, £25. Keyboard vdu (less monitor), £75. 12in video monitor, £30, together, £95. New 2PC0 coaxial relay, N-type, £15. 2m atu, homebrew, £4. Datong AT370 active antenna, £35. 8-el ZL-Special, £5. Casio FX702P pocket computer printer, cassette interface, £80. Texas TI57 programmable, new nicads, £15. RSGB *Teleprinter Handbook*, new edition, £7.50. Stepper motors, £2.50. Joystick assemblies, twin pot, £6 pair. Vero KM4/6U cased cardframe, £25. *Wanted:* R2000, mint. G8MLK NOT QTHR. Tel 01-876 3739, after 6.30pm.

Yaesu FT102, fm, hardly used, two months old, mint, boxed, £575 ono. FV102DM digital scanning memory vfo, as new, £175 ono. G4URK. Tel John, Maidstone 28401.

Yaesu FRG7700, memory, very nice cond, £265. Yaesu FR50B rx, £65. G6SMH. Tel Mitchell (Cornwall) 642.

Daiwa SR9 fm monitor, 144-146, vfo, 11-xtal ch facility, £29. Microwave Modules M2001 rtty to tv converter, as new, £125. Tel Marlow 2726, evenings.

Nicads type C, 12 only, £1 each, £10 the lot. Valves, 2C43, £10. QQV06-40A, £6. 4CX250B, £5. HF base and chimney, £5. All post paid. Weston 5 exposure meter, invercone, cased, £25 or exchange for 16k ZX81 computer. GM4EWM, QTHR.

WANTED

RME69 rx, preferably version with noise limiter, coils for National 1-10 vhf rx, RCA 991 neon tubes, dust cover for rackmount Hammarlund Super Pro rx. *For sale:* HP130A high gain scope, dc-300kHz, manual, gwo, £15. G8LIU, QTHR. Tel Uxbridge 30006.

IC202S 2m ssb tx/rx, can afford £100. G4DIC, QTHR. Tel Hinckley (0455) 636315, evenings or weekends, 0455-38111, ext 2193, daytime.

Attempting my own "real" radio collection. Good price paid for mint 19 sets, 38 sets, 1154, 1155, BC348, anything of this era accepted. W.H.Y? G3ZYC, QTHR.

Pre-war *QST* and *ARRL Radio Handbook* before 1940. Wearite P type bfo coil. G4IMT, QTHR. Tel Marshfield 254.

FT101ZD, incl new bands, under one year old, and atu. Joe Davies, BRS42501, 9 Gelligaer Gardens, Cathays, Cardiff CF2 4LT. Tel 0222 42268.

W/S17 box. W/S48 box. B47 spares. W/S62 spares. W/S22 spares. A510 canvas cases. W/S31, 12/24V, mains psu. A43 tx/rx. A14 tx/rx. Old diving equipment—Navy or commercial, and books. G8MQT. Tel Terry, 07073 27233.

Copy of *Radio Engineers Handbook* by Terman McGraw Hill. Will pay airmail postage from anywhere to Spain. Details please to Ian Millar, 5H3AP, Los Arcos 10, La Nucia, Alicante, Spain.

G2DAF tx, HC6U xtals, comprising 6·25, 7·0, 8·0, 9·0, 11·5, 11·75MHz, 4m converter, MMC70/28. Belcom Liner 2 ssb tx, in gwc. Circuit or manual for Eagle Star SR550 rx. G3GLW, QTHR. Tel Southampton 462382, evenings.

Pair of 4CX250B, comp with chimneys, bases. GW3VLU, QTHR. Tel 0222 707257, after 6pm.

Digital display for FT7 please. G4PCK, QTHR. Tel Torquay 38134 with details.

For the Wireless Museum: old radio books, catalogues, magazines, service manuals, QSL cards, valves, components, morse keys, plate neon tube, shelving, any old knobs! Loan of Gamages catalogue, 'twenties. Collection arranged. Details please to hon curator, G3KPO, QTHR. Tel 0983 62513.

Copy of history of early amateur radio titled "Two Hundred Metres and Down", by Clinton B. de Soto. Good price paid. G8OGO, QTHR. Tel Mike, 0424 882283.

QQV06-40A. 6146 valves. Soldering iron(s) 120/250W. 240V 5·2MHz xtal filter. FT707 cw filter. GM8MLH, QTHR. Tel 083 82 304.

MML144/100LS, 1 or 3W input, straight swap for external vfo, Yaesu FV707DM, new, boxed, or would accept reasonable cash offer. Tel 0253 890179, evenings.

For nostalgic reasons: copy of F. J. Camm book entitled *Wireless Transmission.* Price and condition to G3AWI, QTHR. Tel Mansfield 842227.

Adaptor to convert eight-track player to ordinary cassettes. Price to G2CVO, 28 Elmwood Drive, West Mersea, Colchester, Essex CO5 8RD.

Speaker/mic for Trio 2400. G4PPD. Tel 01-578 6076.

SSTV gear: suitable tv camera, scan converter, computer and interface and program to provide output to dot-matrix printer. Suitable printer. G3CPG, QTHR. Tel 06845-2279 anytime.

Loan of handbook for Solartron CD1014-3 scope, great care taken and will promptly return same, any charges met. G3JQL, 22 Alnwick Road, Newton Hall, Durham DH1 5NL.

2m ssb tx/rx (eg Liner, IC202E) for young recently licensed ham. Tel Tim, 01-398 0114.

Paperback *"Instruments of Darkness"* by Alfred Price. Published by BBC or Fontana. All offers replied to. Peter Ebsworth, 5395 Steinsland, Norway.

For TS520: SP520, VFO520, DG5 digital display, and DK520. G6PVA. Tel 021-476 7300.

For disabled housebound person, funds limited, Viceroy 3 psu and mic or any parts. PSU, urgent for testing. RAIBC member. C. T. Curtis, 554 Middle Park Avenue, Eltham, London SE9. Tel 01-859 1191.

IC730 mobile hf tx/rx. PSU not required. G8EDQ, QTHR. Tel 0935 823475.

770U Eddystone rx or similar. Tel Danbury (024541) 3725.

FRG7700/R1000, atu (good cond if modded), £200 offered. RS50164. Tel Harrow, 01-863 6641.

Small panel mounting variacs about 1A, xtal sockets type 10XAJ. Ferrite rod 0·5in dia, 8in long or several pieces 0·5in dia. G4RJC. R. Coleman, 31 Kingfisher Road, Upminster, Essex RM14 1ER. Tel 04022 21523, evenings, not Sundays.

Help! My switcher's dead, anyone got circuit diagrams etc of a Farnell 19V switch mode psu originally made for ICL, type F2345? Will pay costs plus beer fund contribution. G8JFF NOT QTHR. Tel Crowborough (089-26) 63330, evenings or weekends.

Buy or borrow handbook/instructions/circuit Heathkit XGD1 gdo and BC348R rx. G3WVC, QTHR.

Suitcase tx/rxs: any spares, incomplete or damaged sets. WS (Canadian) No29, any spares, connecting leads etc. Any commercial or military a.m. fone tx or tx/rx covering about 3-8MHz continuous. Taylor, G3UCT, 8 Government House Road, York YO3 6LU. Tel York (0904) 29777.

IC type SNB746F. G3ASL, QTHR. Tel Southend-on-Sea 68254.

Tower, 60ft, tiltover, post mounted, preferably electric winch with transformer, must be in good cond. G6LBU. Tel Weymouth (0305) 832652.

IC202S, up to £100 waiting for good example with nicads and charger. Linear bits needed to complete project, Eimac SK620/SK630 bases and chimneys, 4CX350 valves, 2000·0·2000 eht transformer. G4RUL, QTHR as G6EWL. Tel Alastair, Eastbourne 53618, evenings.

Heath HX1681 tx, or would swap TenTec Argonaut 515. G3WBO, QTHR.

Antarctic QSL cards still needed, and I will pay at least £1 each for them. Bases, supply ships and islands needed. No Falklands please. Send cards for offer or write to G3BDQ, Whitefriars, Friars Hill, Guestling, nr Hastings TN35 4EP.

Information on ex-USAF power amplifier model 96 made by Electronic Communications Inc, tunable 200-400MHz. James Keeler, G4EZN NOT QTHR. Merton College, Oxford OX1 4JD.

Trio 9R59DS rx, must be in good wkg order. Tel 01-556 4050 (London E10).

Handbook for Sommerkamp FL200B, loan, buy or photocopy. Please write G6UYW, Tony Jenkins, 134 Manor Road, Benfleet, Essex, or tel South Benfleet 53984.

Yaesu FT225RD, preferably with Mutek front end, must be in mint cond. G4KZZ, QTHR. Tel Coventry (0203) 444160.

Circuit diagram for "The Olympic" tx T100 or T50 or any information on these rigs. Workshop manual would be welcome. Any expenses will be paid. M. Gist, G4KFX, Sunnyside Cottage, Hugus, Truro, Cornwall TR3 6EQ.

HF ssb/cw tx/rx, in gwo please. Suitable atu if possible. Price in region of £100-£200. Will collect if not too far from Northallerton. Dave Jackson, G4ESY, QTHR. Tel 03257 8527.

Antenna kit LP3126 for use with Eddystone rx model EC10 Mk2. J. Penzer, Aspley House, 27 London Road, Twyford, Berks.

FRDX400 manual, or borrow for copying. Post and fair price paid. G3MTR. Tel 061-491 1350.

I've gotta lotta bottle 813s but desperate for two valve bases to match. Beg or buy. G4HAQ, QTHR. Tel Iain, Gloucester 416802.

HW12A for restoration, cond immaterial but should be generally comp and with undamaged dial drive. G3OHI, QTHR. Tel Wilmslow 532301.

Handbook or manual for oscillograph model 339A by A. C. Cossor Ltd. C. H. Emery, GW4UGP, 16 Maesycoed Road, Cardiff CF4 4HF. Tel 0222 754632.

Trio 7400, Standard 8800 in exchange. Panasonic industrial b&w camera, C mount, 4in viewfinder.

For sale: Eddystone 8307, £200. Free to good home, 0·5in video tapes. Philips V100 camera, £75. Buyer to collect. G8UNZ, QTHR Colchester.

8877 or 8874 vhf triodes, new or used. W.H.Y? Have 4CX250 bases for px or swop, will not sell separately. G4DCV, QTHR. Tel Dover (0304) 853089, evenings.

Full set of VHS videos on The World at War, parts 1-26. Please state price and cond. Part of set considered. B. Canavan, 136 Rectory Road, Stoneyholme, Burnley. Tel Burnley (0282) 59320, any time.

Drake 2B rx. *For sale:* Hi-mound squeeze paddle key, model MK706, £5. Fox Tango model 89H 1·8kHz eight-pole ssb filter for FT101Z, FT901, etc, £10. Tel 04536 3994.

Telescopic tilt-over tower, P60 or similar, vgc. G4PZD. Tel 0524 414030, evenings.

G2DAF rx mechanical filter, well constructed, good cond, working. GW8UH, QTHR. Tel 0222 485062.

SX200N scanning rx and antenna for same by disabled member, must be in good wkg order and cond. Tel Burnley (0282) 59320, anytime.

IC2E or similar, must be cheap! Have MM 2m converter and Sinclair pocket tv with all accessories. Would consider ancient FT290 or C58 as exchange, or Joystick comp: UL1000, w.h.y? G6WCB, 24 Sally Ward Drive, Walsall WS9 9JZ.

CRT 5JP1, uhf/shf tx APQ9, APT5, rx APR2, APR5, Panoramic ARQ8, ARR8 series, mobile hf rx R174/URR, psu. *For sale:* Siemens T100 teleprinter, manual, reperforator, believed ok, collect for £20. National HRO rx, £20. G8LIU, QTHR. Tel Uxbridge 30006.

60ft or taller Versatower, three-el tribander. Yaesu FC107 atu. Prop pitch motor type rotator. Tel Dursley 47564, after 6pm.

Four-track mono reel-to-reel tape recorder, in gwo to replace my old 1963 Philips machine. G4SPQ. Tel Brian, 0453 46632, evenings.

Yaesu YO901 monitorscope or YO901P, mint cond required. Have searched for one year with no luck. Can anyone find one for me please? Thanks. G4OPO. Tel Clive, Bristol (Kingswood) 674424.

Yaesu FR101B, must be 100 per cent ok. Cash waiting. G3LBT, QTHR. Tel Roy (Essex) 0268 412177, after 8pm, or 0268 22822 ext 3252, during business hours.

For Panda Explorer hf tx, circuit, manual. Manual for Taylor valve tester model 45C, and valve charts for same, photocopies would do. Datong D70 morse tutor for Axe Vale ARC. Tel P. Peach, Axminster (0297) 34259.

Valves, 1 × PL38, 2 × EL33. G4IAD, QTHR. Tel 0204 20107.

Manual for Pye Cambridge model FM10DV to copy or purchase. GI4MJD, QTHR.

Rotator controller with circular illuminated display, eg Kenpro. A duff unit will do! Backnumbers of *QST* and *VHF Communications.* Audio filter to help an FT225 with cw. G4NVA, QTHR. Tel Holmes Chapel, Cheshire (0477) 33011.

Trio/Kenwood SM220 monitorscope. Printer suitable for Genie 2 plus cables. G8RZK. Tel 01-427 0584 between 9am and 6pm, ask for Tom.

P40 Versatower. Will dismantle and collect. G4EUF NOT QTHR. Tel Markfield (Leics) 242378.

Tower, P60 or similar, anything considered. TR1 band quad or 4-el triband Yagi. G4NJL. Tel Glossop 65014.

Manual or circuit for Ekco black & white television model T543. Buy or hire. Your price. G3KH, 133 Station Road, Cropston, Leicester LE7 7HH.

AMT-1

The ultimate text communication machine!

The I.C.S. AMT-1 AMTOR/RTTY/ASCII/CW Terminal Unit is extremely powerful in its own right, but combine it with a Commodore 64 computer and our new split screen program and it forms probably the ultimate amateur radio data communication system.

Designed to get any home computer or ASCII terminal on the air with error-correcting data transmission with minimal difficulty, the AMT-1 is leading a strong worldwide build-up in AMTOR activity.

EVEN WIAW IS NOW SENDING NEWS BULLETINS ON AN AMT-1!

This is what an independent test laboratory in America said of its AMTOR performance:- "I have a rather expensive commercial SITOR/FEC system, actually two of them (Phillips and RCA) and your AMT-1 tends to maintain as much as 10 per cent less repeat exchanges, which is quite significant. I have compared your system with HAL's new entry, a prototype of same, and with the Microlog software for the 6800, and as far as I am concerned, there is no comparison, as your unit far outperforms them. I use baud optimised terminal units and under adverse conditions with injected noise transients, I have yet to see more than five per cent additional hits with your system compared to the standard I am using. Mind you, this is comparing it with a $2000 plus terminal unit."

Copies of the unsolicited letter from which this is extracted are available on request. On normal RTTY, the AMT-1 has been described as being "as good as HAL." G3PLX (who coined the term AMTOR), took three years to write and prove the software in the AMT-1 and to the best of our knowledge, no company has written comparable software which is bug free. For the moment therefore the AMT-1 is the **definitive** implementation of AMTOR. Others are trying to emulate it, but still have a long way to go! SIMILAR SOFTWARE IS AVAILABLE FOR THE BBC MODEL B MICRO.

To make using the AMT-1 even easier, I.C.S. have recently commissioned a really professional software package for the COMMODORE 64. At present this computer is probably the best value for money for use with the AMT-1. Among the features the program offers are: Split Screen with transmit buffer; Message Editing; Multiple Message Storage; CW Ident; RY; CQ; QBF; USOS and Automatic Operation. The system can even store and acknowledge messages whilst you are getting on with other things in the shack, with no human intervention!

