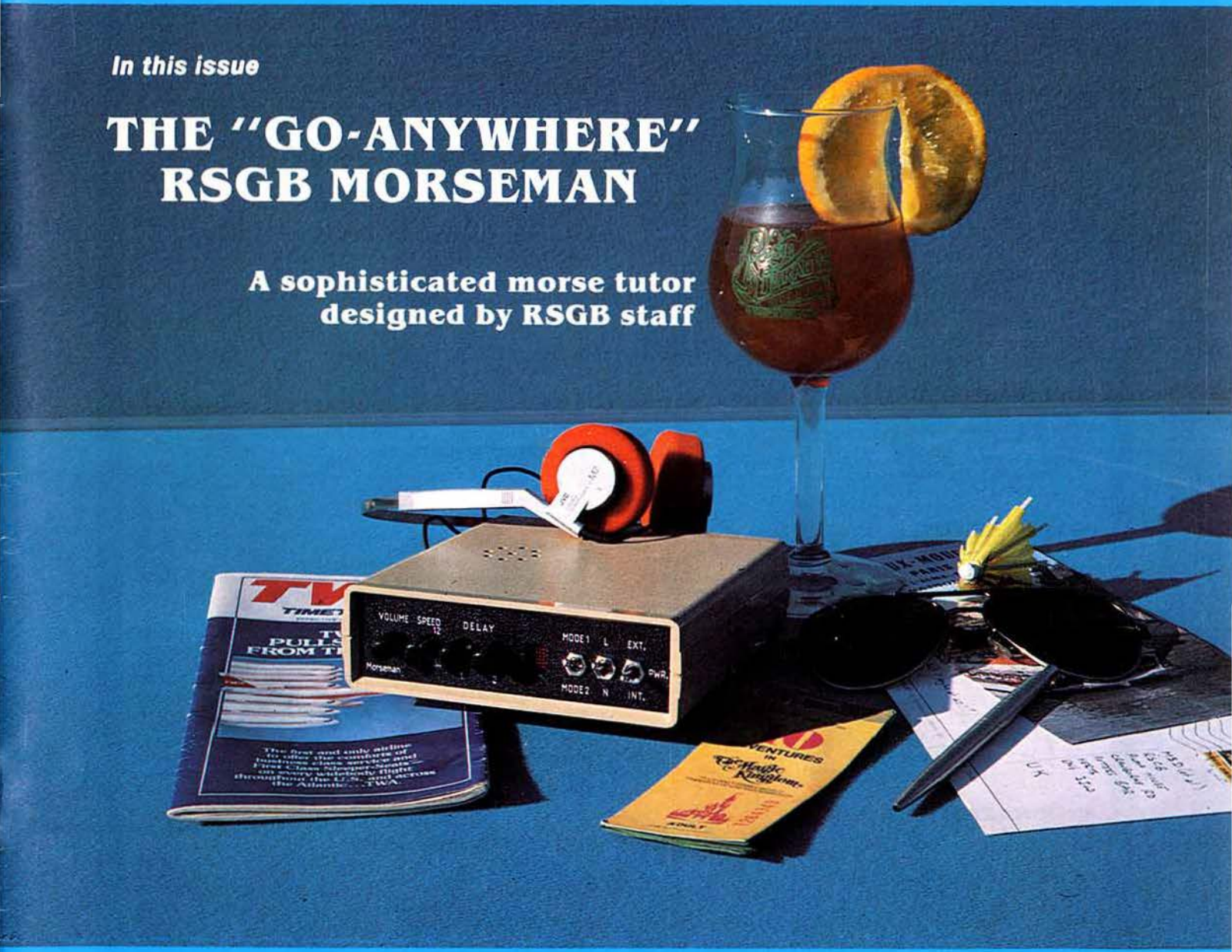
RADio COMmunication

December 1984

In this issue

THE "GO-ANYWHERE" RSGB MORSEMAN

A sophisticated morse tutor designed by RSGB staff



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

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

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

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

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the TH21E & TH41E, hand size handhelds.

In trying to describe the new 2 metre FM transceiver from TRIO, I am faced with a major difficulty. The TH21E is small, 2.24 inches wide, 4.72 inches high and only 1.1 inches deep but size alone is not the rig's fascination. Only by holding the transceiver can one begin to appreciate the attention that has been placed on its ergonomics. The way in which the TRIO TH21E, once picked up, seems impossible to put down. Its ability to slip into the inside pocket and for you to forget you have it. So far no one who has seen a TH21E has been able to resist picking it up, it's as simple as that.

There is also a 70 centimetre version of the TH21E available, the TH41E.

Operating the TH21E could not be easier. Thumbwheel switches being used to set the frequency, the last digit being set by a simple top panel switch. Power output is 1 watt (HI) and 150 milliwatts (LOW). I have used the rig over the past few days and have been really amazed at the distance that can be covered on 1 watt. Both transceivers have repeater shift, the tone burst switch is on the top panel. Microphone and earphone sockets are also located on the top panel enabling both the conventional speaker/microphone and the NEW TRIO HMC1 headset to be used. A clever feature of the headset is that it has, incorporated in its connecting cable, a minute vox unit. The transceiver comes complete with aerial, nicad battery pack and charger.

I am pleased that I can claim one of the rigs to use at home prior to writing the advertising and let the rest of the company fall out about who is having the other one. Never before can I remember two handhelds that have had such fascination.

TH21E	2 metre transceiver	**£179.48** inc VAT, carr £7.00
TH41E	70 centimetre version	**£199.00** inc VAT, carr £7.00
SMC30	speaker/microphone	**£22.47** inc VAT, carr £1.00
HMC1	headset with VOX	**£26.14** inc VAT, carr £1.00
DC21	DC power supply	**£19.85** inc VAT, carr £1.00
PB21	Nicad battery case	**£19.34** inc VAT, carr £1.00
BT2	Dry battery case	**£9.41** inc VAT, carr £ .75
SC8	Soft case	**£9.41** inc VAT, carr £ .75
EB2	External battery case	**£15.16** inc VAT, carr £1.00

the TR2600E & TR3600E, handhelds with DCS.

I have been using the TRIO TS711E VHF 2 metre base station for some time now. The transceiver has, as standard, a digital code squelch facility which when used in conjunction with our other TS11E operated by my colleague David, G4KFN, has proved most useful.

It was with considerable interest, therefore, that I greeted the news that TRIO were going to introduce a higher specification version of the current TR2500 that would incorporate this new call facility. As the TS711E can also be programmed to send your callsign digitally at the beginning and end of each transmission, I wondered whether TRIO would include this useful facility on the new rig.

The answer is yes! The new TR2600E has digital code squelch and will also send your callsign automatically. The digital code squelch and callsign ability are not the only new features to be incorporated into the new TS2600E. Each memory will store both frequency and whether or not the rig was set with simplex or repeater shift: Most useful on today's FM scene when a contact made by repeater quickly becomes a simplex one. Two modes of memory scan are available, the rig looking for either a clear or a busy frequency. Having locked on a signal, scanning resumes after a timed period or when the carrier drops (in open channel scan, when a carrier appears). Programmable scan is as the TR2500, lower and upper scan limits are entered into memories 8 and 9, any multiple of 5 kHz (10, 15, 20, 25 kHz) being programmable. The TR2600E also has a priority channel and the ability to omit selected channels from the scan pattern. Anyone who has used a TR2500 will know that occasionally one or two frequencies entered in memory become superfluous. To remove these frequencies without removing everything would be most useful. A definite advantage is that the time taken for memory scan is shortened. The new higher specification TR2600E has this facility. The normal up/down frequency shift facility of the TR2500 is retained along with lockout switches for press to talk and keyboard entry. The frequency readout is improved, the full 145.500 digits being displayed and to stop the operator having to continually give 5 by 9 reports the TR2600E has an S meter as part of the top panel which doubles as a battery state indicator.

For the UHF enthusiast there is also a 70 centimetre version of the TR2600E, the TR3600E.

Until now, the TRIO TR2500 and TR2600 were "the" hand held FM transceivers for 2 metres and 70 centimetres—the TR2600E and the TR3600E, with their higher specification, provide the only alternative.

TR2600E	2 metre handheld complete with DCS	**£281.60** inc VAT, carr £7.00
TR3600E	70 centimetre handheld with DCS	**£299.89** inc VAT, carr £7.00
BC2	AC Charger	**£11.49** inc VAT, carr £1.50
DC26	DC/DC converter	**£20.37** inc VAT, carr £1.50
EB3	External battery case	**£15.16** inc VAT, carr £1.00
HMC1	Headset with VOX	**£26.14** inc VAT, carr £1.00
PB26	Nicad battery pack	**£31.87** inc VAT, carr £1.00
SC9	Soft case	**£19.34** inc VAT, carr £1.00
SMC30	Speaker/microphone	**£22.47** inc VAT, carr £1.00

TRIO

TRIO-KENWOOD CORPORATION

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TRIO-KENWOOD COMMUNICATIONS, GmbH

D-6374 Steinbach-TS. Industriestrasse.8A West Germany

the TS711E & TS811E, base station transceivers for VHF and UHF.

Ever since the demise of the TRIO 700 series of equipment, we, here at LOWE ELECTRONICS have been campaigning for the introduction of a new "true base station" transceiver. Those who have used a TRIO TS700S or G will know what I mean. There is that certain feel which a base station transceiver has which the mobile or portable rig, when taken out of the car or used in the shack, definitely has not. I am pleased to say that TRIO have introduced a new 2 metre base station, it is called the TS711E. I have been fortunate enough to have used the transceiver over the past couple of weeks and again I am lost for words. Certainly there will be a TRIO TS711E in my shack, I have even prepared a space for it!

Having used the rig let me explain some of its features. In size, weight and appearance the TS711E is similar to the TS430S HF transceiver but unlike the TS430S it has its own internal power supply. It also has an inbuilt speech processor and IF shift, both ideal features for today's active 2 metre band. Power output is 25 watts but the rig I have been using produces 32. Typical TRIO! The TS711E has two VFO's and, wait for it, forty memory channels. Yes, I too wondered how one could use so many memories.

Initially I started to use the rig as I had my dual band TRIO TS780. One VFO left on 144.300 and the other on 145.500. Since the rig remembers both frequency and mode there was no problem operating SSB on one VFO and with the electronic click step engaged, FM on the other. Electronic click step?. . .the TS711E has been designed so that as a multi-mode rig you can have a free running VFO on SSB and CW and when operating FM, a VFO 5 or 12.5 kHz click steps. I refer to the click step as electronic because a touch switch instantly changes the VFO function. Of course, I need not tell you that the memories remember which VFO operation has been selected or for that matter whether repeater shift was required. On SSB and CW the TS711E's synthesized VFO tunes in 10 Hz steps.

After using the rig for some time without the 40 memories I concluded that since it was possible to move a frequency from memory to VFO it would make sense to program the memories logically and then use them as a basis for operating. Result, the rig is a dream to use. With the TS711E's memory carrying a sequence of calling channels, beacon, simplex and repeater frequencies a swift rotation of the VFO (which also serves to change memory channels) and the entire band can be looked at in seconds. To check on OSCAR 10, dial up the correct memory holding say the satellite beacon frequency, if that's audible then move the beacon frequency to the VFO by pushing the appropriate switch and there you are, tuning the correct part of the band, in the right mode and with the VFO running free. The same can be applied to the CW end of the band and with the VFO set to click stop, FM channels also.

There are facilities to put both VFO's on the same frequency, to operate split using one VFO for receive and the other for transmit. A priority call channel is available as is the ability to go back to a predetermined frequency. The TS711E will scan the band or the memories holding for a brief period on an occupied frequency. It will also scan the memories looking at only those frequencies entered in a particular mode. Programmable scan is also included, memory channels 39 and 40 setting the limits. The now standard full repeater facilities are included.

For the blind operator the TS711E is a dream come true. Full voice announcement of frequency and whether the rig is set to repeater shift comes by fitting the optional VS1 board. A push button, conveniently located on the bottom corner of the front panel, activates the voice. The careful location of this control shows TRIO's attention to detail. How difficult would the switch have been to find for the blind operator had it been located in the middle of the panel. Mode of operation is indicated by switches which when pushed instead of a general beeping, send the morse code letter F for FM, U for USB, C for CW, L for LSB and A for auto. Auto, whats auto?. . .With auto switched on, as you tune across the band the TS711E selects the correct mode for the appropriate frequency. You can over-ride this function and as I have said elsewhere, *you too can transmit FM on the SSB part of the band.*

Enough I hear you say. Sorry, one more feature. DIGITAL CODE SQUELCH! The transceiver has as standard an inbuilt selective tone call system incorporating a call alarm. So if you are not in the shack, then you will know you have been called. The transceiver will also send up to 6 letters or numbers as part of the selective call. I am sure it will not be long before TRIO introduce a TS711E accessory (I am told it is called the CD-10 call sign display) which will decode the information. Then will you not only know that you have been called but who has called you, the 6 letters or digits making up the callsign.

What more can I say, what a rig! For the operator who wants the finest two metre base station transceiver TRIO have produced the TS711E. For the UHF operator there is the TRIO TS811E, the 70 centimetre version. Both ideal ways of getting on to the VHF/UHF bands.

TS711E.....2 metre base station transceiver with DCS..... **£792.15** inc VAT carr £7.00
TS811E.....70 centimetre base station transceiver with DCS..... **£898.00** inc VAT carr £7.00
CD10.....Callsign display unit..... **£110.25** inc VAT carr £7.00
SP430.....Matching speaker..... **£32.40** inc VAT carr £2.50

The new DCS system has also been applied to the popular compact mobiles, the TM201A and TM401A. The NEW transceivers are the TM211E for two metres and for 70 centimetres, the TM411E. The two rigs also have front panels whose viewing angle can be adjusted. So what was an easy to accommodate rig becomes much more so. The tight space which would take a rig but where you could not see its front panel is a thing of the past. Add the convenience of a digital code squelch system, 25 watts output on the 70 centimetre TM411E and the two new rigs from TRIO provide the only alternatives to the TM201A and TM401A.

TM211E.....2 metre FM mobile with DCS..... **£377.22** inc VAT carr £7.00
TM411E.....70 centimetre FM mobile with DCS..... **£431.03** inc VAT carr £7.00
CD10.....Callsign display unit..... **£110.25** inc VAT carr £7.00

the TM211E & TM411E, mobile with DCS.

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There is more to a bench power supply than a transformer and rectifier, and we are once again proud to announce a top quality range from DAIWA. True to the DAIWA tradition of good engineering, this range of regulated supplies will satisfy professional and amateur users alike.

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Output connection is by heavy duty terminals on the front panels, and in the case of the PS300, four sets of terminals are provided, for simultaneous connection of several pieces of equipment.

To sum up, the DAIWA power supplies are carefully designed, conservatively rated, well engineered, and totally satisfactory in use.

The price range represents extremely good value, and the units are normally available from stock. For further details contact us at any time.

the 2 metre **BELCOM LS202E,** hand held FM & SSB.

Until now, dual mode 2 metre transceivers have been available suitable for shack, car or shoulder operation. Mobile they may have been but convenient lightweight hand portables they were not. With the advent of the BELCOM LS202E that has now changed.

- Full coverage of the 2 metre amateur band from 144 to 146MHz in 5 KHz steps on both SSB (Upper and Lower) and FM, selection of frequency by means of rotary thumb wheel switches. In addition, a VXO control giving +/– 5 KHz frequency shift and RIT with centre click stop are provided on the top panel. For night time operation the frequency readout and S meter can be illuminated by an internal LED.
- The use of hybrid IC's and a miniature SSB crystal filter has made the LS202E even smaller than some of the existing FM only handheld portables. The rig measures 62mm wide, 40mm deep and 165mm high, small enough for your jacket pocket and weighs only 520 grammes.
- RF power output SSB(PEP), FM 3.5 watts (at 10.8 volts)
  2.5 watts (at 7.2 volts)
  1.5 watts (at 6 volts)
- The LS202E is equipped for repeater operation having both frequency shift and 1750 Hz tone burst.
- A comprehensive range of accessories is available . . . .

LS202E..... £225 inc. VAT

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EMPORIUM NEWS

Good Morning

I seem to have had very little time over the past months for any serious short wave listening, or perhaps it's really because my aerial has blown down and **I lack the energy** to climb into the tree to reattach it. I was, therefore, **amazed** at what I could hear on the **NRD515** last night as I popped into the shack on the way to bed. Vatican Radio I suppose does not require much wire to be well over the nine but some of the other stations I like were also very listenable to.

I am sure I need not reiterate my feelings on the NRD515. **Still priced at £965.00,** carriage £7.00, the receiver not only out-performs other equipment but **does it in style.** Anybody who doubts my statement should try the NRD515 here at Matlock. This particular set has been "on demonstration" for three years and the controls still feel as they did that first day. I make particular reference to the Megahertz switch on the front panel which **I have personally abused** on purpose in front of customers in order to demonstrate the quality. I suppose I shouldn't be surprised, the receiver even switched off and standing on its shelf looks purposeful—**a joy to own!**

Covering from **25MHz** to **550MHz** continuously, the **AR2001** is still going strong. I foolishly suggested that we had reached a stock situation. I should have included the word **'almost'.** Please, before driving 200 miles to buy one **check first by 'phone** to avoid annoyance and disappointment.

The **Lowe Shop** situation now means that wherever you are in the country, with a few exceptions, you are close to a Lowe Shop. I am pleased that our new shop in **Cardiff** and our newly **located London Shop** at **Eastcote** are doing so well. I must thank you for supporting them and the company during the hectic days following the respective openings. And I am sure that by the time you read this both shops will be finally to their Managers' satisfaction.

I have always placed great emphasis on the **ease of car parking** when selecting property for the shops. Knowing that you all like to visit and browse easily, **car parking in Glasgow, Darlington, Cambridge and Cardiff is free!** There is street parking available in front of the London Shop but behind is a large car park where it currently costs 20p to park for the entire day.


NRD 515

Let me draw to your attention **the LS202E from Belcom** and its **"User Report"** in the September edition of **"Amateur Radio"** Magazine, page 43. The rig which has both FM and SSB modes currently costs £225.00, inc VAT, and a full range of accessories are available. May I suggest that the way to evaluate the **LS202E** is to either ask an owner—there are many—or visit a Lowe Shop and try one yourself.

The **Trio TR2500** and **TR3500,** the new models mentioned on the first two pages are of a higher specification; but they have not replaced them. The TR2500 and TR3500 are still current rigs and the same applies to the TM201A and TM401A. Although there are also higher specification versions, **both are still current models.** This brings to mind an advertising problem: It would appear that unless an item is advertised each month amateurs begin to think that it has been **discontinued.** Nothing could be further from the truth, and in future I am going to list current major rigs and if there is room their prices so that nothing becomes forgotten.

There are now many **RTTY** stations using the **Colour Genie,** plus **RadSoft** package. Let me remind you. **For only £168.00** inc VAT you can buy from ourselves a computer with a proper keyboard—the same as found on current electric typewriters. We are including, **free of charge,** a RadSoft RTTY package which enables you to send and receive RTTY and to receive only CW. Easily operated and with visual tuning aid built in, the package provides you with RTTY plus a home computer. **Two other FREE programs are included;** one that operates a log, the other pinpointing a station's location on a map of England, or for the real DXer, one of Europe.

By now you will have seen the new TRIO hand-sized handheld, **the TH21E.** I am convinced that this rig is going to be owned by every radio amateur in the country. **The TH21E is a breakthrough in equipment,** not only because of its performance but due to its size. Later, when the 70cm version TH41E arrives I intend photographing the two models side by side. The only thing better than owning a **TH21E** is to own the **TH41E** as well. No longer will the **enthusiastic radio amateur** be deterred from taking his rig with him because of its **weight** and **size,** channels will be permanently monitored from **inside pockets.** The TH21E and TH41E, the transceivers for all situations.

On a more important note, let us not forget the real meaning of Christmas and, as we have done in previous years, we include for all our friends the true Christmas message.

73, David G8GIY

A Christmas Message

There were shepherds abiding in the field, keeping watch over the flocks by night. And lo, the angel of the Lord came upon them, and the glory of the Lord shone about them, and they were sore afraid.

And the angel said unto them, "fear not, for behold I bring you good tidings of great joy, which shall be to all people. For unto you is born this day, in the city of David, a Saviour which is Christ the Lord".

And suddenly there was with the angel a multitude of the heavenly host, praising God, and saying:

"Glory to God, glory to God in the highest, and peace on earth, goodwill towards men".

LUKE 2 V 8 to 14

A Peaceful Christmas to our Friends

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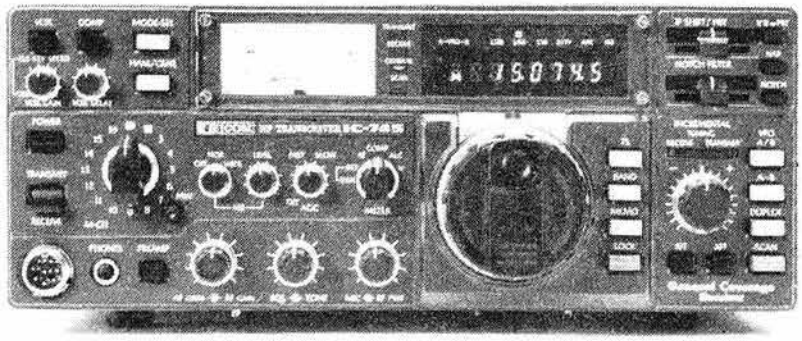
IC-745



ICOM's IC-745 is the all-in-one transceiver featuring an HF all band SSB, CW, RTTY, AM (receive only) ham transceiver, plus a general coverage receiver. Options for FM transceive and an internal power supply make the IC-745 the complete transceiver in an all-in-one package.

The receiver section features a 100KHz to 30MHz general coverage receiver, this allows access to all HF bands plus all the frequencies in between. The IC-745 has an adjustable AGC circuit and DFM (Direct Feed Mixer) giving a wide dynamic range of 103dB with an intercept point at + 18dBm. Exceptionally clean reception is achieved with a low noise PLL circuit and a 70MHz first IF.

The IC-745's features include IF shift, 16 programmable memories with lithium battery back-up, passband tuning, a noise blanker both wide and narrow, threshold level control, notch filter, receive audio tone control and an all mode squelch. Also available is a front end switchable receiver preamp providing 12dB gain. RIT has a ±1KHz range.

We could go on all day about the 745, get in touch with us and we will send you the full story.

Special Offer as from 15th January '84
IC-290D reduced to £469 and the IC-290E to £399. Also 70cm version IC-490E, £529.
Take advantage of this money saving offer.

IC-290D

290D is the state of the art 2 meter mobile, it has 5 memories and VFO's to store your favourite repeaters and a priority channel to check your most important frequency automatically. Programmable offsets are included for odd repeater splits, tuning is 5KHz or 1KHz.

The squelch on SSB silently scans for signals, while 2 VFO's with equalising capability mark your signal frequency with the touch of a button. Other features include: RIT, 1KHz or 100Hz tuning/CW sidetone, AGC slow or fast in SSB and CW, Noise blanker to suppress pulse type noises on SSB/CW.

You can scan the whole band between VFO's/scan memories and VFO's. Adjustable scan rate 144 to 146 MHz, remote tuning with optional IC-HM1 microphone. Digital frequency display, Hi/Low power switch. Optional Nicad battery system allows retention of memory.

Agent: Gordon G3LEQ, or telephone Knutsford (0565) 4040.
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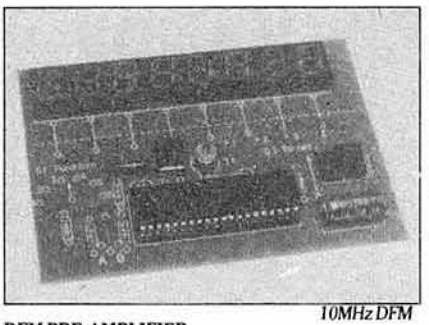
10MHz DFM

A DFM capable of operating at frequencies up to 10MHz. The kit can be configured in six different measurement modes including: frequency, period, elapsed time and unit counter. Applications can be extended using the CIRKIT prescaler and preamp.

SPECIFICATION: Input signal: 2.0V (min) TTL. Frequency range: 0 to 10MHz. Period measurement: 0.5 to 10 secs. Time measurements: up to 10 secs. Output: BCD multiplexed. Display: 8 digit 12mm LED. Supply: 6-9V DC at 100mA(nom).

41-01500 54.10



10MHz DFM

DFM PRE-AMPLIFIER

The rise time of some low frequency signals, even apparent square waves, is often too slow to give a constant readout from a DFM. The use of a pre-amp ensures that these signals are input to the DFM at the correct level and with the correct shape. This simple addition greatly increases the effectiveness of a DFM at low frequencies.

SPECIFICATION: Frequency range: 1Hz-5MHz. Sensitivity: 1Hz-3MHz:20mV, 3MHz-5MHz: 40mV. Max input voltage: 100V (220V instantaneous). Power supply: 5V 8mA. Input signal: Any. Output signal: TTL square wave.

41-01502 5.13

DFM PRESCALER

This prescaler is intended for use with the Cirkit 10MHz DFM, although it is compatible with other frequency counters. The function of the prescaler is to divide the incoming frequency by ten and to shape it into a waveform suitable for the digital input requirements of the DFM. This enables the frequency range of the DFM to be extended up to 50MHz.

SPECIFICATION: Supply voltage: 5V DC. Nominal current: 25mA. Frequency range: 10kHz-50MHz. Input sensitivity: 20mV(typical). Output: 5V TTL level. Dimensions: 80mm x 50mm.

41-01501 8.55

2m POWER AMP

A carefully designed 20W, 144MHz linear power amplifier, to boost the output of hand-held and transportable transceivers such as the TR2400 IC2E, FT208, FT290 etc. With 10dB gain to give a 20W output from a 2W input. Automatic changeover relay - switched from RF sense circuit. High power - output relay, robust construction with die-cast box, plus RX pre-amp.

SPECIFICATION: Bandwidth -3dB: 144-146MHz. Power gain: min 10dB. Output power; 1W input: 10W, 2W input: 20W. Supply voltage: 10-16V. Supply current (at 12V): <3amps-20W output. Input/Output impedance: 50Ω. Size (excluding sockets): 122 x 96 x 44mm. Pre-amp section spec as 2m Pre Amp Kit.

41-01404 32.87

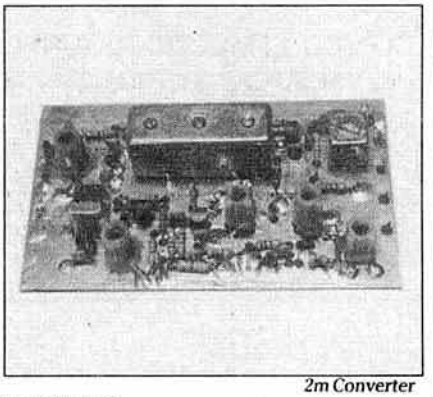
2m CONVERTER

Low noise 2m to 10m converter. This design uses low noise dual gate MOSFETs in the RF and mixer stages which, together with a TOKO pre-aligned helical filter and pre-wound coil, give a high specification and repeatable performance.

A reliable 116MHz overtone oscillator circuit is followed by a double tuned stage which gives a very clean output, this reduces spurii to a minimum. As the circuit is basically linear any mode - AM, FM or SSB - can be converted. The complete circuit is built onto a double-sided PCB.

SPECIFICATION: Noise figure: Less than 2dB. Gain: Min 22dB. 3dB Bandwidth: 144-146MHz. IF Output: 28-30MHz. Input/Output impedance: 50Ω. Supply voltage: 10-16V. Supply current (at 12V): 28mA. Size: 97 x 57 x 22mm.

41-01306 17.35



2m Converter

2m PRE-AMP

Very compact low-noise MOSFET 2m pre-amp. The overall PCB is sufficiently small to be installed inside receivers or transceivers.

SPECIFICATION: Noise figure: Better than 1.5dB. Gain: 18dB Min. Input/Output impedance: 50Ω. Size: 34 x 13 x 10mm.

KIT INCLUDES: Double-sided PCB - All resistors - All capacitors - MOSFET - Coils and cans.

41-01307 3.91

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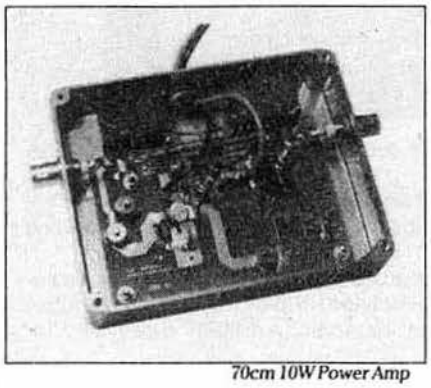
70cm CONVERTER

70cm to 144MHz low profile converter employing high level Schottky diode double balance mixer, pre-aligned helical filter and low noise transistors. The complete design gives a low noise figure and uses pre-aligned filters and pre-wound coils to give repeatable performance with minimum alignment.

SPECIFICATION: Bandwidth: 430-440MHz. RF Gain: 8dB min. Noise figure: <2.5dB. IF output: 144-146MHz. Supply voltage: 10V. Supply current: 30mA. Size: 97 x 57 x 15mm.

41-01405 21.50



70cm 10W Power Amp

70cm 10W POWER AMPLIFIER

The current generation of UHF handheld synthesised transceivers have almost all the facilities found in mobile/base transceivers, the only major limitation being their output power. For handheld operation 1 watt or so is adequate, but for mobile to mobile and for use wth higher power repeaters, the addition power provided by the CIRKIT amplifier increases the range considerably. This is especially noticeable, as is to be expected, at the limits of the service area.

The Cirkit 70cm Power Amp will boost the output power of hand held transceivers up to 12W. Automatic relay switching between TX and RX, is provided via the RF sense circuitry. The finished unit is mounted in a tough pre-drilled die-cast box, which provides sufficient heatsinking while providing a rugged low profile housing.

SPECIFICATION: Power gain (2W I/P): 7.2dB. Output power (13.8V) 2W input: 10W(min). Saturated power output: 14W. Supply voltage: 10-16V (13.8V nom). Input/Output impedance: 50R. Bandwidth: 430-440MHz. Supply current: 2 amps at 12W. Dimensions: 119 x 94 x 34mm.

41-01505 33.82

70cm PRE-AMPLIFIER

This high performance pre-amp offers increased receiver sensitivity and a corresponding extension of the useful communication range. The completed unit is sufficiently compact to be built into virtually any existing receiver and does not require the use of any test gear when setting up.

SPECIFICATION: 3dB bandwidth: 425-445MHz. Noise figure <2dB. Gain: 13dB(min). 1dB compression: -3dBm (0.5mW). Saturated output: -2dBm (0.7mW). Supply voltage: 8-12V (12V nom). Input/Output impedance: 50R. Dimensions 50 x 10 x 17mm.