For **£55.00** including VAT, you get a manual, the software in a cartridge, an interface cable with built-in RS232 drivers (for RFI immunity) and labelled keyboard overlays. You can use your computer for other applications simply by unplugging the software cartridge.

The price of the **AMT-1** is unchanged at **£275.00** inc VAT, and with it's built-in tuning and status indicators; four section audio filter/discriminator and crystal controlled tone generator, offer superb value for money. Incidentally, the AMT-1 will work with *any* computer or terminal which has a 110 or 75 Baud serial RS232 interface.

For those still unfamiliar with AMTOR, it is a unique, error correcting data communications system which gives perfect copy through Noise, QRM and fading. It is on the way to replacing RTTY in Amateur applications, just as it already has done in marine ship-to-shore applications (termed SITOR in this instance.) **Once you try it, RTTY will never be the same again!**

STOP PRESS:
I.C.S. NOW HAVE AVAILABLE COMMERCIAL MARINE VERSIONS OF THE AMT-1 FOR SHIP-BORNE TELEX AND COAST STATION APPLICATIONS.
PLEASE ENQUIRE FOR DETAILS.

PRICES:

AMT-1 Amtor/RTTY/ASCII/CW Terminal Unit	£275. P & P £2.50
CW Receive option	£25. P & P £1.00
Commodore 64 Software, interface	£55. P & P £1.00
BBC Model B software interface	£55. P & P £1.00

Access

All prices include VAT at 15%
plus 6 months parts and labour warranty

BARCLAYCARD VISA

AMT-1 Specification Summary

Modes: AMTOR (ARQ mode)
AMTOR (FEC mode)
AMTOR (mode L) – ARQ listen
RTTY (1-99 Bauds)
ASCII (110 Bauds)
CW (1-99 w.p.m.) [Transmit only]

Tones: 170Hz shift (IARU tone frequencies)

Computer/Terminal interface: 75 or 110 Bauds, serial ASCII at RS232 levels. Full or half duplex.

Tuning indicator: 16 LED "panadaptor" type gated display.

Electronics: Microprocessor based; 4 pole input filter to discriminator/limiter; crystal controlled transmit tones via programmable sinewave function generator.

Equipment compatibilities: Almost all modern transceivers will operate on Amtor with little or no modification (except FT102). Any KSR or VDU terminal with serial ASCII interface of the correct Baud rate will work with the AMT-1, as will any personal computer with a suitable serial interface. Programs of varying complexity are available from ICS for the most popular micros.

Mode control: Via ESCAPE or CONTROL commands from the terminal or computer. Mode status is displayed on the AMT-1 front panel.

Options:
CW receive board.
USA high tone frequencies available to special order.

Other products available from ICS

See (*) for special price reductions

Model	*Description*	*Price (inc VAT)*	*P & P & Ins.*
BT-1	Basic Morse Trainer	**£65.00**	£1.00
KT-2	Keyer Trainer	**£65.00**	£1.50
MM-2	Morsematic Keyer	**£159.00**	£1.50
CK-2	'Contester' Memory Keyer	**£132.00**	£1.50
MBA-RO	Morse/RTTY/ASCII Reader	**£198.00**	£2.00
MBA-RC	Code Converter (Send/Receive version of MBA-RO)	***£265.00**	£2.50
PS-1	12V D.C. 3 Amp. Power Supply for any of the above	**£16.50**	£2.00
Stand	45° Tilt Stand for MBA-RO	**£5.50**	£1.00
Isopole 144	Antenna for 2 metres	**£36.50**	£1.50
Isopole 440	Antenna for 70 cms.	**£59.00**	£1.50
WB-1C	Woodpecker Blanker	***£65.00**	£1.50
HR-1	½ Wave hand-held Antenna	***12.00**	£0.50
VIC-20	Software cartridge/interface kit for AMT-1	**£55.00**	£1.00
VIC-64	Software cartridge/interface kit for AMT-1 for Commodore 64 - split screen	**£55.00**	£1.00
VIC-20	CW Receive option for the AMT-1	**£25.00**	£1.00
Commodore PET	Split screen AMTOR program	**£45.00**	£1.00
Amtor kit	Mk.II P.C. board kit	**£107.00**	£1.00
Amtor kit	Mk.II P.C.B. (Assembled and tested)	**£135.00**	£1.00
CP-1	RTTY Computer Interface	**£175.00**	£2.50

Send SAE for further information

I.C.S. Electronics Limited, PO Box 2
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Phone: (024 365) 590

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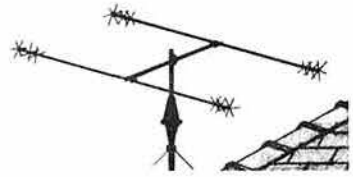
THE G4MH MINI BEAM



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SPECIFICATION

Element length	11 feet	SWR at resonance	1·5 to 1:00 max
Boom length	60 inches	Power rating	1400 watts PEP
Turning radius	7 feet	Input impedance	50 ohms
Operating frequencies	10m, 15m, 20m	Wind resistance	80mph
Forward gain (ref D pole = 1:00)	3·6dB	Weight	14lbs
		Rotator requirements	AR40

– UK AGENTS –

Amateur Electronics Ltd, Birmingham
Jaycee Electronics, Fife
Lowe Electronics Ltd, Matlock
Radio Shack Ltd, London
Stephens James Ltd, Leigh, Lancs.
South Midlands Communications – (Southampton & all branches)

– OVERSEAS AGENTS –

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FT 290R	£249.00	£25.00	£10.00
FT 790R	£299.00	£30.00	£12.00
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Enquiries by post should contain a SAE. Please restrict telephone technical enquiries between 6 pm and 9 pm in the evening on either 0256 24611 or 07356 5324. Access and Barclaycard orders can be taken on 07356 5324.

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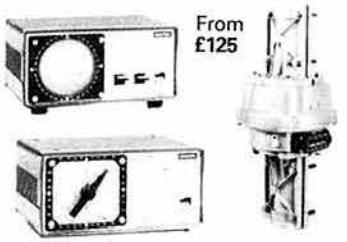

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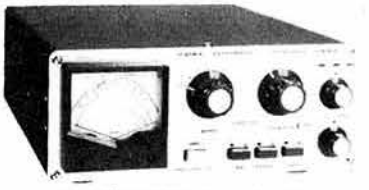

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1 or 3W	30W	SSB	MML144/30-LS	12dB	<1·5dB	13·8V @ 4A	✓	SO239
10W	50W	FM	MML144/50-S			13·8V @ 6A	✓	SO239
10W	100W	AM	MML144/100-S			13·8V @ 12A	✓	SO239
1 or 3W	100W	CW	MML144/100-LS			13·8V @ 14A	✓	SO239

PRICES (inc VAT)

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3 Does the amplifier you are considering have a "realistic" power output specification? Be sure to check if the power rating is RMS or PEP!
4 Is the product fully guaranteed for 12 months—INCLUDING PA DEVICES?

If the answer to any of these questions is No, then you should telephone us immediately for help!

INPUT POWER	OUTPUT POWER (R.M.S.)	MODES OF OPERATION	PRODUCT	PREAMPLIFIER GAIN	PREAMPLIFIER N.F.	POWER REQUIREMENTS	RF VOX	CONNECTORS
1 or 3W	30W	SSB FM SSTV AM CW	MML432/30-L	12dB	<2dB	13·8V @ 6A	✓	INPUT—BNC OUTPUT—BNC
10W	50W		MML432/50	12dB	<2dB	13·8V @ 8A	✓	INPUT—BNC OUTPUT—'N'
10W	100W		MML432/100	—	—	13·8V @ 20A	✓	INPUT—BNC OUTPUT—'N'

MML432/30-L

MML432/50

MML432/100

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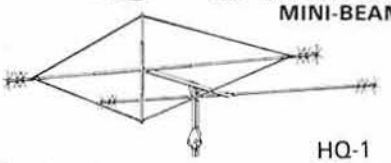

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AT930	Auto ATU 80M-10M	141.00	(–)
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SP430	Matching Speaker	29.44	(1.50)
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TS530S	H F Transceiver 9 Band	595.00	(–)
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TS130V	8 Band 20W Pep Transceiver	456.00	(–)
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SP120	Base Station External Speaker	26.40	(1.50)
AT130	100W Antenna Tuner	93.00	(1.50)
PS20	AC Power Supply – TS130V	57.96	(2.50)
MC50	Dual Impedance Desk Mic	30.80	(1.50)
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FL1	Frequency Agile Converter	79.35	(–)
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FL3	Audio Filter & Notch	129.37	(–)
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ANF	Auto Audio Notch Filter	67.85	(–)
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RFC/M	RF Speech Clipper Module	29.90	(–)
D70	Morse Tutor	56.35	(–)
AD270	Indoor Active Antenna	47.15	(–)
AD370	Outdoor Active Antenna	64.40	(–)
MK	Keyboard Morse Sender	137.42	(–)
Codecall	Selective Call Device (Link prog)	32.20	(–)
Codecall	Selective Call Device (Switch prog)	33.92	(–)
RFA	Wideband Preamplifier	33.92	(–)
DC 144/28	2 Metre to 28MHz converter	39.67	(–)
MPU	Mains Power Unit	6.90	(–)
SRB2	Auto Woodpecker blanker	86.25	(–)

WELZ

SP15M	SWR PWR HF/200W	35.00	(1.00)
SP45M	SWR PWR 2M/70cm 100W	51.00	(1.00)
SP200	SWR PWR HF/2M 1KW	69.95	(1.50)
SP300	SWR PWR HF/2M/70cm	97.00	(1.50)
SP400	SWR PWR 2M/70cm 150W	69.95	(1.50)
SP600	SWR PWR HF/2M/20KW	97.00	(2.00)
SP10X	SWR PWR HF/2M	24.45	(0.75)
SP350	SWR PWR HF/2M/70 200W	59.95	(1.50)
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CT15A	15/50W Dummy Load (PL259)	7.95	(0.75)
CT15N	15/50W Dummy Load (N type plug)	13.95	(0.75)
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–	2 Way Toggle Switch (H.F./2M)	6.00	(0.50)
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SA450N	2 Way Diecast · N plugs (500MHz)	12.95	(0.75)
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CH20N	2 Way WELZ · N plugs (900MHz)	31.95	(1.00)
–	5 Way Western Rotary (H.F.)	15.95	(1.00)
DRAE	3 Way Rotary	15.40	(0.50)
LAR	3 Way Rotary (H.F.)	19.95	(1.25)

ROTATORS

Hirschman	RO250 VHF Rotor	45.00	(2.00)
9502B	Colorotor (Med. VHF)	56.95	(2.00)
EMR400	Alinco	89.95	(2.50)
KR400RC	Kenpro – inc lower clamps	125.00	(2.50)
KR600RC	Kenpro – inc lower clamps	175.00	(3.00)

TEST EQUIPMENT

Drae	VHF Wavemeter 130-450MHz	27.50	(–)
DM81	Trio Dip Meter	71.00	(0.75)
MMD50/500	Dig. Frequency meter	75.00	(–)

TELEREADERS (CW & RTTY)

TONO 500	299.00	(–)
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SP901	External Speaker	31.00	(1.50)
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FT290R	2M Portable Multimode	249.00	(–)
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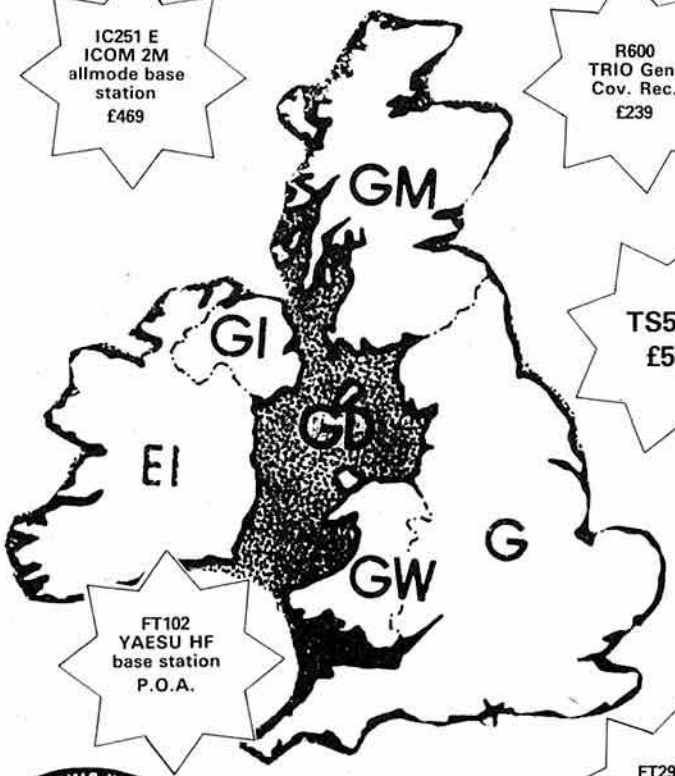

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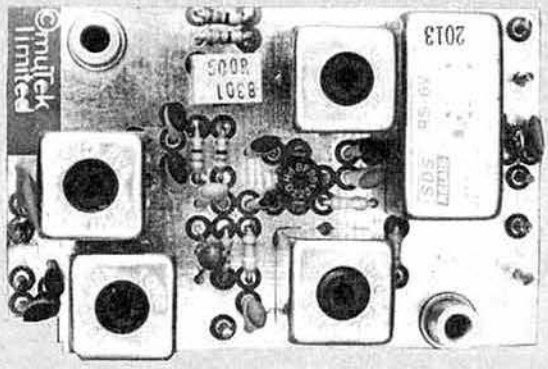

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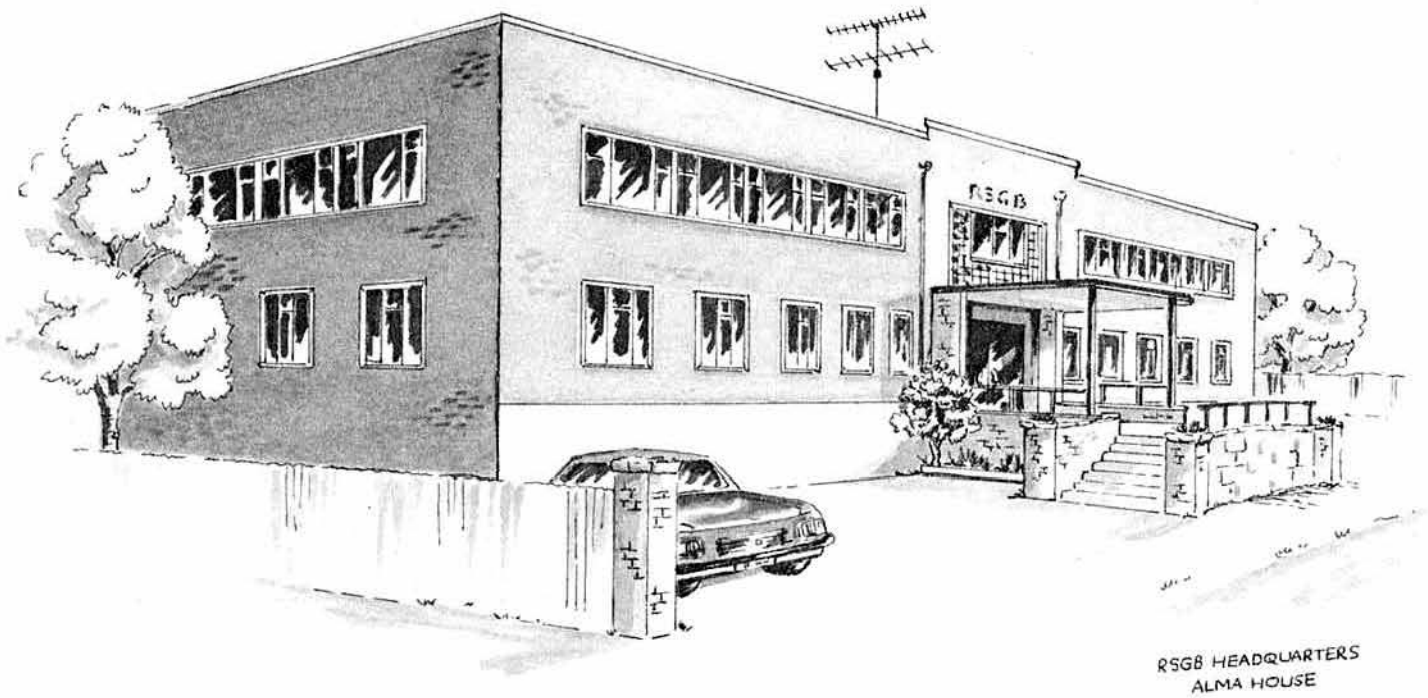
Please write, stating salary required, to **Kevin Bond, Radio & Electronics World, Sovereign House, Brentwood, Essex CM14 4SE**

RADIO SOCIETY OF GREAT BRITAIN



RSGB HEADQUARTERS
ALMA HOUSE

REPORT & ACCOUNTS
and
THE YEAR IN REVIEW

for the year ended 30 June 1983

Radio Society of Great Britain

(COMPANY LIMITED BY GUARANTEE)

ALMA HOUSE, CRANBORNE ROAD, POTTERS BAR, HERTS, EN6 3JW

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

COUNCIL (1 July 1982 to 30 June 1983)

President
D. E. Baptiste, CBE

Executive vice-President
R. G. Barrett, GW8HEZ

Immediate past-President
E. J. Allaway, MB, ChB, MRCS, LRCP, G3FKM

Honorary treasurer
P. F. D. Cornish, FCA, G3COR

Members
J. Bazley, G3HCT
R. Bellerby, MA, BSc, FBIS, G3ZYE†
D. S. Evans, PhD, BSc, FIM, G3RPE*
K. A. M. Fisher, TEng(CEI), MIPRE, G3WSN
G. A. Griffiths, BA, CEng, G3STG††
F. D. Hall, GM8BZX
L. N. G. Hawkyard, G5HD
H. M. Holmden, G4KCC**
J. Heathershaw (Mrs), G4CHH
G. R. Jessop, CEng, MIERE, G6JP
I. J. Kyle, GI8AYZ
G. I. Knight, GM8FFX*
T. I. Lundegard, G3GJW
W. J. McClintock, G3VPK
B. O'Brien, G2AMV*
H. S. Pinchin, BSc, MBIM, G3VPE
D. M. Pratt, BTech, CEng, MIEE, MIERE, G3KEP
K. E. V. Willis, BSc, ARCS, CEng, MIEE, G8VR**

†Resigned 20 November 1982
*Retired 31 December 1982
**Elected 1 January 1983
††Co-opted January 1983

Secretary & general manager: D. A. Evans, G3OUF

Auditors: Edward Moore & Sons, chartered accountants

Bankers: Barclays Bank Ltd

ANNUAL GENERAL MEETING

NOTICE IS HEREBY GIVEN THAT THE FIFTY-SEVENTH ANNUAL GENERAL MEETING of the Society will take place at the Institution of Electrical Engineers, Savoy Place, London WC2, at 2pm on Saturday 10 December 1983 for the transaction of the undermentioned business:

1. To receive and, if approved, confirm the minutes of the fifty-sixth annual general meeting circulated with the November 1983 issue of *Radio Communication*.

2. To receive and consider the accounts for the year ended 30 June 1983, and the reports of the Council and the auditors thereon.

3. To announce the names of members to serve on the Council for the year 1984. In the event of any successful candidate(s) being of the age of 70 or over it will be necessary for their appointment(s) to be confirmed by the meeting.

4. To resolve that Messrs Edward Moore & Sons be reappointed auditors of the Society for the ensuing year, and that their remuneration be fixed by Council.

5. To transact any other business which may be properly transacted at an annual general meeting.

Any member entitled to attend and vote at the above meeting may appoint a proxy to attend. A proxy need not be a member of the Society. Members attending the meeting should bring their current membership cards.

By order of the Council
D. A. EVANS
Secretary

1 November 1983

Notes
(a) Forms for the appointment of proxies may be obtained from the secretary upon request.
(b) The instrument appointing a proxy shall be deposited at the office of the Society not less than 48 hours before the time appointed for holding the meeting.

Financial report of Council to members of the Radio Society of Great Britain

Council has pleasure to present the audited accounts of the Society and its subsidiaries for the year ended 30 June 1983 which are set out on Pages v to viii. They show that before taxation, the ordinary surplus of income over expenditure for the year was £29,520. Corporation tax on investment income and a provision for tax on trading income (net of deferred tax) absorbs £9,299 leaving £20,221 to be added to the Society's funds.

The outstanding event of the year was the sale of the Society freehold premises at 35 Doughty Street, London, and the acquisition and occupation of Alma House, Cranborne Road, Potters Bar, Hertfordshire. After deducting the costs of sale, the net proceeds of the sale of 35 Doughty Street amounted to £258,573, which after deducting the original cost gave rise to a surplus of £216,898 which appears as an extraordinary item in the Income and Expenditure Account to make the total surplus for the year added to the Society funds of £237,119.

The cost of the freehold of the new headquarters at Alma House, including legal fees and other expenses, amounted to £367,572. The net cost of the move in cash terms therefore amounted to £109,000, all of which was found from the Society's own resources.

In addition, the Society also contracted to purchase for £50,000 additional land immediately adjoining Alma House. A deposit of £5,000 has been paid and completion of the purchase has to take place before 23 October 1984.

The surplus of income over expenditure on ordinary activities for the year was arrived at after absorbing approximately £20,000 of incidental costs of the move of headquarters. These included the actual removal costs, replacements and losses on disposal of equipment scrapped, and decorative and other work carried out after occupation of Alma House.

Generally income was much in line with forecast. Subscription income represented a full year at the current rates which were last increased from 1 October 1981. Advertising revenue was at the level anticipated, although it represented a lower volume of space taken by advertisers.

Book sales showed an increase over the previous year, and were helped by the appearance of re-issues or new publications in the first half of 1983.

Other income mainly comprised bank interest. It is Society policy to continue to place on interest earning deposit account, sums not immediately required for the purposes of the Society.

Headquarters expenses showed a large increase, mostly attributable to the amounts incurred for repairs and renovations and the general cost of putting Alma House in good order for the Society's use following the move.

Staff costs overall increased. Taking the total figures shown in Note 6 to the accounts, it should be noted that the average total of staff engaged in the year was 26 compared with 24 for the previous year. At the end of the year there was a total of 28 members of staff (compared with 26 at the end of the previous year) working at headquarters and other locations.

The bad debts provision this year is considerably lower. The provisions made in 1981–2 adequately covered the bad debts actually experienced during the year.

Under membership services, the principal increases have been under the headings of rallies, exhibitions and publicity and the cost of committee, regional and Council meetings. The costs of Council and committee meetings reflected a considerable increase in activities during the year.

The layout and composition of the balance sheet has been varied very slightly to show the additional information required by the Companies Act 1981. The principal change is to show subscriptions received in advance under the heading of creditors, having the effect of reducing the apparent net current assets.

In a year which has seen a great deal of change, Council is especially pleased to acknowledge its debt and gratitude for the enthusiastic support and energy of the staff—led by the general manager, and its pleasure that they now have modern and prestigious offices and facilities from which to continue to pursue the aims and objects of the Society and to serve its members.

Council looks forward with confidence to the coming year.

RADIO SOCIETY OF GREAT BRITAIN

AND ITS WHOLLY-OWNED SUBSIDIARY COMPANIES

CONSOLIDATED INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 30 JUNE 1983

	Notes	1983 £	1983 £	1982 £	1982 £
INCOME					
Subscriptions	(1)		423,735		*367,226*
Advertising	(1)		243,312		*241,960*
Book sales			301,459		*280,160*
Other income	(5)		20,112		*27,229*
TOTAL INCOME			£988,618		*£916,575*
EXPENDITURE					
Cost of book sales					
Cost of printing		159,460		*149,044*	
Costs of editing and despatch staff		50,451 209,911	42,641	*191,685*	
Headquarters					
Rates, lighting, heating and cleaning		19,751		*16,709*	
Repairs and maintenance		14,436	34,187	*991*	*17,700*
Administration					
Staff costs		167,785		*140,059*	
Pension		100		*600*	
Telephone, postage, printing and stationery		76,952		*71,392*	
Insurance		5,505		*1,717*	
Hire and maintenance of equipment	(7)	47,993		*23,011*	
Depreciation of fixed assets and losses on disposal	(1)	25,750		*18,883*	
Audit fees		7,625		*7,500*	
Legal and professional fees		1,410		*1,970*	
General expenses		8,840		*4,664*	
Preliminary expenses of subsidiary		241	342,201	—	*269,796*
Finance					
Interest paid		657		—	
Bank charges		2,512		*1,625*	
Bad debt provision		1,998	5,167	*10,626*	*12,251*
Membership services					
Radio Communication	(8)	285,236		*284,757*	
Certificates, awards, trophies, etc		4,573		*2,731*	
QSL Bureau		11,179		*9,463*	
Beacons, repeaters, satellites and Intruder Watch		3,419		*3,751*	
IARU Region 1 contribution and levy		5,218		*4,333*	
Rallies, exhibitions and publicity	(9)	18,584		*16,258*	
Cost of committee, regional and Council meetings		38,205		*28,981*	
Cost of international meetings and conferences		1,218	367,632	—	*350,274*
TOTAL EXPENDITURE			£959,098		*£841,706*
SURPLUS ON ORDINARY ACTIVITIES BEFORE TAXATION					
[of which £29,963 (*1982: £74,980*) arises in the Society]			29,520		*74,869*
Less Provision for taxation thereon at 38% (*1982: 40%*)	(10)				
Corporation tax		(11,469)		*(12,500)*	
Deferred tax		2,170	(9,299)	*(1,555)*	*(14,055)*
SURPLUS ON ORDINARY ACTIVITIES AFTER TAXATION			20,221		*60,814*
EXTRAORDINARY ITEM					
Surplus on disposal of freehold property			216,898		—
SURPLUS FOR YEAR			£237,119		*£60,814*

RADIO SOCIETY OF GREAT BRITAIN

AND ITS WHOLLY-OWNED SUBSIDIARY COMPANIES

BALANCE SHEETS AT 30 JUNE 1983

	Notes	1983 The Society £	1983 The Society and subsidiaries £	1982 The Society £	1982 The Society and subsidiaries £
FIXED ASSETS					
Tangible assets	(1) (2)	389,104	389,104	*48,179*	*89,854*
Investments	(3)	200	—	*200*	—
		389,304	389,104	*48,379*	*89,854*
CURRENT ASSETS					
Stocks, at lower of cost and net realizable value		160,995	160,995	*120,522*	*120,522*
Trade debtors		56,531	56,531	*90,172*	*90,172*
Amount due from subsidiary company		—	—	*42,801*	—
Other debtors		4,420	4,420	*5,340*	*5,581*
Prepayments and accrued income		38,826	38,826	*13,094*	*13,094*
Cash at bank and in hand		130,156	132,230	*195,249*	*197,323*
		390,928	393,002	*467,178*	*426,692*
CREDITORS: AMOUNTS FALLING DUE WITHIN ONE YEAR					
Trade creditors		(41,989)	(41,989)	*(41,358)*	*(41,358)*
Amounts due to subsidiary companies		(215,792)	—	*(100)*	—
Corporation tax		(13,018)	(13,018)	*(5,954)*	*(5,954)*
Other taxation and social security		(7,388)	(7,388)	*(5,718)*	*(5,718)*
Other creditors		(11,418)	(12,887)	*(9,120)*	*(10,467)*
Accruals and deferred income		(39,351)	(39,351)	*(33,543)*	*(33,543)*
		(328,956)	(114,633)	*(95,793)*	*(97,040)*
Subscriptions in advance		(205,176)	(205,176)	*(190,290)*	*(190,290)*
		(534,132)	(319,809)	*(286,083)*	*(287,330)*
NET CURRENT ASSETS/(LIABILITIES)		(143,204)	73,193	*181,095*	*139,362*
Total assets less current liabilities		246,100	462,297	*229,474*	*229,216*
CREDITORS: AMOUNTS FALLING DUE AFTER MORE THAN ONE YEAR					
Corporation tax payable 1 January 1985		(10,700)	(10,700)	*(12,249)*	*(12,249)*
		235,400	451,597	*217,225*	*216,967*
PROVISIONS FOR LIABILITIES AND CHARGES					
Deferred taxation	(1)(10)	(2,648)	(2,648)	*(4,818)*	*(4,818)*
		£232,752	£448,949	*£212,407*	*£212,149*
ACCUMULATED FUNDS					
Income and expenditure account					
Balance at 1 July 1982		209,894	209,636	*148,969*	*148,822*
Surplus for year		20,664	237,119	*60,925*	*60,814*
		230,558	446,755	*209,894*	*209,636*
Legacy fund	(4)	2,194	2,194	*2,513*	*2,513*
		£232,752	£448,949	*£212,407*	*£212,149*

(The notes on pages vi and vii form part of these accounts)

Approved by the Council on 29 September 1983, and signed on its behalf by:

D. E. BAPTISTE, CBE, *President*

P. F. D. CORNISH, FCA, *Honorary treasurer*

NOTES ON THE ACCOUNTS

1. Accounting policies:
   (a) Subscriptions—cash received in respect of subscriptions for the year has been apportioned on a time basis from the actual dates subscriptions were receivable, after deduction of VAT.
   (b) Advertising income is the gross amount receivable for advertisements in *Radio Communication*.
   (c) Depreciation—tangible fixed assets, except freehold land, are written off using the straight-line method over their estimated useful lives at the following rates based on cost:
   Freehold buildings — 2 per cent per annum
   Furniture — 10 per cent per annum
   Equipment — 20–25 per cent per annum
   Computer — 20 per cent per annum
   (d) Deferred taxation has been provided using the liability method in respect of timing differences which are not expected to continue for the foreseeable future.
   (e) Since a consolidated income and expenditure account is submitted, no such account for the Society alone has been presented.

2. Tangible fixed assets

	Freehold land and buildings	Furniture, equipment and computer programming	Total
Cost	£	£	£
At 1 July 1982	41,675	111,857	153,532
Additions	367,572	14,103	381,675
Disposals	(41,675)	(52,160)	(93,835)
At 30 June 1983	£367,572	£73,800	£441,372
Depreciation			
At 1 July 1982	—	63,678	63,678
Charge for the year	6,351	12,255	18,606
On disposals	—	(30,016)	(30,016)
	£6,351	£45,917	£52,268
Net book value			
At 30 June 1983	£361,221	£27,883	£389,104
At 1 July 1982	£41,675	£48,179	£89,854

Freehold land included above amounts to £50,000

3. Fixed asset investments

	1983 £	*1982 £*
Shares in group companies		
Cost at 1 July 1982	200	*100*
Additions	—	*100*
	£200	*£200*

The subsidiaries, both of which are wholly owned, are Lambda Investment Company Limited (an investment company) and RSGB (Raynet) Limited, which has been dormant since incorporation.

4. Legacy fund

	1983 £	*1982 £*
Balance at 1 July 1982	2,513	*6,665*
Amounts refunded	—	*(4,293)*
Legacies received	111	*141*
Donation paid	(430)	—
Balance at 30 June 1983	£2,194	*£2,513*

5. Other income includes bank interest of £19,119 (*1982: £25,834*) and listed investment income of £Nil (*1982: £832*).

6. Staff costs

	1983 £	*1982 £*
Wages and salaries	218,109	*202,976*
Social security costs	24,619	*22,736*
Pension costs	4,365	*3,426*
	£247,093	*£229,138*

The average number of persons employed by the Society was 26 (*1982: 24*).