41-01506 4.78

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STU 5K ATU Kit 41-50500 130.00

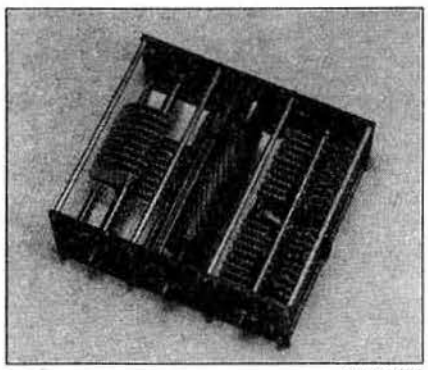
CABINET - custom-made for STU 5K ATU
41-50510 62.50

DIGITAL TURNS COUNTER
Multi-turn, vernier scale with digital indication, for use with roller coaster, with or without cabinet.
Turns counter 41-50520 27.94

BALUNS
To complete the ATU, we have the following Baluns:

Location		PEP	Ratio	Stock No.	Price
Outdoor	OB141	1kW	4:1	41-50141	27.35
Outdoor	OB111	1kW	1:1	41-50111	27.55
Indoor	IB241	200W	4:1	41-51241	17.25
Indoor	IB141	1kW	4:1	41-51141	22.35

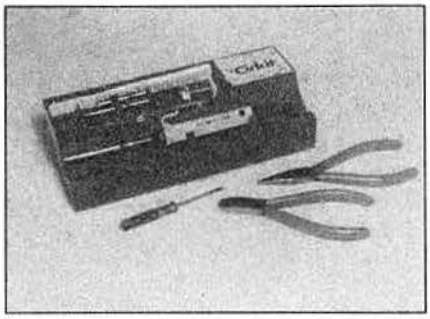
ROLLER COASTER
To complement existing equipment, covers 1-30MHz, 28uH inductance, tapered pitch for 10 and 15 meters.
Roller Coaster 41-50540 46.00



TAU ATU

AKC AERIAL KIT
Unique clip-on spacer system for open wire feeders. Patented design manufactured from an ultra-violet resistant poly-propylene the spacer can be configured to give a 75,300, 400 or 600 ohm system. Kit contains 20 spacers, 1 Tee piece and 2 Ceramic insulators.

AKC Aerial Kit 41-50530 12.70



CIRKIT ELECTRONICS TOOL KIT
Contains: 15W Soldering Iron, 2 spare bits, heat shunt, solder, pliers, cutters, and screwdriver.
41-00007 15.56

Selected Lines

PB2720	80dB Piezo Buzzer	43-27201	0.55
10M15A	10.7MHz Filter	20-10152	2.10
FC177	LCD Freq. Meter	39-17700	20.00
CM161	Min LCD Clock	40-80161	8.25
8 x 0.3"	IC socket	28-00800	0.12
14 x 0.3"	IC socket	28-14000	0.13
16 x 0.3"	IC socket	28-16000	0.13
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CX520D	COAX relay (N type)	46-90520	26.98
CX540D	COAX Relay (BNC)	46-90540	26.98
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HC7030	0.1% Acc DMM	56-07030	43.00
Meteor	100MHz DFM	56-00100	95.00
Meteor	600MHz DFM	56-00600	121.00
Meteor	1000MHz DFM	56-01000	165.00
CS240	Antex 17W Iron	54-22300	5.20
TCP3	Weller temp cont iron	54-20007	17.63
PU3D	Weller 24V PSU for TCP3	54-20026	30.74

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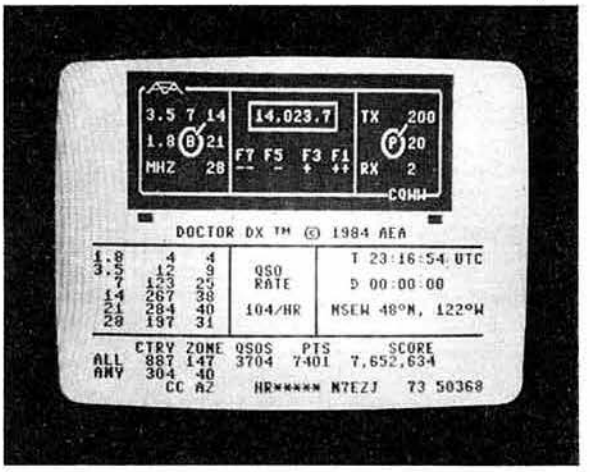

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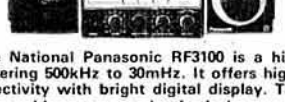
20199 Oscar	£34.20
20623 1206mHz	£25.90



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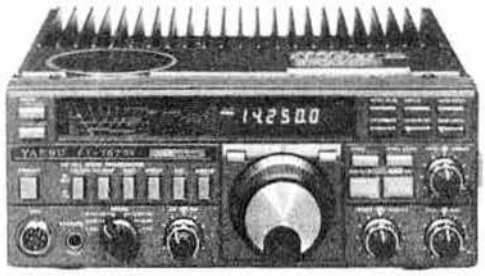

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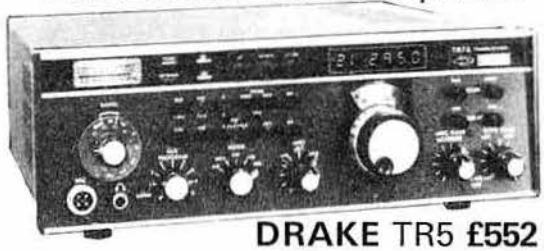

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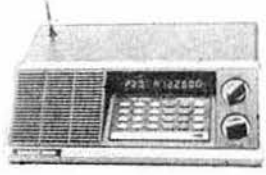

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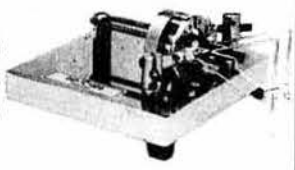

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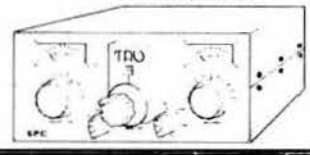

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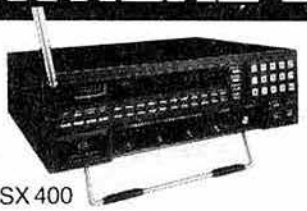

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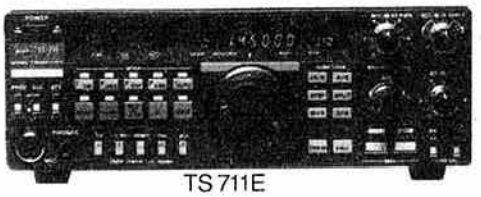

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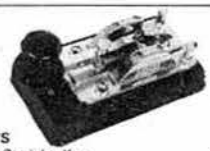

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RSL-28b	Yaesu 10M mobile whip	**£10.65**	£2.00
SMCGCCA	Gutter mount and cable	**£10.95**	£2.00
SMCSOCA	4M cable assembly 10SE	**£5.65**	£1.50
FLEXI 10	G. Whip mobile 10-80M	**£52.33**	£2.35
MULTI-M	G. whip mobile 10/15/20	**£33.92**	£1.85
FLEXIWHIP	G. Whip 10M mobile	**£19.21**	£1.85
GW BASE	Base for all G. Whip antennas	**£6.90**	£1.00
SMTC3170L	Twin meter SWR bridge	**£16.95**	FOC
SMC100LP30	Low pass filter	**£6.30**	FOC
120406	4 Amp DC power unit	**£14.95**	£2.35
SP55	Extension L/S	**£16.50**	FOC

NB. PRICES INCLUDE VAT AT 15%
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PUBLICATIONS

	£	P/P
I.P.C. (PRACTICAL WIRELESS)		
Out of Thin Air	1.25	0.75
Passport to Amateur Radio	1.50	0.75
Wires and Waves	3.00	0.90
Are the voltages Correct	1.00	0.50
Introducing R.T.T.Y.	1.50	0.50
R.S.G.B.		
Teleprinter Handbook	11.65	1.35
Radio Communications Handbook	8.95	2.05
Test Equipment (Raio Amateurs)	4.70	1.30
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HF Antennas for all Locations	4.75	1.35
Guide to Amateur radio (Soft)	2.75	0.75
Radio Amateur Operators Manual	4.25	0.75
1983 Call Book (UK)	2.10	0.80
1984 Call Book (UK)	5.00	0.50
R.A.E. Manual (10th Edition)	2.75	0.75
T.V.I. Manual	1.50	0.50
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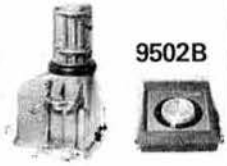

9502B

				p.p.
FU200	Thro'	3 Core	Light Duty	**£49.95**
KR250	Bell	6 Core	Lighter Duty	**£61.95**
9502B	Offset	3 Core	Lighter Duty	**£69.49**
AR40	Bell	5 Core	Medium Duty	**£115.00**
KR400	Bell	6 Core	Matches KR500	**£109.95**
KR500	Thro	6 Core	Elevation	**£139.95**
AR50	Bell	5 Core	5 Position (AR40)	**£139.00**
KR400RC	Bell	6 Core	Medium Duty	**£132.50**
CD45	Bell	8 Core	Heavy Duty	**£189.95**
KR600RC	Bell	8 Core	Heavy Duty	**£189.50**
HAM IV	Bell	8 Core	Heavier Duty	**£299.00**
KR2000RC	Bell	8 Core	Heavier Duty	**£346.50**
T2X	Bell	8 Core	Very Heavy Duty	**£365.00**
HDR300	Bell	8 Core	Digital Readout	**£699.00**

Control Cable			p.p.
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RC6W	6 Way	mtr **£0.55**	£1.90
RC8W	8 Way	mtr **£0.55**	£1.90
9523	Support Bearing for 9502b F4200	**£19.65**	£2.50
KC038	Lower Mast Clamp for KR400 600 etc	**£12.50**	£2.50

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TH3JNR	3 Ele 10-20m	£212.00	£3.50
TH5DXX	5 Ele 10-20m	£419.00	£6.70
TH7DXX	7 Ele 10-20m	£545.00	£8.75
TB3	3 Ele 10-20 Jaybeam	£212.75	£5.90
HQ1	Mini Quad 10-20	£169.00	£4.00
G4MH	Mini Beam 1-20	£88.50	£4.50
TA33JNR	3 Ele 10-20 Moseley	£177.10	£6.00
Mustang 2	2 Ele 10-20 Moseley	£177.10	£6.90
Mustang 3	3 Ele 10-20 Moseley	£220.80	£6.90
GQ2E	2 Ele 10-20 Quad	£279.00	£5.40
GQ3E	3 Ele 10-20 Quad	£439.00	£9.20
GQ4E	4 Ele 10-20 Quad	£605.00	£10.00
Hyquad	2 Ele 10-15M dipole 20M	£339.00	£6.00
LP1007	Log Periodic 13-20 MHz	£2065.00	DIST
3Y1015D20	3 Ele 10/15M Dipole 20M	£179.00	£5.95
DB10/15A	3 Ele 10-15m	£209.00	£4.80

TB3

MONO BAND BEAMS		
103BA	3 Ele Yagi 10m	£75.00 £3.50
105BA	5 Ele Yagi 10m	£159.00 £3.95
153BA	3 Eli Yagi 15m	£105.00 £3.50
155BA	5 Ele Yagi 15m	£239.00 £5.90
203BA	3 Ele Yagi 20m	£189.00 £4.90
204BA	4 Ele Yagi 20m	£299.00 £7.30
205BA	5 Ele Yagi 20m	£399.00 £9.40
402BA	2 Ele Yagi 40m	£259.00 £6.50
18TD	Dipole Tape 10-80m	

HF5V

HF5R

VERTICALS			
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14AVQ	Vertical 10-40m	£73.00	£2.75
18AVT/WB	Vertical 10-80m	£119.00	£2.75
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SMCHF5V	Vertical 10-80m	£65.00	£2.65
SMCHF5R	Radial Kit for above	£39.85	£2.65
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SMCTD/HP	High Power 10-80m	£47.50	£2.65
SMC TD/P	Portable inc coax	£67.50	£2.65
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Tribander	10-20m Slide sw.	£29.33	£1.65
Multimobile	10-20m	£33.92	£1.85
Flexiwhip	10m only	£19.21	£1.85
Extra coils	For above to 160m	£7.25	£1.00
Flexiten	2, 10, 12, 17, 15, 20, 30, 40, 80M	£52.33	£2.35
Bases	For above	£6.90	£1.00

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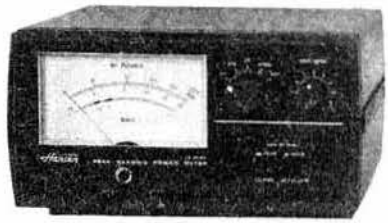
IN LINE POWER/SWR BRIDGES P.E.P., AVERAGE 1·8-440MHz

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



FS-500H

		HANSEN		
FS710H	1.8-60 MHz	15/150/1500W	PEP Auto SWR	102.95
FS710V	50-150 MHz	15/150W	PEP Auto SWR	102.95
FS50HP	1.8-60 MHz	20/200/2000W	Interval PEP/SWR	99.95
FS50VP	50-150 MHz	20/200W	Interval PEP/SWR	99.95
FS500H	1.8-60 MHz	20/200/2000W	PEP	79.95
FS500V	50-150 MHz	20/200W	PEP	79.95
FS300H	1.8-60 MHz	20/200/1000W		53.50
FS300V	50-150 MHz	20/200W		53.50
FS200	1.8-150 MHz	20/200W	PEP/SWR Interrd Battery	57.95
FS601M	1.8-30 MHz	20/200W	PEP	58.95
FS601MH	1.8-30 MHz	200/2000W	PEP	58.95
FS602M	50-150 MHz	20/200W	PEP	58.95
FS603M	430-440 MHz	5/20W	PEP	58.95
FS210	1.8-150 MHz	20/200W	Auto SWR/ Power Meter	63.50
FS301M	2-30 MHz	20/200W		41.00
FS301MH	2-30 MHz	200/2000W		41.00
FS302M	50-150 MHz	20/200W		41.00
FS711H	2-30 MHz	20/200W	Head/ Display	42.35
FS711V	50-150 MHz	20/200W	Head/ Display	42.35
FS711U	430-440 MHz	5/20W	Head/ Display	42.35
W720S	130-430 MHz	20/200W	Head/ Display (200W on 144 only)	41.50
FS7	145/(432 MHz)	5/20/(200)		46.97
FS5E	3.5-150 MHz	20/200/1000W (1KW HF only)		42.75
FS5S	1.8-150 MHz	20/200/1000W (1KW HF only)		43.75
SWR3E	3.5-150 MHz	20/200/1000W (1KW HF only)		28.75
SWR3S	3.5-150 MHz	F/S Meter ant. switch 20/200W		30.50
SWR50B	3.5-150 MHz	Twin Meter		30.50
FS20DL	3-150 MHz	1/10W Dummy/SWR/Power		43.65
FS20D	3-150 MHz	5/20W Dummy/SWR/Power		43.65
FS800	1.8-150 MHz	6/30/150W Dummy/SWR/ Power		125.35
W720S	930 MHz	7.5/15W Head/Display		46.00
		JD		
JD110	1.5-150 MHz	10/100W		15.85
		MIRAGE		
MP2	50-150 MHz	50/500/1500W	PEP	P.O.A.
		SMC		
S3-30L	Mini (CB Style)			8.80
T3-170L	3.5-170 MHz	Relative	Twin Meter	16.95
		WELZ		
SP300	1.8-500MHz	20/200/1KW	SWR/ Power	121.00

T3-170L

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

SMC-HS

HF, VHF, UHF ANTENNAS MOBILE VERTICALS

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 ¦λ	5.75	0.85
SMCT144h	Telescopic 2M ¦ wave BNC	9.95	0.85
SMC6P2T/BNC	Telescopic 2M BNC fitting ¦λ	6.00	0.85
SMC2H/PL	Helical 2M PL259 fitting	5.75	0.85
SMC2H/BNC	Helical 2M BNC fitting	6.00	0.85
SMCHS430S	70cm ¦ wave BNC fitting 2.5dB¦	7.95	0.65
SMC2QW	2M ¦ wave 0dB¦ 1.6'	2.70	1.85
SMC2NE	2M ¦ wave fold 3.0dB¦ 4.3'	7.95	2.00
SMC2VF	2M ¦ wave fold 3.0dB¦ 3.5'	13.65	2.00
SMC78F	2M ¦ wave fold 4.5dB¦ 5.7'	15.95	2.50
SMC78B	2M ¦ wave ball 4.5dB¦ 5.6'	15.95	2.59
SMC78SF	2M ¦ wave short 4.7'	15.95	2.50
SMC88F	2M 8/8 wave 5.2dB¦ 6.5'	21.95	2.50
SMC118M	Colinear 2M 11/8 7dB¦ 9.7'	33.35	2.65
SMC258	70cm 2×¾ fold 5.5dB¦ 3.1'	15.60	2.00
SMC268C	70cm 2 section colinear 6dB¦	25.95	2.00
SMC358	70cm 3×¾ 6.3dB¦ 4.7'	19.65	2.00
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SMCHS770	144/432 Duplexer 50W	17.85	1.85
SMC20SE	20M 1.72M 100W PEP	19.95	2.50
SMC15SE	15M 1.72M 130W PEP	16.75	2.50
SMC10SE	10M 1.72M 200W PEP	15.95	2.50
SMC17SE	17M 1.915M 200W PEP	17.95	2.50
SMC12SE	12M 1.915M 200W PEP	16.75	2.50
RSL-28b	Yaesu 10M mobile whip	10.65	2.00
SMCGCCA	Gutter clip 4 mtrs cable	10.95	2.00
SMCSOCA	Cable assembly 4M	5.65	1.50
SMCSOCAL	Cable assembly 6M	5.95	1.50
SMC50CALLR	Cable assembly c/w 5M cable/ PL259	6.50	1.50
SMCROL	Rollet, 10mm thick (for SMC50CALLR)	1.15	0.50
SMCTMCAS	Trunk mount c/w 6M cable	9.95	2.00
HDTMCA	HD trunk mount c/w 5M cable	15.40	2.00
SMCSOMM	Magnetic base c/w 4M cable	10.95	2.00
SMCSOWM	Adjustable wing mount base	4.85	0.90
SMCGCD	Gutter clip deluxe	5.30	1.50
SMCBSD	Bumper strap deluxe	10.95	1.50
HS88BK	Bumper mounted extension for 144 MHz antennae	23.35	2.00

SOMM

HS770

NB: PRICES INCLUDE VAT AT 15%

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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.

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Affiliated club or society/registered group (UK): £16.50 (including *Radio Communication*); **£9.90** (excluding *Radio Communication*)
(Subscriptions include VAT)

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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 January issue of *Radio Communication*, and amendments will be 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 July 1984 *RSGB News Bulletin*.

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

WORKING TOGETHER

An important point which often seems to be overlooked by some of our members is that the Radio Society of Great Britain is a *society*; one definition of which is "an association of persons united by a common aim, interest or principle". Indeed, the founder members formed our Society to ". . . promote the general advancement of the science and practice of radio communication, to facilitate the exchange of information and ideas on these subjects among its members, and to obtain the maximum liberty of action consistent with safeguarding the interests of all concerned".

It is evident that the RSGB is like a club in which its members are expected to contribute and participate. The Society is not intended to be a commercial organization in which its members simply pay for services rendered—though of course the Society must be able to pay its way. Indeed, the members are the Society, and any surplus which the organization might accrue from its operations is simply ploughed back into amateur radio.

The advantages of a properly-directed society are that everyone benefits in one way or another; the total cohesive force is far stronger than any unco-ordinated effort by individuals. That, simply, is why people unite to achieve common objectives. In this context many members, well over 500, are keen to put something back into amateur radio to repay in part what they have gained from it. Indeed, a society such as ours does provide an opportunity for many individuals to contribute and take part in the organization in a direct way. The cost to a purely commercial organization for such a large amount of dedicated and expert effort would be prohibitive.

Above all else there is one essential ingredient which is necessary to an organization such as the RSGB—it is called "goodwill". Without goodwill the efforts of volunteers, staff and members alike can come to naught—without it there is no benefit of the doubt; people are guilty until proven innocent; and problems which may be impossible to solve in the way the members might wish are assumed to have been ignored or glossed over. If there is goodwill, there is a presumption that other people are doing their best, however imperfect that may be; with real goodwill almost anything can become possible.

This season of the year should, perhaps, provide an opportunity for members of the Society to reflect on what they are trying to achieve through the medium of amateur radio, and to reflect on their role as a member of this Society. If anger, disillusionment, discrimination and conflict are words which strike a chord, then amateur radio has failed in individual terms. Perhaps, for some members, the truth lies in the well-worn cliché about only getting out what you put in, and the corollary to that is along the lines of "instead of complaining, why not volunteer to help?" Deeds of goodwill are very much appreciated in a world where struggle and compromise is the order of the day.

What is certainly true is that the RSGB can never do enough for its members. Some simple-sounding problems—spectrum abuse, antenna planning and breakthrough, for example—do not have simple solutions. Yet the Society strives to seek solutions to these difficulties and strives to address hundreds of other tasks in order to fulfil the desires and aspirations of its members. The overall task is far from simple, yet some members do not appear to know how to help. So let us plead with members with questions: check *first* in *Radio Communication* to see if the answers are there before ringing up your representative or headquarters. Let us also plead with members to accept that those who devote much of their efforts to amateur radio are doing their best and deserve your goodwill—we have much to lose if we allow a "them and us" situation to develop, and so much to gain by working together.

United we stand. . . .

David Evans, G3OUF

A SEASONAL MESSAGE FROM THE RSGB PRESIDENT

As the year draws to a close and the time for the traditional seasonal message draws near, it is my cue to reflect on the past year in office as your President. The year has simply flown by, and it seems only yesterday when the celebrations at Cardiff Castle were taking place.

During the year I have been able to experience the far wider implications of amateur radio, not only in the UK, but also in IARU Region 1, and I am heartened by the very high esteem in which the RSGB is held by our neighbouring countries in Europe. The CEPT licence which is under current discussion will, I know, further this international friendship that is so important to the growth of amateur radio.

At home, the year has been one of consolidation, building a good, sound structure on the firm base laid down by my predecessors. We have to thank the general manager, David Evans, and his team at headquarters for much of the actual work. Without their efforts we would still be in the 'seventies or worse.

I must not forget to thank also our many hundreds of volunteers all around the country. They are the backbone of the Society, and their efforts, however small or large, are irreplaceable.

The RSGB runs, as far as is practical to do so, a fair and democratic system of representation. There may have been problems during the year, but I know of no Society that does not have its share of problems, and the RSGB is no different.

This is the time of year not only to reflect on the past few months, but to look forward to greater things in 1985. The goodwill of all radio amateurs is vital to the smooth running of your Society. So let us all go forward into the second half of this decade with the strength to overcome all adversity and to continue to build a strong and thriving national Society.

May I extend my good wishes to all of you at this time and wish you all a very merry Christmas and a happy and prosperous New Year.

R. G. Barrett, GW8HEZ

Amateur Radio News

Comex 84

Comex 84, the mobile radio and paging industry exhibition and conference organized by the Federation of Communication Services, took place in Northampton on 16/17 October 1984. From the point of view of the radio amateur, the most significant part of the conference was a paper given by Mr Ian Jones, head of the licensing branch of the Radio Regulatory Division of the Department of Trade & Industry, on the subject of "Spectrum Availability and Location—Bands 1 and 3".

Mr Jones said that the remaining Band 1 and Band 3 transmitters would finally close down by 6 January 1985. The release of Band 3 to the land mobile radio service would follow; this band is being dealt with first since it was best suited to the needs of the industry. However, there were still many areas for discussion—in particular the matter of common signalling standards for use in Band 3—and the DTI was still listening to views from within the mobile radio industry as to exactly how Band 3 should be utilized. He pointed out that in the London area there were currently some 870 available channels for mobile radio: the release of Band 3 would provide somewhere in the region of another 1,000 channels in London, and it was obvious that this was the most important and significant release of frequencies to the land mobile service which had ever taken place. However, the demand for mobile radio channels had, on average, increased at about 10 per cent per annum for some years, and the expectation was that Band 3 would become used to capacity in a relatively short period. Extrapolated at 10 per cent per annum, it was expected that there would be between 1·5 and 2 million mobile users by the year 2000. Because of this it was necessary to make the best possible use of Band 3, and there was a good deal of support for the proposition that most of Band 3 should be given to so-called "service providers". Some effort was now being put into monitoring, in order to ensure that optimum use of allocated channels was being made.

From what was said, and the nature of the questions asked after the paper had been delivered, it appeared that the future for Band 1 frequencies is rather less clear-cut than those in Band 3. There was still a considerable amount of discussion and debate necessary in the matter of both Bands 1 and 3, and Mr Jones emphasized that all the decisions on the future use of the bands were unlikely to emerge at once. However, some concerning Band 3 were "imminent". It appears to the RSGB that the likelihood of an allocation to radio amateurs in the UK at 50MHz is still quite good, but what remains uncertain is the timescale.

QSL Bureau news

Sub-managers for callsigns in the G4HAA-HZZ, G4NAA-NZZ and G4RAA-RZZ groups have changed as follows:

G4HAA-HZZ—M. Cuckoo, G6ECM, 15 Fair Oaks, Herne Bay, Kent CT6 6EU.

G4NAA-NZZ—M. Musgrave, G4NVT, 24 Buller Road, Laindon, Basildon, Essex SS15 6BA.

G4RAA-RZZ—D. Buckley, G3VLX, 16 Wood Ride, Petts Wood, Orpington, Kent BR5 1PX.

The sub-manager for the G4IAA-IZZ callsign group, C. J. Webb, G4JFF, has changed his address to: 68 Higgs Field Crescent, Cradley Heath, Warley West Midlands B64 6RB.

MEMBERS' ADS RATE INCREASE

The rate charged for Members' Ads has remained unchanged since June 1980 despite the fact that printing, paper and postage costs have increased annually.

It has now become necessary, therefore, for the Society to increase the rate in line with the increased cost, while still retaining the element of subsidy which has always made Members' Ads a valuable membership service.

The flat rate for each Member's Ad will therefore be increased to £2 for every 40 words, or part thereof, with effect from 1 January 1985.

All Members' Ads postmarked before that date will be accepted at the current rate, but thereafter only advertisements at the new rate will be accepted.

Region 15 representative

Mr J. T. Barnes, GI3USS, the present Region 15 representative, having been elected unopposed to the RSGB Council with effect from 1 January 1985, an election will be necessary to fill the position of Region 15 left vacant from that date.

Any five corporate members resident in Region 15 (Northern Ireland) may nominate any other qualified corporate member resident in Region 15 for the office of regional representative. Each nominator may not nominate more than one person to fill the vacancy.

Nominations must be made in writing and signed by all the nominators, and 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 14 January 1985. All nominations will be acknowledged by return of post.

In the event of more than one person being nominated, a ballot will be held, details of which will be published in the March 1985 issue of *Radio Communication*.

Region 18 election

Nominations for the position of Region 18 representative have been received in respect of Messrs E. W. Bate, G3LUC; I. Gibbs, G4GWB; and E. W. Malone, G4MRT.

Not later than 21 January 1985, members residing in Region 18 may vote for one candidate in the form prescribed below. Completed ballot forms, which must reach RSGB headquarters by the above date, should be enclosed in a sealed envelope marked "Region 18 election", and addressed to "The Secretary". The composition of Region 18 is given on page 1028 of this issue.

FORM OF BALLOT PAPER

I, ...
being a fully-paid-up corporate member of the RSGB residing in Region 18 wish to record my vote in favour of
Mr .....
as representative for Region 18
Signed .....
Callsign or BRS No .....
Address .....
.....

SP gets first repeater

Thanks to a translation by G4PUO, it has been learned from the Polish magazine *Radioelektronik* that the first 144MHz repeater in Poland has now been commissioned. Using the callsign SR9E, the unit operates on channel R0 (ie input 145·000MHz, output 145·600MHz) with a power output of 1W. It is located in the Jura region, between Krakow and Czestocowa, in the town of Podzamcze, and came into use on 18 March 1984.

It is also hoped to instal a beacon on the same site at a later date. This unit has been allocated the callsign SP9VHE and will have a power output of 100mW. The altitude of the site is 502m, and its constructors hope that the beacon will be audible at considerable range under good conditions.

Christmas/New Year holiday

The RSGB headquarters at Potters Bar, the *Radio Communication* editorial office at Chelmsford, and the RSGB QSL Bureau in London SW20 will be closed from 25 December 1984 to 1 January 1985 inclusive.

Need to know?

Information such as the transmission schedules for GB2RS broadcasts, the list of QSL Bureau sub-managers and the names of area representatives, is published in *Radio Communication* at long intervals in order to economise on space. If the information required cannot be found in *Radio Communication*, it can be obtained from the membership services department at RSGB headquarters on receipt of a second-class stamp. Lists of centres at which the RAE may be taken are also available.

It is at this time of year that members begin thinking about next year's summer holiday, and those considering obtaining a reciprocal licence are reminded that a comprehensive database on reciprocal and visitors' licences in some 150 countries is held at headquarters. The information is free to members by a letter, telephone call, or by calling personally at headquarters.

Untouched by human hand

The City & Guilds of London Institute has recently been upgrading its computer systems, and one result of this is CAIBAR —Computer-Assisted Item Banking and Retrieval. In the words of their newsletter: "CAIBAR permits a subject officer to compile a question paper by selecting multiple-choice questions from a computerized bank of questions. It is expected that once the data quality is of a sufficiently high standard the computer will be able to compile a question paper with only minimal human guidance. When this system is operational much duplication of effort will be eliminated, since final printed copy of each question will exactly agree with data shown on a vdu screen. Diagrams will be recalled via microfiche."

Perhaps the next stage is for candidates' personal computers to be connected to CAIBAR via a telephone line—examination centres and question papers could then be consigned to oblivion!

Amtor

Several enquiries have been received at RSGB headquarters concerning the acceptability of Amtor under the terms of the new schedule to the amateur licence. The new schedule refers specifically to "CCITT-recognized codes, which radio amateurs are permitted to use: as a matter of fact Amtor is not a CCITT-recognized code, although its transmission parameters do conform with CCIR Recommendation 476. In this particular instance the DTI has indicated to the Society that it has no objection to radio amateurs using Amtor.

News from the USA

Two bills have been introduced into Congress which would have the effect of adding "malicious interference to radio communications" as an offence named in the 1934 Communications Act. This would mean that enforcement in such cases could be handled directly by the Justice Department. Currently, cases of this type have been handled as simple violations of FCC regulations.

On 10 October 1984 the FCC released a Notice of Proposed Rule Making which has some bearing on access to the post-WARC hf bands in the USA. Briefly, the entire 10,100–10,150kHz segment of the 10MHz band would become available to operators holding General or Higher class licences for A1 and F1 operation. The "window" between 10,109 and 10,115kHz would be removed. The power limitation of 250W would also be removed. During the pending period of the notice, the entire band from 10,100 to 10,150kHz is available for A1 and F1 modes with an output power limitation of 200W.

With regard to the 18MHz band, the FCC has concluded that certain US Government operations in that portion of the spectrum would preclude any amateur usage of it prior to the scheduled implementation date of 1989.

Early access to the 24MHz band has been requested in the USA, by the ARRL and others, and the FCC has found no objection. The FCC has proposed that the ARRL plan for the band, which is based on the worldwide IARU band plan, is accepted. This is for A1 and F1 only between 24,890 and 24,930kHz; and A1, A3, A4, A5, F3, F4 and F5 between 24,930 and 24,990kHz. No special power limitations are proposed for this band, and it would be available to General and Higher class licensees.