7. Hire of equipment amounted to £19,217 (*1982: £8,379*). Under leasing arrangements in connection with the IBM38 computer, the Society has a commitment to pay £19,216 annually until 31 December 1987.

8. *Radio Communication* expenses comprise the whole of the costs of printing and distribution, the cost of editorial and advertising staff and the Chelmsford office.

9. Rallies, exhibitions and publicity expenses comprise:

	1983	1982
	£	£
Society publicity and advertising	9,872	6,945
Deficit on the Society's own events and the cost of participation in other rallies and exhibitions	8,712	9,313
	£18,584	£16,258

Book sales totalling £33,465 gross (*1982: £28,697*) made at rallies and exhibitions have been accounted for under income from book sales.

10. The Society is liable to pay corporation tax on its investment and trading income. Tax deferred owing to the effects of capital allowances has been provided for in full. The potential taxation liability, not provided for in these accounts, in respect of capital gains rolled over is £65,000. The taxation charge has been reduced by £2,510 (*1982: £2,055*) as a result of stock relief.

11. The Society administers certain prize and memorial funds, totalling £572 (*1982: £544*) which are not included in these accounts.

12. Capital commitments at 30 June 1983 amounted to £45,000, in respect of the purchase of land adjacent to the Society's headquarters at Alma House.

CONSOLIDATED STATEMENT OF SOURCE AND APPLICATION OF FUNDS FOR THE YEAR ENDED 30 JUNE 1983

	1983	1982
SOURCE OF FUNDS	£	£
Surplus for the year before taxation	29,520	74,869
Donations, legacies and interest	(319)	141
Adjustment for items not involving the movement of funds:		
Depreciation (including losses on disposals)	25,750	18,883
Tax suffered by deduction	—	(250)
Surplus on sale of listed investments	—	(77)
Total generated from operations	54,951	93,566
OTHER SOURCE		
Proceeds from sale of listed investments	—	19,580
Proceeds from sale of property less expenses incurred	258,573	—
	313,524	113,146
APPLICATION OF FUNDS		
Purchase of fixed assets, less proceeds of sale	(366,675)	(16,337)
Corporation tax paid	(5,954)	(2,484)
	(£59,105)	£94,325
INCREASE IN WORKING CAPITAL		
Stocks	40,473	28,201
Debtors, prepayments and accrued income	(9,070)	32,512
Creditors accruals, deferred income, and subscriptions in advance	(25,415)	(19,784)
	5,988	40,929
MOVEMENT IN NET LIQUID FUNDS		
Cash balances	(65,093)	53,396
	(£59,105)	£94,325

REPORT OF THE AUDITORS TO THE MEMBERS OF THE RADIO SOCIETY OF GREAT BRITAIN

We have audited the accounts set out on pages *iv* to *vii* in accordance with approved auditing standards.

In our opinion the accounts, which have been prepared under the historical cost convention, give a true and fair view of the state of affairs of the Company and its subsidiaries at 30 June 1983 and of their surplus of income and of their source and application of funds for the year ended on that date and comply with the Companies Acts 1948 to 1981.

4 Chiswell Street, London EC1Y 4XB.
29 September 1983

EDWARD MOORE & SONS
Chartered Accountants

LAMBDA INVESTMENT COMPANY LIMITED

REPORT OF THE DIRECTORS

The directors have pleasure in submitting their report for the year ended 30 June 1983. The company is a wholly-owned subsidiary of the Radio Society of Great Britain (a company incorporated in England) and was formed to acquire the freehold property, 35 Doughty Street, London WC1, which was the headquarters of the Society. The property was sold during the year for a sum, net of expenses, of £258,573.

The directors during the year were Messrs L. E. Newnham (chairman), G. R. Jessop and P. F. D. Cornish. Mr L. E. Newnham holds one share as nominee of the Society. Mr G. R. Jessop retires by rotation at the Annual General Meeting and, being eligible, offers himself for re-election. A resolution re-appointing Messrs Edward Moore & Sons as auditors will be proposed at the Annual General Meeting.

On behalf of the Board: D. A. Evans, *Secretary*

BALANCE SHEET AT 30 JUNE 1983 and REVENUE ACCOUNT FOR THE YEAR ENDED ON THAT DATE

	1983			1982		
	£	£	£	£	£	£
FIXED ASSETS						
Tangible						
Freehold property			—			*41,675*
Preliminary expenses			—			*241*
			—			*41,916*
CURRENT ASSETS						
Amount due from holding company		215,692			—	
Bank balance		2,074			*2,074*	
		217,766			*2,074*	
CREDITORS						
Amounts falling due within one year						
Creditors		(1,469)			*(1,347)*	
Amount due to holding company		—			*(42,801)*	
		(1,469)			*(44,148)*	
NET CURRENT ASSETS (LIABILITIES)			216,297			*(42,074)*
TOTAL ASSETS LESS CURRENT LIABILITIES			£216,297			*£(158)*
CAPITAL AND RESERVES						
SHARE CAPITAL						
Authorized and issued capital						
100 shares of £1 each fully paid			100			*100*
REVENUE ACCOUNTS						
Rent receivable in year		—			*250*	
Less:						
Audit fee	150			*150*		
Sundry expenses	—			*40*		
Insurances	52			*171*		
Preliminary expenses	241			—		
		(443)			*(361)*	
LOSS ON ORDINARY ACTIVITIES		(443)			*(111)*	
EXTRAORDINARY ITEM						
Surplus on disposal of freehold property		216,898			—	
		216,455			*(111)*	
BALANCE AT 1 JULY 1982		(258)			*(147)*	
BALANCE AT 30 JUNE 1983			216,197			*(258)*
			£216,297			*£(158)*

Approved by the Board on 29 September 1983 and signed on its behalf by: *L. E. Newnham, director*
P. F. D. Cornish, FCA, director

REPORT OF THE AUDITORS TO THE MEMBERS OF LAMBDA INVESTMENT COMPANY LIMITED

We have audited the accounts set out above in accordance with approved auditing standards.

In our opinion, the accounts which have been prepared under the historical cost convention give on that basis a true and fair view of the state of the Company's affairs at 30 June 1983 and of the result for the year ended on that date and comply with the Companies Acts 1948 to 1981.

4 Chiswell Street, London EC1Y 4XB
29 September 1983

EDWARD MOORE & SONS
Chartered Accountants

THE YEAR IN REVIEW

Some of the activities of the Society in the year ended 30 June 1983

GENERAL MANAGER'S REPORT

THE MAJOR EVENT of the year was, of course, the very successful move of the RSGB headquarters to Potters Bar. This, for the first time in many years, gave the headquarters staff reasonable working facilities. It also represented something of a watershed in the sense that the Society had in previous years devoted a high proportion of its efforts to putting its house in good administrative order, but could now begin to look forward to introducing new services for its members.

Associated with the move were a number of further changes which could be implemented. An important one was the expansion of the IBM34 to IBM38 status, which has allowed the development of more sophisticated programmes and produced more efficient operation. This in turn has permitted more headquarters staff time to be devoted to amateur radio affairs, which has produced results in the form of improved licensing conditions, the transfer of the main exhibition to NEC, and improved links with clubs by talks and via information sheets. For the first time for many years, it has been possible to operate a headquarters station on a regular, if very limited, basis. Further important changes described below include the re-establishment of the Editorial Board and the FPG studies on the working of committees and the representational scheme. Despite the present depressed economic climate, members have increased by five per cent and the turnover by eight per cent. This would appear to form a sound basis for the coming year.

THE MOVE TO THE NEW HEADQUARTERS

What clearly must be regarded as the most important event of the year was the long-awaited move of the RSGB HQ from 35 Doughty Street in November 1982. There had been two main decisions to make, both very complex: when to move and to where to move.

Those who are unfamiliar with membership organizations such as RSGB will probably also be unaware of the extraordinary complexity of running this type of business, although an attempt has been made over the years to give a picture in previous annual reports and elsewhere. In the case of RSGB, the problem was exacerbated by a number of factors, which included the small number of staff employed (which meant little reserve effort), the fact that the small staff could not be expanded because of lack of floor space, while at the same time the membership had been expanding at over 10 per cent per annum for a number of years. It is not surprising therefore that absences of staff due to sickness or holidays caused disproportionate problems, an experience repeated year in, year out.

This context obviously dominated the decision making on the question of when to move. There was a balance to be drawn between the advantages of staying while advanced new management procedures based on the IBM34 were developed (these would greatly facilitate the transfer and make the administration less vulnerable to the loss of experienced staff) and the disadvantage that the staff were working in what can only be regarded as most difficult conditions without the option of additional help being hired, and an earlier move was very much to their advantage.

The question of to where to move was also crucially dependent on similar considerations: it was essential to maintain continuity of staff while at the same time maintaining good communications with essential services. After much research it was concluded that central Watford would be the ideal position, but despite active searching over a period of months, and visiting a number of possible buildings, no suitable premises became available within that period. However, what many people now regard as near-ideal premises became available in Potters Bar, initially for short-term leasing: access to the building was good, with ample space for extending the building if required. While the links were generally not quite as good as a site at Watford could have had, nevertheless they were adequate. For example, Potters Bar railway station was only approximately one mile away, and this had a 16min service to Kings Cross. Access by road was good and would improve when the M25 was completed in 1985.

From further investigation a situation developed that can only be described, from a Society point of view, as remarkably fortunate. The freeholders of the building were not only prepared to sell, but were also interested in buying the Society's existing HQ at Doughty Street. Thus the possibility existed of what was effectively a simple part-exchange with cash adjustment. After much negotiation to clarify the innumerable details (which were only completed an hour before contracts were due to be signed) the deal was concluded on 23 November.

The result at the end of the day was that the Society obtained an almost ideal new HQ, four or five times larger than previously, for an additional outlay of approximately £110,000. This money was paid entirely out of the Society's financial reserves carefully accumulated over the previous years, so there was no need for any mortgage or loan with associated interest or, as it happens, even a bridging loan.

One illustration of the change is that the space now available for the storage and despatch of books exceeds the floor area of Doughty Street! All but one of the staff transferred to the new HQ, which gave the continuity that was required. Since the move, settling in has proceeded, and the process of recruiting long-awaited additional staff is now well in hand.

NEW CENTRAL PROCESSOR UNIT

As mentioned earlier, the Society upgraded the central processing unit of its computer installation during the course of the financial year.

As if moving a very active headquarters of an organization receiving several thousand letters and many hundreds of phone calls each week, with the minimum of disruption, was not enough; running in parallel with this was a study of our computer requirements for the next decade. Fundamentally, the Society's headquarters is dealing with a vast amount of data each working day.

For reasons of economy, most routine work is now handled by the data processing equipment. As an example of the volume of work, in a typical working day some 100,000 separate "disc accesses" are made and some 2,500 changes to files take place. These, typically, can be changes of address or changes of callsigns. The need to keep track of all this work is quite obvious.

In March 1983, a new central processor unit, the IBM38, was commissioned and went on line at the new headquarters. All headquarters staff now have access to the computer through one of the 14 work-station display units. From the point of view of a member telephoning or writing to headquarters with an enquiry, a range of techniques is now available to staff in order to provide information. The new cpu is capable of handling the Society's requirements for many years to come, and upgrading from similar equipment meant that this changeover also took place with ease.

THE FORWARD PLANNING GROUP

The Forward Planning Group (FPG) has as its terms of reference the examination of the whole future of amateur radio with a view to determining whether the Society is providing the necessary support and services to its members, and if not, what changes and revisions to the structure and scope of the organization, premises and equipment need to be made. Its membership is formed by the invitation of the President and has included: Dr E. J. Allaway, G3FKM, President 1982; Mr D. E. Baptiste, President 1983; Mr R. G. Barrett, GW8HEZ, executive vice-President; the general manager/secretary; Dr D. S. Evans, G3RPE; Mr G. R. Jessop, G6JP; and Mr B. O'Brien, G2AMV.

The main effort of the FPG during the year under review has been to consider in depth the way in which Council relates to its committees. In general terms, it was concluded that the existence of the 15 committees represented a source of great strength within the Society, and is a feature much envied by many sister societies. However, with the ever-expanding breadth of amateur radio and its increasing technical and administrative complexity, Council was becoming more and more concerned about maintaining an effective link between itself and the committees. As a consequence, at its meeting of 20 November Council asked the FPG to study the problem as a matter of urgency with a view to making its recommendations at the Council meeting of 11 December.

After much research and discussion within the FPG, the main features of the changes proposed were:

(a) Council should normally concern itself only with those items of committee business which are innovative or represent new policy: it should not involve itself with the routine work of committees.

(b) To ensure that there is a close and direct link with each committee, Council itself should appoint the chairman, who would then become directly responsible to Council for the effective working of the committee. At the same time, the chairman should have the right to address Council on relevant matters. The chairman would be responsible for selecting as members of the committee (other than ex-officio) those whom he/she judged to best serve the interests of the committee.

(c) At least part of most committees' work should be concerned with a limited number of well-defined new projects or areas for discussion which would be agreed by the chairman of the committee in conjunction with the FPG and approved by Council. These proposals would be the subject of special interest by Council.

It was emphasized that it was the intention of Council that the work of each committee should be clearly defined and that when this had been done, the committee was then to be left to get on with its work.

The changes were agreed in provisional form at the Council meeting on 11 December 1982, and in a final form at its meeting on 28 April 1983. In the intervening period, the FPG met each chairman at least twice to discuss the future objectives of the committee. The need for any additional links with other committees or outside bodies and also any changes to the committee's terms of reference were discussed. This clearly was a major task for all those involved, especially as so much had to be accomplished within a strictly limited timescale.

A second area of study concerned the links between the Society administration, as represented by Council, its committees and the HQ administration, and the membership at large. In this study, the effectiveness of regional representatives as part of the representational system was the subject of a questionnaire which present and previous RRs were invited to complete.This was based on their role as defined in the Society's "Green Book" and which arose from earlier discussions at various RR Conferences. The overall impression was that their range of duties proposed was so extensive that each RR could be expected to do only a small fraction of the duties suggested by the "Green Book": consequently there was room for further consideration of their role. It is intended that the roles of zonal members of Council and of area representatives will form part of further studies in this area.

One of the consequences of this work was that the Society's Membership & Representation Committee proposed that the "Council Letter" should be mailed to each affiliated club to enhance the direct link between clubs and the Society's HQ. This has been warmly welcomed.

Radio Communication Editorial Board

The *Radio Communication* Editorial Board was re-established by Council towards the end of the financial year, following a recommendation to the Forward Planning Group by the chairman of the Technical & Publications Committee. The board was given full responsibility for ensuring the production of a highly readable magazine of interest to all its readers: the decision reflects the great importance that Council places on the magazine both as a service to and as a link with members. The board consists of the general manager/secretary as chairman, Mr A. W. Hutchinson, editor, and Dr D. S. Evans, G3RPE, chairman, Technical & Publications Committee, with close contact being maintained with Mr P. Hawker, G3VA.

Since its first meeting on 12 April, a number of changes to *Radio Communication* have already been initiated. One of the more important was the introduction (or, more correctly, the re-introduction) of a monthly editorial in which topical and sometimes controversial items could be raised for general comment. At a time when amateur radio needs to question its future, these editorials have already provided an effective stimulus to members to express their views and thus provide most welcome feedback.