Some restrictions on operation between 420 and 430MHz along the Canadian border would be imposed, with a ban on operation unless a written waiver was in force for a particular station.

RSGB 1985 PRESIDENTIAL INSTALLATION

The installation of
Mrs Joan Heathershaw, G4CHH,
as the 51st President of the
Radio Society of Great Britain
will take place during a

SOCIAL EVENING
at
The Post House Hotel, York,
on
Saturday 19 January 1985

The ceremony will begin at 7pm, when guests assemble, and dinner will be called at 8.15pm, to be served at 8.30pm.
Admission by ticket only: price £3

Applications for tickets should be addressed to Ms H. Norman, RSGB, Alma House, Cranborne Road, Potters Bar, Herts EN6 3JW, and must be received by 20 December 1984; cheques to be made payable to RSGB.

Finally, the FCC has proposed to make the 902-928MHz band available to USA amateurs in most of the country. The band would be available for the use of all amateurs except the Novice class, and no sub-bands or special power limits are proposed.

Replies to the notice are due by early 1985, and it is expected that any provisions which are accepted would come into force soon after that.

The Society understands from the ARRL that the FCC has released a Notice of Proposed Rule Making which, if adopted, would permit A4, A5, F3, F4 and F5 modes in the 1·8MHz band in addition to the A1 and A3 which are currently permitted in the USA.

The ARRL said: "This NPRM came as a response to an ARRL petition to authorize A1 (rtty) in the 1·8MHz band. Several commentators urged the FCC to consider other additional modes. The FCC found that these ideas had merit and expanded upon ARRL's original proposal. Offshore Navigation (ONI) and Racal noted that they would soon be requesting that 1,900-2,000kHz be transferred to the radiolocation service. In the NPRM, the FCC points out that if these modes are permitted, hams should be aware that this segment of the band is subject to proceedings that might reassign it to another service."

The debate on the future of the upper part of the band in the USA continues, with Offshore Navigation (ONI) claiming that amateur radio should also be forced to document its needs for an allocation in the mf spectrum.

News from Canada

The Canadian Radio Relay League has notified the Canadian Department of Communications that it may at some time in the future request an expansion of the 3·5MHz phone allocation. It has said: "We respectfully ask that the department issue a Gazette notice proposing expansion of the . . . band, down to 3,700 or even 3,675kHz. . . . Assuming that the comments generally supported this expansion, we would ask that the department implemented it at the earliest possible date."

The rationale for this request appears to be the expansion of the phone sub-band in the USA down to 3,750kHz from 3,775kHz earlier this year. However, it is understood that the request may be something of an academic exercise since the Canadian Department of Communication is reported to be considering adopting the approach of European licensing administrations and leaving the matter of sub-bands and band planning to radio amateurs themselves.

News from New Zealand

The New Zealand Post Office has informed the national society, NZART, that the early release of the 18 and 24MHz bands in that country to the amateur service is currently considered "inappropriate" until the completion of an International Frequency Registration Board re-assignment programme. However, it has added that "the matter will be kept under close review over the next 12 months".

A request for an extension of the 50MHz band in New Zealand from 53 to 54MHz has been denied: the primary users have indicated that sharing would be impracticable. In New Zealand the primary users of that portion of the spectrum are the fixed and mobile services.

Get-away special doesn't

The "get-away special" experiment MARCE carried on board the last shuttle mission, which was intended to have transmitted some basic telemetry from the spacecraft in the 430MHz band, was not heard anywhere in the world and appears not to have functioned at all. The canister containing the experiment has now been removed from the Shuttle's cargo bay and examined: when power was applied to the circuitry, everything appeared to be functioning normally. According to NASA sources, it appears that there was an "in-flight power-up anomaly"—during the flight a controller was programmed to switch on three relays, and lights on the controller itself indicated that the relays had closed. At the end of the experiment the same controller was programmed to turn the relays off but the lights indicated that the relays had already gone "off line", as it were. The anomaly was noted in the shuttle's flight log, but no action could be taken during the mission.

In a manner of speaking this is good news since it suggests that there is nothing basically wrong with the experimental package itself, and it should be possible to try again on a subsequent shuttle mission. The Goddard Space Flight Centre has been given the task of finding the cause of the problem.

The Society is of the opinion that members whose equipment fails to work when switched on should in future use the terminology "power-up anomaly" when in contact with other amateurs rather than the outmoded "fuse blew" or "wire dropped off". . . .

It appears that a second licensed amateur will be aboard the shuttle during the mission in which Tony England, W0ORE, will be a member of the crew, as reported in here last month. The other licensed crew member will be John-David F. Bartoe, W4NYZ, who is a payload specialist.

Special special event station

The research vessel *RRS Discovery*, operated by the Natural Environment Research Council, will be carrying out a programme of research work in the South Atlantic and the Weddell Sea between 8 January and 12 April 1985. An amateur radio station is being established on board for the duration of the expedition, and the Department of Trade & Industry has approved the allocation of the special event callsign GB4DIS for the station. It will operate from *RRS Discovery* between 12 February and 12 April 1985, and will be manned by staff of the Research Vessel Service who are also licensed radio amateurs. The station will only be heard using the suffixes /MM or /MA, and although the callsign is in the series usually used for special events, the greetings-message facility associated with special event stations in the UK will not be available to GB4DIS. Operation will take place on 14 and 21MHz using cw and ssb, and a special QSL card will be available. Further information is available from Dr Charles W Fay, NERC Research Vessel Services, No 1 Dock, Barry, South Glamorgan CF6 6UZ.

New books

In the light of the number of inquiries received at headquarters, the Society suspects that there is a shortage of generally available information on the selection and substitution of semiconductors for published projects. We are now stocking three of the well-known "Towers" manuals which list device characteristics and offer some possible substitutes: these are the *International Transistor Selector*, the *International MOSpower and other FET Selector* and the *International Op-Amp Linear IC Selector*. The latter covers both the "classical" operational amplifer and several classes of "quasi-op-amps" such as comparators, operational transconductance amplifiers, current-difference (Norton) amplifiers and voltage-follower amplifiers.

Other new books now available from the Society cover test equipment, power supplies, antennas for the short-wave listener, and the use of the oscilloscope; the membership services department at headquarters can supply further information.

Exchange visit to America?

The American Radio Relay League has compiled a list of amateurs in the USA who are interested in exchanging vacations and/or making travel arrangements with amateurs in other countries. It has also commenced what it calls an "International Travel-Host Exchange", for the promotion of international goodwill and friendship. Members interested in meeting and possibly accommodating foreign amateurs visiting the UK are asked to write to Naoki Akiyama, JH1VRQ/N1CIX, International Programs Manager, ARRL HQ, 225 Main Street, Connecticut, USA 06111, giving details of their name, callsign, languages spoken and whether or not they are able to accommodate visitors. Their names will be added to the list, which will then be sent to participating societies. The Society has copies of the current list, which are available on receipt of an sae by the membership services department at headquarters and marked "ITHE".

President in the dark

Noel Eaton, president emeritus of the IARU, is seeking a copy of the book *Instruments of Darkness* for his personal library. Written by Alfred Price and published by MacDonald & James Publishers Ltd of London N1, the book deals with signals and radio countermeasures during and after the second world war, and Noel Eaton would be pleased to obtain a copy in any reasonable

condition. His address is N. B. Eaton, VE3CJ, Box 660, Waterdown, Ontario L0R 2HO, Canada.

Amateur radio aids USA disaster relief

The following news item was reported by ARRL:

"Tornadoes in Mississippi brought radio amateurs to the rescue on 21 April 1984. Bill Ford, Mississippi State Civil Defense Communications Officer, reported that local amateur radio operators were active at the State Emergency Management Agency, the State Civil Defense Office, the National Guard, Salvation Army and the Mississippi Baptist Convention Disaster Team.

"The tornado (sic) left 16 dead and around 100 injured. Damage was spread over a 10-county area in Northern Mississippi. Preliminary damage estimates reached over $20 million. Four counties were declared federal disaster areas. Water Valley was almost completely flattened.

"Ford said: 'From the standpoint of the Mississippi Emergency Management Agency, we could not have managed the disaster relief operations without the amateurs' support.'

"Dusty Perkins, public information officer for the Mississippi Emergency Management Agency, was at the emergency operations center when the tornado hit. All communications to and from the eoc were provided by the amateur radio service. Perkins said that 'the help from hams was critical —communications facilities were at a minimum. We had minor radio troubles here and there, and the hams really came through for us. I know that the state of Mississippi appreciates their efforts'."

Tornadoes are fortunately not a common feature of the meteorological scene in the UK, but the moral is clear: whether via organized groups such as Raynet or through the efforts of individuals, amateur radio has a good deal to offer to society at large, and the rewards, both in terms of satisfaction and the credibility of the hobby, are large.

Yeah, yeah, yeah

Merseyside Special Event Group will be operating GB0,1,2,6,4 and GB8BCL (Beatle City Liverpool) from midnight 1 December 1984 to midnight 31 December 1984 inclusive, to celebrate the opening of the Beatle City Museum in Liverpool. The station will be operational on all pre-WARC hf bands and all modes on 144 and 430MHz. QSL cards should go to G4VKV, c/o Beatle City, PO Box 12, Liverpool: UK amateurs should enclose an sae. European and other amateurs are asked to enclose two and three Ircs respectively.

Sidebands

W. J. Hunt Ltd of Sun Lane, Gravesend, Kent, have advised the Society that they stock many components from the RS Components range and can obtain others to order.

CERN, the European nuclear research establishment, is currently using energies of 450GeV (giga-electron-volts) in the Super Proton Synchrotron. One electron-volt is the amount of energy acquired by an electron passing from the negative end to the positive of a 1V battery—did someone say QRO?

The operators forming the Merseyside Special Event Group, L to r: Paul, G4UVB; Tony, G4SYW; Tony, G1DFQ; Phil G4KIN; Frank, G4YPD; Mike, G6ICR; Terry, (QSL manager) G4VKV; Mike, G4HSF; and Paul, G6PZW

Members may recall the recent successful crossing of the Atlantic in a balloon. The pilot was Mr Joseph W Kittinger of Florida, who is also licensed as N4HDP: however, it appears that he did not use amateur radio during the flight.

The Society's headquarters station GB3RS is now active on Oscar 10: nothing special about that, but cw contacts are made with the help of a morse key made in 1917. . . . VS6 and JA are best dx to date. That reminds us that we are looking for some 807s and 813s in good condition for part of an hf amplifier project. Any member with any redundant ones who would like a good home for them is asked to contact the membership services department. We would also like some bases for them, if anyone is feeling extra-generous!

Members are asked to note the long-standing convention that lsb is used below 14MHz, and usb on 14MHz and above. Some 3·5MHz band users prefer the use of usb, but not all equipment is designed to receive ssb signals other than in accordance with the convention.

The North-East Radio Communications Club of Newcastle has changed its title to Hazlerigg Amateur Radio Club. The secretary is G1HDV, tel 274 2413.

Raynet ties for Christmas. These navy-blue ties with Raynet emblem are obtainable from Mrs J. Balestrini, Merrivale, Willow Walk, Culverstone, Gravesend, Kent DA13 0QS, at a cost of £2.90; cheques to be made payable to Mrs Balestrini.

1985 VHF Convention. Mr L. Hawkyard, G5HD, is the trade exhibition organizer for this event, and all trade enquiries should be addressed to him QTHR, or tel 040 928 342.

Morse classes, beginners and advanced, are held every Monday throughout the year, commencing at 7.30pm, at the Rolls Royce Sports & Social Club, Barnoldswick. Details from L. Logan, G4ILG, 19 Fenton Avenue, Barnoldswick, Colne, Lancs BB8 6HB, tel 0282 812288.

Clive Ramsey, G8VZD, publicity officer of the East London RSGB Group writes: "Two years ago the East London RSGB Group was financially insolvent, had no committee and a falling attendance. However, over the last two years, the present committee, despite many problems, has managed to make the group financially secure, increase attendance, reduce the entrance fee and provide for a varied programme. Unfortunately, this year we have lost the valuable services of Sheila Gabriel, G3HCQ, who has moved out of the area. Further, the other committee members have examinations and domestic commitments this year and will be unable to stand again. Unless some fully committed people came forward at the September agm, the group may fold up. Will this long-established and respected group die as a result of apathy?"

Two new digital integrated circuits, a universal shift register and a binary counter, have been introduced by the Harris Microwave Semiconductor Co. The significance of these is that they are based on gallium arsenide technology: as a result they are capable of operation at about five times the speed of the fastest silicon-based ics of today. GaAsfets are relatively familiar to radio amateurs, who usually use them at somewhat lower frequencies than they were designed for because of their good noise performance, but it looks as though a new acronym, the GaAsic, will need to enter the language.

Rob Pohorence, N8RT, editor of the Kenwood and Icom newsletters, tells us he has up-to-date information ready to be published on most Kenwood and Icom products as the newsletters go into their sixth year of publication. If you own Kenwood or Icom equipment, the newsletters are a worthwhile investment. For free information on newsletters and nets, send a self-addressed envelope and appropriate ircs to Rob, at International Radio Inc, 364 Kilpatrick Avenue, Port St Lucie, Fl 33452, USA.

Report of the City & Guilds of London Institute on the May RAE

(Reproduced by authority of the C&GoLI)

STATISTICS

OVERALL RESULTS

Year	No of candidates completing exam	UK candidates qualifying for RAE certificate No	%
1982	8,176	5,478	67·0
1983	7,542	5,317	70·5
1984	5,922	3,928	66·3

COMPONENT RESULTS FOR THE MAY 1984 EXAMINATION

Component No	Name of component	No of candidates	Distinction %	Credit %	Pass %	Fail %
01	Licensing conditions and transmitter interference	5,615	11·7	33·8	31·1	23·3
			76·7%			
02	Operating practices, procedures and theory	5,583	9·5	25·1	38·5	26·9
			73·1%			

REPORTS ON MULTIPLE-CHOICE QUESTION PAPERS

PAPER 765-1-01

Syllabus topic or objective	No of items	Comments on performance of candidates
1. Licence conditions	23	Very well answered by most candidates. There was some confusion between the maximum carrier power and peak envelope power permitted by the licence. There continues to be misunderstanding of the licence requirements to prevent interference to wireless telegraphy. Many candidates thought that the licence requires apparatus to be maintained so that interference is not caused to audio equipment.
2. Transmitter interference	12	Questions on transmitter interference were also well done. The major areas of concern are the causes and cures of spurious emission. Less than 40 per cent of all candidates answered correctly a question on the use of a filter in the mains supply to a transmitter.

PAPER 765-1-02

Syllabus topic or objective	No of items	Comments on performance of candidates
1. Operating practices and procedures	5	Quite well done, but many candidates thought that the principal purpose of the Q-code was to save time on telephony.
2. Electrical theory	11	Questions on ac circuits were generally badly answered. In particular, almost half the candidates got wrong a simple calculation of current in a series resonant circuit. Also, the principles and application of a parallel (rejector) resonant circuit were not understood.
3. Solidstate devices	9	Generally well answered, although it was disappointing that many candidates did not recognize that the output of a common base amplifier offered a high impedance.
4. Radio receivers	9	Questions on receivers were well answered. Many candidates did not appreciate that while the local oscillator of a receiver for the 1·8MHz band may be either on the i.f. above or below the signal frequency, it would normally be on the i.f. + signal frequency in order to provide easier tracking of the ganged circuits.
5. Transmitters	9	Although several questions in this section were answered well, there were two which caused difficulty. Most candidates did not know the cause and cure of frequency chirp in a morse transmitter. There was also a lack of understanding of the difference between frequency and phase modulator circuits.
6. Propagation and aerials	10	Most questions were well answered. The only question badly answered related to the turns ratio of a transformer to match a 300Ω aerial to 75Ω. Most candidates did not know that the turns ratio is the square root of the impedance ratio.
7. Measurement	7	This section caused some difficulty among the less able candidates. Topics requiring attention include the measurement of ssb peak envelope power, the construction of dummy loads and the use of an oscilloscope to measure the depth of amplitude modulation.

Many candidates were well prepared for the examination and obtained high marks. Weakness in some sections of the syllabus tend to indicate a lack of understanding of some of the practical aspects of amateur radio. As explained in the Notes for Guidance in the Institute's syllabus booklet, practical work should be included in the tuition wherever possible.

Mobile Rallies Calendar

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

10 March
Northern ARS Association Exhibition & Mobile Rally. Central Hall, Belle Vue, Redgate Lane, Longsight, Manchester M12 4WH. Details from Mr G. Wood, G8NRF, QTHR.

10 March
Pontefract & DARS Components Fair. This rally is aimed at the home-constructor and d-i-y enthusiast. Traders are invited only to sell components, surplus equipment and antennas. No new black box type equipment is allowed. Open 11am–4.30pm, at the Carleton Community Centre, Pontefract, on the A1 between Darlington and Pontefract. Details from G4ISU or G4KMW, both QTHR, tel 0977 792784 or 792654.

24 March
White Rose Rally, The University of Leeds. Details from Alan Bramley, G4NDU, QTHR, or Box 73, Leeds LS1 5AR.

21 April
Lough Erne ARC Mobile Rally. Killyherten Hotel, Enniskillen. Further details from Cliff Corderoy, GI4CZW, tel 0365 24500.

12 May
Swindon Radio & Electronics Rally. Oakfield School, Marlowe Avenue, Swindon, Wilts. Open 10.30am. Talk-in on 144MHz (S22) and 432MHz (SU8/GB3TD). Refreshments, ample parking, cartoons, many other attractions. For further details contact Ken Saunders, G8SFM, QTHR, tel 066689 307.

19 May
Northern Mobile Rally. Great Yorkshire Showground, Wetherby Road, Harrogate. Open 11am. There will be refreshments, bar, bring & buy, and over 90 trade and club stands. There is a caravan site at the showground. Details from H. Moore, 269 Leeds Road, Ilkley, West Yorks LS29 8LL.

26 May
East Suffolk Wireless Revival. More details later. Further information from Jack Tootill, G4IFF, QTHR, tel Ipswich (0473) 44047.

26 May
Maidstone YMCA ARS Biennial Mobile Rally. Y Sports Centre, Melrose Close, Cripple Street, Maidstone. Details to follow later.

2 June
Spalding & DARS Mobile Rally. Talk-in from 10am. Details from Betty Whitley, G4ZGT, 45 Exeter Drive, Spalding, Lincs.

9 June
Elvaston Castle Mobile Rally, Elvaston Castle Country Park, 5 miles south-east of Derby on the B5010. Organized by the Nunsfield House ARG. Open 10am. Talk-in will be provided by GB2ECR on both 144 and 432MHz. All the usual facilities including bring & buy sale and flea market. Full on-site catering facilities. Further details from John Robson, G4PZY, QTHR, tel Derby (0332) 767994, or Ian Cage, G4CTZ, QTHR, tel Derby (0332) 799452. Trade enquiries to Mr R. Woolley, G4HIJ, tel Ashbourne 43241.

30 June
Buxton Mobile Rally. Pavilion Gardens, Buxton. This will now be an annual event, due to the overwhelming success of the 1984 event. Details from Dave Cooper, G6MIF, QTHR, tel 0298 6174.

28 July
Scarborough ARS Rally. The Spa, Scarborough. Open 11am. Talk-in on 144MHz (S22), 432MHz (SU8), and RB0, GB3NY. Further details from sec Norman Lill, G4YWR, QTHR, ex-G6CXK, tel 0723 360587.

25 August
18th Preston Annual Rally, to be held at Lancaster University. Details to follow.

OBITUARIES

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

Mr S. Bradford, G3HLI
Sam Bradford died on 12 September. In his youth he was very active on top band and contributed a great deal to amateur radio in the Coventry area. He was always ready to give advice to newcomers to the hobby. He retained his interest in amateur radio until his death.

Mr A. Bucknall, G8BLZ
Allan (Buck) Bucknall died on 16 August. He was a staunch member of the Stoke-on-Trent ARS, and was active on 144 and 432MHz and 1·3GHz. His great love was atv on 432MHz, using mainly homebrew equipment. He was one of the originators of the 24cm fm atv repeater, GB3UD, and had hoped to be one of the first to operate through it.

Mr J. W. Conway, RS36193
Mr Conway died in December 1983. Although he had passed the RAE he never got around to obtaining his licence. He was, however, a keen listener, and gained years of pleasure as a member of the RSGB.

Mr H. Griffiths, G2DFH
Harry Griffiths died on 22 July, aged 71. His friendly manner and droll humour made him a popular character, both on the air and at club events and rallies throughout the southwest. His career as a professional radio operator included

service with a special communications unit during the second world war. In amateur radio his great love was for hf cw, although he was also active on lower frequency ssb and 144MHz fm in recent years. He was a founder-member and past-president of the Saltash & DARC, and a past-president of the Plymouth RC.

Mr J. Gordge, G3HRJ

Mr John Gordge died on 13 October 1984, aged 87. He worked for many years as missionary in Madagascar before losing his eyesight. He was fiercely independent, and his spirit and great faith was an inspiration to all. As a respected and much loved member of RAIBC.

Dr R. Nathan, G4IYY

Ranga Nathan died on 12 September. He was a gifted physicist, who was involved in post-doctorate research at Calgary (Alberta) and Southampton Universities until he was appointed to the Physics department of Brockenhurst College in 1976. He was also instrumental in setting up the 'A' level electronics course, and introduced amateur radio to the college. He had a keen personal interest in amateur radio, electronics and computing, and was a valued member of the Lymington & DARS.

Mr R. H. Newham, CBE, G3SU

Ron Newham died on 7 September. He was licensed in the 'thirties, and for many years was known worldwide as a fine cw operator. In recent years his duties as a director of EMI Electronics Ltd limited his activity, although sadly he was about to retire and was looking forward to considerable activity on the air.

Mr A. Nuttall, G8ZPR

Alan Nuttall died on 4 October. He encouraged his son Graham, G8XRS, to obtain his licence, and he followed suit as G8ZPR. He could be heard on 144MHz, frequently working portable from the Gloucestershire hills. His principal interest was in construction, and he had just completed a 432MHz transceiver from a kit. All his antennas were home-constructed. He was an active member of CARA.

Mr B. Randell, OBE, GM3ALE

Bernard Randell died on 23 August, aged 62. For some years he operated XE1RV in Mexico City. A brilliant technician, he dealt with solidstate equipment for electric induction furnaces up to 1,000kW, but at comparatively low frequencies. His largest one was 1,000kW at 600Hz, and the highest frequency one (for induction heating rather than melting) was 100kW at 100kHz. He returned to the UK in 1983. He was the first president of the Grafton RS.

Mr D. F. Shaw, G3JIB

Don Shaw, a well-known dx hunter, died on 8 August, aged 49. He started in amateur radio as an swl when still a teenager, and acquired his licence in 1952. For many of his earlier years he was a keen supporter of the Manchester & DARS.

Mr J. Simpson, G4JS

Joseph Simpson died on 6 October. He was a founder member of the East Lancs club and held the offices of secretary and chairman. He was also the founder and chapter head of the "Pendle Witch" chapter of Ten-Ten International, and holder of the 1000 plaque and many "firsts"—one of which was for being the first guest operator to receive a certificate from W6RO, the "Queen Mary" club station of Associated Radio Amateurs, Long Beach, California.

Mr R. F. Smith, G8UNG

Ron Smith died on 27 September. His main interest was in construction and model making. He was a member of the Newquay & DARS and active on vhf until his death.

Mr R. Wellenkamp, G1DCD

Rolf Wellenkamp died on 10 September. He spent many years in the radio and television trade and in industrial electronics. His main interests were 144MHz mobile, ssb and rtty, for which all his equipment was home-built. He was studying for his "A" licence and had many friends on the air.

Lt Col A. B. Whatman, MBE, MA, CEng, FIEE, FTLGS, G2BQ

"Brownie" Whatman died on 4 October 1984, aged 74. He was licensed as G6BW in 1927, and having allowed his licence to lapse before the second world war, he was relicensed as G2BQ. In 1929 he was commissioned into the Royal Corps of Signals and retired from the Army after a distinguished career in 1952. He then worked with Rediffusion Ltd, and he finally retired to Brockenhurst where he was chairman of the Lymington Radio Group.

COUNCIL PROCEEDINGS

A brief report of the Council meeting held on 28 July 1984

Present:

(Members of Council) Messrs R. G. Barrett (President, in the chair), J. T. Barnes, Dr D. S. Evans, Messrs F. D. Hall, L. N. G. Hawkyard, H. M. Holmden, G. R. Jessop, T. I. Lundegard, W. J. McClintock, B. O'Brien, H. S. Pinchin, D. M. Pratt, G. R. Smith, K. E. V. Willis.

(Committee chairmen/deputies during consideration of their respective committee's report.) Messrs M. Shardlow, member, Education Committee; R. L. Glaisher, chairman, HF Contests Committee; P. G. Murchie, chairman, Microwave Committee; G. A. Griffiths, chairman, Raynet Committee; M. Dennison, chairman, Repeater Management Group; Miss S. Gabriel, vice-chairman, EMC Committee; Messrs R. G. Flavell, chairman, Propagation Studies Committee; J. H. Quarmby, chairman, VHF Contests Committee; M. J. Atherton, member, HF Committee; N. O. Miller, chairman, Exhibition & Rally Committee; M. S. Appleby, chairman, VHF Committee, and member, IARU Committee.

(Members of staff) Messrs D. A. Evans, secretary/general manager; A. W. Hutchinson, editor; Ms H. M. Norman, minutes secretary.

The President welcomed Mr Barnes to the meeting.

Apologies were received from Messrs Baptiste, Cornish and Thomas. A telephoned message of apology for non-attendance was received from Mrs Heathershaw during the meeting.

Council minutes

Concern over the late receipt of Council minutes was expressed. After discussion it was proposed, seconded and agreed unamimously that Council minutes should be received by Council members within 14 calendar days of the meeting, unless exceptional circumstances prevailed (eg staff holidays, sickness etc).

Reduced and waived subscriptions

In reply to a question from Mr Holmden, the secretary confirmed that those members listed as reduced and waived subscribers had satisfied the conditions previously laid down by Council. Council had voted at its meeting held on 22 March 1984 to maintain this procedure, pending recommendations from the Finance & Staff Committee.

An informal approach had been made to the Society's solicitors, and this matter could only be formalized after Council had made a decision with regard to the recommendations from the Finance & Staff Committee. These recommendations were to be tabled at the next meeting of Council on 11 August.

Reports from chairmen

The chairmen or deputies of the committees listed above were invited, in turn, to join the meeting and were asked by the President to give a brief summary of their reports, which had been previously circulated to Council. Following this, Council was invited to comment or ask questions relating to the work of the committee.

Following the committee reports, Dr Evans said he felt that the exercise had been both interesting and useful. He noted the absence of committee objectives in a number of the reports, and added that Council should insist on the presence of the chairman, rather than a deputy, in future.

The President commented that the Society was fortunate to have such dedicated people running its committees.

1985 President

Mr Holmden proposed that the question of the 1985 President be discussed next, as some Council members might not be present at the next meeting. Mr Lundegard seconded this proposal. The President assured Council that it was an item on the supplementary agenda for 11 August, and he would prefer that the executive vice-President was present during the discussion.

The ensuing show of hands indicated six were in favour of discussing the matter next, four were against and one abstained.

The President stressed his reluctance to continue the discussion as the executive vice-President had not been formally asked if she was willing to be elected President for 1985, and because the matter of the 1985 Presidency was not on the agenda for this meeting.

Mr Holmden asked if there were any other proposals for the appointment. Mr Smith proposed Mr Lundegard; this was seconded by Mr Holmden, and Mr Lundegard left the room.

Considerable debate ensued on the method of voting to be employed to cater for those who were unable to be present at the meeting on 11 August. Mr Willis proposed that this be conducted by a postal vote after the next meeting, where there would be an opportunity for discussion on the candidates; this was seconded by Mr Holmden.

Mr Evans had doubts as to whether a postal ballot was in order under the Articles of Association, but he would obtain legal advice and write to Council. All absent Council members would be informed of this discussion prior to 11 August.

A brief report of the Council meeting held on 11 August 1984

Present: Messrs R. G. Barrett (President, in the chair), D. E. Baptiste, CBE, Dr D. S. Evans, Messrs F. D. Hall, L. N. G. Hawkyard, Mrs J. Heathershaw, Messrs H. M. Holmden, G. R. Jessop, T. I. Lundegard, W. J. McClintock, B. O'Brien, H. S. Pinchin, D. M. Pratt, G. R. Smith, D. M. Thomas, K. E. V. Willis (members of Council), Mr D. A. Evans (secretary/general manager), Ms H. M. Norman (minutes secretary).

Apologies for absence were received from Messrs Barnes, Cornish and Hutchinson.

Prior to the secretary's report, Mr Jessop thanked him for the prompt distribution of the minutes of 28 July meeting. Mr Jessop then referred to the issues of waived and reduced subscriptions being raised by Mr Holmden. He appealed to Mr Holmden to bear in mind that the points he had made had been noted, action was being taken and there was little use in repeating his objections.

There was general agreement with this sentiment.

Secretary's report

The secretary said that he was pleased to report that for the seventh year running, RSGB membership had again increased; the increase during the year ended 30 June 1984 had been 6·73 per cent. He was budgeting for a five per cent increase in the next financial year, though this could be a little optimistic. He considered that the increase in membership due to the cb boom was now over, and inevitably the increase in members' fees would take its toll.

In reply to a question from Mr Smith, the secretary said that in his view some of today's newly-licensed amateurs had a less immediate view of the national Society. As such, the proportion of licensed amateurs as members was bound to fall. Mrs Heathershaw added that the Membership & Representation Committee was also aware of the problems of membership, which was similar to the problem faced by many local clubs.

Commenting on book sales during the financial year to 30 June 1984, Mr Evans reported that there had been a five per cent increase in value terms. He had noted a change in the pattern of sales and he was at present doing an analysis in order to establish the latest position.

The secretary read a letter from the DTI which related to spectrum abuse, and he invited comment from Council as a means of progressing this matter. The contents of the letter were welcomed and prompted a discussion on the expulsion from RSGB of amateurs who had been prosecuted for contravening the Wireless Telegraphy Act.

Other matters under discussion with the DTI included: demonstration licence, unattended df transmitters, beacons and repeaters, Raynet, Class B stations using cw, licence schedule, common licensing, international greetings messages, licence documentation, special research permits, and 50MHz operation.

The secretary said that he had received during

the previous week the 50MHz questionnaires from the vhf manager. There was quite a bit of work to be done at HQ to get them into the format agreed with the DTI. The secretary added that he had responded to the Green Paper on 50MHz, restating the interest in this part of the spectrum by UK radio amateurs.

Reports from chairmen
Mr O'Brien, chairman of the Finance & Staff Committee, outlined his report, and gave further details of the committee's current projects.

Mr Pratt, chairman of the Licensing Advisory Committee, introduced his report and answered various questions arising therefrom.

Mr Pinchin, chairman of the Membership & Representation Committee, outlined his report, noted some additions since the report was written in preparation for the 28 July meeting, and then responded to several questions.

Dr Evans, chairman, Technical & Publications Committee, invited questions arising from his report.

Dr Evans raised the subject of payment to Council members writing articles and books for the Society. It had been a condition of the Company Acts that if the Society did not wish to have "Limited" in its title, then a consequence was that Council members could not be paid. However, the legal position had since changed and the Society's solicitor could see no real difficulties in resolving the problem should Council wish to change the Society's Memorandum.

There was general agreement that members of Council should be paid for their contributions to *Radio Communication* and other Society publications.

The secretary said that as Council had now agreed to proceed with this matter, he would contact the solicitors with a view to requesting an amendment to the Memorandum at the time of the next annual general meeting. Council would be asked to vote on this at its next meeting, having seen the advice obtained from the solicitors.

Recommendations from committees
Finance & Staff
"Reduced subscriptions—that the existing subscription reduction should be allowed to members over state pension retirement age with at least one year's membership. This would be subject to a specific request from the member and a declaration of his/her age and that he/she had retired from full-time employment. This change would reduce the present 15 years' service qualification for a reduced subscription to one year and could be effective from 1 January 1985 if approved."

It was unanimously agreed to amend the membership qualification period from one year to five years. There was some debate as to whether the age of 60 rather than the state pension age, should be specified. A vote was taken, showing 14 in favour of the existing wording and two in favour of specifying the age. The secretary would instruct the solicitors to proceed with a suitable amendment to Article 22.

"Waived subscriptions—that subscriptions should not be waived due to blindness or disability until after one year's membership. Each case would be subject to a specific claim for waiving of subscription and would be reviewed every three years (present waiving is for life). The disability, other than blindness, must be such that the member is unable to obtain or follow full-time employment while under state pension retirement age."

Some consideration was given to altering the length of membership from one to five years after which a waived subscription could be granted, but it was agreed that this would go against the charitable nature of waived subscriptions. The wording of the recommendation was amended as follows:
"That subscriptions of home corporate members may be waived due to blindness or disability after one year's membership. Each case. . ." etc.

It was noted that both reduced and waived subscriptions applied only to UK (home corporate) members and ex-patriates.

The secretary would consult the Society's solicitors, who were currently working on the wording of Article 22. Meanwhile all applications for waived subscriptions were being held in abeyance until after the date of the agm, at the request of Council.

Licensing Advisory Committee
"That Mr R.J. Osborne, MBE, G4FJN, be invited to serve the Society as organizer of the Amateur Radio Observation Service with immediate effect." This recommendation was carried unanimously.

HF
A recommendation regarding the appointment of chairman of this committee was noted. It was deferred to the next meeting of Council, pending consideration by the Forward Planning Group.

Membership and representation
The granting of reduced subscriptions in respect of a further 11 members was notifed.

The granting of affiliation to the following societies/clubs was noted:
Armagh & Dungannon DARC;
British Telecommunications Research Staff Club Radio Section, Maidenhead;
Buchan ARC, Aberdeenshire;
BUX DX Radio Club, Buxton;
Carlisle & DARS;
Crawley Repeater Group;
Darenth Valley RS, Kent;
Eastbourne Electronics Club;
Forfar & DARC;
Hillingdon ARC;
Houghton-le-Spring ARC, Tyne & Wear;
Loch Lomond ARC;
Maesteg ARC, Mid-Glamorgan;
Methodist College Belfast Radio Club;
Motorola ARC, Basingstoke;
North East Radio & Communications Club, Newcastle;
Pembroke & DARC;
Porthmadoc & DARS;
Rochford DRC, Essex;
Scout Association, Gilwell Park;
Severn Valley RS, Bridgnorth;
Sidmouth & DARC, Devon;
69 (NIH) Signal Squadron ARC, BFPO 807;
Solihull Contest Group;
South Belfast VHF Contest Group;
308 ARC, Surbiton;
Trowbridge & DARC, Wilts;
Welland Valley ARS, Leics;
Wigston ARC, Leicester;
Worksop ARS.

Council noted the appointment of the following regional and area representatives:
Region 3 — Mr Glen Ross, G8MWR
Region 13 — Mr Drew Givens, GM3YOR
Region 19 — Mr Ron Broadbent, G3AAJ

1985 President
Mr Lundegard was proposed by Mr Smith and seconded by Mr Holmden.

Mrs Heathershaw was proposed by Mr Pinchin and seconded by Mr O'Brien.

Both nominees withdrew from the meeting.

A ballot followed, and the two candidates were invited to re-join the meeting. The President announced that Mrs Heathershaw had been elected as President for 1985.

Reconstruction of the Technical & Publications Committee
Mr Lundegard expanded the proposals contained in his paper, voicing concern that the Society's publications were not being up-dated systematically.

Dr Evans felt that there was a need to integrate the work done on *Radio Communication* and books, rather than dispersing the effort. He gave an assurance that there should be a great improvement in the books situation within the next 12 months. It was expected that the recruitment of a book editor would also result in some of his efforts being available for technical writing on specific required topics.

After further discussion it was agreed that the secretary, in conjunction with Dr Evans and Mr Jessop, would discuss the possibility of outside assistance.

Reports from spectrum managers
The written reports from each spectrum manager were noted.

It was felt desirable that spectrum managers be requested to give an annual report to Council in conjunction with those from committee chairmen, in addition to their regular reports submitted at each Council meeting.

EMC rating of current-production television receivers
Mr Hawkyard spoke of a Consumers' Association report on emc rating of tv receivers being co-ordinated via a working party of the Society's EMC Committee. He requested Council's agreement to proceed with this project, and for the EMC Committee to be granted facilities to carry out the required tests.

The secretary referred to headquarters involvement, mentioning correspondence between himself, G3HLF and G3HCQ, copies of which he would send to Mr Hawkyard. Council noted that the HF and Technical & Publications committees also wished to be involved with this project. The secretary added that he was currently drafting a letter to the DTI with regard to their powers permitted by the amendments to the WT Act.

Council asked the secretary and Mr Hawkyard to continue to co-ordinate this important work.

Contests with affiliated societies
A debate took place on the question of allowing non-RSGB members to operate affiliated club stations during Society contests. Mr McClintock, speaking as one of the log checkers, said he was not prepared to devote his time for a non-member.

In the vote which followed, nine were in favour of maintaining the present rules (thereby excluding non-members from competing), three being against and one abstaining.

The secretary would write to the two contest committees' chairmen reporting the views of Council and drawing attention to two suggestions arising from the discussion: (i) that a non-member be allowed to operate under the supervision of a member; and (ii) consideration be given to organizing an affiliated society contest on vhf.

Forward Planning Group
It was agreed to change the name of the Forward Planning Group to the Presidential Advisory Group. Corrected minutes of all future meetings were to be circulated to Council members.

A brief report of the Council meeting held on 20 September 1984

Present: Mrs J. Heathershaw (executive vice-President, in the chair), Messrs D. E. Baptiste, CBE, J. T. Barnes, P. F. D. Cornish, Dr D. S. Evans, Messrs F. D. Hall, L. N. G. Hawkyard, H. M. Holmden, G. R. Jessop, T. I. Lundegard, B. O'Brien, H. S. Pinchin, K. E. S. Willis (members of Council), D. A. Evans (secretary/general manager), A. W. Hutchinson (editor), Ms H. M. Norman (minutes secretary).

Apologies for absence were received from the President and Messrs Pratt and Smith.

Before commencing with the next agenda item, Mrs Heathershaw said it was her pleasure to present Mr Baptiste with a Presidential plaque and Honorary Vice-President's certificate. These items were warmly accepted by Mr Baptiste.

Postal ballot
Mr Evans reported that investigation had revealed that this could be achieved only if the Articles of Association were changed.

It was agreed that this was no longer appropriate and that no further action was needed.

HF Committee chairman
Mrs Heathershaw reported that the President had contacted members of the HF Committee, and then the Presidential Advisory Group, who had recommended that Mr Atherton, G3ZAY, be appointed chairman. There were no objections.

Honorary treasurer's report
Mr Cornish presented the accounts to 30 June 1984 and highlighted some of the figures therein, explaining their significance and drawing attention to their breakdown as shown in the accompanying analysis documents. He then invited questions.

Mr Hawkyard raised the question of Society exhibitions being attributed to the Exhibition & Rally Committee. In reply, the secretary stated that the figures for NEC '84 had only recently been finalized and he had had discussions with Mr Miller, G3MVV, and a budget for next year's event had been produced. Mr O'Brien added that this was an area for further discussion within the Finance & Staff and Exhibition & Rally committees. The overall expenses for events such as NEC at present included expenses incurrred by people attending on behalf of other committees.

The increase in the cost of *Radio Communication* was noted, and Mr Baptiste pointed out that this was the effect of last year's decision by Council to enhance the journal and other membership services, the benefits of which were as yet not necessarily apparent.

The secretary spoke of the difficulties in the detailed allocation of monies. He commented that if the Society operated a purchase ledger on its dp equipment then the exercise of cost centres and better analysis of expenditure would be a far easier task. However, the policy for the dp equipment, indeed its inception, had been to use it primarily for those tasks which involved the membership directly. Later it would be possible to bring the detailed analysis of purchases within the scope of the dp equipment. This was intended as part of the planned growth of the administration.

Mr Cornish put forward the idea of levying a charge of Raynet members. Mrs Heathershaw said this had been considered in the past but there were objections to being charged for a voluntary service. This would be considered by the Finance & Staff Committee.

(At this juncture the agenda item "EMC Committee" was brought forward, Mr Hawkyard said he had to leave the meeting in a few minutes and he wished to raise the matter of the EMC Committee testing of tv sets and also the appointment of an EMC Committee chairman.)

EMC Committee

Mr Hawkyard commented that he had recently spoken with Mr Greenwell, G3AEZ, who had said that the testing of tv sets was progressing well.

It was noted that the EMC Committee had not put in a formal recommendation regarding the chairmanship, but that the President was continuing with his informal enquiries among the members of the committee, results of which would be awaited before proceeding further.

(Messrs Hawkyard and Jessop left the meeting at this point.)

Dr Evans said that at present the number of pages of technical articles in *Radio Communication* which supplied material for subsequent publications was having to be curtailed. There was concern that the journal was becoming overloaded by regular features, and the Editorial Board and the Technical & Publications Committee were currently looking closely at the balance of the content.

Mr O'Brien circulated a diagram which he had produced in relation to income and expenditure at the request of Mr Jessop. He added that he saw next year as one for consolidation, constraint and co-operation.

There was some further discussion of the Society's accounting system in general.

Mr Hall then proposed approval of the accounts to 30 June 1984. This was seconded by Mr Willis and carried unanimously. It was proposed and resolved that the accounts be signed on behalf of Council by the President and the honorary treasurer. Appreciation was expressed to the treasurer for the considerable amount of work he had undertaken in the preparation and presentation of the accounts.

Mr Cornish said that the accounts would be finalized at a meeting with the auditors to be held within the next few days. He then referred to the 1984-5 budget which had been provisionally considered; he hoped to circulate the figures to Council shortly.

Mr Cornish added that it had been his intention to retire from the position of honorary treasurer at the end of 1984. However, he had been unable to find a successor and would, subject to Council's wishes, remain until the end of 1985. This offer was accepted with appreciation.

Mr Willis asked if there was any action which could be taken in order to minimize any predicted deficit. Mr Cornish replied that one area to explore was a reduction in committee expenses; other areas were being considered by the Finance & Staff Committee and headquarters staff. Mr O'Brien said that, subject to further consideration by the Finance & Staff Committee, he would be recommending committees to cut down one meeting per year and urging them to exercise restraint in the coming year.

Recommendations from committees

HF Committee

"That the award of the Rotab Trophy for 1984 be made to Mr D Gibson, GI3OQR." This was approved unanimously.

HF Contests Committee

"That the following awards be made in respect of the 1984 Commonwealth Contest:

Senior Rose Bowl ...	...Mr N. Hoyow, 6Y5HN
Junior Rose Bowl ...	...Mr J. Roberts, VE3IY
Col Thomas Rose Bowl	...Mr A. Slater, G3FXB
Receiving Rose Bowl...	...Mr E. Trebilcock, BCRS195"

This was approved unanimously.

VHF Contests Committee

"That the VHF Contests Committee Cup be awarded to the Hillbillies Group, G4HWA/P, as overall winner of the 1,296MHz Trophy Contest held in June 1984." This was approved unanimously.

VHF Contests Committee

"That the 1951 Council Cup be awarded to the Parallel Lines Contest Group, as overall winners of the 432MHz Contest held in June 1984." This was approved unanimously.

Membership and representation

Mr Holmden objected to the wording at the head of the list of reduced subscriptions in the supplementary agenda, which stated that they had been granted.

Mr Evans explained that this was correct—reduced subscriptions having been granted to those who complied with the conditions previously laid down by Council.

Reduced subscriptions in respect of six members were noted.

Dr Evans formally proposed acceptance of all outstanding applications for waived subscriptions, following agreement of a suitable amendment to the Articles of Association. Mr Baptiste seconded this proposal.

In the vote which followed, seven were in favour of acceptance, Mr Holmden was against, and two abstained.

Mr O'Brien expressed his disappointment, saying that there had been complaints at the delays caused by Mr Holmden's actions, which would also lead to administrative problems at headquarters.

Messrs Pinchin and Baptiste echoed this concern, saying that a lot of people were being upset by Mr Holmden's continued veto.

Mr Holmden repeated his view that Council had deliberately violated the Articles of Association.

The appointments of the following area representatives were noted:

R. M. Grant, GM4DQJ	Perth
J. O. Hopwood, G6CWK ...	Stratford-on-Avon
G. R. Morris, GW1ATZ	Chester
K. A. Saunders, G8SFM	Swindon
D. S. Smith, G4DAX ...	Scarborough & Whitby
M. J. Valentine, G4ANP	Mexborough & district

Spectrum managers

Mr Fisher was unable to attend the meeting and had submitted some remarks in response to a paper by Mr Jessop. He urged Council to bear in mind the international liaison aspect of this appointment, which needed continuity and experience.

Dr Evans felt that the system of spectrum managers should not be totally dependent on one volunteer, and he spoke of the virtue of having an experienced person one step removed from the daily running of the spectrum committee, who could keep an eye on the international scene. He added that the introduction of spectrum managers had been a positive step forward.

Dr Allaway joined the meeting at this point. He said that he found his roles as Region 1 secretary and hf manager complementary.

Dr Evans felt that deputies should be gradually trained, by attending international conferences for example, as happened at Cefalu in April, and this should be an on-going training, not a sudden replacement.

After further consideration it was generally accepted that spectrum managers should have some form of back-up and that this should be left to the individual spectrum manager to arrange.

Dr Allaway withdrew from the meeting.

It was proposed, seconded and agreed unanimously, that Dr Allaway continue as hf manager.

Dr Allaway returned to the meeting, and Mrs Heathershaw said that Council was grateful for his offer to continue in office. Dr Allaway thanked Council, and took the opportunity to express his gratitude for the waiving of his subscription as a past-President of the Society.

Dr Allaway then left the meeting.

Mr Willis commented that all spectrum managers appeared to have given sterling service and that the system seemed to be working well.

Consideration was then given to the post of vhf manager and it was noted that the VHF Committee had been unable to recommend an alternative representative at this time. Mr Baptiste pointed out that Mr Fisher was experienced and effective on the international side, and he suggested that he be allowed to continue but to groom a deputy who could take over in, say, a year's time.

It was agreed that the President/Presidential Advisory Group would approach the VHF Committee to suggest someone who could fill this role.

The microwave manager's appointment was confirmed, and it was noted that Dr Evans had adequate deputies.

The reports of spectrum managers were noted.

IARU proposal 179

Council unanimously agreed to register a vote of "aye" in respect of the following IARU appointments:

Mr R. L. Baldwin, W1RU, ...	President
Mr C. L. Smith, W0BWJ	Vice-President

Amendments to Articles of Association

Documents from solicitor

Mr Evans had circulated a document entitled "Opinion", received from the solicitors on the previous day. It was noted that counsel had put forward suggestions on various items but it was proposed to deal only with those of immediate priority.

1. Payments to authors

An extended discussion ensued on the suggested re-wording of Clause 4 of the Articles, to include Council members.

There was much debate over the risk of creating a loop-hole for other services provided by Council members. To avoid this, Mr Hall proposed the deletion of the phrase which referred to other services rendered to the Society.

Acceptance of the following wording was proposed, seconded, and carried by six votes to two:

"The income and property of the Society shall be applied exclusively in the promotion of the foregoing objects, and no dividend shall be paid to its members or any of them; but these restrictions shall not prevent the payment to any member (including any member of the Council of the Society) of interest on money lent, or rent for premises leased by him or her to the Society, nor the payment of appropriate fees or other remuneration for original literary or other material accepted by the Society for publication or inclusion in any of its publications."

2. Waived subscriptions

Acceptance of the following wording in Article 22 was proposed, seconded and approved without objection:

"Not withstanding anything in these Articles the Council shall have the power to specify from time to time, classes of members, or applicants for membership any individual members or for whom payment of the full subscription would in the opinion of Council be unduly burdensome and to resolve that those so specified shall be liable either indefinitely, or for such period as the Council may prescribe, to pay only a reduced or no subscription, and from time to time to vary the amount of the reduction in the case of any member or classes of members as the Council may think fit.

It was noted that this would give Council the power to impose certain restrictions as and when agreed. Such restrictions would be covered in a narrative for the guidance of the membership prior to the annual general meeting.

3. Trust fund

The secretary read counsel's opinion with regard to Article 89. This suggested that it was not possible under Article 25(2) for the Society to transfer money into a trust fund.

Mr Evans would contact the solicitors to clarify the situation where money was left for a specified purpose.

The secretary would progress items 1 and 2 above and seek further advice on the wording now agreed. He would advise Council by post of the final wording which would be put to the membership at an extraordinary general meeting to be held on the same day as the annual general meeting.

Members' Mailbag

THE EDITOR,
RADIO COMMUNICATION,
88 BROOMFIELD ROAD,
CHELMSFORD, ESSEX
CM1 1SS

MORE ON FORMULAS

Sir—Reference the transmission line formulas correspondence (June and September issues), I think the following additional points may be useful:

1 The interpretation remains confused by the incorrect notation of tanh as tan h, the latter implying circular measure with h as one of the line parameters.
2 The errors and incorrect notation in the *VHF/UHF Manual* are identical to those in the equally excellent *Radio Data Reference Book*, and conceivably result from a block reproduction of a printing error.
3 Somewhere along the line, gremlins have been at work on G4FUN's explanatory equation, which should read:

$$\tanh x = \frac{\sinh x}{\cosh x} = \frac{e^{x} - e^{-x}}{e^{x} + e^{-x}}$$

4 G8UYZ should find complete tables of hyperbolic functions in a textbook from his local library and thus save himself much unnecessary calculation, but if he is unlucky, I would be pleased to photostat some (free) copies!

Frank Rose, G2FHV

RTTY—WRU?

Sir—As a newcomer to rtty, I am puzzled by one aspect of the mode, upon which someone may like to comment. Being an inveterate "rag-chewer" of over 30 years standing on cw, I don't really mind if the station at the other end is "down the road" or in some much more exotic location, as long as he is not a rubber stamp merchant! If dx is there and hears me, well and good; if not, I just go off and work someone else.

I have looked forward to rtty as an extension of this activity, assuming that lots of operators would use their keyboards in a similar way; indeed, in my limited experience of a few weeks the contacts I *have* had (UK and European) have in most cases been very enjoyable, with not much "rubber" showing.

But—where are all the UK rtty ragchewers on hf? There must be several hundred Class A licensees with rtty facilities . . . are all of these chasing dx on 14MHz or vhf/uhf (which I do not wish to use)?

At a time when 3·5MHz cw is bustling with activity, and I could have any number of chatty inter-UK QSOs, I am lucky to hear anyone on the 3·5MHz rtty section, and repeated "CQs" either have no effect, or may pull in one curious station after several attempts! I cannot believe that of all the people on rtty, there are no others like myself, who, although rather slow "pick 'n poke' typists, really enjoy a chat and a chance to improve their keyboard skills. If there are, where are they? I have worked more G and GM stations on 14 than 3·5MHz.

Please help to prove me wrong!

T. Hall, GM3HBT

STANDARDS

Sir—Over the last two decades the standard of operating on the amateur bands has steadily declined. For those of us who have been introduced to the disciplines of commercial and military communications training, and those who benefited from the example set by the pre- and immediate post-second world war radio amateurs, the present operating techniques experienced on the amateur bands in the UK leave a lot to be desired. The degradation of usage has manifested itself in many ways. While the ill-mannered and uncouth anti-establishment element can be observed daily, the more discerning operators gradually swell the ranks of the silent listening majority. Shades of 144MHz.

One wonders whether the RAE classes should place more emphasis on operating procedures and recommended practices. As each crop of new callsigns comes on the bands, it becomes increasingly obvious that they are using the bad example set by others as a standard for their own operating. The perpetuation of mediocrity is a down-going curve.

A thought that I have expressed on numerous occasions, as related to my own start in amateur radio of 25W cw for only 12 months, is that permission for class B licensees to be permitted cw operation, in particular on 144MHz, could be a way of encouragement of proficiency in the attainment of the "A" licence.

I do not consider the advocation of a novice licence as a method or medium which would increase the quality of operating. I strongly suspect that the novice lobby is pandering to the lowest common denominator and is allied to the aspirations of the cb lobby to facilitate access to the world of amateur radio by the back-door, easy-way-in method. For those with the initiative, whether young or old, the RAE certificate can be attained. Existing licence holders are living proof that it can be done, if the mind is put to it. Mark you, if RSGB members wish to close the gap between what we know as amateur radio and what can be overheard on cb, then vote for a novice licence.

This letter being submitted in the hope that the Society will increase its emphasis toward encouragement to achieve much higher operating standards.

E. Briggs, G3IJU

With regard to the use of cw by Class B licensees on bands permitted in the schedule to the Class B licence, the Society expects to receive further news from the DTI shortly.

PACKET RADIO

Sir—I should like to record that packet radio transmissions were undertaken by myself (G6IPN) and G3WRI on 19 January 1984 on the 144MHz band via AMTEXT software running on BBC 32k microcomputers.

The protocols employed were experimental but included sync byte, station address formats, variable text window, error check and end of text byte.

The AMTEXT (Radio Amateur Microprocessor based Terminal for Experimentation in the Transmission of Text) software was developed by Paul Brown, G3WRI, from his research-based experimental data communications system entitled "The Adaptive Microcomputer based Terminal for Experimentation in the Transmission of Text".

A packet radio simulation was further demonstrated to the members of the Westmorland RS on 13 March 1984 by G3WRI, Norrie Stanley, G3UEC, and myself, again on the 144MHz band.

M. D. Davies, G6IPN

Any more claimants? Interest in this new mode is certainly increasing rapidly and the RSGB Packet Radio Working Group continues to look into how radio amateurs can get the best out of it.

WHAT'S IN A NAME?

Sir—Having read with interest the letter from G3MQU re the use of the name "Radio Ham", I am prompted to suggest that we call ourselves "Private Radio Operators" (PRO).

This would please the old-timers like me (licensed 50 years) and we have, by now, it could be said, served our apprenticeship in this wonderful hobby.

I doubt if anything can be changed after all these years but if we all use the name "Radio Amateurs" in full on all occasions it may not sound so bad to the general public.

Ian Lamb, G6LD

METRES AND MEGAHERTZ

Sir—The paragraph headed "Metres and megahertz" of "Council Proceedings' in your October issue makes disturbing reading. Surely Mr Jessop is not advocating the use of wavelength instead of frequency to quantify an electromagnetic wave. A return to such an archaic practice would put the RSGB on a par with the Flat Earth Society.

John E. Hodgkins, G3EJF

RAPID RESULTS

Sir—I have just been catching up on my reading of *Radio Communication* and I feel that I cannot let Dr Pay get away with her comments in her letter in the August issue regarding the course offered by the Rapid Results College for the RAE. I particularly note your comments (with which I agree) that valves and their techniques should never have been dropped from the RAE syllabus.

I also used the Rapid Results College for tuition for the examination, and found the course first class. I was glad they covered the use of valves in radio circuits as I like to get the historical background to any subject I study.

I started my course with the Rapid Results College in October, and sat the examination the following May. In August I was notified that I had passed both papers of the examination with distinctions. Considering I was 73 years of age when I started my studies, I do not see that there is anything wrong with the course. Indeed I would recommend it wholeheartedly to any candidate for the examination.

I must add that the Rapid Results College do not know that I have written this letter, and I must thank them again for their excellent tuition.

W. S. Lea, GW6YYH

QSL CARD RETURNS

Sir—As I changed my callsign on 5 April this year from a GU6 to a GU4, I thought I would look back through my log-books and see how many QSL cards I had sent and how many received. The answer: 535 sent, 242 received.

I know that a GU prefix is not rare, but it is requested by a number of other stations. I regret that in future I will adopt the habit of other GU stations, QSL cards will only be sent on receipt of one. Sorry, but I have to pay for my cards too.

Ron Grove

The problem of QSL cards has been with us since the dawn of amateur radio, and probably always will be. In our experience "rare" dx stations almost invariably QSL only on receipt of an incoming card, precisely for the reason given by Mr Grove.

"CQ" ON CHANNEL 4

Sir—I wonder haw many letters you have received expressing disgust, dissatisfaction and dismay at the play entitled "CQ" on Channel 4 tv on 8 October? I felt a little sorry for Michael Elphick who had so obviously never been inside a radio shack before in his life, and the number of mistakes and errors that were so blindingly apparent to any reasonable radio operator were far too numerous to mention. Poor Norman. It would appear that he did not bother with a log-book, navigational aids were all he needed, and his morse—I have not passed the morse test in this country yet, but I hope I get the same examiner that examined him. The person who made up the model antenna for the play should have been given a real Tribander in order that he could see what they look like, and the mention of a G0QTR (????). Incidentally, that was the first time that I have heard cb on 14,3030kHz! Whoever was the "expert" sent to assist on the technical side of this play? As regards the play itself, I think it did a considerable amount of damage to the amateur radio fraternity, and I shudder to think what the public think of us now. I wonder if there were any amateur radio enthusiasts who actually enjoyed it?

David C. Davis, G6YQD/KA0NTH.

The Society received about 35 letters and telephone calls concerning "CQ" the majority of which expressed more or less disquiet at the portrayal of amateur radio and its adherents. Leaving aside any questions of artistic merit, Channel 4 appeared to accept that there were some deficiencies in the programme from that point of view and, in a telephone conversation with headquarters, suggested that there might be a possibility of a documentary on amateur radio: this will be pursued as far as possible.

BEWARE POWER LINES

Sir—The tragedy of cb operators being electrocuted should be published as widely as possible as a warning, as done in "Amateur Radio News" in your September issue. There were three like accidents in the space of two weeks. However, a significant technical aspect —not mentioned either in "ARN" or in "Technical Topics"—which might help discourage the erection of antennas near power lines is the intensity of power line noise.

Thirty-odd years ago, commercial equipment was supplied with notes regarding suitable types of antenna and how best to site them. Overhead power lines being among the taboos because of noise.

Appliance operators these days do not necessarily get such advice.

Denzil Roden, G3KXF.

Mr Roden is, of course, quite correct. Power lines, or at least the insulators supporting them, can be prolific sources of noise under certain conditions, particularly when they are damp and/or dirty. Better materials and different manufacturing techniques have considerably reduced the scale of the problem, to the point where other sources of noise predominate, but the Society is still occasionally asked for advice as to the source of strange noises in receivers which vary with weather conditions. These usually turn out to be a failing insulator on a power line, and the local area board is usually glad to have advance warning of what can be an expensive failure!

VHF MATTERS

Sir—May I put on record the valuable work, service and efficiency of the vhf awards manager, Jack Hum, G5UM; he operates in a manner that is a model for all, and a recent batch of cards was checked and returned with the awards within a few days. He instituted in his day a 70cm Activity Night, which still operates to this day. It is not his fault that the RSGB awards are dowdy in comparision with the colourful awards of other countries.

I was pleased to see the commencement of the *Computing* page, and I hope it goes from strength to strength. I would like to come now to a topic that I am sure creates the same feeling among other members as it does me, the *VHF Newsletter.* In my opinion all information to the VHF Committee, especially since the increase of subscription rates, should be available by the GB2RS news or *4-2-70.* If it is said that there is insufficient space, there is one page repeated every month telling us the Council of the Society—once a year would be sufficient.

Is the information being milked from *4-2-70* and the News? To get the information, the subscription rate for the vhf majority is being increased by a further £5. it would be enlightening to hear their views.

Instead of thinking up ideas like the *Newsletter,* let the VHF Committee concentrate on doing something to improve the situation. The activity on 430MHz is appalling. Get members who intend to operate on 430MHz to commence operations on the hour until 10min past the hour; instead of random calling at odd times, and then disappearing when no reply is forthcoming. Consider putting morse transmissions from the beacons when "A", "T" or "E" conditions prevail.

Stop the *VHF Newsletter* immediately, before they institute "HF", "Brass-Pounders", "Computing" and "XYL's" newsletters.

Bob Matthews, G3ZNZ

Mr Matthews appears to have missed the point with regard to the new VHF-UHF Newsletter. *Specialized newsletters dealing with a variety of subjects appear throughout the world—the RSGB's* DX News Sheet *and* Microwave Newsletter *being examples, as well as the highly regarded* DUBUS *from Germany—and there are also many newsletters from local clubs and other small groups with special interests, such as* Lunar Letter *dealing with eme working. There are more than 100 national societies around the world, of which the majority publish magazines: these attempt to cater for a very wide range of interests. One of the exciting features of amateur radio is that there is a large breadth of specialized activities and, clearly, no one magazine can cover all of these all of the time in depth. The specialized "newsletter" is intended to carry material for those who wish to have access to a much larger amount of specialist information. Indeed, the RSGB now has four such newsletters which are financially self-supporting without being profit-making, and it is our intention to produce more as and when they become necessary.*

No information in the VHF-UHF Newsletter *is "milked from 4-2-70 and the News". It is true that something like half of the Society's licensed membership consists of Class B operators using 144MHz and above, but the percentage of them who are interested in weak-signal dx work using (probably) high power and large antennas for eme, ms and so on is probably relatively small. It is for them that the* VHF-UHF Newsletter *was conceived.*

It is also true that activity in some parts of the 430MHz band is somewhat sporadic; however, members of headquarters staff who are active on the band feel that the position is improving as more people realize the potential of 430MHz. From comments heard and feedback received, many newly-licensed stations who are primarily interested in dx working are coming straight on to the 430MHz band, albeit with simple equipment, and reporting good results. The 430MHz repeater network is extensive, although at present somewhat under-used, and the units give good coverage.

Finally, at least one member of headquarters staff has worked enough counties and countries on both 144 and 430MHz for a Senior FMD award on each: two other staff members are not far behind. We expect that many RSGB committee members are in a similar position. However, one of the drawbacks of giving voluntary time to the affairs of the national society is that extensive sporadic-E openings or auroras invariably occur half-way through a committee meeting!

ON THE SOCIAL SIDE

Sir—I have just returned from a three week visit to the USA, where I was the guest of Bill Shrader, W7QMU, and his xyl Judy, KA7OFM (Oregon's Fairest Maiden, a description which suits her fine). FCC granted me a reciprocal licence, so I was G3IMP/W7, and this licence was granted in record time, a matter of a few days, not the two months which FCC ask for. In fact, the licence was waiting for me at W7QMU when I arrived, less than two weeks after I sent off the application to FCC.