Over recent years, much effort has been spent by HQ in improving its capacity both to gather news and to disseminate it via GB2RS and various publications. Advantage has been taken of this also to expand the news section of *Radio Communication* to provide a more comprehensive service to readers. At the same time, the opportunity has been taken to gather together other news items previously dispersed throughout the magazine. A further most important change has been to place proper emphasis on readers' letters. These are now given more space in a prominent position in the magazine, together with comments and replies where appropriate. One heartening consequence of this change is that this section now carries greater authority as a forum for members' views. Finally, attention has been paid to presentation by providing more space for improved graphics and, for example, by giving a photograph and brief biographical details of authors to demonstrate that, behind the technicalities, there is a real live author.

The above changes reflect the increased staff effort that can and is now being devoted to this area. This has been well justified by the favourable response of members.

RADIO COMMUNICATION

Two trends noted last year, continued this year. On the credit side, the number of technical articles continued to rise, resulting in a 50 per cent increase compared with last year. Of these, however, few were of the simple constructional type, for which there is a continued demand, but during the coming year it is hoped that a start can be made to produce such articles "in-house". On the debit side, however, the decline in advertising content did not level off but continued throughout the year. A similar decline was noted in other magazines.

Even though the total number of pages, including supplements, fell by 12 compared with the previous year, the number of editorial pages increased by 34, and credit must be given to the editorial staff for coping with this extra workload. Other statistics for the year which may be of interest are: number of pages, 1,204; number of copies printed, 407,300: weight of paper 98·5 tonnes.

Over the years the editorial content of the magazine has expanded as the Society has grown in membership and resources, and the last issue of the year under review heralded a further and a more rapid expansion then ever before. The first steps in this expansion were commented on earlier, and it is expected that further strides will be taken in the year ahead. In order to achieve this, we are sure we can rely, as ever, on those who play a part in ensuring that the magazine goes out on time every month, and our thanks are extended to them.

MEMBERSHIP CONTACT AND THE MEDIA

Apart from the very large amounts of mail which arrive every day at headquarters, to say nothing of the many hundreds of telephone calls each week, there are many other ways in which staff and volunteers have contact with Society members and it is worth looking at these in some detail.

Exhibitions and rallies

There are now more amateur radio exhibitions, rallies and conventions than ever before, and an enormous amount of Society effort is involved in either organizing or attending them. Traditionally the Society has mounted a National Amateur Radio Exhibition in some form or another during the year, and this has had various venues —most recently, Alexandra Palace in north London has been used, and the "Ally Pally Rally" was an important event in the radio amateur's calendar. Following the disastrous fire in 1980, the original venue became unavailable, and an annexe, the Palm Court, was used in 1981, but it was rather small and generally unattractive for a major exhibition. In 1982 the new Alexandra Pavilion became the venue for the national exhibition, but this was also unsatisfactory for the type and scale of event which the Society had in mind.

With a certain amount of trepidation, a decision that the 1983 event would take place at the National Exhibition Centre was taken by the Society—two halls were booked, along with facilities for lectures and discussions. The 1983 National Amateur Radio Exhibition & Convention, as it was known, was considered to be a success, especially for a first time at a new venue. Attendance figures were about a third higher than in previous years at other venues, and the exhibition proved very popular both with the visitors and the trade. So much so, in fact, that the 1984 event will be held at the same venue, in a larger hall and with extra facilities.

Another RSGB event is the National Mobile Rally at Woburn—the weather for this event is usually excellent, and 1982 was no exception. This rally is becoming larger and better attended, and is without doubt one of the premier mobile rallies of the year.

Two other popular events in the year are the Scottish and Welsh Conventions, which are attended by the Society. The 1982 Scottish Convention was held in Aberdeen and was very well attended: the Society's bookstall was kept extremely busy even throughout the comprehensive lecture programme, of which the highlight was a lecture from Dr R. V. Jones of "Most Secret War" fame. The Welsh event took place at Blackwood, and was much enjoyed by all despite the wet and windy weather. We would like to acknowledge the invaluable assistance freely given to the Society at both events by local members.

Other exhibitions and rallies attended by the Society included the Electronic Hobbies Fair, the Lincoln Hamfest, NARSA, the Northern Mobile Rally, Elvaston Castle, Longleat, the EI/GI Convention at Ballymascanlon, the Lowe Open Day, the Leicester exhibition and—last but not least—the BARTG Rally and our own VHF Convention. The latter continues to be an extremely popular event at its Sandown Park venue, and attendance this year was an all-time high.

There are several reasons why the Society attends as many exhibitions and rallies as possible despite the demands on time. One is that it gives members the chance to meet Society staff and volunteers in person, exchange information and provide feedback; another is so that Society publications can be made available over-the-counter to many people. However, there is a surprising amount of work involved. Quantities of books required have to be worked out, transport has to be arranged (involving quite large lorries or vans in the case of a major event), the stand has to be set up, and staff have to be available not only to sell Society publications but to take new membership applications—and deal with the thousand-and-one questions from members, the general public, local dignitaries and, usually, the media in one form or another. After the event come the tasks of unloading, stock control and the financial procedures. If the Society is organizing the event, there is much more to be done and the behind-the-scenes work involved in setting up an event at the National Exhibition Centre, for example, is enormous. Stands have to be built, space organized, traders booked, publicity arranged and so on and so forth—it is not surprising that most exhibition organizers charge a very high price for their services.

All in all, the Society views the organization of, and attendance at, rallies and exhibitions as an important part of its work. All affiliated clubs and societies are being circularized and invited to supply details of their events so that the Society could arrange to visit as many as possible during 1984.

Lectures by headquarters staff

Another task which the Society sees as having fundamental importance is that of giving lectures and seminars to clubs and societies about its work, since the local club is a focal point of grass-roots amateur radio which provides instant feedback. A senior member of headquarters staff—usually John Nelson, the assistant to the general manager—is responsible for arranging and giving lectures and for providing information about the Society and amateur radio in general to clubs and their members. During the year under review, clubs in the following towns have been visited: Reading, Aylesbury Vale, High Wycombe, Ipswich, North London (Grafton), Walton-on-Thames, Coventry, Dover, Chichester, South London (Cray Valley), Chelmsford, Bournemouth, Stowmarket, Cheshunt, Colchester, Newbury, Chesham and Bedford. Additionally, ordinary regional meetings have taken place at Barnstaple, Norwich and Potters Bar.

The Society and the media

The other area in which the Society has contact with the outside world at large is via the media. Public and media relations are handled by the general manager's office with, again, John Nelson as the main contact point. Society relations with the broadcasting media are very good indeed, and the Society is consistently able to bring amateur radio to the attention of a wide public audience. Amateur radio is not inherently interesting to broadcasters: it tends to achieve prominence when it is the vehicle for other events such as the invasion of the Falkland Islands or the space shuttle flight with W5LFL on board. Perhaps this is as it should be—the Society has been criticised for not matching the media attention paid to cb radio, but it could be argued that there is a fine line between positive media interest and notoriety. Relations with newspapers have been reasonable, although many letters have had to be written to editors pointing out that cb and amateur radio are not the same thing, and that headlines such as "foul-mouthed radio ham wipes out cab company airwaves" do the hobby a disservice. Considerable confusion between cb and amateur radio still exists in the public mind and, being an organization "pro" amateur radio, the Society has put considerable effort into changing this situation during the year under review.

Probably the best radio programme of the year which incorporated amateur radio was "Electromania", featured on the BBC World Service and repeated on Radio 4. Several well-known amateurs explained the more esoteric aspects of the hobby—ms and eme were given a good airing—and some favourable feedback was received. Twenty-nine interviews and features were given to BBC and local radio during the year, ranging from explanations of anomalous propagation on vhf, for Radio Nottingham, to an hour-long feature on Radio 210 about the hobby. BBC Radio Scotland, in their programme "High Tech", has been a frequent customer for the Society's expertise. At the present time, effort is going into preparations for the space shuttle flight, and much media interest is expected from this—several interviews have already been given.

LIAISON WITH RRD

The 1982/83 financial year was the first complete year in which new arrangements for liaising with the UK licensing authority were operational. Council had recognized in early 1982 that, with the increasing liaison workload, it was necessary that the day-to-day business with the Radio Regulatory Division must be dealt with primarily by HQ staff. The Society's secretary/general manager was to become more heavily involved with this aspect of the Society's work, with assistance from several other staff in specific areas. The overall *modus operandi* was to be that the Society's Council determined the policy on the advice of its Licensing Advisory Committee, which was then implemented by HQ staff.

Among the first licence changes to come about after the introduction of the new scheme of working, was the introduction of a third-party greetings message facility associated with the GB special event callsigns. This was introduced as part of the UK licence on 1 October 1982. Also on that date, both the 18 and 24MHz bands were granted to UK amateurs on a restricted basis, but long before the expected release date of July 1989. In addition the 47, 75, 142 and 248GHz bands were released to UK amateurs.

In January 1983, following a considerable amount of negotiation with the RRD, a number of concessions were granted with regard to the use of amateur radio under emergency conditions. These facilities not only affected Raynet operations, which were considered very important, but also UK amateurs in general. It is now permissible for any UK radio amateur to pass emergency traffic on the amateur bands, if there is no other convenient method of communication, without the need to be involved with a specified user service—at a road traffic accident, for example.

In February 1983, some eight years of effort in securing experimental licences for 50MHz operation reached fruition in the shape of an agreement with the RRD (and BBC) for 40 special research licences. The Society expects that there will eventually be a 50MHz UK allocation for both Class A and Class B licensees. We are particularly optimistic because of the positive reaction of the Merriman Committee to RSGB proposals regarding the future of that part of the spectrum.

Liaison between RSGB and the RRD is, of course, an on-going Society commitment. It involves many thousands of hours of work each year, including daily contact by telephone and telex, regular meetings and much correspondence, and the time of committee and Council members.

Other matters discussed during the period under review include: beacon and repeater licensing, reciprocal licensing, Class B licensees using cw for practice purposes, morse testing, UK power levels, test and development licences, special event station licensing and extensions to the greetings message facility, licence processing delays and licence documentation, the licence schedule, cable tv and cordless telephones, crossband communications, novice licensing and a host of other subjects.

It must be emphasized that the work of the Society in the area of amateur licensing is considered one of the most vital areas of our activity. Readers will have noted that special efforts have been made to keep members informed via the Society's magazine: this has been yet another area in which improvement has been possible during the year because additional staff effort has been made available.

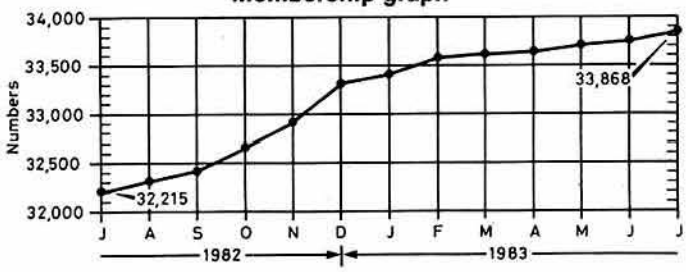
MEMBERSHIP

During the year under review, membership again continued to rise. As can be seen from the graph and chart, the net increase in membership was 5·13 per cent.

New members by month

Month	1982-3	1981-2	1980-1	1979-80	1978-9	1977-8
July	540	540	291	213	214	188
August	446	414	295	307	311	150
September	509	836	679	210	249	195
October	558	626	288	400	379	254
November	192	549	581	455	483	336
December	458	558	280	328	140	187
January	511	313	483	539	510	396
February	468	419	529	320	301	302
March	795	436	320	316	415	250
April	365	478	491	439	226	280
May	355	283	437	342	339	322
June	301	285	696	346	366	227
TOTAL	5,498					

Membership graph



SOCIETY AFFAIRS

The Society's 48th President, Dr John Allaway, G3FKM, completed his term of office at the end of 1982: Mr D. E. Baptiste, CBE, became the 49th President of the Society on 1 January 1983. There was a total of four vacancies for the 1983 Council, all for ordinary members: these were filled by the election of Messrs H. M. Holmden, G4KCC; G. R. Jessop, G6JP; D. M. Pratt, G3KEP; and K. E. V. Willis, G8VR. Mr R. Bellerby, G3ZYE, resigned from Council in November 1982, thus creating a casual vacancy which was filled at the wish of Council by Mr G. A. Griffiths, G3STG, at its first meeting in January. The election of Mr G. R. Jessop, G6JP, was confirmed at the annual general meeting on 4 December 1982.

At the first Council meeting of 1983, Mr R. G. Barrett, GW8HEZ, was elected executive vice-President for the year. Council wishes to record its thanks to Dr D. S. Evans, G3RPE, and Mr B. O'Brien, G2AMV, who stood down from Council at the end of 1982 under Article 26 of the Articles of Association, and to Mr G. I. Knight, GM8FFX.

In the year under review Council met nine times: details of the work of Council and

Attendance at Council meetings

	1982				1983		
	14·8	16·9	20·11	11·12	15·1 24·3	28·4	11·5
Dr E. J. Allaway	×	×	×	×	××	×	×
Mr D. E. Baptiste	×	×	×	×	××	×	×
Mr R. G. Barrett	—	×	×	—	××	—	×
Mr J. Bazley	—	—	—	—	—×	—	×
Mr R. Bellerby	—	×	×	Resigned			
Mr P. F. D. Cornish	—	×	—	—	—×	×	—
Dr D. S. Evans	×	×	×	×	End of office		
Mr K. A. M. Fisher	—	—	×	—	×—	—	—
Mr G. A. Griffiths	Co-opted				×	×	×
Mr F. D. Hall	—	—	×	×	××	×	—
Mr L. N. G. Hawkyard	×	×	×	×	××	×	×
Mrs J. Heathershaw	—	×	×	×	×—	×	—
Mr H. M. Holmden	Elected for 1983				××	×	×
Mr G. R. Jessop	×	×	×	—	××	×	×
Mr I. J. Kyle	×	×	—	×	××	×	×
Mr T. I. Lundegard	×	×	×	×	××	×	×
Mr W. J. McClintock	×	×	×	×	××	×	×
Mr B. O'Brien	×	×	×	×	End of office		
Mr H. S. Pinchin	×	×	×	×	××	×	×
Mr D. M. Pratt	—	×	×	—	×—	×	×
Mr K. E. V. Willis	Elected for 1983				××	×	×

the highlights of the work of its committees have been recorded in *Radio Communication* under "Council proceedings". The policy of arranging some Council meetings on Saturdays to reduce conflicts with members' work has continued whenever possible. During the year the Society's President, Council members and headquarters staff continued the policy of visiting clubs and amateur radio events around the UK. Since meetings and rallies etc take place during evenings and weekends, the resulting workload is a heavy one. Eighteen lectures on the work of the Society were given to clubs and societies by members of headquarters staff during the year, and these are considered an important part of the headquarters role even though they make considerable demands on time.

The Society continues to have useful contact with other national societies, especially with the American Radio Relay League and many European societies. This has been of great assistance when mutual problems have had to be solved.

As in previous years, an informal meeting was held which 19 past-Presidents attended, together with the current President.

As described elsewhere, the Society made a number of major changes during the year under review, which will put it in a strong and commanding position as a leading national society. It has continued to play an important part in international amateur radio affairs. As always, the Society's very special thanks must go to those many hundreds of volunteers who make its day-to-day work possible.

COMMITTEE REPORTS

Education

Committee: G3HB, G3LCK, GW4HWR, GM8BZX, GW4JNE, GI8AYZ, G6NZ, G8MW, G3FVC, G2WS, G3SZJ, G2CVV, GM4FZH*.

The primary function of getting Society members, and potential members, through the RAE was served during the year by the following activities.