The hospitality of Bill and Judy was of course tremendous, and memories of the trip will stay with me for a long time, but I thought that I might mention the gentlemanly behaviour of all the many amateurs I met in W6 and W7, whether on the air, at club meetings, at weekly lunchtime meetings to which I was invited, or at the farewell party thrown for me the night before I left. The club meeting was conducted more like a company board meeting rather than the noisy undisciplined rabble I have encountered at some UK club meetings over 32 years.

It would be unfair to mention by name anyone of the dozens of amateurs I met on this trip. The list would be very long if I tried, but I left having made a lot of real friends.

In your June issue Ralph Gordon, G6FYW, complained about the treatment meted out to a friend of his who visited an amateur radio club, and was not very pleased. Your comment was "Oh dear! Hopefully a one-off". I have seen that sort of thing happen many times, but in my own club, Telford, the new committee is constantly trying to improve the welcome they give to new members. When I went to the River Rogue Club in Medford, Oregon, the first business of the evening was that Bill, W7QMU, got to his feet to introduce me, and I was asked to reply. In other words, I was made to feel welcome.

S. Poole, G3IMP

MARITIME MOBILE

Sir—I read with interest the remarks of your correspondent Paul Barry in your October issue, regarding the use of amateur radio equipment aboard ship. As an ex-ship's RO and coast station operator, I too have often wondered why it has never been considered necessary to provide a completely separate emergency radio installation situated in a part of the ship well removed form the main radio office. This was, and no doubt still is, standard practice in the Navy, and I can remember during the war that a few merchant ships did have such a system.

In those days the radio room was often reduced to a shambles within minutes of gunfire from enemy raiders, the position of the wireless room being easily identifiable to the raider by virtue of the fact that it would be located close to where the antenna downleads entered the superstructure, generally on the lower bridge. As such it was the aiming point for the raider's first salvoes.

Just such a situation as Mr Berry visualizes occurred in the early 'seventies. At that time I was on duty at Port Elizabeth Radio/ZSQ in South Africa when I picked up a hurried distress message on 500kHz from a British ship called the *Heythrop.* She gave her position as being about 200 miles north east of Port Elizabeth, reporting that there had been an internal explosion and fire. After this one message nothing further was heard from *Heythrop,* until, after alerting all ships in the area, we subsequently worked another ship who had managed to establish vhf contact with her. Via the other ship we learned the *Heythrop's* radio was out of action, among other things, and that she was requesting medical assistance and tugs. Had *Heythrop* had a separate emergency set, no doubt assistance would have been on the way to her much sooner.

Although I do not think that it would be a good idea for distress traffic to be made on the amateur bands, very often beggars cannot be choosers, and in cases of emergency some signal is better than none at all, and perhaps the MM amateur equipment could be modified to cover the maritime distress frequencies.

Thirty odd years ago in the famous case of the *Flying Enterprise* the only means of communication available to the ship was a failing MM amateur set operated by Capt Carlsen, his signals being relayed to shore by a US destroyer.

With regard to Mr Berry's point about the American amateurs; how times must have changed. I can well remember when the erection of a small receiving antenna by one of the crew (let alone a passenger) would have brought down wrath from on high. Dire mutterings about the df calibration being thrown out, and making the ship look like a Christmas tree. As for transmitting—well—shades of the old days—"Sparks, nothing, but nothing, is sent from **my** ship without **me** seeing it first". It makes one wonder: just when did Home Office authority begin to exceed that of the Master.

Leonard Moss G3VXJ

RED CROSS COMMUNICATIONS DAY

Sir—The Red Cross is a truly international organization with members in 135 countries throughout the world. The Cleethorpes & Immingham Branch recently held an open day in which an amateur station was operated on their behalf.

I have been asked to enquire if there is any support for an annual communications day organized along the same lines as the Scout JOTA. If any amateurs (or club) are interested in the idea, would they please contact me, QTHR. A date mid/late summer 1985 is envisaged as being suitable.

T. Matthews, G3RGC

NOVICE LICENCE

Sir—Everyone is entitled to an opinion, but Colin Watson, BRS46598, is taking it a bit too far in his letter in your October issue. If he was to shift himself and take City & Guilds exam 765 and pass, then all his demands, and more, would be met. As for wanting 50W, why so lenient with demands. Why not ask for 500W? After all, Belgium and Holland can be worked with a few watts. Then again, with his novice licence why not provide a 50W rig to use on our bands?

Joining a local club, meeting and learning from other hams, and taking the relevant exams is a proper way of becoming a radio ham, Mr Watson. Trying to usurp our frequencies is not the way to endear yourself to the ham fraternity.

Tony Skaife, EngTec (CEI), MSERT, G4XIV

AN RSGB HOME-BREW PROJECT

THE RSGB MORSEMAN

A SOPHISTICATED "GO-ANYWHERE" MORSE TUTOR

Designed by M. Noakes, G4JZQ*

Introduction

The ability to send and receive morse at even the modest 12wpm required by the UK morse test is a most valuable skill. The major point about cw is simply that it works — and works very well. Compared with other modes it greatly increases the effective range of the equipment, whichever part of the spectrum is being used, and it is especially valuable under weak-signal conditions. It is in this light that learning morse should perhaps be regarded, rather than as a hurdle which has to be surmounted in order to be allowed to operate on the hf bands.

Morse has other advantages. Although we live in a black-box age, sophisticated commercial equipment is not necessarily available to everyone. Young people on a limited budget and amateurs in developing countries with little foreign exchange usually do not have easy access to the marketplace, and a basic morse code transmitter built for a very low cost is what brings them on the air. It follows that many exciting and rare contacts on the hf bands would not be possible without a knowledge of morse. For some propagation modes, such as meteor scatter, aurora and eme, cw may be the only practicable transmitting technique. And, of course, many who initially regard the morse test as a necessary (or even unnecessary) obstacle between them and the dx on the hf bands soon take great pleasure in being able to send and receive morse well. There is a particular satisfaction in being able to communicate in what is effectively a second, international, language.

The purpose of this article is to describe the construction of a morse tutor having a number of special features:

- **It will generate random letters, random numbers or a mixture of the two.**
- **It can be programmed to send randomly from a group of consecutive letters. The length of the group can be chosen by the user.**
- **It can be made to send in groups of five characters for those who wish to learn in this way.**
- **The character being sent is shown on a display: two display modes are available, in which the character can be seen either at the time when it is sent (to assist initial learning) or after a variable delay. This provides an extremely useful and probably unique facility for checking one's progress.**
- **The speed at which the morse characters are sent can be varied over the range 6–34wpm.**
- **An adjustable delay can be introduced between each character to reduce the overall sending rate, the advantages of which will be explained later.**
- **It can be used as a morse practice oscillator.**
- **It can be used either with its own internal sounder or with headphones for private practice: The Morseman can also drive an external audio amplifier for group practice, such as within an amateur radio club.**

At the heart of the Morseman is a microprocessor: in this case, the popular and inexpensive Z80. The program for the microprocessor is stored in a 2716 eprom, and the characters are displayed on a 7 by 5 dot-matrix led display. Enough audio output for most needs is available from the unit via a built-in sounder, and headphones may be used if required.

The morse characters are stored in the 2716 memory, from which the microprocessor selects characters at random which are then transformed into audible and visual signals. Because almost all of the unit's features are defined by, and contained in, the "software", the actual electronic circuitry of the Morseman is very simple.

The unit will obviously appeal to those who wish to learn morse, but it would also be an excellent club project, and be of interest to experienced amateurs who wish to become more familiar with "computer-type" techniques. Intending constructors may like to note that ready-made pcbs and artwork are available to members from RSGB headquarters, together with kits containing some of the major parts of the unit which might be difficult to obtain from other sources. The cost of making the Morseman will depend on how many components are already available in the proverbial junk-box, and also whether low-power versions of some of the integrated circuits are to be used; however, the "worst-case" price should not exceed £50. An experienced constructor could have the unit working in about 5h, although beginners should take as much time as they need.

Learning morse with the Morseman

The front-panel controls of the unit are shown in Photo 1. The setting of the speed control is most important — it is strongly recommended that even the raw beginner sets the control to about 14wpm and then slows down the overall sending rate by using the DELAY 1 control to introduce a delay between each character. This extends the "thinking time". This approach has the advantage that right from the start the beginner learns to identify the character by its rhythm. As he/she becomes more proficient, the delay can be progressively reduced until the overall speed rises to 14wpm. Higher speeds may then be tackled as required.

What is **not** recommended is that the Morseman-generated characters be sent at low speed, say 6wpm, and learned at this and progressively higher speeds. The major disadvantage of this approach is that the characters are identified and learned by counting the dots and dashes. Indeed, it may be impossible to detect any rhythm to the characters at all at these low sending speeds. At 6wpm it is easy to count the dots and dashes: at higher speeds this becomes impossible, which may be the reason why many who have attempted to learn in this way reach a barrier at around 9wpm. The only way in which they can then make effective progress is to "unlearn" this method of trying to read morse, which means that time, effort and enthusiasm have been wasted. Nevertheless, it appears that a very small proportion of people are able to learn by beginning at very low speeds, so this facility has been built into the unit.

A particularly valuable feature is that it is possible to select a group of consecutive letters of any desired size and the tutor will then output letters within that group at random. For example, suppose that the beginner is learning for the first time the morse equivalents to the first five letters of the alphabet, A to E. He or she may instruct the tutor to produce random letters which are only within that particular group of five, and these can be practised until they are thoroughly mastered. The learner can then pass on to the next group of five letters, F to J, or alternatively could command the device to produce, for example, the letters A to K instead of A to E. The same facility is available anywhere in the alphabet, with no restrictions on the size of the selected group.

A drawback of some commercial morse tutors is that they are only able to output random letters taken from the entire alphabet. This can cause

*This project was designed by the RSGB's technical officer, and any correspondence concerning it must be addressed to RSGB HQ.

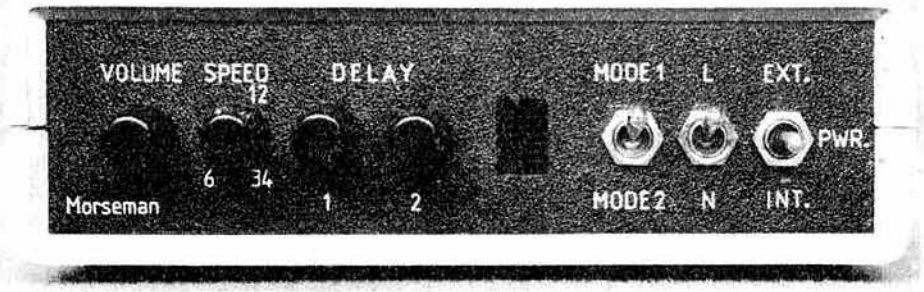


Photo 1. Front panel layout

frustration initially, as it is necessary to have learned the morse equivalents of much of the alphabet before the tutor is of any real use. Committing the entire alphabet to memory takes a good deal of time and effort.

Imagine also a situation where the learner has difficulty in learning certain characters. The Morseman can be of great assistance here, since it allows individual letters appearing at random within a group of letters to be practised. For example, if learning the letter "L" is causing trouble, it is easy to program the unit to send a random group of letters of any required size containing "L"—it could send characters from the groups JKL or KLMNOP at random, for instance. It can also produce the entire alphabet at random, and for general practice it will probably spend much of its life in this mode as opposed to the "group" mode just described. It will produce letters, numbers, and a mixture of the two on demand.

There are two ways in which characters are displayed. In Mode 1 the character is displayed while it is being sent, whereas in Mode 2 the character is sent first and then appears on the display. A variable delay between characters operates in both modes, and the amount of the delay is set by the DELAY 1 control. Many learners are used to learning in blocks of five characters, and a further delay can be introduced between each group of five characters in Mode 1; the amount of this delay is varied by the DELAY 2 control. In Mode 2 this delay would be superfluous and instead is used to vary the amount of time for which the character is displayed after it has been sent. In other words, there are two user-variable delays for each mode.

Mode 2 in particular offers a powerful self-test facility, since it becomes possible to hear the character, write it down and then have the answer verified (or not) by the display. This is the ideal method of learning the reflex action of hearing a character and immediately being able to write it down in longhand—an essential part of learning morse in the early stages —and of course it assists in the development of reading morse in one's head, which is a valuable asset later on.

It is also possible to turn the display off entirely in Mode 1 to save battery power. In this state the Morseman simply generates audible morse at random, with all its other features still operative.

Finally, for sending practice a morse key may be plugged into the unit's audio oscillator circuitry. This facility disables the morse generator circuitry when in use.

Circuit options

The digital circuitry is shown in Fig 1 and that of the psu and audio stages in Fig 2. The Z80 was used mainly because it is relatively cheap and easily available. However, as with some other integrated circuits in the Morseman, it is available in versions which consume much less power than the standard device. The Z8400 L1B1 and Z8400 L2B1 consume some 35mA, as opposed to the 110mA of the standard Z80, and indeed a cmos version of the Z80 consuming about 16mA, the UPD70008C, is available at about £7. The standard Z80 costs in the region of £3, and the low-power versions about £12.

The same comments apply to the 2716 eprom. The standard device consumes about 25mA and costs about £3.50: a low-power cmos version, the 27C16, consumes about 100μA but it costs about £11. The RSGB hopes to make the cmos eprom available in one of the kits but, as with many other cmos memory ics, there is something of a world shortage at the present time and they are not easy to obtain.

In the interest of low battery drain, ics specified in the components list are all cmos. However, there are some ttl equivalents which may be used if they are to hand, and if the constructor does not object to the resulting increase in power consumption. IC2 and IC3 can be 74LS374s, which will increase the brightness of the display but at a cost of an extra 25mA each. IC4 can be a 74LS74, taking an extra 10mA for no benefit. The other two ics, IC1 and IC6, must be cmos versions.

The current consumption of the Morseman will obviously depend on what ics have been used. The worst possible case is when a standard Z80 and eprom have been used, together with ttl alternatives mentioned above, and under these conditions the currrent consumption is around 200mA.

The basic circuitry will function satisfactorily with a supply voltage as low as 4.75V and safely at up to a nominal 6V. A 6V battery pack can be used, and space for this has been provided inside the unit. However, the batteries used should be of the manganese-alkaline type (such as the Duracell or the Ever Ready "Gold Seal") rather than the more common zinc/carbon variety, as the former lasts much longer under the operating conditons presented by the Morseman's circuitry. If the unit is to be used with battery power for any length of time, we strongly recommend the use of the low-power Z80 and memory ic, as battery life is likely to be roughly tripled. It is worth mentioning that nickel-cadmium batteries are not suitable for the Morseman's internal supply, as their terminal voltage is significantly lower than that of ordinary primary cells (approximately 1·1V on load as opposed to 1·5V).

Provision for an external power supply is also made, and there are several ways in which this may be implemented. Space for a 5V three-terminal regulator, IC8, is provided on the pcb, and this may be used with an external supply producing more than about 8V. An external 5V supply may also be used if it is available and the regulator can then be omitted. The internal battery supply can be retained at the same time and, it is suggested that the external power supply jack is wired so that the battery is disconnected when the plug carrying the external voltage is inserted, as shown in Fig 1. The three-terminal regulator used is a 5V 78-series component — this can be the 7805 or the LM340T-5, or indeed any other 1A equivalent. A heatsink may be required. As a rule-of-thumb, if the constructor wishes to use an external power supply producing more than about 9V, a standard clip-on TO220 heatsink should be used. No heatsink should be required, however, if the low-power Z80 and eprom are used.

The recommended input connector for the Morseman's internal power supply is a "Roka" socket, available from J. Birkett among others. This is in the interests of staving off the effects of Murphy's Law, which states that if the same type of connector is used for the power input jack and the morse key and/or the audio output jack, the power supply will one day be plugged into the wrong socket — with disastrous results. There is, however, one important point which must be observed concerning the way in which the power input connector is wired. The "break" contact on the socket is on the 0V side, as opposed to the more usual practice of having it on the supply side: the reason for this is bound up with the requirement for automatic switching between internal and external supplies. The only point which is common to both circuits is earth and, as the Roka socket has only one "break" contact, this is where it must be placed. Fig 2 shows the details.

If a commerical power supply, such as those used for powering transistor portable radios, is to be used, it is important to check that its polarity is compatible with the Morseman's power connector. If the psu happens to have a Roka plug, for example, on its output lead, the polarity of its output must be checked with a multimeter and, if necessary, altered so as to be compatible with the wiring of JK1 shown in Fig 2.

A 6mm jack was used for the audio output, and a 3·5mm jack for the external key input, but any suitable components which fit the case may be used. It is also necessary to ensure that the supply will provide the required current while maintaining about 9V output. As mentioned above, the worst-case current drain will be about 200mA and, at the other extreme, the current consumption can be as low as 50mA if low-power and cmos devices are used throughout. A three-position switch on the front panel, S1, selects internal battery power, external power and OFF.

Provision has also been made on the pcb for a bridge rectifier and associated reservoir capacitor so that the unit may be used with an external transformer—a secondary voltage of around 12V would be quite suitable. However, an internal battery supply cannot then be used since these components occupy the space otherwise used by the battery holder. Any component capable of supplying about 1A, with a "peak inverse voltage" (Vrrm) of 100V or so, may be used as a bridge rectifier.

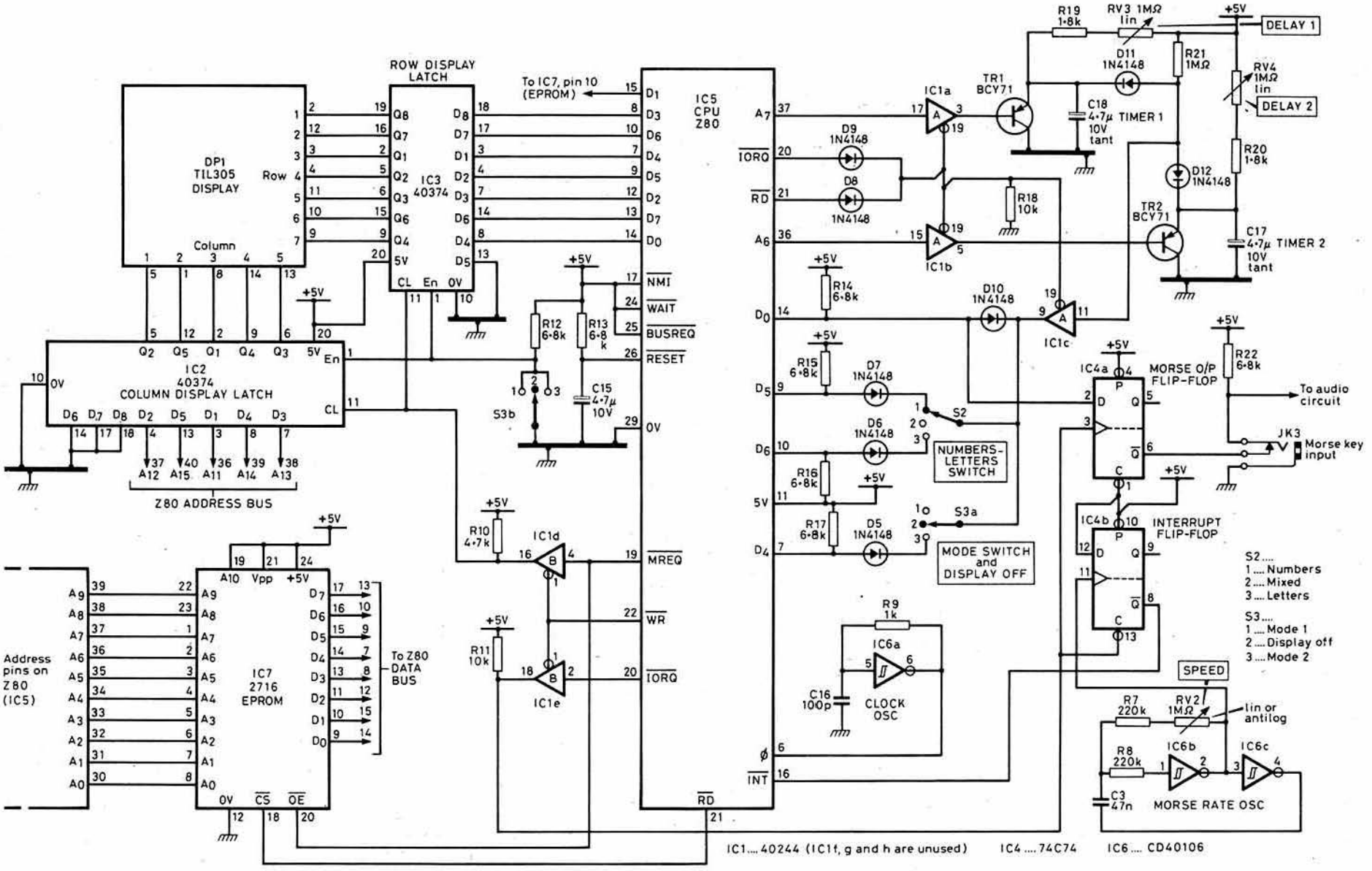


Fig 1. Digital circuitry of Morseman

Tools required to build the Morseman

Soldering iron of not greater than 25W rating and a bit not wider than about 3mm.
Some form of desoldering aid, such as solder wick or a "solder sucker" pump.
Solder: Multicore, about 22 swg.
Small side-cutters.
Long-nose pliers for bending component leads and inserting components.
Abrafile or small fine file for cut-outs in pcb—a small round file would also be useful.
Small table vice.
Thin "hook-up" wire, preferably with insulation of various colours, for connections to switches etc.
Small drill for drilling holes in rear panel for sockets etc.
Screwdriver; blade about 4mm.

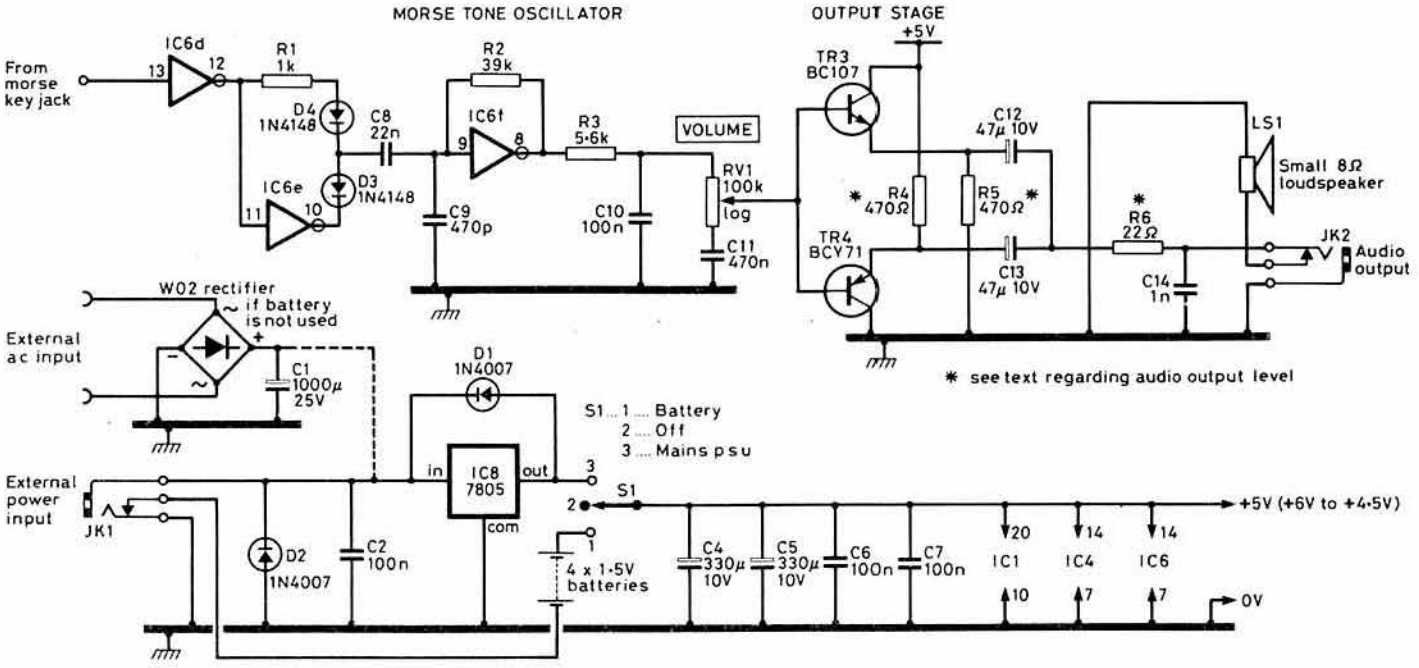


Fig 2. Power supply and audio stages

Construction

Preliminaries

The case shown in the illustrations is about 125mm square by about 35mm in height. It is obtainable from RSGB HQ complete with pre-drilled and lettered front panel. For those wishing to use the ready-made pcb but intending to use a different type of case, a drilling plan for the front panel is given in Fig 3. One pcb approximately 115 by 120mm carries the majority of the components: those members wishing to manufacture their own board may obtain the artwork at no charge, also from RSGB HQ. In order to keep cost to a minimum, single-sided board has been used and accordingly several wire links are required.

Components which might otherwise be difficult to obtain are available from RSGB HQ. These include both types of eprom mentioned in the text, although, as mentioned earlier, the low-power 27C16 is difficult to obtain and it may not always be possible to supply this device. Please note that the RSGB cannot undertake to program eproms supplied by members. For those who are able to program their own eproms, a copy of the actual code used and also a complete machine-code program listing is available.

A soldering iron with a rating not greater than 25W should be used, and a 3mm bit will be adequate. If a mistake is made and the constructor discovers that a component has been inserted into the incorrect holes, it is strongly recommended that the leads of the component are cut flush with the top of the board on the component side, and then the remains of the soldered part of the lead should come away fairly easily with the application of a little heat. However, on no account should the iron be applied to the track for long periods at a time because of the risk of lifting the tracks away from the glass fibre base. Modern semiconductors are somewhat more immune to excess heat than were their predecessors, but transistors and diodes in particular should be soldered as quickly as possible. It is useful to keep a moistened pad on the workbench to wipe the bit of the soldering iron lightly before each joint is made in order to keep it clean. Use a good grade of 22swg solder.

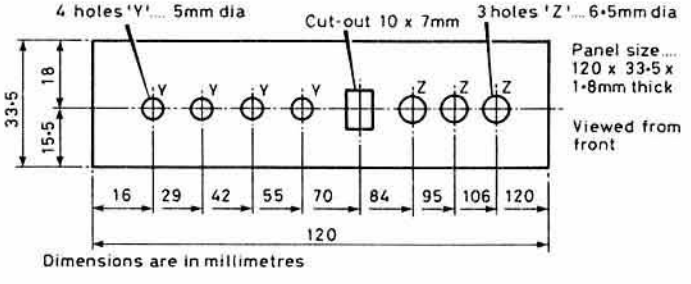


Fig 3. Drilling plan of front panel

It is advisable to use good quality ic sockets for all integrated circuits mounted on the pcb, such as the gold-flashed types. The use of turned-pin devices is a luxurious but costly way of doing the job. A primary reason for advocating ic sockets is that cmos ics should always be treated with care, as they are sensitive to static voltages. Soldering them in pin-by-pin can cause static charges to be transferred to one pin at a time via the soldering iron, which is a good way of destroying them. Most present-day cmos ics are internally protected by diodes, but a certain amount of care should be exercised in handling. The connections to the integrated circuits (usually referred to as "pinouts") are shown in Fig 4.

All resistors used are standared 0·25 or 0.4W (MR25) types — metal-film or metal-oxide components should ideally be used for long-term stability and reliability, but almost any resistor can be used provided its body is not longer than 8mm. Most capacitors are disc-ceramic or polyester, apart from electrolytic and tantalum capacitors where specified, and provision has been made on the pcb to allow for various sizes of capacitor to be used. C9, however, should be polystyrene. The diodes may be any fast logic type such as 1N4148, BAW62, BAX13, 1N914, etc; except for D1 and D2, associated with power supply protection, and 1A components in the 1N4001-7 series are quite adequate here. TR1–4 are not critical, and small-signal transistors of the correct polarity will suffice: BC107 and BCY71 types have been specified in the components list simply because they are very common. It is suggested that a miniature 8Ω loudspeaker is used for the unit's internal sounder, if available, although other impedances should work well. Because of the limited voltage swing and the relatively low frequency and harmonic content of the audio output, the common type of piezo-electric transducer of oriental origin does not produce an output which could be regarded as ear-splitting and is not suitable for this design. If the user wishes to increase the audio output, R4, R5 and R6 can be changed to the alternative values which are given in the parts list: there is, however, a slight current penalty. Provision is made for an external jack socket, which is wired so that the internal sounder is disabled when external transducers are used.

Building the unit

The general arrangement of the components is shown in Photo 2 and Fig 5. Before mounting the board in the case available from the RSGB, it will be necessary to cut away the two marked sections on each side of the pcb to clear the pillars in the sides of the case. This should be done before any components are mounted.

A spacer for use with the potentiometers supplied by the RSGB is supplied on the RSGB pcb, which should be cut from the end of the board and kept for later use. Constructors intending to use internal batteries will also need to cut out the appropriate slot for the battery pack. One of the borders for the battery pack cut-out is actually a track, and it is obviously essential to leave this well alone and cut just inside the line. Any cutting required is best carried out with an Abrafile, after which the edges can be smoothed with a conventional fine file.

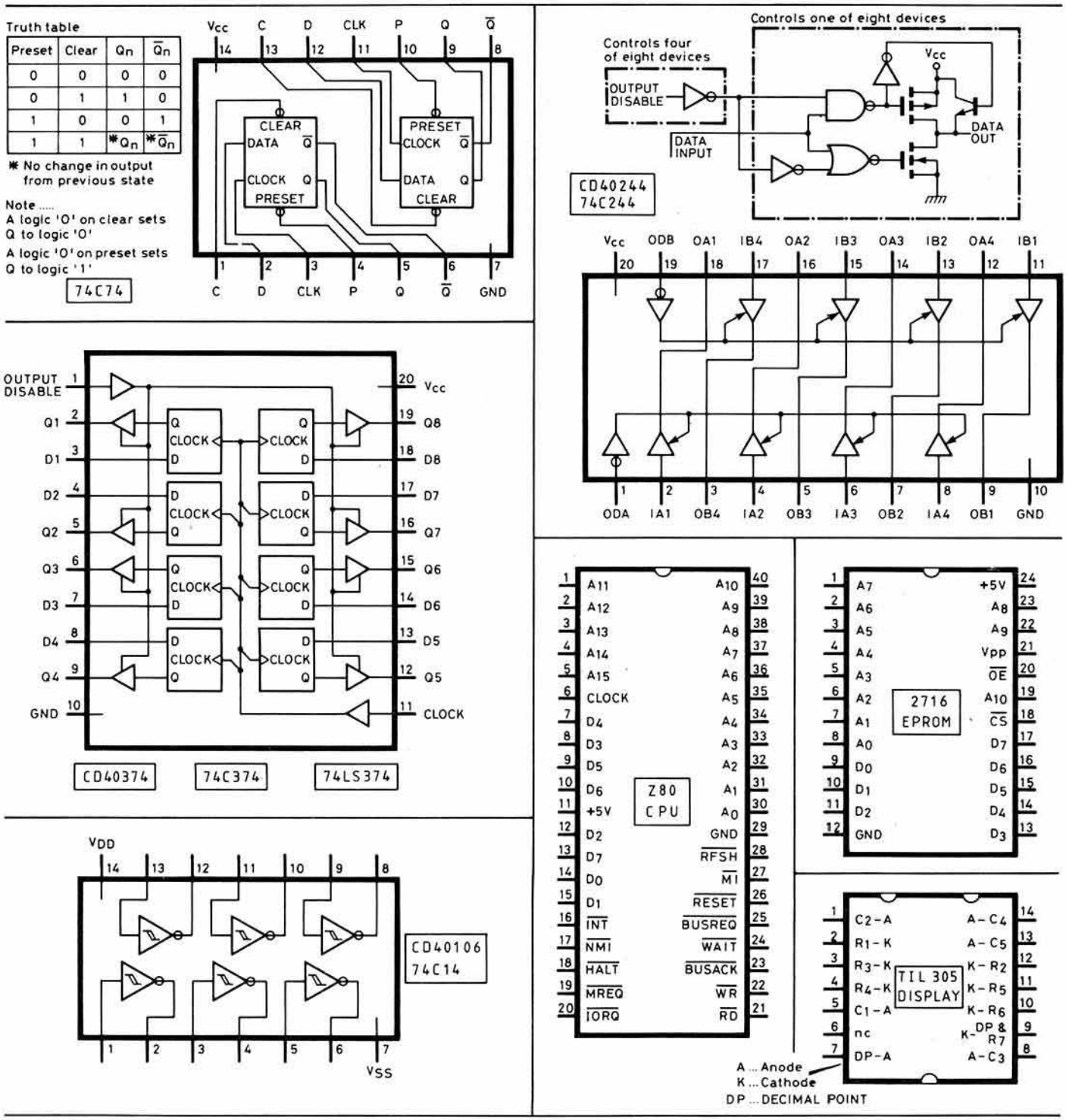


Fig 4. IC connections

A small vice is useful at this stage for holding the pcb. Alternatively, a G-clamp could be used to hold the pcb firmly on the workbench while filing and sawing operations are carried out.

The next step is to install on the component side of the board the 23 wire links as shown on Fig 5. Fairly thin wire should be used, since some links are quite close together; as a guide, the size of wire used on resistors and small capacitors is about right. Some links have been shown curved on Fig 5 for reasons of clarity, but all links are in fact straight. Note that six links run under the sockets for IC5 and IC7. The resistors and diodes should be fitted next, followed by the ic sockets and the capacitors. Other components can then be installed, taking to observe the polarity of diodes and electrolytic (including tantalum) capacitors.

The four potentiometers recommended and available from RSGB are from the Spectrol MD149 series, and the pcb is laid out to accommodate these. However, Veropins or similar can be inserted into the relevant holes in the pcb so that conventional chassis-mounting types can be used. Wiring details for these potentiometers, and for the sockets on the rear panel, are shown in Fig 6. When using the pcb-mounting potentiometers, a spacer is required between these components and the board so that the shafts emerge approximately on the centre-line of the front panel. The spacer which was cut from the pcb earlier is now cut in half and the two halves stacked together as shown in Photo 3.

It is also advisable to cut approximately 3mm from the end of the potentiometer shafts before mounting, as those supplied are slightly too

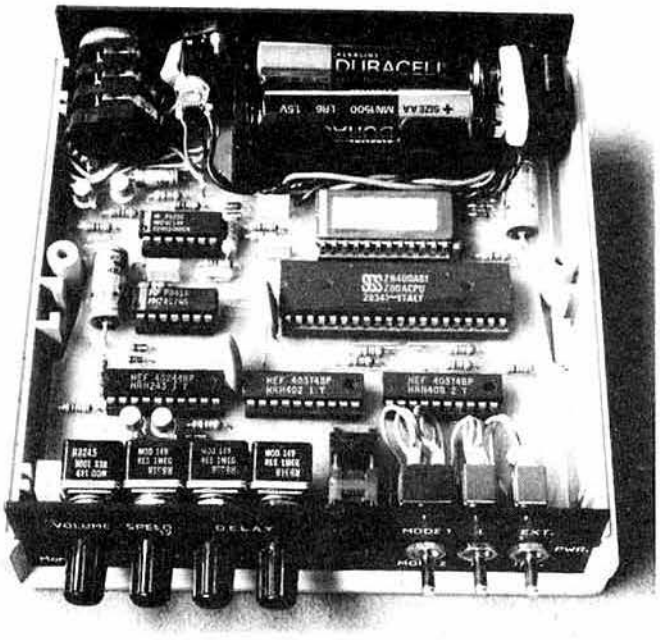


Photo 2. Interior view

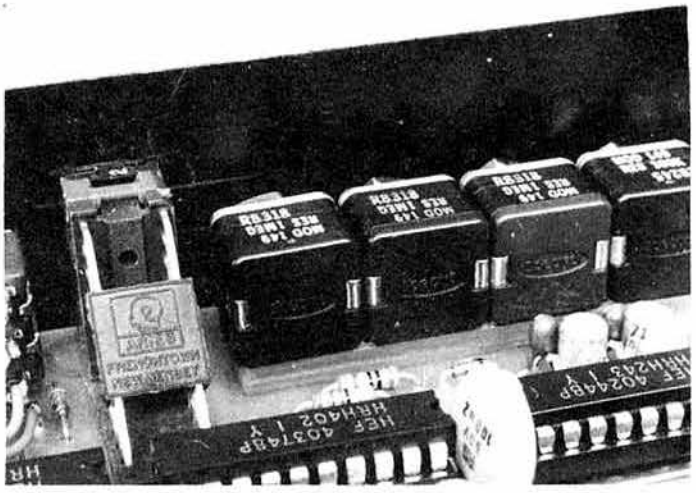


Photo 3. Details of display and potentiometer mountings

long. RV1 is the volume control and should ideally have a logarithmic track, although a linear track component will work perfectly well. The morse speed control potentiometer, RV2, can also have a linear law, although this means that the calibrated scale will be somewhat compressed at the high-speed end. To obviate the problem, an inverse-log potentiometer could be used. As supplied, the front panel is lettered assuming that a linear potentiometer will be used.

On early prototypes, pcb-mounting switches were used and provision made for them on the board. However, most miniature pcb-mounting switches available have a sideways action rather than the conventional up-down operation, which makes life difficult from the point of view of front-panel lettering, and they also sit very low down from the centre-line of the front panel when the unit is complete. Here again it is suggested that Veropins are inserted into the associated holes in the pcb and that miniature chassis-mounting toggle types are used. The three switches are centre-off types: S1 and S2 are spdt and S3 is dpdt. Wiring details are shown in Fig 6.

There are various ways of mounting the display. A purpose-made holder can be supplied, although it is rather expensive. Alternatively, a 14-pin dual-in-line header plug with a 14-pin wire-wrap ic socket with its leads suitably bent and soldered to the plug could be used. The pcb will accept both: Photo 3 shows the purpose-built holder in use. A gap is provided between the front of the display and the cut-out in the front panel so that a filter can be used if desired: a piece of polarizing material or red gel will enhance contrast.

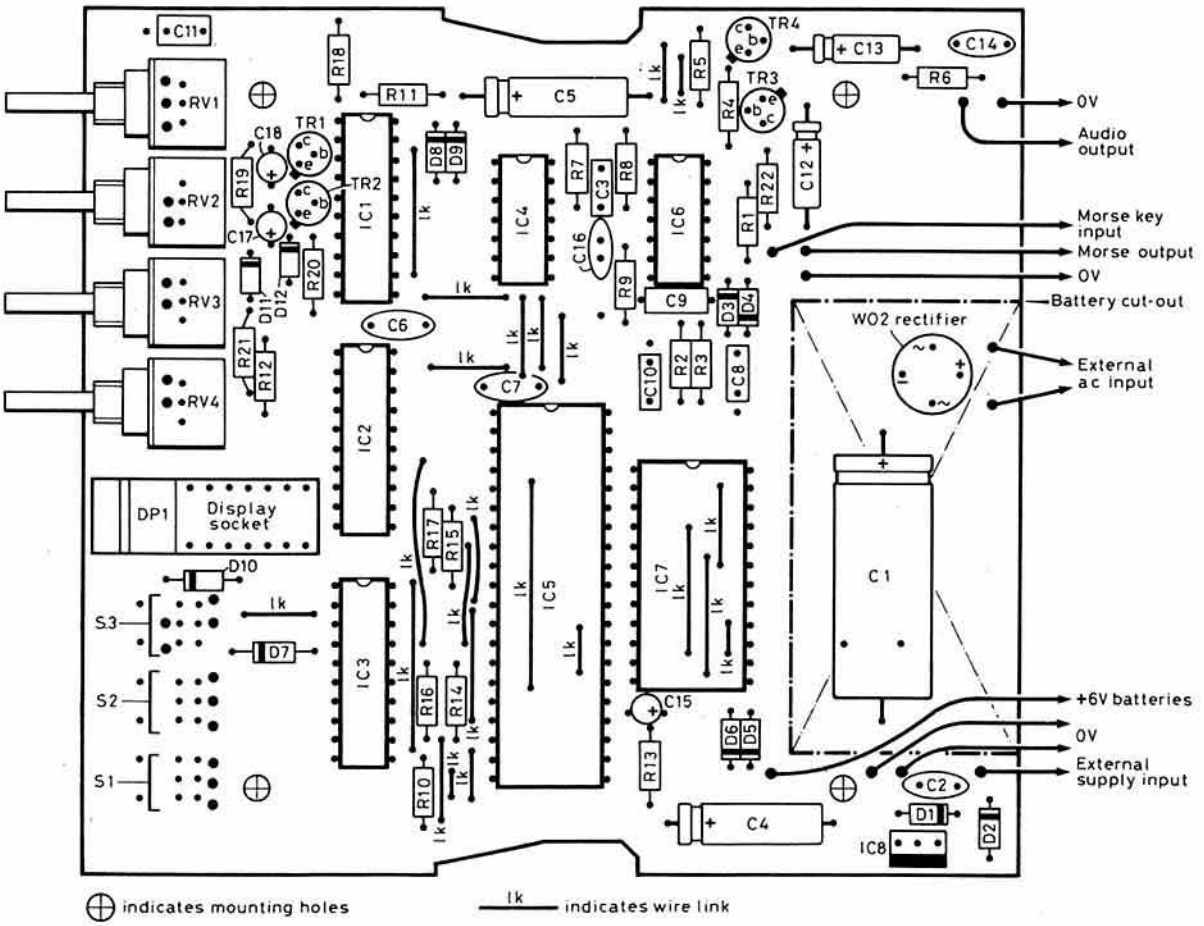


Fig 5.
Component layout

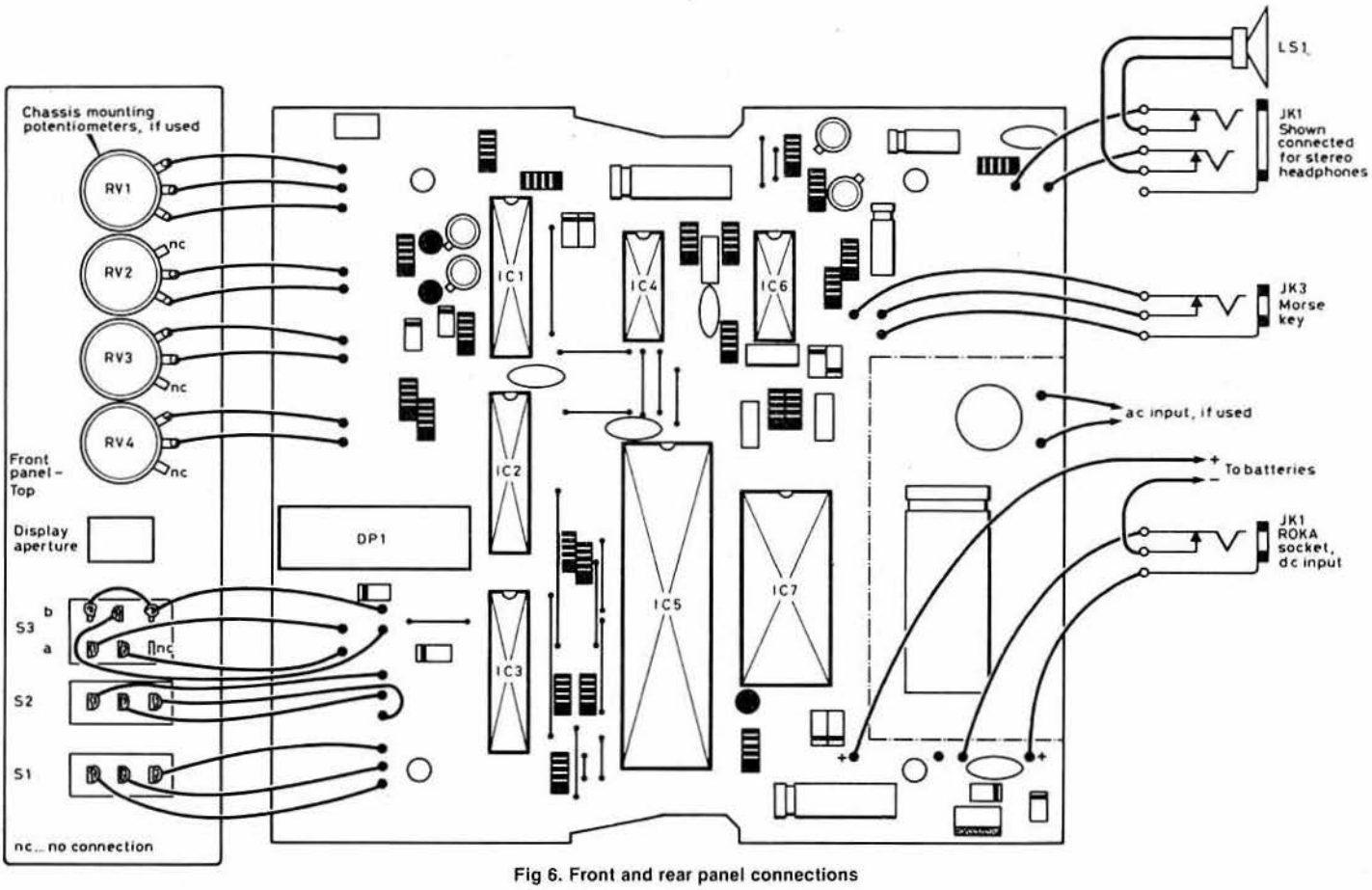


Fig 6. Front and rear panel connections

Good quality solder should not create much flux residue but it is best to clean the pcb with a proprietary flux remover when the work is completed. When the board has been proved to be working satisfactorily, it is also recommended that the track side is sprayed with clear lacquer for long-term protection, after removal of flux residues. The lacquer reduces corrosion and the possibility of low-impedance paths between tracks building up due to the ingress of moisture etc. The unit will probably misbehave for an hour or two after the lacquer has been applied: this is simply due to the high impedances involved in some parts of the circuitry, and matters should return to normal after it is thoroughly dry.

Checking the assembly

Before switching the unit on for the first time, the pcb should be given a thorough visual examination to ensure that no tracks have been bridged with solder. A direct comparison of the finished pcb against the artwork is the best way of detecting solder bridges which are not obvious upon visual examination. The component density on the board is relatively high and the track layout is therefore quite complicated and intricate, and those who are new to home-brewing are recommended to take plenty of time and concentrate on one stage at a time; for example, installing all resistors or capacitors and checking at each stage that the correct components have been fitted in the correct holes. A magnifying glass and good lighting are very useful.

Testing

With all ics removed from their sockets, power in the form of batteries or an external supply should be applied via a multimeter which is initially set to its highest current range. (This is good practice when any item of new equipment has power applied for the first time.) The indicated current consumption should be between 5 and 15mA — any higher value requires investigation, as this probably indicates that tracks may be shorted by solder bridges. When this test is satisfactorily passed, the power supply should be removed or switched off and the first ic plugged in: this should be IC6, a CD40106B. As this is a cmos ic, the indicated current consumption should only rise marginally when power is re-applied. If an oscilloscope is available, the functioning of the three oscillators formed by this ic can be checked. The clock oscillator should be producing about 3V pk-pk at about 800kHz, and this should be seen on pin 6 with an approximately triangular waveform. In theory the Z80 requires a square-wave clock waveform, but because the frequency is relatively low the triangular waveform from the clock oscillator in the present design is perfectly adequate. The output of the morse-rate oscillator should be visible on pin 2, and it should have the form of a low-frequency square wave of some 5V pk-pk. Finally, the audio oscillator output should be present on pin 8: as the unit is not yet producing morse, the frequency of the output waveform should be somewhere between 20 and 30kHz. Here again it should have the form of a square wave with an amplitude of about 5V pk-pk. Shorting-out the morse key input to earth (JK3) should produce an audible tone in the sounder, and the frequency at pin 8 should fall to around 500 Hz. If all these tests have been passed, all other ics can be inserted and the device should work straight away.

Calibration

Those purchasing the case and front panel assembly from the RSGB will receive a front panel which is already lettered and carries calibration markings, so that when constructed the unit will be ready for service without further alignment or adjustment. However, for those who wish to calibrate their own tutor, the following procedures can be used. It is possible to make an approximate calibration by operating the unit in Mode 1 with no inter-character delay and the smallest amount of "group of five" delay which can be perceived: it is perhaps easier to see the delay on the display rather than to register it by ear. Timing the number of five-character groups sent in 1min will give an approximate words-per-minute speed, and the operation will obviously be more accurate if it is performed several times.

A much more accurate method takes account of the fact that the classic word used to define morse speed is "Paris" — this means that the word "Paris" takes 1 min to be sent 12 times at a speed of 12 wpm. This word consists of 48 dot periods, including inter-word and inter-letter spaces, and since the morse-rate oscillator changes state twice per dot period, it follows that by measuring the period of the morse-rate oscillator, the unit can be calibrated. For example, if the 10wpm position were to be marked on the scale, 48 dot periods multiplied by the required number of words per minute, ie 10, is a total of 480 dot periods in 1min. Therefore there are 480/60, that is eight dot periods per second (8c/s or 8Hz), corresponding to a period of 125ms. This is fairly easy to measure on an oscilloscope but less

Components list

IC1	CD40244 (alternatively 74C244 or HEF40244)
IC2, 3	CD40374 (alternatively 74C374, HEF 40374 or 74LS374—see text)
IC4	74C74 (alternatively 74LS74—see text)
IC5	Z80 or Z80A (alternatively cmos UPD 70008C or low-power Z8400-L1B1—see text)
IC6	CD40106 (alternatively 74C14)
IC7	2716 (alternatively 27C16 low-power version—see text)
IC8	7805 or LM340T-5
DP1	TIL305
TR1, 2, 4	BCY71 or similar
TR3	BC107 or similar
D1, 2	1N4006 or similar
D3-12	1N4148 or similar
C1	1,000μF 25V electrolytic
C2, 6, 7, 10	100nF disc ceramic or polyester
C3	47nF polyester
C4, 5	330μF 10V electrolytic
C8	22nF polyester
C9	470pF polystyrene
C11	470nF disc ceramic or polyester
C12, 13	47μF 10V electrolytic
C14	1nF disc ceramic
C15, 17, 18	4·7μF 10V tantalum electrolytic
C16	100pF disc ceramic
R1, 9	1kΩ
R2	39kΩ
R3	5·6kΩ
R4, 5	470Ω (or 220Ω—see text)
R6	22Ω (or 10Ω—see text)
R7, 8	220kΩ
R10	4·7kΩ
R11, 18	10kΩ
R12-17, 22	6·8kΩ
R19, 20	1·8kΩ
R21	1MΩ
RV1 100kΩ	lin or log
RV2 1MΩ	lin or inverse log
RV3, 4	1MΩ lin
	All resistors MR25 0·25 or 0·4W
DIL sockets	Three 20-pin, two 14-pin, one 24-pin, one 40-pin, one vertical 14-pin for DP1 display (see text)
S1, 2	SPDT centre-off miniature toggle
S3	DPDT centre-off miniature toggle

9mm collet knobs suitable for potentiometer style used
Case as required (see text)
Jack sockets as required (see text)
Battery holder if required, to take four AA-size cells
Printed circuit board

Table 1—Frequency/period of Morseman rate oscillator (IC6, pin 2)

WPM	Frequency (Hz)	Period (ms)
6	4·8	208
8	6·4	156
10	8	125
12	9·6	104
14	11·2	89
16	12·8	78
18	14·4	69·5
20	16	62·5
22	17·6	57
24	19·2	52
26	20·8	48
28	22·4	44·5
30	24	41·6
32	25·6	39
34	27·2	36·5

easy to measure on the average frequency meter. The output of the morse-rate oscillator, to which the oscilloscope should be connected, is Pin 2 of IC6: Table 1 shows the relationship between period and words per minute.

Calibration of the two timers, if required, can be performed with an ordinary stop-watch, although the absolute value of the delay is unimportant: the intention of the unit is that the user works towards a state whereby no delay is required.

Setting up the Morseman

The earlier section "Learning morse with the Morseman" gave advice on the best way of using the Morseman. Assuming that the unit has now been built and is performing correctly, here is a brief summary of the way in which the various controls are set for the different modes of operation which are available:

Special items available from RSGB

Program listing and a hex dump can be supplied at no charge to members.

Three separate types of "kits" of parts are available from RSGB HQ. These do not contain components such as resistors, capacitors or semiconductors which are readily available from commercial sources. The intention of the "kits" is to make available parts which are either difficult to obtain in small quantities or which are the correct size for use in the Morseman.

Kit 1. Pre-drilled pcb and artwork. Ready-programmed 2716 eprom (normal version) Price £11.50, incl VAT and postage.

Kit 2. Pre-drilled pcb and artwork. Ready-programmed 27C16 cmos eprom. Price £15.50, incl VAT and postage.

Kit 3. TIL305 display. Display holder. Four Spectrol MD149 potentiometers. Four knobs. Case. Predrilled and lettered front panel. Battery holder. Price £32.50, incl VAT and postage.

Orders for kits should be sent to RSGB Sales, Alma House, Cranborne Road, Potters Bar, Herts EN6 3JW, specifying the kit number. If Kits 1 and 3, or Kits 2 and 3, are ordered together, deduct £1 from the total cost.

All ics for this project are available from Technomatic Ltd, 17 Burnley Road, London NW10 1ED. Due to continually fluctuating circumstances it is not possible to quote prices here, and these should be requested before ordering.

Roka plugs and sockets are available from J. Birkett, Lincoln (see *Radio Communication* advertisement).

Basic components such as resistors, capacitors and transistors are available from various sources. Many component suppliers advertise in *Radio Communication* and other amateur radio magazines; and rallies and similar events are also good sources. However, many constructors prefer to purchase via mail order and the following companies have extensive catalogue ranges and sell to the private individual:

M. S. Components Ltd, Zephyr House, Waring Street, West Norwood, London SE27 9LH (01-670 4466).

STC Electronic Services Ltd, Edinburgh Way, Harlow, Essex CM20 2DF (0279 26777).

Maplin Electronic Supplies Ltd, PO Box 3, Rayleigh, Essex SS6 8LR (0702 552911).

The above three companies accept telephone orders using credit cards.

Random numbers and/or letters with immediate display—"teaching mode"

1. Switch off unit.
2. Set L/N switch at N or L for numbers or letters, or mid-way for a mixture of both. Mode switch at Mode 1.
3. Switch on.
4. Adjust Delay 1 for gap between characters. Delay 2 for gap between groups of five characters.

The display may be switched on and off by setting the mode switch at its mid-position.

Random numbers and/or letters with display delayed—"checking mode"

1. Switch off unit.
2. Set L/N switch at N or L or mid-way for mixtures of both letters and numbers. Mode switch at Mode 1.
3. Switch on.
4. Set mode switch at Mode 2.
5. After a few seconds adjust: Delay 1 for gap between characters being sent and the display being shown; Delay 2 for duration of display.

Again, the display may be switched on and off by setting the mode switch at its mid-position.

Note that it is possible to switch from Mode 1 to Mode 2, or from L to N, or to alter morse speed control at any time.

Groups of letters of pre-determined length

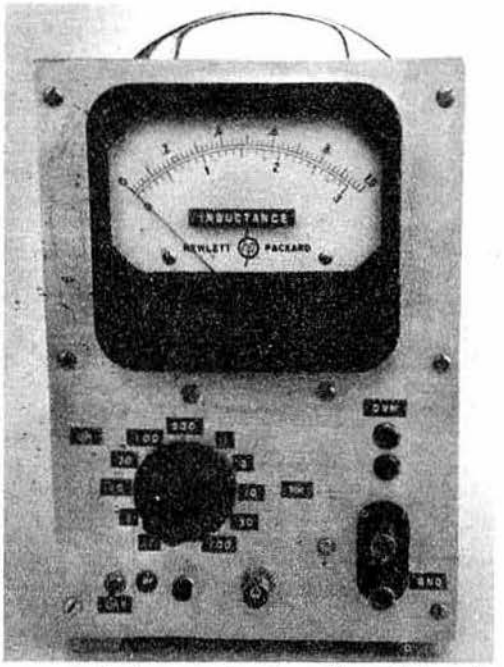
1. Switch off.
2. Set L/N in any position.
3. Mode switch at Mode 2.
4. Switch on.
5. Adjust Delay 2 for a convenient speed at which letters cycle through on the display.
6. Change position of L/N switch when the first letter required appears.
7. Change position of L/N switch when the last letter required appears.
8. Set mode switch at Mode 1.
9. Adjust Delay 1 for gap between letters. Delay 2 for gap between five-character groups or:
10. Set mode switch at Mode 2.
11. Adjust Delay 1 for delay between characters being sent and being displayed and Delay 2 for the duration of the display.

Note that the L/N switch does not operate in this "group" mode of operation.

Finally . . .

The completed "Morseman" should make the learning of morse code a pleasure. The various display modes, coupled with the versatility of the "group" mode, mean that the unit can be used by everyone, from the outright beginner to the dx-chaser wishing to raise his speeds from 20 to 30wpm! □

AN RF INDUCTANCE METER



by Fred Brown, W6HPH*

Fred Brown was licensed at the age of 16 in 1949 as W6HPH, upgrading to Extra Class in 1967. Electronics has been Fred's career as well as his hobby. He holds degrees from two USA universities, has worked as an electronics engineer, has taught electronics at college level, and has had more than 50 technical articles published in amateur and professional technical journals. During the summer he frequently operates as G5AWI.

SMALL VALUES of inductance are commonly measured on a Q meter or RLC bridge. Inductance can also be determined by resonating with a known capacitor if a calibrated variable-frequency sine-wave source is available. One advantage of an inductance meter over the traditional methods is speed: with an L-meter it's not necessary to search for a peak or null; the coil is simply connected to the meter, the proper range selected, and the inductance value read. This advantage becomes particularly apparent when sorting through a large number of unknown inductances.

A properly designed L-meter can achieve a measurement accuracy at least equal to the more traditional methods. The principle of a differentiator type of inductance meter can be understood from Fig 1. If $R \gg X_L$, the rf voltmeter reading will be proportional to inductance, and the meter scale can be made to read directly in micro- or millihenries through proper selection of generator frequency and amplitude, the value of R, and the voltmeter sensitivity.

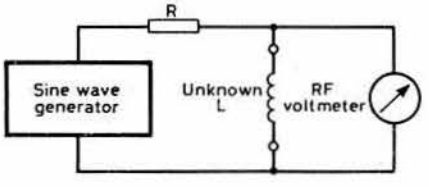


Fig 1. In essence the L-meter measures rf voltage across the unknown inductance when it is connected to a current source. The resistance and inductance together form an RL differentiator

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Errors

If R exceeds $10X_L$, the two principal sources of error usually result from the coil distributed capacitance and the finite coil Q. Unfortunately these two sources of error cannot be expected to cancel one another because they both add to the inductance reading. The effect of capacitance can be minimized by making the measurement at the lowest possible frequency. But if the frequency is too low the coil Q will be insufficient. Fortunately the effect of finite Q is negligible until quite low values are approached. A Q as low as 5 gives rise to only a two per cent error; a Q of 10 results in a miniscule 0.5 per cent error.

For each inductance range there will normally be an optimum generator frequency which will lie somewhere between a lower frequency where Q is inadequate and an upper frequency where distributed capacitance effects begin to introduce significant error.

Ranges

The oscillator frequencies given in Table 1 were chosen to minimize the effects of coil distributed capacitance and series resistance. Typically, both wire resistance and shunt capacitance increase with increasing inductance. Because of distributed capacitance the optimum measurement frequency will be lower for larger inductors but not so much lower as to prevent reactance from rising. Reactance must gradually rise in step with inductance so that it remains large compared to series resistance.

This particular instrument was designed around a meter with two scales: 0–1 and 0–3, an arrangement which permits good resolution on all ranges. Meters of this kind are sometimes called 1–3–10 sequence meters; they were widely used on many instruments during the valve era. Large numbers of such instruments are now being retired and often can be purchased for less than the price of the meter alone. The one used in this instrument came from an old Hewlett Packard 400B ac valve voltmeter. The L meter covers 0–100mH in 11 ranges, with a lowest range of 1μH full-scale.

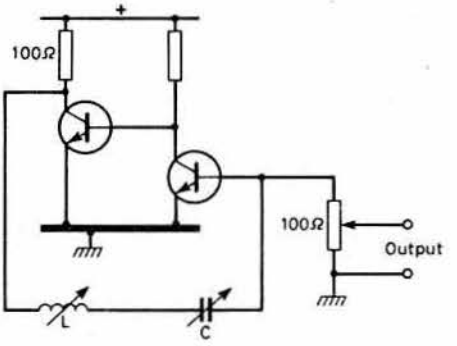


Fig 2. Simplified circuit of the sine-wave oscillator. Oscillation will occur at the series resonate frequency of L and C. A good waveform calls for a high L to C ratio. The two transistors correspond to TR9 and TR10 in Fig 4

Oscillator

The generator must produce a quite pure sine-wave since any harmonic that is present could fall near the self-resonant frequency of the coil and could thereby cause a substantial measurement error.

An op-amp Wein bridge oscillator would seem a simple solution to the generator problem, but a high-speed op-amp would be required: ordinary 741 types will not function at 900kHz.

Since no high-speed op-amp was on hand an LC oscillator was used in this instrument. One advantage over a Wein bridge oscillator is that only one switch section is required.

Three inductors are needed to cover the 300 to 1 frequency range; if attempted with two, the waveform will suffer on some ranges. The inductors need not be especially high Q, an 88mH toroid was used for one, merely because it is so readily available surplus: its high Q is not really needed.

A simplified circuit of the oscillator is shown in Fig 2. Positive feedback is transmitted around the two-stage amplifier by means of the series-resonant LC circuit. Output is taken from across the 100Ω-resistor at the *input* of the amplifier because at this point the waveform is a pure sine-wave.

As can be seen from the simplified diagram of Fig 3, the instrument utilizes three amplifiers, A, B and C. The circuit could be simplified if op-amps were used for these three amplifiers, but, again, high-speed op-amps would be needed. Amplifier C is the two-stage amplifier of Fig 2.