1. Members of the committee were available at the Leicester exhibition to give advice on RAE matters etc.
2. Talks were presented at the Amateur Radio Convention held at the National Exhibition Centre. It is hoped to resume the "Questions and Answers" sessions for lecturers and instructors.
3. Lectures on "Getting started in Amateur Radio" were given at Easter in the Science Museum.
4. Two meetings of the C&G Subject Committee were held. The three members representing the RSGB again stressed the desirability of candidates being allowed to retain the question papers. At the second meeting grateful thanks were recorded for the long and valuable services of Bill Scarr, G2WS, and Len Newnham, G6NZ.
5. Constant revision of the *RAE Manual* was carried out, thanks to G3HB. It is proposed to produce a new edition of the *RAE Revision Notes*. A new edition of *RAE Questions and Answers* is being considered.
6. Discussions took place with the National Extension College regarding an introductory electronics course. This will be aimed at students wishing to get a grounding in electronics before tackling an RAE course. It is understood that preparations are proceeding.

We were sorry to lose the services of Dan Adams, GW3VBP, due to the pressure of his business.

To cope with the increased work, and for fuller representation, a warm welcome is extended to Messrs I. J. Kyle, GI8AYZ; D. J. Bradford, G3LCK; E. J. Case, GW4HWR; M. Shardlow, G3SZJ; and F. Hall, GM8BZX.

G. C. Oxley, G8MW, chairman

Exhibition & Rally

Committee: G5HD, G3TDR, G4HHB, G3VPK, G3MVV, G3SZJ, G8ENO, G3KGU*

The committee met 12 times during the year under review, and many committee members attended numerous functions throughout the year, including all the major rallies, exhibitions and conventions.

It is with pride that the committee's decision to take the national convention to the heart of England at the National Exhibition Centre at Birmingham, proved to be so successful and popular with both members and exhibitors. This major event at Europe's foremost exhibition centre is a milestone in the Society's calendar of events.

The fact that some members drove over 1,000 miles return to attend the convention makes a very valid point in planning further conventions allied with an exhibition in the future at this particular venue.

A feature of this year's convention was to see so many of the allied societies and RSGB committees in attendance, with the HF Convention running in parallel. It all proved to be one of the best-attended Society functions ever to be held. Planning for the 1984 RSGB National Convention is at an advanced stage at the time of writing.

The National Rally at Woburn held under 25,000 square feet of canvas again proved very successful, with increased trade participation and increased attendance —yet another event which grows year after year.

Norman Miller, G3MVV, chairman

Finance & Staff

Committee: G3FKM, GW8HEZ, G3CQR, G3RPE, G4CHH, G2AMV, G3VPE.

During the Society's year 1982–3, the committee met 12 times. Members will recall that the previous annual report emphasized the need for a new and larger headquarters. Mention was made of the search, and it was hinted that a suitable building had been found. Much of the committee's time during the last six months of 1982 was devoted to discussions regarding the purchase of Alma House at Potters Bar and the sale of 35 Doughty Street. Those who have followed "Council Proceedings" (particularly of meetings on 14 October and 20 November 1982) will recall that the transactions were completed with a considerable degree of success and were financed from the Society's own resources. Tributes must be recorded to the honorary treasurer and the general manager for the parts they played in the protracted negotiations.

Following the move, the committee has been discussing the possible ways in which the number of headquarters staff can be increased within the finance available. Some junior appointments have been made, and the matter of more senior appointments is now in hand.

The opportunity was taken for a thorough review of the Society's insurance arrangements, which have been re-negotiated by the secretary/general manager. At the same time it was agreed that there should be a comprehensive pension scheme for the staff, and the honorary treasurer approached insurance companies for suggestions. Discussions are continuing.

The committee is anxious to establish more formal arrangements for the acceptance of legacies and donations, and to use them where possible to assist members of the Society who are in need by virtue of ill-health or financial worries. Early discussions have progressed and legal advice has been sought.

In conjunction with the Technical & Publications Committee, there has been a re-examination of authors' contracts. New banking arrangements following the move to Potters Bar have been considered, and a transfer is anticipated in the next few months. The matter of a revision of the staff conditions of service has been discussed by the general manager on several occasions, and these are to be implemented before the end of 1983.

Each of the committee meetings features a report from the honorary treasurer accompanied by budgets and quarterly accounts, and a report on appropriate matters by the secretary/general manager. Other routine activities include the annual staff review and recommendations to Council regarding honoraria.

The chairman records his appreciation to all members of the committee for their various contributions—also to the general manager for his advice and co-operation.

B. O'Brien, G2AMV, chairman

HF

Committee: G3FKM, G3ZAY, G3XTT, G3AAE, G4BUO, G3GIQ, G3NKS, G3KDB*, G8KG*, G3DME*. G3HCT resigned during the year.

The major activity of the committee was in organizing and running the second National HF Convention in conjunction with the RSGB National Convention at the NEC, Birmingham in March. This event, which was described in the June issue of *Rad Com*, was generally agreed to have been most successful.

During the year the chairman had two meetings with the President and the Forward Planning Group, when the future of the committee was discussed and various improvements in the composition and effectiveness of the committee agreed.

The committee has produced a number of papers on hf matters for submission to the 1984 IARU Conference.

During the year a 28MHz County Award was instituted. The aim of this award is primarily to stimulate activity on the band during periods of low sunspot activity. The committee also produced a new and updated "Countries List".

As the chairman believes that it is in the best interests of the committee for there to be a change of management at reasonable intervals, he is returning to the ranks and wishes to place on record his appreciation for the support he has enjoyed during the past two-and-half years, and to wish the new chairman, G3NKS, success in the future.

J. D. Kay, G3AAE, chairman

HF Contests

Committee: G3FKM, G3OZF, G3KKQ, G6LX, G4DJX, M. Harrington, G4BUO, G3KDB, R. A. Treacher, G3RJV*, G6AGE*, G4BEL*, G3NKS*. (Edwin Hodson, G3XTJ, who died on 30 August 1983, was a valued member of the committee and is greatly missed.)

The workload on the committee continues to be high, and it has been necessary to hold eight evening and one full-day meetings during the period under review. This is in addition to the 1,000 plus man-hours expended in the adjudication of contests by individual members of the committee. During the year, we lost by retirement, the long standing chairman, Dennis Andrews, G3MXJ, and John Bazley, G3HCT. Thanks are due for the many hours of voluntary effort that they gave to the Society. New members of the committee are Don Beattie, G3OZF, Alan Grey, G4DJX (full

members), and Derek Thom, G3NKS, who has rejoined as a corresponding member.

The committee is concerned with all aspects of hf contests and aims to present a wide range of events of interest to all contest-minded operators, and to newly-licensed amateurs who have had little or no contest experience. The Commonwealth, the two Field Day events and AFS, continue to be very well supported contests, as well as the shorter single-band events, which have an ever-increasing following. The Cumulative (Training) Contests have been extended by adding 28MHz sessions, and a new 1·8MHz phone contest (Town and County) has been added to the calendar. The committee has introduced contest-free segments and is taking other measures to ensure the reduction of interference from contest traffic to non-contest operators. A close liaison has been established with other IARU societies to obtain a wider acceptance of these measures.

The committee is grateful to the three corresponding members, the Rev G. C. Dobbs, G3RJV (QRP matters), Eric Mollart (DF) and G3NKS (HF) for their help and advice. In addition to the links with other committees via common membership, there is a link with the VHF Contests Committee through cross corresponding membership.

Ron Glaisher, G6LX, chairman

IARU

Committee: G3FKM, G3BYW, G3RPE, G3WSN, G5CO, G3GVV, G4ANB, G4KGC, G3NKS, G8PB, G5XB*, G4IQQ*, G3DME*, Miss H. M. Norman.

During the period 1 July 1982–30 June 1983, the committee met on six occasions. Its three main tasks were:

1. The consideration of papers for the 1984 Region 1 Conference, which will be held in Sicily; some 40 papers have already been received from RSGB committees.

2. Reviewing the structure, function and value of the IARU Monitoring Service. The RSGB and the DARC are the only societies in Region 1 (ie in Europe and Africa), actively involved in this service.

3. Completion of the text of a pamphlet entitled *Operating Advice for Licensed Radio Amateurs*, by G3FKM, G3XDV and G3GVV, with assistance from headquarters staff. This should be available throughout Region 1, for the guidance of newly-licensed amateurs.

The Region 1 HF Working Group's meeting at Salzburg was attended by G3FKM (Region 1 hf manager) and G3NKS. The Society was represented at the VHF/Microwave Manager's Conference at Zurich by G3WSN and G3RPE.

Additional members have been brought on to the committee, to provide new blood and back-up facilities.

R. J. Hughes, G3GVV, chairman

Interference (EMC from 1/7/83)

Committee: G3MUX, G4BYA, G2FLB, G3HCQ, G3PLB, G3HLF, GI8AYZ, G2YS, G3VWK*, G4DXA*, GU3YIZ*, GM4IKT*, G3BLE*, G4FWM*.

For the most part the work of this committee proceeded as in previous years, some 36 cases being dealt with during the year.

Progress on the new *Interference Manual* was disappointing, due largely to the failure of promised contributors to meet their deadline. Efforts are being made to rectify this at an early date.

At the end of the year the name of the committee was changed to EMC Committee. This was done for two reasons: first, to bring the committee into line with the rest of the world; and secondly, because the work of the committee now covers a much wider range of problems involving a large variety of equipment.

In preparation for the new Society year, and after consultation with the Forward Planning Group, it was decided to change the structure of the committee and increase its size. A main committee strength of 12 was required, although at the moment there are still three vacancies. The main committee is to be sub-divided into at least three working groups, each specializing in a different type of problem. Each working group will be chaired by the committee chairman. It is intended that the committee will be represented on as many relevant professional bodies as possible.

In addition, it is intended that there should be a representative of the committee in every RSGB zone. These will be corresponding members, and will deal with the problems including cases of interference, of individual society members in the zone. They will of course liaise with the main committee, and queries should still be passed through the committee chairman in the usual way. Representatives are still required for Zone B and Zone C.

It is hoped that, as a result of this report, the vacancies mentioned will be filled and the new system will shortly be working smoothly so that a large amount of work will be done in assisting our members.

P. F. Jobson, G3HLF, chairman

Licensing Advisory

Committee: G3FKM, G3ZNU, GW8HEZ, G3HCT, G3RPE, G3WSN, G3YGF, G3STG, G3KEP.

The principal function of the committee is to liaise with the Radio Regulatory Division and appropriate government departments to obtain licence provisions in the best interests of the amateur service. Eight meetings of the committee were held in 1982–3.

Successful discussion with the RRD resulted in the issue of 40 experimental permits for operation on 50MHz. A provision for enabling visitors at special event stations to exchange greetings was introduced in time for the 1982 Jamboree on the Air, and we are endeavouring to obtain some extension to this facility in the future.

The situation in regard to the use of the station during emergencies was also clarified.

The Society was invited to make submissions to the Independent Review of the Radio Spectrum. Two papers were produced by the vhf manager, in which the essential work carried out by radio amateurs was acknowledged, emphasizing the necessity to retain our existing bands, and obtain additional ones in the future.

Revisions to the amateur licence are currently being considered, together with an improved schedule format. This will probably be introduced by the RRD during 1984.

Proposals have been made to the RRD for some provision to be made for Class B licensees to use morse for practice purposes. We hope that an announcement will be made about this quite soon.

The committee continues to monitor the progress of the Telecommunications Bill, and the impact that cordless telephone, cable television and citizens band have on the amateur service.

Reciprocal licensing arrangements with other countries are also considered, and the facilities extended as appropriate.

The Amateur Radio Observation Service is also covered by this committee; a report is given on page xv.

D. M. Pratt, G3KEP, chairman

Membership & Representation

Committee: G3FKM, GW8HEZ, G3RPE, GW2FLZ, GM8BZX, G5HD, G4CHH, GI8AYZ, G3VPK, G2AMV, G3VPE, G4ADD, Miss H. M. Norman†.

This year has been a busy one for the committee, and many aspects of amateur radio have been under discussion. The major topic of the year has been the question of how best the RSGB can communicate with the membership and how to improve liaison at all levels. This is an on-going subject to which many hours will no doubt be devoted in the future. A number of changes towards this objective have been made, among which is the circulation of the *Council Newsletter* to affiliated societies.

Two experimental Marler Haley display stands have been made available to zonal managers and regional representatives for use as a focal point at local rallies.

The open meetings held by the committee last year were very successful and they have been continued this year; meetings being held at Nottingham and Winchester. It is proposed to extend this idea so as to include all RSGB members in an area and not just the official representatives. An experimental meeting is being planned for the end of September, the results may determine the approach for the next few years.

A new information package has been prepared by HQ for new members and a press package for the space shuttle flight is also in the planning stage: these are just two small publicity items that have been discussed by the committee, along with a set of RSGB publicity slides presented to each RR at last year's Regional Representatives' Conference. The conference itself went off very well, and each RR was asked to fill in a questionnaire about his activities over the year. The information was used for an assessment of the representation scheme in conjunction with the Forward Planning Group.

One item that always appears on the agenda is the GB2RS news service, and over this year several new newsreaders have been appointed to fill in some of the gaps in the service. One major point was agreed, that every effort should be made to help AMSAT to put out GB2RS news on Oscar 10. This, I am pleased to report, will go ahead, and our thanks go to the Home Office for its co-operation.

I would like to finish this report by thanking all members of the committee for their untiring efforts over the year, and the excellent support by HQ has been a large factor in the success of the committee.

R. G. Barrett, GW8HEZ, chairman

Microwave

Committee: G8AGN, G4KNZ, G3PFR, G3RPE, G3YGF, G4FSG, G3WDG, G4KGC, G3JVL, G8VR, G3ZNU*, G4CNV*, G3JHM*, G3RWL*.

In common with all other committees, much time has been spent on the re-organization of the committee structure, although the work and method of working has changed little as a result. The workload of the committee is very high, a point recognized by the Forward Planning Group in discussions.

The membership of the committee is such that a very wide experience of microwaves is available to comment on any aspect. Much of the work is of a technical nature, and it speaks highly of the individual members that they carry out much of the committee business outside the formal meetings.

There are close links with the majority of other committees, and with outside industry and a number of universities.

The committee has acted as the focal point for discussion and response to the proposals on radiation hazards presented by the National Radiological Protection Board.

A number of special projects have been started, and work is progressing well on producing 47GHz equipment to lead the way in operations on the newly-licensed bands.

The *Microwave Newsletter*, edited by G4KNZ, G3YGF and G4CNV, continues to flourish. The regular tasks of beacon and repeater control, participation at round tables, exhibitions etc, and general technical matters, international liaison, microwave contests, band planning etc are dealt with on a day-to-day basis.

Graham Murchie, G4FSG, chairman

Propagation Studies

Committee: G3HTF, G3BYW, G3LTP, G2FKZ, G4AQI, G3DME, G3JVL, F8SH*, DJ5DT*, G3NAQ*, G3USF*, G3GVV*.

Like other committees of the Society, the PSC has had its work closely scrutinized by members of Council this year, and we have been gratified to find that our existing projects and policies have been endorsed.

One major change has been the greater prominence now given to our HF Propagation Prediction tables, prepared for *Radio Communication* by G4AQI, following the retirement of Dr Lange Hesse, DJ2BC, and the consequent disappearance of the monthly bar charts. The co-operation of the editor in evolving a format which combined the simplicity of the bar charts with the greater usefulness of the tables has been much appreciated. The propagation section of the GB2RS News Bulletin has been expanded and now includes a weekly explanatory feature, generally prepared by G2FKZ, which has proved to be popular.

The vhf sporadic-E project continues, and revised report forms and explanatory letters are being widely distributed, for the eventual use of F8SH, the IARU sporadic-E co-ordinator, who is a corresponding member of the committee. Papers on tropospheric (G3LTP) and auroral (G2FKZ) propagation were presented to the Third International Conference on Antennas and Propagation (IEE) at Norwich in April.

The committee manned its own stand at both the Amateur Radio Exhibition and the VHF Convention, sponsoring talks by Eric Devereaux (on hf predictions) and F8SH (on field-aligned vhf propagation) at the respective events. Representation on CCIR Study Groups 5 and 6 has been maintained; the chairman attended a special combined CCIR/URSI meeting at the Royal Society and an invitation to take part in a discussion on sporadic-E has been received from the Rutherford Appleton Laboratory.

G2FKZ has completed another auroral propagation tape/slide lecture, the *VHF/UHF Manual* has appeared in a new edition containing a completely revised chapter on propagation, and several members of the committee have been active in giving appropriate talks to local clubs. G3JVL has worked towards the compilation of microwave propagation statistics, in conjunction with the Microwave Committee. G3DME has kept the committee informed on the activities of the IARU International Beacon Project and has supplied news items for wider circulation when the circumstances have warranted it. Contacts with professional bodies have been strengthened and enlarged, among them the National Geophysical Data Centre at Boulder (Colorado), which has expressed great interest in information supplied.

R. G. Flavell, G3LTP, chairman

Raynet

Committee: G4FRG, G8CAC, G4AVV, G3XC, G3STG, G4CHH, G4KAR, G3TJP, G3VPE, GI3USS*, G8LWY*, G3PYN*, GW3ZXI*, GM3RFA*, G6AJF*, G6DDQ*, G3KWT*, G3IIR*, Mrs J. Balestrini, Mrs T. Crane, G4FLQ†.

The year got off to a very successful start with a committee meeting, attended by all the zonal representatives, held at Easingwold, and at which Sir Leslie Mavor, co-ordinator of voluntary effort in civil defence, was able to make the importance of the Raynet contribution to the wartime activities of the cepo very clear. The committee had the opportunity for full discussion with Sir Leslie, and a tape recording of these conversations was subsequently distributed to zonal representatives so that group members could hear for themselves what was said.

Once again, during the bad weather at the turn of the year, many of the Raynet groups throughout the UK made invaluable contributions to the communications capability of their local communities, and are to be congratulated upon their work.

The turn of the year also saw the publication of revisions to the licence schedule which had direct impact upon the activities of all members. In particular, the frustration experienced by all those involved in the last-minute postponement of Raynet's contribution to the Leeds Marathon was relieved somewhat by the recognition of their potential contribution. Also particularly welcomed was the long-sought-for facility for third-party operation for user services under genuine emergency situations.

The details of insurance cover provided for members during the course of their activities was clarified by the issue of an explanatory booklet available through zonal representatives and controllers, and many of the previous uncertainties were removed.

The publication of a fully-revised *Raynet Manual* and a guide for Raynet members is expected to take place during the current year, and much time and effort have been expended upon preparation of material for these.

Working relationships with the user services have steadily improved over the year.

The question of frequency usage, with particular reference to the 144MHz band has also been the subject of much discussion, and negotiation with the Society's VHF Committee.

The availability of supplies to members has been strengthened by the introduction of a new fabric badge, the availability of high visibility jackets, and the continuing supply of teleprinters for members in order to support the growing rtty activity by members and users. The reporting forms continued to be well used, telling their own story of useful support to the community nationwide, and the new exercise reporting cards helped to record the formal user-service activities.

In order to assist the presentation of Raynet to the amateur, posters were prepared and distributed to groups for use at rallies and shows, and Raynet stands were manned at Leicester, NEC, the VHF Convention, Woburn, and at many other events. In addition, communication within the organization was aided by the availability of controllers lists.

The zonal representative scheme continued to serve membership well, and is planned to continue to strengthen the links between groups. More members have been enrolled this year, but there continues to be a growing demand for Raynet's services, and there is a need for further strengthening of membership.

The committee has been served well throughout the year by the membership services officers of the Society, its registration secretary and its supplies officer. Particular thanks go to Brian Goddard, G4FRG, who worked so hard for the success of Raynet during the year.

G. A. Griffiths, G3STG, chairman

Technical & Publications

Members: G4FAW, G3RPE, G3YGF, G3VA* G3SJX, G4GYO, G4SWX, G4FTJ†, Mr A. W. Hutchinson†

The committee met at 5-6 weekly intervals throughout the year. Its main responsibility continues to be that of ensuring, within the limits of its capacity, that first class technical information is made available to members via both *Radio Communication* and RSGB books. Consequently, much of the committee effort is devoted to the refereeing of the many dozens of articles submitted for publication each year, and to the monitoring of the several books which at any one time are being planned, written for the first time, or being revised. In terms of output, this now amounts to a major publishing effort.

Until recent years, amateur radio tended to be a close-knit essentially "amateur" activity, and it was therefore possible to organize our publishing activity on a relatively informal basis. However, its increasing scale of operation, and particularly the growth of strong commercial competition in the field of publications, has meant that it is now necessary to put it on a more formal basis. To this end, efforts are being made in three directions: to safeguard the position of both authors and the Society, particularly regarding copyright; more detailed planning of books to suit members' needs; and more effective refereeing of technical articles.

Unlike many producers of magazines (and to a lesser extent, books), the Society has hitherto had to rely entirely on material volunteered by members and others. As has been pointed out on a number of occasions, some authors naturally tend to write the material which *they* wish to write, rather than the material readers would wish to read. This situation has tended to get worse over recent years as the pressures on experienced writers appear to have increased while, at the same time, newcomers to the hobby are generally demanding more basic information than before. Clearly, there is a need within the Society for more effort to be directly allocated to the generation of the latter type of material. In the past, there have been financial limitations and, more recently, the lack of space at the old Doughty Street HQ. The recent move of HQ to Potters Bar has allowed at least the first steps to be taken in this direction.

The workload on the committee represents a considerable effort. Our thanks must go both to the volunteer committee members, and to the staff members, Mr Hutchinson, editor of *Radio Communication*, and Mr Eckersley, G4FTJ, book editor. (Regrettably, we must give special thanks and best wishes to Mr Eckersley, who left the Society's employment in August 1983 after several years' invaluable service, to set up his own publishing business.)

Dain Evans, G3RPE, chairman

VHF

Committee: G3ZNU, G3COJ, G3XDV, G5KW*, G3WSN, G8GOJ*, G5UM*, G3RWL*, G3VPK, G4ANB, G4FSG*, G3VZV*, G3FZL, G3RKL*, G3SEK, G8VR, G3UUT*.

In the year since July 1982 the committee has had a number of personnel changes. G8VR joined the committee upon his appointment as *4-2-70* contributor and G3BA decided to step down. In December, G3VEH decided to step down from the committee chairmanship, and G3ZNU was elected chairman for the remainder of the committee year.

One of the most important events of the year was the granting by the Home Office of 40 experimental 50MHz permits. The committee, through the vhf manager, participated in the drafting of a questionnaire sent to all applicants, and co-operated with the Home Office in processing replies. The committee was also successful in obtaining permission for the 50MHz beacon GB3SIX to operate continuously, having been previously restricted to operate outside television hours only. The committee is happy to report that activity on 50MHz has been good, and that reports from permit holders are currently being collected.

The committee participated in the new NEC Exhibition with a committee stand and a modest lecture stream, including a committee forum. Reaction was, in general, very favourable, and it is hoped to extend the involvement in the event planned for next year.

The VHF Convention was again a great success, with attendance well up on the previous year. The venue at Sandown Park has proved both suitable and popular with visitors and traders alike. The lectures, as usual on a wide variety of topics, were well attended, and thanks are due to all lecturers who gave of their time and effort so freely. The committee held a forum at the convention, giving people a second chance in the year to "have a go" at the members.

Other matters handled by the committee during the year included the preparation of two submissions to the Merriman Review of the VHF Spectrum; the preparation of papers on power limits, on morse/cw operation for Class B licensees, and on a number of topics for the forthcoming IARU Region 1 Conference; and, through its sub-committee, the Repeater Working Group, processed a number of repeater applications and changes. Thanks to the efforts of G3COJ, G3UUT and the many beacon keepers throughout the country, the vhf beacon network was enhanced during the year to provide a better service to all users.

Particular thanks are due to the *4-2-70* contributor, G8VR, whose mailbag has increased tenfold since starting the job a year ago, and to the awards manager, G5UM, for his continued service to the committee.

Malcolm Appleby, G3ZNU, chairman

Repeater Working Group (Now renamed Repeater Management Group). G3LEQ, GM8LBC, G3XDV, G4AFJ, G8HVV, G4EFO, G3VZV, G4CCC, G4KNZ*.

A large number of repeater proposals were vetted, and the Home Office licensed 12 vhf and 10 uhf units. A great deal of time and effort went into fending off criticism of HO licensing delays, which reached record levels. Towards the end of the year

discussions were held with the Home Office regarding new guidelines and procedures to ensure the future of repeater licensing, and to speed up licensing. Licence applications were made for five tv repeaters for 1·3GHz, and for an experimental pilot-ssb unit. This was the culmination of a great deal of work over several years by the RWG and a number of other committees and bodies. The main vetting document, the Repeater Questionnaire, was extensively revised.

Much time was spent in monitoring, administration and support for the licensed networks, which grew to 180 units on three bands. This involved processing site and channel change applications, giving technical and administrative advice, bringing any monitored problems to the notice of repeater groups, and offering support to groups whose repeater had been off the air for some time, or had yet to become operational. A technical officer was recruited to assist in this role. Coexistence with the primary users of the 430MHz band, military and radiolocation, caused some difficulty, and this was discussed with the Home Office. Regrettably, as secondary users, amateurs are not in a strong position.

Both the BBC and Pye indicated they wanted to revise the site sharing arrangements with the Society, and some success was made in reducing the impact of this on groups. Although the new agreements are less favourable than before, both companies continue to give practical support to the repeater networks, as does the IBA.

The repeater list, and other relevant information held on the data processor at RSGB HQ, was updated every few days, and a map was produced showing the 145MHz and 433MHz networks.

There were seven committee meetings, as well as open meetings in Crawley, Bristol, Stirling, and at the NEC Convention, but this was only the tip of the iceberg as most RWG work was carried out between meetings.

Responding to increased interest in rtty and data repeaters, liaison was set up with BARTG in order to devise specifications and band plans for this type of unit.

Plans for 1983–4 include publishing repeater service area maps, investigating the possibility of an experimental 29MHz repeater, and the addition of 10GHz receivers to certain 433MHz repeaters.

M. Dennison, G3XDV, chairman

VHF Contests

Committee: G3VPK, G3LCH, G3XDY, G2HIF, G3FZL, G4KGC, G4HWA, G4ERP, G4JLG, G3WDG*.

During the past year the committee has met on 10 occasions to deal with contest rules, results presented by the adjudicators, and correspondence. Members also attended the NEC exhibition and the VHF Convention. The committee attempts to achieve a reasonable balance of events across all bands at various power levels and modes. Inevitably we cannot please everybody all the time, as evidenced by feedback following the late inclusion of a 432MHz cw contest on a date previously occupied by a 144MHz event. In future the contests calendar will not be changed after first publication in *Radio Communication*.

The committee has been devoting a lot of time to a "think tank" intended to simplify and update contest rules, and to restructure the contest calendar to encourage more entries, particularly on the higher bands. A separate report will appear in *Radio Communication* giving full details of changes that will be implemented in 1984. We thank all those who wrote in or provided feedback at the NEC and the VHF Convention, and provided the raw material for our discussions.

During the year Les Hawkyard, G5HD, and Roger Taylor, G4BEL, left the committee after many years' valuable service, and recently Frank Mathews, G8ACJ, has retired from the committee after putting in a lot of hard work during his chairmanship. Recent additions are Richard Marshall, G4ERP; Bernie Morton, G4HWA; and David Yorke, G4JLG. We must also record our appreciation of the work done by Jack Hum, G5UM, in keeping up with the stream of certificates going out to winners and runners up.

John Quarmby, G3XDY, chairman

* Corresponding member
† Staff member

(A list of committee members' attendance at 1982–3 meetings is available from the secretary/general manager at RSGB HQ on receipt of an sae.)

REPORTS FROM THE . . .

. . . Amateur Radio Observation Service organizer

During the past year the Amateur Radio Observation Service has continued to provide guidance on reported licence contraventions in much the same way as in previous years. Some of the reported operation during the year has included:

illegal use of 50MHz band by non-permit holders;
third-party traffic handling;
coded messages;
phone-patch;
excessive bandwidth of transmission;
unintelligible and infrequent use of call-signs; and
out-of-band operation.

It should be pointed out that observers are active radio amateurs who notify the AROS organizer of licence contraventions heard during their normal use of the bands. Only relatively serious incidents are notified, in the hope that the problem will be corrected before an official approach is made by the licensing authority.

Thanks are due to the voluntary team of observers for their valuable assistance.

D. M. Pratt, G3KEP

. . . Audio Visual Library co-ordinator

The Audio Visual Library was taken over by G2PA in October 1982, and from that date until June 1983 some 160 enquiries were made about the facilities of the service, resulting in 140 postings of about 200 items. This represents a follow-up of 87·5 per cent. During this period three items were irretrievably lost in the post, but compensation was paid.

The service is barely self-supporting and does not show any profit. Income for the nine months was £241 and expenditure £258. To prevent a permanent deficit, the hire-fee plus postage element will have to be altered in the near future.

In brief, the library manages quite well, but it is in need of a complete overhaul.

1. Many subjects are out of date and there are no modern ones. The quality of some items is rough but this cannot be improved. An appeal could be made to clubs, societies, individuals and commercial organizations (particularly the latter) to donate cassette subjects to the library.
2. Transfer to modern means of showing, ie 16mm films to video cassettes.
3. Making of master copies. (The library has only four master copies.)
4. Duplicate, even triplicate, copies should be made to satiate the demand for the most popular subjects.

A real survey of the library should be undertaken, with ideas and plans made well in advance, and it should shut down for six months for the overhaul. A competent technical person (which I am not!) should be found to volunteer to do the task.

The library should be brought in to the 'eighties ready for the 'nineties! The policy of hiring *only to affiliated societies* is being enforced.

R. G. Auckland, G2PA

. . . HF manager

The Society continued to take a very active part in international hf affairs during the year under review, and matters covering a very wide field. For example, the organization of an IARU Region 1 HF contest championship, the ethics of QSLing, the more active promotion of "contest-free" band segments for those who wish to be able to make normal QSOs at contest times, the preservation of band plans (with special reference to 10MHz), and the problems created by those administrations which allow access to 28MHz by those amateurs who have not taken a morse test, were but a few of the topics discussed. The Society itself produced papers on the ethics of working dx via lists and nets, and on dx working on the hf bands, and these have been recommended for publication in other national society magazines. Discussions on the future of the "dx window" on 1·8MHz were held in view of the changes taking place on that band; this continues, as the situation which will exist in a few years' time when all the WARC changes have been implemented is still very unclear. The band plans for the new 18 and 24MHz bands originally agreed at Brighton in 1981 were put forward to both Region 2 and Region 3 and accepted, thereby making them agreed worldwide.

The need for promoting legal activity by licensed radio amateurs on 28MHz has resulted in the Society issuing two new awards during the year for working on the band. Great concern has been expressed at a proposal by the USA administration to allow fm and repeater stations in that country to use the part of 28MHz at present reserved for downlink satellite signals. Modified cb equipment for use on 28MHz came onto the UK market in considerable quantity and at low price, and efforts are being made to persuade those using it not to use the satellite band frequencies.

Once again much correspondence took place with other hf amateurs throughout the world, and the writer was able to have both informal and formal discussions with the hf managers and other representatives of many other societies both at the meeting of hf managers and at other meetings held in Belgium, France, the Federal Republic of Germany, Italy, and the Netherlands.

John Allaway, G3FKM

. . . HF awards manager

During the period under review the number of certificates issued was almost the same as that for the previous year: 831, compared to 836 last year. However, the only significant change was an increase of over 20 per cent in the number of certificates issued to our own membership.