Oscillator output is only about 0·35V rms. This weak sine-wave must be amplified sufficiently to overcome the loss of the RL differentiator (about 26dB with a full-scale value of inductance) and brought up to a level where it can drive the meter rectifier into its linear range. All of the amplification could be accomplished in amplifier A, but to do so is to invite feedback problems. Note that the meter is not at rf earth potential. If amplifier A is run at high gain, careful screening will be needed between input and output. To avoid screening problems, some of the amplification (amplifier B in Fig 3) is placed ahead of the RL differentiator as this permits amplifier A to run at low gain.

The circuit

A totem-pole output, TR6 and TR7 in Fig 4, permits amplifier B to deliver an undistorted sine-wave of about 3·5V rms, and with an output impedance of about 6Ω. Trimpot R5 adjusts the amplitude to the maximum attainable without distortion. This sine-wave is also delivered to a front-panel coaxial fitting for general purpose laboratory use.

The range switch, S1A, selects the proper differentiator resistance value from the array of 11 trimpots. These pots are set during calibration of the instrument and will normally have values of about 20 times the full-scale inductive reactance on each range.

A high input impedance for amplifier A is provided by the fet input stage, TR1. This stage has source degeneration for gain stability, and the resulting voltage gain is only about two times. A totem-pole output stage, TR4 and TR5, drives the meter rectifier; the latter is placed in the negative feedback loop to insure linearity.

The resistor in series with the meter, R2, is chosen so that clipping occurs in amplifier A at a level about 20 per cent beyond full-scale deflection. This reduces meter wear when the meter is deflected beyond full scale. Of course, over-deflection always occurs when a coil is removed from the terminals: the normal resting position of the meter is beyond full scale.

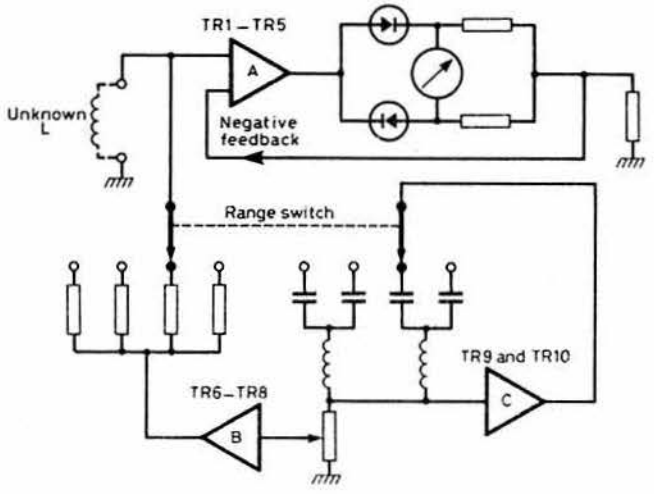


Fig 3. Simplified diagram of the L-meter. The range switch selects the oscillator frequency and the R part of the RL differentiator. For simplicity only four range positions are shown

Capacitor C1 and resistor R3 are for meter damping; the values shown are correct for this particular meter but will not generally be correct for some other make. Values should be experimentally chosen that provide maximum speed of response with no overshoot.

The 12V regulated supply, TR11 and TR12, could have been simplified through use of an ic 12V regulator such as the 7812. Discrete components were used in this case only because no suitable ic was on hand.

As an aid in trouble shooting, transistor dc voltages are given in Table 2.

Table 1. Oscillator frequencies and inductive reactances

Range	Oscillator frequency (kHz)	Inductive reactance at full scale (Ω)
0-1μH	900	5·65
0-3μH	900	16·96
0-10μH	300	18·85
0-30μH	300	56·5
0-100μH	100	62·8
0-300μH	100	188·5
0-1mH	30	188·5
0-3mH	30	565
0-10mH	10	628
0-30mH	3	565
0-100mH	3	1,885

Digital output

DC output is taken from the meter rectifier through the two 10kΩ isolating resistors and the trimpot R4, and made available at test-prod jacks on the front panel. This makes possible connection of a digital voltmeter for digital display of inductance. The inherent accuracy of the instrument, of the order of one per cent, does not justify a digital readout; but a three- or four-figure display permits resolution of small incremental changes in inductance such as occur when measuring temperature coefficients.

The trimpot R4 is adjusted for a 1·00V reading on the dvm when the L-meter is at full scale. Except for the decimal point the dvm will then correctly display inductance on the 1, 10, 100 etc scales. Another trimpot could have been added for the 3, 30, 300 etc scales, but this refinement was not felt to be justified.

Construction

Construction is not especially critical. This particular unit was built entirely on a 6 by 8·5in panel and housed in a 5in-deep cabinet, although a somewhat smaller box could have been used.

Most of the components are mounted on perforated boards such as Veroboard. Two boards are used, the power supply, oscillator, and amplifier B are constructed on one board; amplifier A and the array of 11 trimpots are mounted on the other board. These boards and the power transformer are secured to the front panel.

Note in Fig 4 how connections are made to the upper inductance terminal to avoid error from lead inductance. Likewise the lower terminal should be earthed with the shortest possible lead or with multiple short leads.

Trimpot R1 is set for equal dc voltage drop across TR4 and TR5. Similarly R5 is set to place the emitters of TR6 and TR7 at half the supply voltage. In both cases fixed resistors could be used in place of trimpots, but the resistance values cannot be predicted since they will depend on the dc betas of TR3 and TR8.

Table 2. Transistor voltages

Transistor	Source	Gate	Drain
TR1	1·73	0·00	6·81
	Emitter	**Base**	**Collector**
TR2	0·274	0·94	3·78
TR3	0·00	0·68	5·39
TR4	6·05	6·73	11·97
TR5	6·05	5·39	0·00
TR6	5·99	6·66	11·97
TR7	5·99	5·32	0·00
TR8	0·18	0·87	5·32
TR9	0·16	0·654	3·94
TR10	3·39	3·94	10·97
TR11	11·97	12·61	18·12
TR12	5·77	6·43	12·61

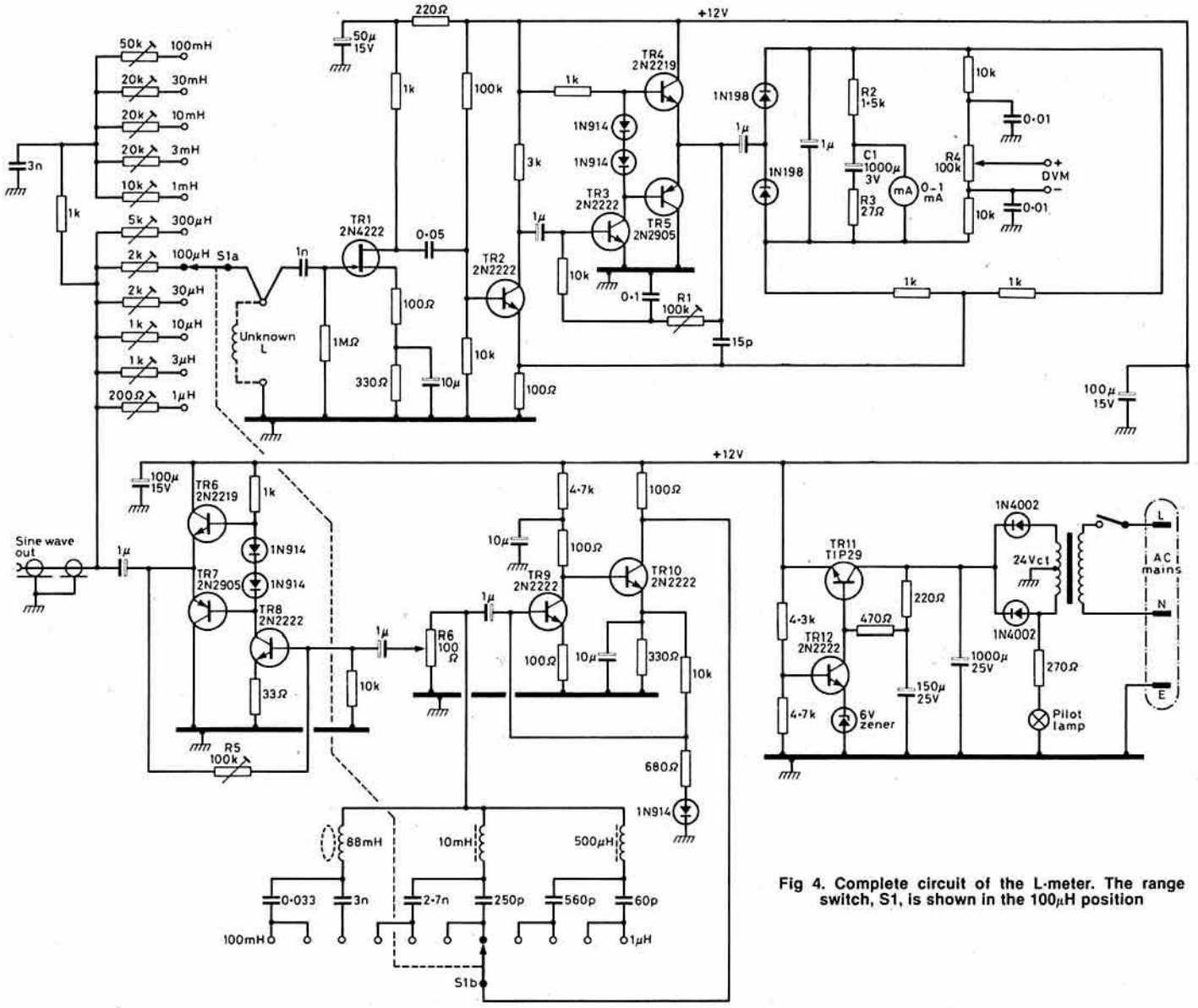


Fig 4. Complete circuit of the L-meter. The range switch, S1, is shown in the 100µH position

Calibration

Known values of inductance can be used for calibration, preferably one coil for each of the 11 ranges. Ideally these coils should have high Q, low distributed capacitance, and have inductance values that fall somewhere in the upper half of the meter scale. The inductance values can be determined with a Q-meter or RLC bridge, the latter is usually more accurate for larger inductors because it operates at a low frequency (usually audio) where capacitance effects are negligible.

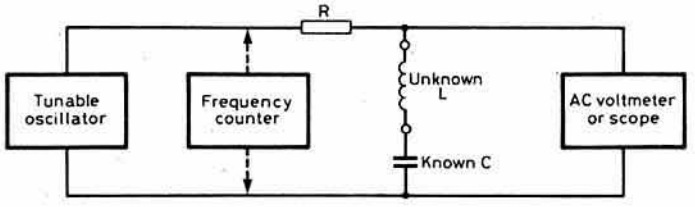


Fig 5. Inductance can be determined by resonating with a capacitor of known value. The frequency counter will not be needed if the tunable oscillator is accurately calibrated, but in any event will improve accuracy

Another way to determine inductance is with a tunable oscillator and known capacitor, as shown in Fig 5. Unlike parallel resonance, the resonant frequency of a series-tuned circuit is independent of coil resistance. This series resonance procedure can be carried out at a low frequency where distributed capacitance will not affect accuracy.

If the oscillator is tuned to resonance as indicated by a null on the ac millivoltmeter or oscilloscope, the inductance will be

$$L_{\mu H} = \frac{25{\cdot}33 \times 10^9}{f^2_{kHz} \times C_{pF}}$$

If no Q-meter, impedance bridge, or calibrated oscillator is available, a fair job of calibration can still be accomplished by substituting non-inductive resistors for the desired inductive reactances. Still needed, however, will be an accurate knowledge of the instrument's operating frequencies.†

Also it should be borne in mind that the different phase relationships of resistors vs inductors can give rise to a source of error. The assumption of a constant current source in Fig 1 is quite valid in the case of the inductor since its voltage is in quadrature with the voltage across R. This relationship no longer holds true when a resistor is substituted. The voltage across the resistor will, of course, be in-phase with with the drop across R. Since R is about 20 times X_L at full scale, an error of five per cent can result. To compensate, it is advisable to set the trimpots so the meter reads about five per cent low if resistors are used in place of full-scale reactances. If mid-scale values are used the compensation would be 2·5 per cent etc. □

†The highest four frequencies can be accurately measured by tuning in the harmonics on a communications receiver. The harmonic content at the collector of TR10 is strong enough to enable harmonics of 900kHz to be heard through 3·5MHz and harmonics of 30kHz through the medium-wave broadcast band.

Microwaves

*by Mike Dixon, G3PFR**

Detecting microwave "lifts"

Phil, GW3PPF, makes a number of points arising from DC0DA's comments on the use of 1·3GHz for monitoring propagation for the higher microwave bands (*Microwaves* May 1984). He suggests that it would be fruitful to call on 1,296·2MHz, indicating clearly the higher bands available, having himself wasted many hours abortively calling on 144·33 and 144·175MHz, "getting lost amid the welter of non-microwave stations doing the same".

He goes on to say "My method is to watch the weather charts on tv, and when these start to look promising, I monitor distant 433MHz repeaters (these being very great in number and lying in many different directions). When they become strong I take to the hills, but limit my height to about 1,000ft (in fact 600 to 700ft seems to be optimum) and start waving dishes about".

Using such methods Phil says that "during the last 12 lifts I have managed to take observations on at least one day during 10 of them: from these 10 GB3ALD (10GHz) has been heard during six of them, peaking typically to 30dBn".

This of course all ties in with the point that I and others have made many times—the higher the frequency, the higher the probability of the formation of td's (tropospheric ducts), as the refractive layer(s) can be so much "thinner" than for lower frequencies. With regard to Phil's observations on height, I would agree, as under real lift conditions both the 432MHz and 1·3GHz Emley Moor beacons often completely disappear at my QTH (the 1·3GHz beacon is usually only just audible in any case). From this I infer that the beacons must be above the refracting layer(s), and that signals are unable to propagate downwards. This would indicate "duct" formation over-land at between a few hundred feet and perhaps 1,500ft. For stations near the sea (and almost at sea level) over-water ducts are, under such conditions, often formed by advection as well as surface evaporation, making the effects over water even more probable, widespread and stronger than over-land. Such stations are in a prime position to launch their signals into the duct "waveguide", hence the well-known "east-coast microwave dx effect", which is apparently observed across the Pacific and the Great Australian Bight as well as from East Anglia to the Continent!

Operating news

During VHF NFD Don, G3JHM, had a notable crossband contact with PA0EZ. After exchanging reports on 1·3GHz Don received Aries' 300mW 10GHz ssb at 15dBn over a path of 450km, with Aries' signals "detected within 10kHz of the stated frequency". This must be one of the longer paths worked since the establishment of the world record in Italy.

Chris, G4DGU (XK or IO70 square), indicates that he is active on 1·3GHz with 100W to a 1·2m dish, which, with a masthead MGF1202 preamplifier "gives a troposcatter range of about 350km under normal conditions". He would welcome skeds on this band or on 10GHz (wideband) describing Devon as "a lonely place for microwaves". He reports that G4SJP is also active on 10GHz and "a phone call to the works QTH will raise a sked with either station".

A recent 10GHz activity day was arranged by Peter, G3PHO, and the South Yorkshire Microwave Group to try to activate the north-east side of the country. The event seems to have been very successful, with 18 stations participating within an area bounded by the Dales, North York Moors, the Wolds and parts of Leicestershire. It is unfortunate that Ray, G3NKL, who climbed Great Whernside (2,300ft), and G6NVC and G8DPB, who made a long journey from Dagenham to Leicestershire, made no contacts at all, although paths varying between 45km and 127km were worked. More "impromptu" activity of this kind is to be encouraged, and I would be pleased to receive news of the results of such activities. I feel certain the *Newsletter* editors would also welcome notice of your intentions for inclusion in that publication. Keith, G6HHV (Ellesmere Port, QTHR), and several other stations have formed a microwave activity group with the callsign G1GHZ. At the moment they are concentrating on "stirring up activity on 10GHz wideband"—they are out on sites around the Wrexham area most weekends conducting tests, and contacts will be most welcome. The Mid-Cheshire (Delamere Forest) Group, callsign G4ZTT, intends to be similarly active over the coming months, and plans for activity include operation from Snowdon next spring.

Charlie, G3WDG, worked PE1GHG and PA0FRE on 2·3GHz from his home QTH on 22 August. Later, following "Continental tv interference warnings" on 25 August, he worked five more Dutch stations, G3ZEZ and G4NQC, and heard the Dutch beacon PA0TGA, all on 2·3GHz. He described it as "quite an exciting evening, although, unfortunately, the lift did not extend much further than DM square". These activities serve only to underline GW3PPF's comments.

Mike, WB3LJK, writing from Indiana, indicates that he is about to abandon the "cb-like 144MHz" and go higher in frequency. He has just joined the RSGB, built four JVL loop antennas and power splitters for 1·3GHz, and has acquired a collection of high-powered 6·2GHz equipment which he hopes to modify for operation on 5·7GHz along with partner station WA4PGI. It will be interesting in due course to learn how these stations fare on the two bands.

Alan, GI8YDZ, who was writing from Antrim (WP76b), says he is now QRV on 1·3GHz with 120W to four by 23-element Tonnas and a masthead MGF1412 preamplifier. He indicates that skeds would be most welcome (QTHR) for, as he points out "the nearest square with any significant activity is YN at about 350km". He is active on 144 and 432MHz and will QSY on request. By the time this report is read he expects to be QRV on 10GHz (wideband).

Keith, G6NVC (AL31, JO01CM), also reports activity on 1·3GHz. His equipment, 30W to four by 23-element Tonnas at 10m above ground at his sea level QTH, yielded a number of good contacts on 25 August, the most notable being GM8MBP at 656km (1·5W to a 15/15 Jaybeam) and G4VCJ at 363km (800mW to a single 23-element Tonna). Keith is also active on 10GHz wideband and reports a successful "first season".

Microwave Committee components service

The latest update from Steve, G4KNZ, QTHR, is as follows: Driver board with trapezoidal capacitors, £4.60; Low-voltage-drop regulator boards, £1.50; 1,000pF trapezoidal, 1,000pF and 100pF chip capacitors, 6p each; MGF1402 GaAsfets, £12.50; 94·6666MHz crystals, £4.00; Snap varactors, MD4901, £7.00; GDH033 24GHz oscillators, £25.00; Copper WG20, £3.60/ft; WG20 flanges, £3.80 each; and various point contact diodes, price on application. When making enquiries, please do not forget an sae and that orders carry a 50p *per order* handling charge.

Fundamentals (5)

Again, available space will only allow a brief discussion of the remaining module which makes up the basic and fundamental 10GHz transceiver—the i.f. amplifier, demodulator and audio unit. In some ways this is the most controversial, as 100,30 and 10·7MHz have all been used for this purpose, and often with well-justified reasons. 100MHz using cheap pocket-portable broadcast receivers is the easiest route to take. However, it suffers increasingly from i.f. breakthrough, and the extensive retuning necessary between receive and transmit (due to lack of a truly "common" i.f.) is both a chore, and requires a degree of skill, luck and good oscillator resettability. Duplex operation using nominal 100MHz is, for these reasons, rare.

Using modern Gunn diodes and well-designed oscillator cavities direct conversion to 10·7MHz is feasible, and several designs and kit-form i.f. strips are available, most of them fairly basic. Those which are most versatile are based on the complete signal processing offered by ics, such as those mentioned in the October column, that is, the CA3089/CA3189 series. A good preamplifier at any frequency between 150 and 10·7MHz is the SL560C; a satisfactory af amplifier the LM380N; and, as already mentioned, the Gunn supply and modulator functions can be provided from a 7805 regulator ic. Adequate signal filtering is provided by one or two small, inexpensive ceramic filters, and matching from the microwave mixer into the preamplifier ic is readily provided by an LC network in the form of small Toko inductors. One advantage of the move of operating frequencies up to a suggested 10,350 to 10,400MHz is that if the oscillator is centred at, say, 10,375MHz, it should prove possible to "push" the oscillator at least 10MHz (and possibly more, depending on the individual diode and cavity), thus minimising or perhaps even eliminating the need for *elaborate* mechanical tuning drives. It is hoped that next month it will be possible to give much more detail of suitable circuitry, and a board layout for 10·7MHz.

For masthead use i.f. breakthrough can be troublesome at 10·7MHz, and it may be desirable to consider the use of a small, simple converter designed to convert the signal from a first i.f. of 30MHz down to 10·7MHz, enabling interference-free 30MHz to be used from masthead to operating position.

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

Technical Topics

by Pat Hawker, G3VA

AS ANOTHER YEAR draws to a close and we settle down to Christmas and the New Year, it is time to shake off all gloomy prognostications. For whatever doubts may have been expressed in *TT* and elsewhere during past months, there are still valid reasons for feeling that, in the overall scene, amateur radio remains in good shape. The various niggles are lightweight in comparison with the solid and enduring features of the hobby.

I remain surprised when I read in *Members Mailbag* so many complaints of inconsiderately rude operating practices that appear to have crept into some bands, some modes. As an old-fashioned hf cw operator I detect few signs of any noticeable deterioration on my favourite segments. Yes, a few people attempt to send faster than they should or use complex keyers on-air without sufficient practice—but there were always such; some beginners, not unnaturally, are painfully slow but seem to improve dramatically in a matter of weeks (or perhaps desert to ssb); a few old-timers develop "brass-arm" or "tin ears", but many others do not. The standard of signals seems high. Rare dx, admittedly, brings out the worst in most of us—but it always did. Even on the most crowded bands it is usually possible on cw to sort out wanted from unwanted signals. More people now listen on frequency before launching into CQ calls. Activity among British amateurs on hf cw, including that of many newly-licensed Class A stations, seems definitely to be on the increase. As far as one can judge many amateurs are retaining an interest in technical matters, and their expertise is catholic—from valve to solidstate, from QRP to QRO, from the simplest wire antennas to those impressive monsters that originate the Japanese signals that roar in when conditions are reasonable. Some people even construct some of their own gear.

So, with our Christmas cheer, let us this month look optimistically to the future. There will be time enough in 1985 to discuss the grey areas!

THIS MONTH

Elephants sometimes forget—the volatile memory
British Telecom Research at Martlesham
Narrowband television
Cellular 900MHz mobile radio
Car electronics and emc
The transmitter/antenna interface
A vote for the "ultimate"
But cheers also for spc
Z-match atu
Digital switched-capacitor filtering
Battery sulphation and Glauber's salt
Treat rechargeable batteries kindly

Elephants sometimes forget — the volatile memory

The incorporation of electronic memories in amateur radio transceivers has reached the stage where amateurs now regard such facilities as standard practice for top-of-the-line equipment. However, in many current transceivers the information stored in such memories consists of little more than channels or frequencies of often-required stations (eg hf broadcast stations in a general coverage receiver, or the local "net" frequencies). If these are lost there is no real problem, as it is a straightforward matter to re-program the memory.

In some equipments, however, the "memory" has become virtually the central brain, replacing manual switches and controls. An accidental loss of memory cannot then be made good by the operator but needs factory servicing. In order that information stored in a ram memory is not lost when the equipment is turned off, or when there is a temporary power failure etc, it is normal practice to convert the memory into a "non-volatile" system by including a long-lasting battery in the transceiver. This should preferably be a lithium battery with its high-energy, long-lasting characteristics. With such a battery the memory remains programmed over many years, whether the set is in use or not.

Neil Glover, G3AAV, and others, however, have been rather horrified to discover from the *Icom Newsletter* issue 47, September 1984, as issued by International Radio Inc of Florida, the problem posed by the battery memory back-up in some current Icom models and possibly in similar models from other manufacturers. The note applies specifically to Icom IC751, 745, 271 and 451 transceivers, but seems likely to apply to most equipments where the memory forms a vital part of the basic unit. According to the newsletter, the failure of the lithium battery, either due to a fault, or more likely, simply due to its reaching the end of its useful life, requires sending the whole unit, or at least the particular pcb involved, back to Icom to change the battery and reprogram the ram memory.

Robert Pohorence, N8RT, editor of the newsletter, suggests that users should date the battery, either physically or in the owner's manual. As the maximum useful life is of the order of seven years, he suggests to be on the safe side that the battery be changed during its fifth year. This could be done by arranging to power the pcb from a 5V dc source, during the unsoldering and replacing of the lithium battery, while ensuring that the ram circuitry remains continuously powered throughout the operation.

This pre-supposes that you have available a lithium battery similar to that fitted originally — and have confidence in your ability to carry out the operation correctly. As G3AAV comments: "Thank goodness my Icom 730 involves no nonsense of this kind. . .but I wonder how many modern equipments have 'built-in obsolescence' of this type. What guarantee has the user that the firm or firms involved, or their agents, will still be in existence when the problem arises? Will they still be interested in servicing what by then will be an out-of-date model? How long will it take them to return the gear? How certain can we be that the correct size of soldered-in lithium battery will still be available?"

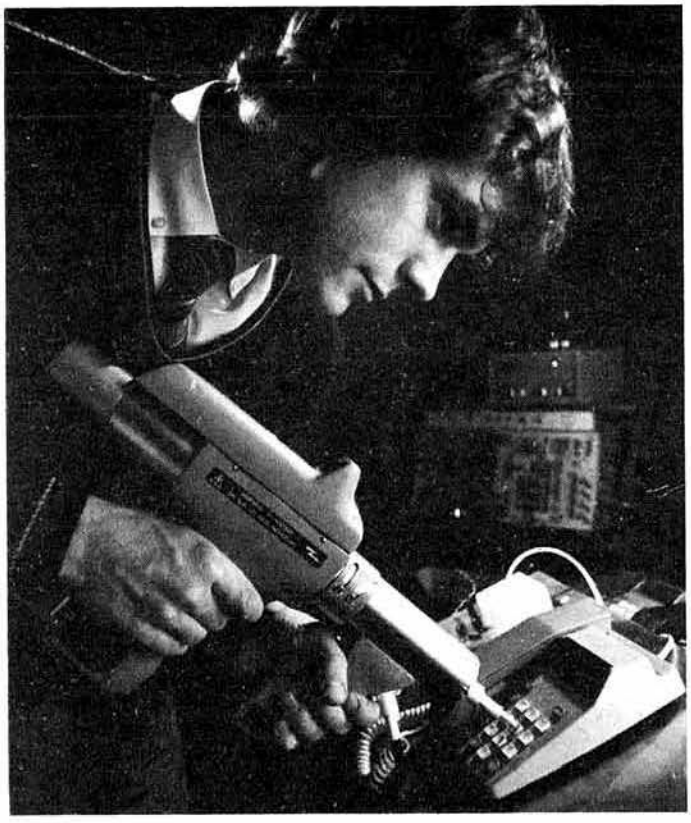
I would stress that the Japanese firms have established a first-rate reputation for supplying spare parts etc promptly and efficiently. Nevertheless there could be problems. For example, if you buy a secondhand model you may have no very clear idea of how soon you will need to replace the battery. If the problem has not been explained to you the chances are that the battery will stay in place until it fails. Then there is the question of "authorized agents", who not infrequently decline to service models that have not been purchased from them.

Reputable manufacturers of consumer electronics normally undertake to maintain "spares" for a minimum of seven years after a model has been discontinued. But careful users of a high-cost transceiver are likely to expect far more than seven years of useful life. There are plenty of amateur radio equipments still in use many years after the firms that made them have vanished or lost all interest in the amateur market. While users of vintage valve equipment always accepted that valves tend to have a finite lifetime, at least these were made as plug-in replacements and did not require factory-servicing when they failed. And it is still possible, if increasingly difficult, to find sources of valve types introduced over 50 years ago!

British Telecom Research at Martlesham

In the September *TT* I referred briefly to some of the current professional and academic research projects on anomalous radio propagation at RAL, BRT at Martlesham, and at various British universities, as reported during a national URSI symposium last July. Steve Cherry, G3SJK, rather took me to task for seeming to suggest that the propagation work formed a major part of the current research at the large Rutherford Appleton Laboratory. In fact, of course, this occupies only a tiny part of RAL's resources, and staff at RAL also cover all aspects of high-energy physics, molecular research on neutrons, space research, high power lasers and the like.

Similarly, my reference then to the Martlesham work by British Telecom research staff on digital radio propagation should not be read as suggesting that this is other than a very small part of the work of BTR. Indeed, during



This is not an irate amateur attacking a Sceptre 100 telephone as a result of rfi, but a BTR engineer subjecting it to a static shock of up to 10,000V to ensure that the memory store is not disrupted by static. It also shows up any susceptibility to rfi and resistance to lightning discharges. But did BT carry out such tests *before* putting their electronic telephones into service?

a very full day spent at Martlesham in mid-September, it was possible to see and absorb only a tiny part of the work of this very large establishment. It was interesting, for example, to note the continuing progress being made in optical communications, including the development of optical systems for ocean cables, using lasers and glass fibres.

In this field remarkable results are now being achieved using extremely narrow-band (single spectral line) semiconductor laser systems with frequency shift keying rather than the customary on-off modulation. These are used with heterodyne-type receivers, analogous to superhet radio receivers and converting the incoming light signals down to a 560MHz i.f. A new dx record for optical systems having no intermediate repeaters has been established by sending 140Mbit/s digital signals along 200km of fibre.

There are a considerable number of radio amateurs on the staff of BTR, and several kindly drew my attention to projects that may well have a future bearing on our hobby. In view of the problems of rfi on the new generation of electronic telephones, it was pleasant to find a lively recognition at Martlesham of emc/rfi problems and to receive some assurance that telephone designs are being made more resistant to local rf fields.

Less reassuring are the implications of some of the work being done on "leaky coaxial cable" systems. Special forms of leaky coaxial cable have been used for a considerable number of years to provide communications in tunnels and mines where the environment inhibits conventional radio systems. BTR is investigating leaky cable systems as a means of distributing longer-range vhf signals within a building, providing local pick-up on cordless telephones without requiring elaborate antennas on the cordless units. This sounds an excellent idea and no criticism is intended of that work.

The worrying point is that BTR has found that a conventional tv-feeder cable acts as a very effective "leaky cable", suggesting that if signals can leak out, they can also leak in. The amount of leakage from the feeder is relatively small, so that the attenuation characteristics of the cable are only moderately affected. The reason why ordinary cables can be used is that tv-feeder cable and other lower-cost forms of coaxial cable now have an outer braid coverage of only about 40 to 50 per cent of the total surface, as mentioned on several occasions recently in *TT*.

The BTR work thus suggests that we now face a greater chance of causing tvi, additional to pick-up of local signals on the outer braid. It appears that we can no longer think of low-cost cable as rf-screened cable.

Narrowband television

For some years, Martlesham engineers have been developing a fast-scan plus slow-scan system for video conferencing etc that can operate over a 2Mbit/s digital link providing a reasonably high-quality colour or black-and-white picture except in the presence of fast motion which inevitably results in blurring and pronounced lag. Digital video to broadcast standard can involve bit rates in the studio over 200Mbit/s although this can be processed down to about 140Mbit/s for inter-city distribution with virtually no detectable loss of picture quality; and down to about 35Mbit/s for inter-continental distribution over satellite circuits. But 2Mbit/s represents an extremely high degree of bit-rate reduction, permitting a reasonable quality tv picture to be transmitted in a limited bandwidth while retaining the advantages of digital transmission.