Also during this period the IARU Region 1 certificate was completely redesigned, with a specially endorsed certificate for 28MHz operation, and it is hoped to start issuing these very shortly.

May I remind applicants always to include a stamped self-addressed envelope when sending QSLs, and when writing for information.

Certificates issued during the year

	G	EU	North America	South America	Asia	Africa	OC	Total
WBC	41	138	10	8	68	3	5	273
CDXC	6	6	4	1	5	—	1	23
IARU	64	149	9	9	34	9	5	279
DXLCA	1	47	—	—	14	1	—	63
BCRTA	13	40	6	1	21	1	4	86
BCRRA	4	24	—	—	7	—	—	35
WAC	72	—	—	—	—	—	—	72
	201	404	29	19	149	14	15	831

P. Miles, G3KDB

. . . Intruder Watch organizer

During the year under review the Society's Intruder Watch suffered a small set-back, mostly related to the move of headquarters to Potters Bar in November 1982. Nevertheless considerable successes can be reported, and the national administration succeeded in obtaining the removal of a small number of infringing signals, mostly in the 21 and 28MHz segments, where harmonics and combination/mixing products are often radiated. The system continues to be trammelled by its inability to identify many of the offending signals, most of which need special equipment normally not available to the radio amateur. Resulting from publicity given to this problem in *Radio Communication*, a number of members with computer program experience rose to the challenge, and under skilled leadership by one of their number are devising ways of harnessing microcomputers to the work.

The system continues to enjoy the interest and co-operation of the UK administration.

The Intruder Watch has 11 dedicated members; a further 12, many with computer facilities, have offered their services, and most are expected to be employed in the system in the near future.

S. Cook, G5XB

. . .Microwave manager

The main preoccupation of the year has been international matters. April saw the VHF Managers' Conference, held this year, in Zurich. As has been previous practice, part of the conference was devoted entirely to microwave affairs. The most important topic, raised in general terms for all microwave bands by RSGB, and more specifically for 2·3GHz by VERON, was the danger associated with individual national administrations making changes to their allocations for amateurs on a purely local basis. This, of course, would lead to the elimination of common working frequencies which would considerably obstruct international working on the microwave bands.

The timeliness of this discussion was shown only too clearly by the situation in Belgium where, shortly after the conference, Belgian amateurs effectively lost all their microwave allocations overnight. Fortunately this decision was later reversed for reconsideration. Not surprisingly this topic will form a major agenda item at the 1984 triennial Region 1 Conference in Sicily, the preparation of the papers for which has also formed an important part of this year's work.

One of the more pleasant events was the presentation of the RSGB Microwave Award and the Marconi Medal to the Italian amateurs who first made a contact exceeding 1,000km on 10GHz. It is worthy of note that the mode of propagation employed by the Italians was "rediscovered" by UK amateurs in 1977, after its original discovery by Marconi (an Anglo-Italian!) during pre-war tests from his yacht *Elettra*: the presentation of the awards in 1983 was made by his daughter, Princess Elettra. As they say, amateur radio can make the world seem quite small.

Dain Evans, G3RPE

. . . Slow Morse Practice Transmissions organizer

The number of listed Slow Morse Practice Transmissions has increased considerably during the past year. While this is good for the service as a whole, it is unfortunate that the emphasis is now almost entirely on the 144MHz band. This means that listeners within the urban areas are very well catered for, but members in the more rural areas, who must rely on the hf band transmissions for their practice, have very few opportunities to attain the necessary standard. It should be realized that not every would-be licensee has vhf facilities, or wishes to obtain a Class B licence. The greater coverage from 3·5MHz transmissions should not be overlooked by members willing to offer their services in the future.

Nevertheless, whatever the chosen frequency, the Society would wish to thank those members who devote so much of their spare time to the provision of this service.

M. A. C. MacBrayne, G3KGU

. . .Trophies manager

This year, for the first time, hf trophies were presented at both the annual general meeting and the HF Convention, and it has been decided to continue this in future. Generally, trophies awarded by Council for general hf matters will be presented at the agm, and those awarded by the HF Contests Committee for specific contests will be presented at the HF Convention.

In view of members' comments, it has been decided that trophy recipients can retain the trophies after presentation, but they must be prepared to return them in good time for the next presentation.

One new trophy was presented to the Society during the year. It will be known as the T. E. Wilson (G6VQ) Award, and will be awarded to the winner of the 21MHz CW Contest.

P. Miles, G3KDB

. . . VHF manager

The past year has been of particular interest to the vhf enthusiast. We have seen some excellent tropo, and also had a good share of sporadic-E openings. Generally, operating behaviour has been good and, with the many new licensees, occupancy of the vhf bands—144MHz in particular—has increased considerably. Adherence to the band plans has been good, although all should occasionally ensure that their own house is in order if we are to continue to utilize our bands in the most efficient and effective way.

The 50MHz experiment has been most rewarding, with a vast collection of data already produced. The transatlantic QSOs have been a significant achievement. Intrusions into the amateur bands have become more proliferous in the past year, and the situation is being monitored closely. Reports of interference from cordless telephones have increased considerably.

The Society is pressing for the use of cw by Class B licensees as an aid to self-training in cw telegraphy. On the international scene the Society continues its close liaison with other Region 1 societies through IARU, and many vhf related topics were discussed at the VHF Managers Conference in Zurich in April. This has led to the production of several papers for the next IARU Region 1 Conference. The VHF Committee and the Repeater Working Group have been very busy during the year handling an increasing volume of work. The signs are that this trend will continue.

K. Fisher, G3WSN

. . . VHF awards manager

Analysis of vhf/uhf and microwave awards issued during the year.

Four Metres & Down certificates (last year's issues in parentheses)

Category	Number	Total issued
70MHz Standard Transmitting	2 (2)	143
70MHz Senior Transmitting	2 (1)	49
144MHz Standard Transmitting	33 (35)	649
144MHz Senior Transmitting	13 (21)	198
144MHz Standard Receiving	1 (0)	39
144MHz Senior Receiving	1 (1)	5
432MHz Standard Transmitting	14 (13)	187
432MHz Senior Transmitting	9 (5)	89
432MHz Standard Receiving	1 (0)	8
1·3GHz Standard Transmitting	7 (6)	40
1·3GHz Senior Transmitting	1 (1)	7
Supreme Award (qualification: three Senior or two Senior plus one 1·3GHz):	5 (7)	46
Microwave Distance Awards for initial contact beyond specified QRB		
1·3GHz 600km	16 (12)	55
2·3GHz 500km	2 (0)	8
3·4GHz 400km	1 (1)	3
10GHz 150km	8 (3)	63

Total of Four Metres & Down certificates issued for the year: 116.

QTH Squares awards (last year's issues in parentheses):

70MHz 20 squares and 4 countries	2 (1) certificates	5
70MHz 25 squares and 6 countries	2 (1) stickers	4
144MHz 40 squares and 10 countries	46 (32) certificates	133
144MHz 60/15	27 (12) stickers	55
144MHz 80/18	14 (4) stickers	26
144MHz 100/20	17 (12) stickers	32
144MHz 125/20	2 (3) stickers	6
144MHz 150/20	3 (3) stickers	6
144MHz 175/20	4 (0) stickers	4
144MHz 200/30	2 (0) stickers	2
144MHz 250/35	0 (0) stickers	1
144MHz Receiving: BRS32525 has reached 100/20 confirmed.		
432MHz 30 squares and 6 countries	4 (8) certificates	23
432MHz 40/10	5 (5) stickers	12
432MHz 50/13	5 (1) stickers	8
432MHz 60/15	5 (0) stickers	6
432MHz 70/15	1 (0) sticker	2
432MHz 80/15	0 (1) sticker	1

Total: 52 initial certificates and 87 subsequent stickers issued in the QTH Squares and Countries competition.

Microwave Squares award

1·3GHz 5 squares: basic certificates	7 (8)	30
1·3GHz 10 squares stickers for above:	6 (9)	20
1·3GHz 15 squares stickers:	4 (4)	14
1·3GHz 20 squares stickers:	6 (1)	9
1·3GHz 25 squares stickers:	5 (0)	7
1·3GHz 30 squares stickers:	4 (0)	6
1·3GHz 35 squares stickers:	2 (0)	3
1·3GHz 40 squares stickers:	2 (1)	4
1·3GHz 45 squares stickers:	0 (0)	0
1·3GHz 50 squares stickers:	1 (0)	1
1·3GHz 60 squares stickers:	1 (0)	1
2·3GHz 5 squares stickers:	3 (2)	6
2·3GHz 10 squares stickers:	1 (0)	2
2·3GHz 20 squares stickers:	1 (0)	1
10GHz 5 squares stickers:	5 (1)	20

Total: 48 certificates and subsequent stickers issued during year contrasts with 26 issued during the previous year, and is an indication of the considerable increase in interest and activity in the microwave bands in the UK.

In addition to above 303 operating proficiency awards, a considerable number of contest certificates has been sent out upon instructions from the VHF Contests Committee. Certifications for RSGB members of claims for overseas awards (eg the VERON VHF 25) are also completed from time to time.

The year's proficiency awards are more than 50 per cent up on the previous year's total, which is an indication of the enormous increase in activity on these bands in the country generally.

Finally, one must offer thanks to Mrs G5UM who participates in the often time-consuming job of card checking, and to G4FZL for very efficiently standing in for the VHF Awards Manager while the latter was out of the country for three months at the beginning of 1983.

Jack Hum, G5UM

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This sophisticated, but simple to use, range of amplifiers have performance characteristics and extra features previously not available in the UK. The pre-amplifier uses the highly regarded BF981 MOSFET, and an LED bargraph power meter is provided, to highlight only two of the amazing number of features.

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To complement the LPM range, we have introduced the L series linear-only versions for the amateur who may already be equipped with a good pre-amplifier and power meter. The excellent linear performance is maintained and both RF Vox and hard-wired changeover are standard.

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- *Unique over-drive protection circuit*
- *Mobile mount on all 100 Watt models*

LPM144-1-100	**£172.50**
LPM144-3-100	**£172.50**
LPM144-10-100	**£149.50**
LPM144-25-160	**£189.50**
LPM144-3-180	**£215.50**
LPM144-10-180	**£212.50**

LINEAR PART NUMBERING SYSTEM

LINEAR — PREAMP — RF METER — LPM144-3-100 — OUTPUT POWER — INPUT POWER — FREQUENCY (BAND)

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L144-3-100	**£138.00**
L144-10-100	**£115.00**
L144-25-160	**£155.00**
L144-3-180	**£181.00**
L144-10-180	**£178.00**

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- 30A maximum output current
- Large 30A current meter
- 30A output terminals
- LED shut down indicator
- Fully protected

12/12A £86.40
- 13·8V, 12A continuous output
- 15A maximum output current
- Large 20A current meter
- 15A output terminals
- LED shut down indicator
- Fully protected

12/40A £225.40
- 13·8V, 40A continuous output
- 50A maximum output current
- Large 50A current meter
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Every frequency related function is digitally synthesised permitting local or external control via a personal computer of: Mode, all VFO and memory functions, IF shift and width, clarifier, band limits, FSK shift—and more!

Two independent VFO's—multiple tuning methods including; flywheel knob, two speed scanning in 10Hz (also 5/500 KHz) steps and keyboard entry.

12 totally independent mode/frequency memories (whose contents can be checked even while transmitting) are provided.

Primary digital readout offers resolution to 100 or 10Hz is mode sensitive, displays offsets and even VHF frequencies when used with the matching transvertor. A remarkable secondary display indicates frequency change by scrolling sideways, with a scrolling cursor providing resolution to 1 KHz.

Two receiver front ends are provided, one for general coverage—150KHz to 30 MHz, the other for amateur bands only. Seven high IDss JFETs produce extraordinarily wide dynamic range and the employment of ten V.C.O's secures a high carrier to noise ratio —even in the adjacent channel.

The triple conversion design of the FT980 receiver (Ω 47 MHz, Ω 9 MHz, 455 KHz) incorporates four cascaded stages for all modes and can operate as standard on SSB, CW, AM, FSK and FM transceiving.

The transmitter covers all H.F. amateur bands in 500 KHz segments. Convenience features include: simultaneous measurement of forward and reverse S.W.R., or compression (RF processor) or Ic or Vc or output power or ALC (includes "easy adjust" peak hold facility), AMGC (reduces ambient noise on voice transmissions), and a transmission quality monitor (all mode IF demodulator).

With a P.A. rated for 560W dissipation 100W PEP is produced from a 24V line with 3 order intermodulation at typically −40dB. Full thermal (with blower and VSWR) protection (though power delivery is still 75% of full into a 3:1 VSWR!) are of course standard.

For CW, full break-in and calibrating (spotting —zero beating with other station) and choice of sidetones are fitted, and an inbuilt Curtis Keyer is optional.

Other FT980 features include AGC speed, tone, FM, squelch and centre zero meter, additional 'write' button for protected memories, display dim, dial lock, QSK linear provisions—the list is almost endless—Ask your authorised Yaesu dealer for a full colour leaflet or better still call in to him and try one out today!

GENERAL

Frequency coverage
Rx; 50 KHz—30 MHz (continuous)
Tx; 10-160M (9 bands)
Frequency accuracy
Better than ±3p.p.m (0-40°C)
Tuning steps
10Hz, 5 KHz & 500 KHz (band)
Direct/Computer keyboard entry
Modes of operation
J3E (LSB/USB), A1A (CW), A3E (AM), J1B (AFSK), G3E (FM); Rx & Tx
Power requirements
100/120-200/234 V 50/60 Hz
72VA Rx, 530VA Tx (100W out)
Dimensions (Ex/Inc projections)
370/380W x 157/165H x 350/465D mm
17Kg, Nett
Options

XF-455.8MCN	300Hz CW Filter
XF8.9HC	600Hz CW Filter
XF8.9GA	5 KHz AM Filter
MH-1-B8	Hand Scan Microphone
MD-1-B8	Desk Scan Microphone
D3000026	Curtis Keyer Unit
FIF-80	Computer Interface

RECEIVER

Sensitivity (2-30MHz)

J3E/A1A/J1B	:0.25μV	(2.4 KHz)
(10dB S+N/N)	0.16μV	(600 Hz)
	0.10μV	(300 Hz)
A3E	:1.40μV	(6 KHz)
(10dB S+N/N)	1.25μV	(5 KHz)
	1.00μV	(3 KHz)
G3E (12dB SINAD)	:0.60μV	(12 KHz)

Sensitivity (150 KHz-2 MHz)

J3E/A1A/J1B	:4.0μV	(2.4 KHz)
(10dB S+N/N)	2.6μV	(600 Hz)
	1.6μV	(300 Hz)
A3E	:22μV	(6 KHz)
(10dB 5+N/N)	20μV	(5 KHz)
	16μV	(3KHz)

Dynamic range
95dB in 300 Hz (max sensitivity)
Audio peak filter
350 Hz-1400 Hz
IF notch filter
500 Hz-2700 Hz (demodulated)
Audio
4-16 Ohms, 3W in 4 ohms (10% THD)
Image/I.F. rejection
Better than 70dB

TRANSMITTER

Power output
J3E/A1A : 100W(PEP)
A3E : 25W
G3E/J1B : 50W
Intermodulation (3rd Order)
Better than −40dB (14 MHz 100W)
Carrier suppression
Better than −50dB (peak output)
Sideband suppression
Better than −50dB (1 KHz tone)
Spurious radiation
Better than −50dB (peak output)
Audio response
Better than 250 Hz-2750 Hz @ −6dB
FM deviation
±5 KHz (maximum)
AFSK shift
170, 425, 850 Hz
Microphone impedance
600 Ohms nominal
Output impedance
50 Ohms nominal, unbalance

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