Such a system would overcome many of the present problems of amateur tv operation, but unfortunately there is a major snag. The BT codec (coding/decoding equipment) occupies a large rack and costs around £40,000. Much of this cost is accounted for by the need for large electronic memories for the digital processing; nevertheless the cost of frame-store memories may well continue to fall, with ccd chips offering some 120,000-bit memories expected to become available soon at costs low enough for them to be put into tv receivers, so there may well be opportunities opening up for narrowband fstv. The BT system, already in operational use, also provides document transmission capable of really sharp good-quality reproduction; this is achieved by switching over to a form of sstv.

Microwave enthusiasts would similarly envy the BTR its new system that permits extremely accurate alignment of the dishes used on terrestrial microwave links of up to about 35km hops, using a system that provides a direct read-out of alignment data with remote control of the distant dish.

Cellular 900MHz mobile radio

Both the BT/Securicor and the Racal "Vodafone" cellular systems are expected to be operational in many parts of the country next year. The BT system uses equipment manufactured by Motorola.

I have to admit to having doubts as to the safety aspects of cellular radio when used by operator-drivers. These were partly, but by no means entirely, dissipated by learning that BT hopes to have a hands-free telephone instrument before long—since the presently-planned handsets with keyboard dialling can hardly fail to be a handicap to safe driving. Even with a hands-free instrument, the possibility will remain that drivers linked into the public telephone network could be emotionally disturbed by some messages, and their driving affected. It seems regrettable that so little interest has been shown by transport authorities since the 'sixties in the safety implications involved in the widespread use of mobile telephones by drivers. One notes that publicity photographs tend always to show their use by passengers, yet everybody recognizes that in practice they will be used as much, if not more, by drivers.

Frequencies around 900MHz are likely to be used increasingly. BTR is

Field trials of the British Telecom/Securicor 900MHz cellular mobile radio system due to be in operation in parts of the UK next year, linking vehicles with the public switched telephone network. In urban areas cells may be only 2km in diameter, in rural areas up to 30km. Cell transmitters are switched by computer-controlled exchanges, automatically transferring the radio links from one cell to the next. But one notes that this photograph shows the mobile telephone being used by a passenger—a lot safer than when used by a speeding driver!

developing cordless telephones operating in this part of the spectrum, and these will work full duplex using a single radio channel. The system uses digital fsk modulation in a single 100kHz channel using burst-mode duplex operation with time-compression and a bit-rate of about 70kbit/s, possibly in conjunction with a diversity arrangement for the fixed terminal. It is claimed that, by using this technique, over five times as many cordless telephones could be used in a square-kilometre than with more conventional split-frequency operation. I am not sure whether to groan or cheer at this information. It would be nice to get these devices out of the 1·8MHz part of the spectrum, but I wonder how vulnerable cordless telephones are to rfi?

Car electronics and emc

Five years ago, Chris Rees, G3TUX, raised in *TT* (November 1979, p1037) the question of radio-frequency interference affecting the increasing number of semiconductors and microelectronics devices being fitted in cars. He wondered whether this might not become a major headache for mobile operators. Though he also expressed the hope that "since so many of the devices being fitted in cars originate in the USA or Japan, where there are so many vehicles fitted with two-way radio, the manufacturers may have already taken this into account."

This hope, unfortunately, seems to have been over-optimistic, as evidenced by the reports from time to time of amateurs being faced with expensive repairs when their local rf fields wipe out memories or otherwise inflict damage on the now sophisticated car-management systems based on electronics.

That some designers still seem incapable of overcoming the many problems of electromagnetic compatibility (emc) was underlined recently (as Mike Rhodes, G4FMS, notes) by the crash in West Germany of a £15-million RAF Tornado aircraft, allegedly due to its on-board computers being affected by the very high power broadcast transmissions from Radio Free Europe.

Pat Painting, G3OUC, has drawn attention to an article "Paying the price for protection" by Peter Eustace (*The Engineer* 16 July 1984), which emphasizes that "the danger of a serious, possibly fatal, car crash following the disturbance of electronic circuitry by stray radio frequencies is becoming more likely as vital control functions are transferred to electronics". Yet the author indicates that it was not until about 1983 that British car manufacturers finally admitted that "in controlled tests, failure could be induced in engine management systems by exposing them to high-power radio waves".

The problem has been intensified, at least to some degree, by the increasing use of plastics to house the electronics, though radio amateurs would probably point out that equally important is the use of ineffectively-screened interconnection wiring.

Much of *The Engineer* article is concerned with the use of various techniques such as conductive paints and adhesive foils to provide better screening, and the claims and counterclaims being made by the firms now supplying conductive coatings etc. This subject was discussed in *TT* May 1983, p427, in some detail.

Peter Eustace wrote: "The newest development is conductive compounds. These use conductive fillers that are mixed into the plastics before moulding; the protection is built into the housings rather than applied later. Unfortunately manufacturers claim that this system is not economical so far . . . in these mass markets the final solution is bound to be a compromise between the levels of protection and the cost. As to which supplier of which technology will win the day, it remains to be seen what will be under the bonnets of the next batch of models to come from the car manufacturers."

The cynic may feel that if a £15-million aircraft can be knocked out by flying over a broadcast transmitter, the chances of other than a low-cost compromise solution being adopted for mass-produced cars, sold to a public that is unlikely to have heard of rfi or emc, cannot be rated very high, unless there is clearcut legislation on the subject.

The September *TT* showed that small sparks can occur at considerable distances from high-power transmitters when metal work acts as a resonant antenna. The risk of this happening tends to be greatest at mf/hf and less at vhf/uhf. Some idea of the extent of this problem can be gleaned from the Admiralty marine chart for Dubai, United Arab Emirates. This shows a "danger area" stretching almost *seven miles* from a broadcast transmitter running at about 2MW to a directional antenna. The chart carries a note that within the danger area "a fire hazard to electronic equipment exists owing to radio transmissions in the 1,470 to 1,490kHz frequency band. Masters of vessels are advised to avoid the area". While I would be very surprised to learn of a receiver going up in flames at such distances, it is worth noting that the British Standards Institution is busy on a "draft British Standards guide to prevention of inadvertent initiation of electro-explosive devices by radio-frequency radiation", though the final document has not yet been published. It does appear that tiny sparks can be induced over a few hundred metres at power levels not entirely unknown in amateur radio—though not at seven miles!

The transmitter/antenna interface

There are times when those of us who have been using hf transmitters for several decades begin to feel that we must be losing touch with current thinking. Take for example the business of connecting a transmitter to an antenna. In the early days this was usually accomplished simply by tapping in the end of the antenna on to the pa tank coil, via a legally-required dc blocking capacitor. Many of the pioneers of hf soon discovered that this technique also provided a reasonably-sensitive indication of antenna resonance, as a non-resonant antenna, with its inductive or capacitive reactance, "pulled" the tuning point of the pa dip in order to compensate for the j-component by tuning it out.

Then came the technique of having a coupling coil wound on the plug-in pa tank coils and used with series or parallel tuning to suit the high or low feedpoint impedances. With push-pull amplifiers there was often the refinement of a swinging link coil, providing a low-impedance output that could be used directly with low-impedance balanced or unbalanced feeders, or with a separate tuned circuit which, so-to-speak, provided the equivalent of the tank coil. Few people worried unduly about the harmonic output of the early pre-tv transmitters, although the technically-minded wrote about (and sometimes actually used) "Faraday screens".

Towards the end of the thirties Arthur Collins, W0CXX, showed how pi-networks could provide a "universal" antenna matching system, though the balanced version started to look rather complex, as ideally it needed at least two roller-coaster type variable inductances. Most of us stuck to the simpler arrangements outlined above.

The post-war need to reduce tvi brought about renewed interest in the harmonic suppression characteristics of the pi-network, and this soon moved into the transmitter to form the tank circuit, leading to the virtual disappearance of the push-pull "balanced" amplifiers, and introducing the concept of "tune" and "load" controls that permitted the transmitter to match directly into various impedance loads. The search for additional harmonic suppression soon led, however, to the fixed-impedance low-pass filter which meant that transmitters were designed to work into a 50Ω impedance (though this does *not* mean that transmitters can be regarded as representing a 50Ω source impedance). With such an arrangement good harmonic suppression could be achieved and the output from the pf fed directly to a centre-fed resonant antenna element via coaxial cable. Antenna tuning units were relegated largely to those who wanted to use end-fed antennas, open-wire balanced feeders etc, or for those who found they still needed a few extra decibels of harmonic suppression.

So it might have remained had it not been for the growing popularity of solidstate transmitters incorporating protection circuits. These refuse to provide full output power if the swr on the coaxial cable to which they are connected rises above about 1·8:1, and sometimes even lower. Few practical antennas provide such a low swr over entire bands without the intervention of an antenna matching unit. In effect, with broadband solidstate circuitry we may have eliminated the need to tune tank circuits, but the result often enough has been the need to use and adjust an atu to ensure that the transmitter always looks into a matched load. With the modern dislike for manual controls, this has led some firms to adopt automatic tuning techniques in their increasingly complex atus.

The result is that today the atu is back in vogue, in many cases an essential requirement for an efficient hf station. But there is a price to pay for this —currently anything from about £100 to around £350 or even more, a far cry from the days when a coil and wide-spaced variable capacitor gave us all we needed. It is worth remembering that the older "kiss" systems can still transfer the output from a transmitter into an antenna system just as effectively as the most expensive units now on offer, although possibly with less flexibility and ease of operation — see below.

A useful survey, including component values for typical arrangements, was given by Louis Varney, G5RV, in *Rad Com* August 1983, pp702-4. He distinguished between an atu required to provide a good match to a resistive, non-reactive feed line, and the more common situation of what he termed an "astu" (antenna system tuning unit) needed to bring the

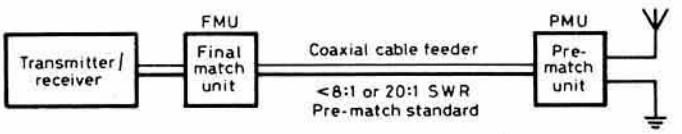


Fig 1. The two-stage tuning and wide-range antenna-matching philosophy of G3LHZ discussed in *TT* September 1981. The pre-match unit is a 4:1 coaxial cable balun

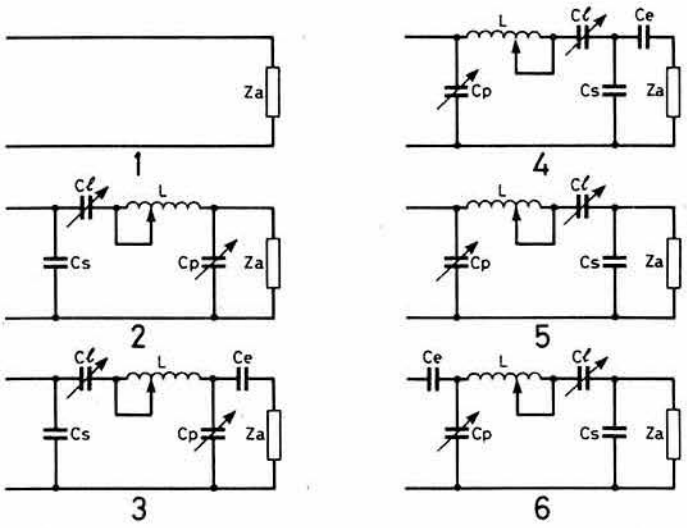


Fig 2. Network configurations of the final match unit shown in Fig 3, basically a reversible L-network. The C1 series capacitor replaces the need for a continuously-variable inductor L and permits the use of taps.

complete antenna system including element, feeder, earth, radials, counterpoise or what-have-you into resonance (conjugate match). Remember that whatever you may have been told there is no magical property whereby a resonant element radiates better than a non-resonant one. The attraction of a resonant element, with its purely resistive feedpoints at the centre or ends, is that it can be fed effectively and efficiently without needing to tune out any j-factor. The increasing use of multiband verticals and the new non-harmonically-related 10, 18 and 24MHz bands have made it important to be able to cope with a wide range of resistive and reactive impedance situations, though one perhaps needs to emphasise that simple series/parallel-tuned systems with open-wire feeders can still provide a very practical and low-cost solution. Costs begin to rise steeply when roller-coaster variable inductors and high-value, high-voltage variable capacitors form an essential part of an atu.

A long paper by Dr M. J. Underhill, G3LHZ presented at a 1981 IERE conference (published in *IERE Conference Proceedings No 50,* "Radio Receivers and Associated Systems", pp101-35) contains design information on wide-range antenna matching networks including a survey of their respective merits and drawbacks. The paper makes it clear that developing a low-cost unit capable of matching a transmitter to an antenna at any frequency between 1·6 and 30MHz is not particularly easy: in practice he advocated a two-step transformation by including a 4:1 coaxial balun in the system: Figs 1, 2. His main unit is in the form of a reversible low-pass L-network, on the grounds that a single stage of impedance transformation over this very wide frequency range calls for awkwardly large values of low-loss inductance, and high-voltage, high-value variable and fixed capacitors. G3LHZ later provided (*TT,* November 1981) a version suitable for use above 1·8MHz, as this significant reduces maximum values: this version is shown in Fig 3. Two 1,600pF variables, however, do present a problem.

It should be stressed that given perfect components with suitable maximum/minimum ratios it is possible to match any impedance (reactive as well as resistive) to any other when using the basic L-network in a step-up or step-down configuration. Note that G3LHZ overcame the need for a continuously-variable roller-coaster by showing that a similar variation can be achieved with a tapped inductor and series capacitor.

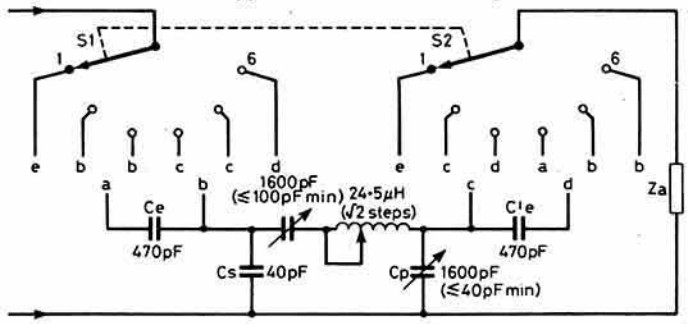


Fig 3. G3LHZ's final match unit. The series capacitor eliminates the need for a continuously-variable inductor and permits the use of a tapped coil. An available roller-coaster could replace both components

The atu debate continues

It is not altogether surprising that this whole subject of transmitter-to-antenna interface still continues to generate considerable debate, with amateurs tending to favour arrangements that they have found suitable and economical in their particular circumstances. It would be a brave or foolhardy writer who claimed categorically that any one network was clearly superior to all others. This is borne out by some of the interesting correspondence received following the publication of the item on "ultimate versus apc transmatch" in *TT* September 1984, pp770-1.

For example, Peter Chadwick, G3RZP, is unhappy about virtually all forms of spc, pi, L and Z-match arrangements. He writes:

"Having used, rather against my better judgement, the spc arrangement for some years, I find it, in common with all two and three variable-component atus, disappointing. Starting from the question of bandwidth, my antenna is 12·5 + j22Ω at 3·55MHz. Using an spc circuit, the 2:1 swr bandwidth is only about 20kHz (±10). The use of a 4:1 transmission line transformer and a series capacitor gives 4·5A of antenna current as against 3·5A, a gain of 2dB.

"So in this case, it is obviously not a desirable circuit. Obviously again the working Q (Qw) is too high. It is not for nothing that textbooks for the past 50 years have advised a working Q of 12. If you double Qw, you double the circulating current and since $P = I^2R$, you get four times the losses. Exactly the same arguments apply to pi, L- and Z-matches—no amount of promotion or advertising can change the basics of electrical network theory! Note, incidentally, that the vast number of atus on offer for amateur operation are limited to a 5:1 vswr. Fortunately, the answer (as usual in radio communications) has been around since pre-war days. It is our old friend the parallel tuned circuit: Fig 4(a).

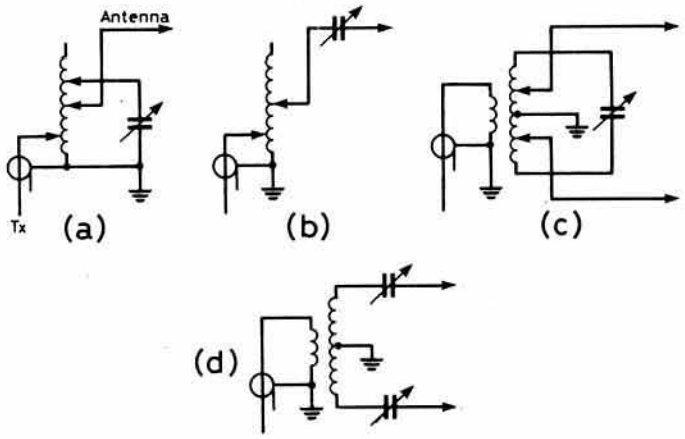


Fig 4. The "kiss" 1930-50 style matching networks favoured by G3RZP

"This acts as a tuned auto transformer: suitable selection of tapping points and Qw may be set up to the desired figure: 'Thumb's rule' says use 1·5pF/m of wavelength. This gives an R_D for the circuit of about 5KΩ for Qw = 10, which matches almost everything. Inefficiencies are leakage reactance in the coil and resonances in any unused portion of it. Very low resistive loads may need series tuning as in Fig 4(b). Note that leakage reactances get tuned out, so they're not as much trouble as might be expected. The balanced versions (Fig 4(c) and (d)) are well known.

"The advantage of the parallel circuit is the dc ground electrically connected to the antenna. Some years ago I came across a reference which suggested that a dc ground causes a discharge of the local field, so decreasing the likelihood of a lightning strike. How true, I do not know.

"These varieties of atu are not popular with manuafacturers for several reasons: for multiband operation they involve either lots of switches, or taps, and are no so easy to set up. Some of us, however, are prepared to trade convenience against efficiency.

"One point to watch are resonances in unused sections of the coil. My spc atu uses the 30μH Johnson roller coaster, and on 14MHz the unused portion is self-resonant, giving arcing at the end. Re-arranging to short-circuit the unused portion is obvious; obvious that is until you go on 1·8MHz, where most of the coil is used and the rf rushes madly round the few short-circuited turns!

"Finally, I do not believe in getting harmonic attenuation from an atu. It is better to use a low-pass filter and low-Q atu. It is more efficient and better to operate."

This point is made also by G5IJ in the next item.

A vote for the "ultimate"

Ivan James, G5IJ, puts forward a practical viewpoint on why, despite the points made by W1FB and W2DU, he prefers the ultimate transmatch to the spc version. He writes:

"In 1978 I wanted a simple antenna matching unit to feed my 'novice 90ft' end-fed wire which operates against earth and is used from 3·5 to 30MHz. After studying the various alternatives I opted for the ultimate transmatch, but using available capacitors and coils. Analysis of the circuit shows that the use of a double-ganged capacitor on the transmitter side, as in Fig 5(a) and in the September Fig 1(a), has the advantage of stepping up the impedance from the 50Ω required by the transmitter to 200Ω at the top of the coil, and substantially reducing the voltage (in the matched condition) across C1 C2. For 150W output the voltage across C2 would equal $\sqrt{(PR)} = \sqrt{(150 \times 50)} = 86{\cdot}6$V rms or 122.5V sap.

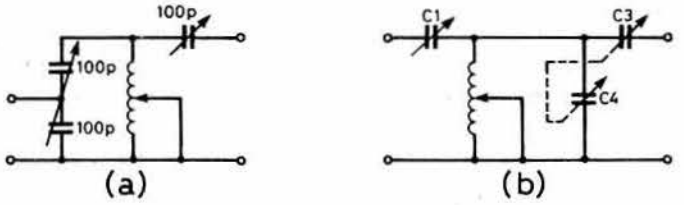


Fig 5. The rival transmatchs: (a) ultimate; (b) spc

"Thus an ordinary broadcast-type ganged capacitor, still readily available, can stand this power with a reasonable spacing. The only practical problem is that the rotor has to be mounted on insulators and the control knob requires an insulating coupler behind the front panel. C3 will, of course, need a higher voltage rating, depending on the effective antenna impedance.

"With the spc circuit the voltage across the capacitor C4, part of the ganged unit, will be considerably higher, depending on the antenna impedance. For example with a voltage-fed antenna of 2,500Ω impedance the voltage is about 433V sap (and unloaded very much higher) so that a ganged capacitor of significantly higher rating is imperative.

"The question of harmonic reduction is less important as this should be done in good engineering practice by including a separate multi-section lpf of 50Ω impedance between the output of a transmitter and the antenna matching unit."

G5IJ is also not convinced by the tests on harmonic reduction described in *QST* July 1980, which used a 1,000Ω test load for fundamental, second and third harmonic frequencies, as in practice the antenna impedance is hardly likely to be the same on all three frequencies. In other words, the arguments about harmonic reduction depend so much on the actual antenna impedances that no definite conclusions can be drawn from such tests. His own preference remains for the original ultimate transmatch circuit.

But cheers also for spc

Other correspondents favour the spc version. Frank Rogers, G3BFR, reports changing a home-made T-match unit into an spc network, and finding it extended the low frequency limit. His coil is 27μH, and 1.8MHz is covered with about 80 per cent of it in circuit.

A wodge of information from T. Williams of Tau Systems Ltd (51 Greenhey Place, East Gillibrands, Skelmersdale WN8 9SA) draws attention to the firm's products, including a new 1·5kW-rated SPC-3000 atu, one of a series of its units that has been attracting favourable comment and which incorporates the firm's own roller coaster coils and high-voltage capacitors. The cost of this high-grade unit (about £350), admittedly seems above what is found at G3VA (various odd coils including a ancient "surplus" roller-coaster that cost all of 35p, a few crocodile clips and a twin-section high-voltage variable capacitor from a wartime T1154), but then an old 813 pa laughs at high swr and delivers sufficient output on cw to avoid the need to worry about a little inefficiency!

It is good to see that Tau is also marketing diy assembly kits, including a 5kW p.e.p. spc atu (about £150), and also high-voltage single stator and twin 200pF variable capacitors and fully-assembled roller-coasters. The rising cost of imports, due to the currency exchange rates, should at last give a boost to home-production of specialized equipment and components.

Z-match atu

To round-up this survey of transmatching it is worth mentioning the Z-match atu that has long been popular in the UK and has been marketed here as the KW EZee Match. In his article "Wire Antennas" *(Amateur Radio (VK)* September 1984) Rob Gurr, VK5RG, reprints some notes on the Z-match that were first published in Australia in 1979, extracts from which are as follows:

"I have had success with the RSGB version and have built a number of these units. My modified version (Fig 6) has been copied by several Australian amateurs. While the RSGB gives excellent information on coil construction its suggested layout gives extremely long leads to the 14/30MHz coil; this is overcome in the modified version.

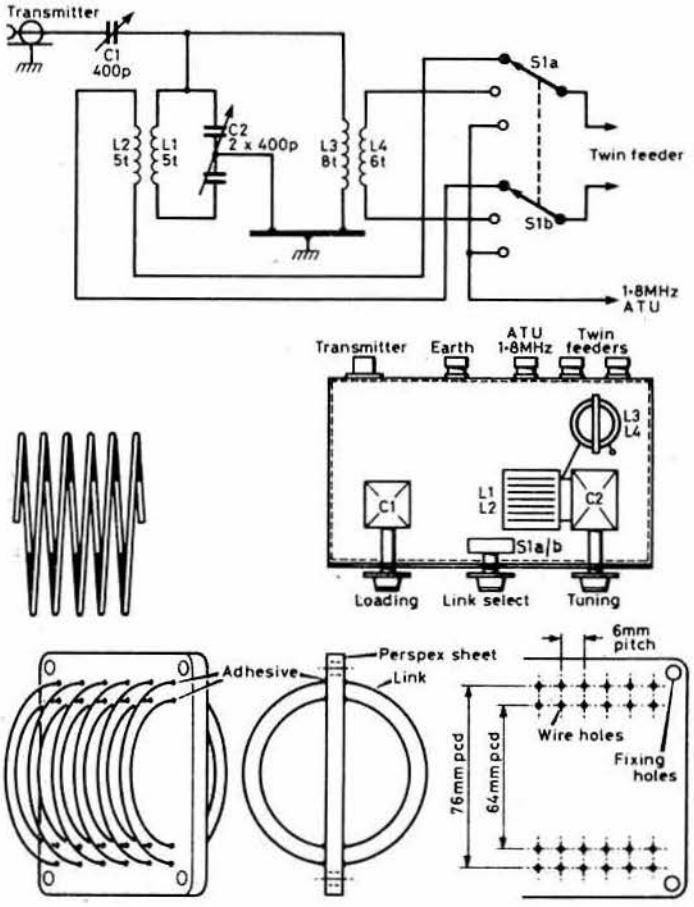


Fig 6. Australian version of the Z-match atu based on the design in various RSGB publications

"Each link is marked for 3·5/7 or 14/21/28MHz, which has caused difficulties for some constructors as some feedline lengths present impedances to the coupler which may be matched better by an alternative connection. I solved this problem by using a three-position, two-pole switch which allows the twin feeder to be connected to either link (positions 1 and 2) or to the external terminal mounted on the rear panel of the coupler (position 3). This allows the twin feeder to be used as a top-loaded vertical antenna on 1·8MHz through an additional antenna coupler, or as a general coverage receiving antenna.

"Coils may be 63mm and 75mm in diameter, and 14 to 16swg wire is suitable. The coils should first be wound around a cylindrical former (eg an electrolytic capacitor) of smaller diameter, and then threaded into the holes in the Perspex support. A suitable adhesive (eg plastic cement) may be used to fix the coils in the holes.

"For up to 100W standard single-and two-gang broadcast receiver tuning capacitors are suitable. For higher power a pair of transmitting variable capacitors, with adequate plate spacing, should be used. Note C1 needs to be insulated from earth and from the *coupling* control knob. The frame and rotor of C1 should be connected to the transmitter output, while the stationary plates should be connected to L1.

"The unit should be used with a good earthing system. A minimum 1·5m length of 0.75in galvanized water pipe should be driven into the ground immediately behind the antenna coupler and connected directly by a length of 4mm² or larger copper wire between the earth terminal and a clamp on the pipe. One or two metres of wire should be enough. Additionally, bonding to nearby water pipes, galvanized steel carports or other earthed structures will improve efficiency when using unbalanced-feed antennas."

Digital switched-capacitor filtering

The October *TT* included a brief note on the advances being made by Collins and other firms in digital filtering and frequency conversion in receiver i.f./demodulator stages. The Collins HF2050 receiver, I noted, initially digitizes the i.f. signals at 3MHz, sampling the incoming signals at 12-million times/s. This is still a relatively high speed for conventional ic devices, but digital "switched capacitor filter" (scf) systems can nowadays be implemented using available devices at af and possibly at some of the formerly popular vlf intermediate frequencies (eg 50kHz) and perhaps even at 455kHz.

In *QST* (July 1984, pp11-5) Richard Schellenbach, W1JF, and Frank Noble, W3MT, present an scf constructional project in the form of an add-on unit that accepts the af output from a receiver and then processes it digitally to provide tunable low-pass and notch filtering to reduce interference. Fig 7 shows the block diagram, although for full details it would be essential to consult the *QST* article.

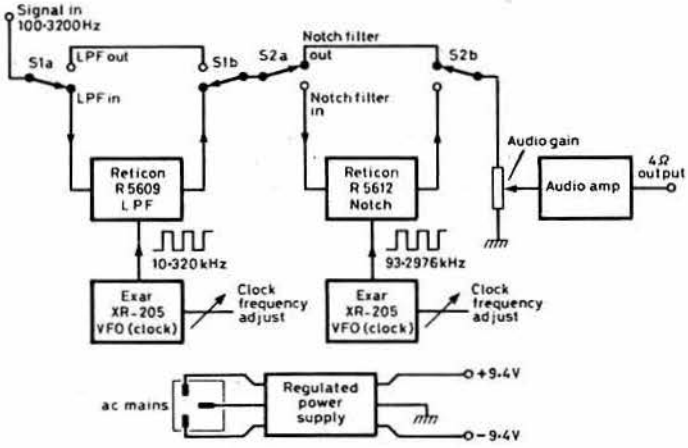


Fig 7. Block diagram of an add-on digital switched capacitor filter by W1JF and W3MT in QST (July 1984)

The authors provide full circuitry for what, in effect, are two switched-capacitor filters, each built around two ic devices one of which is a waveform generator. The first scf provides low-pass filtering having an extremely sharp cut-off frequency and providing an ultimate attenuation of 75dB. The upper frequency of the filter is continuously variable from 100 to 3,200Hz by varying the clock (switching) rate. The second scf is a high-performance notch filter having a – 20dB bandwidth at 10 per cent of the centre frequency with a notch depth of some 55dB, again with the centre frequency variable over 100 to 3,200Hz. Each scf comprises a special purpose ic (Reticon R5609 lpf, R5612 notch filter) and a waveform generator (Exar XR-205) with the frequency roughly determined by a series of capacitors and a fine-adjustment potentiometer. The article lists a number of alternative scf devices available from American semiconductor manufacturers.

Battery sulphation and Glauber's salt

On several occasions reference has been made in *TT* to the use of Glauber's salt in order to regenerate car batteries that have failed due to sulphation (*TT* December 1983, August 1981) as suggested by Tom Walshal. This has prompted Malcolm Gray, ZL1BJG, to send along a clipping from a 40-year-old publication: "Salving accumulators" by Dr A. Hickling, as reprinted in *The Lamphouse Annual—1943* from *Wireless World*, December 1941. This provides some interesting background to this effective means of overcoming the problem of sulphation in lead-acid cells. The opening paragraph reads as follows:

"It is a common and annoying experience that lead accumulators which are only intermittently in use for laboratory or experimental work gradually lose their capacity and their ability to hold a charge. This is due in nearly all cases to the sulphating of the negative plates which takes place if the cells are allowed to stand idle for lengthy periods. It does not seem to be generally realized, however, that there exists an extremely simple method by means of which even very badly sulphated accumulators can be restored practically to their original capacities. This method, which was originated by Bennet and Cole many years ago (*Trans American Electro-chemical Society*, 1912, 21, 303), consists merely in replacing the sulphuric acid electrolyte by a solution of sodium sulphate, giving a long charge in the ordinary manner, and then washing out with distilled water and filling with fresh acid."

Dr Hickling stressed that the results using this method are highly satisfactory, reporting in detail on the restoration of eight 30Ah 2V laboratory accumulators, most of which had deteriorated to the stage where they would hold only about one-sixth of their original capacity (ie about 4·5 or 5·5Ah). His procedure was as follows:

"The cells were emptied, washed out twice with distilled water, filled with a 20 per cent solution of sodium sulphate (200 grams of crystalline salt $Na_2SO_4 10H_2O$ per litre—note this solution may be made by using commercial Glauber's salt at the rate of 4oz per pint of distilled water) and charged at 2A for 50h. They were again emptied, washed out twice with distilled water, and filled with sulphuric acid of specific gravity 1·25."

The capacities of all eight cells were then shown to be either 29Ah (six cells) or 28Ah (two cells), and after a further charge-discharge cycle were measured as 29Ah (two cells), 28Ah (three cells), 27Ah (two cells) and 26Ah (one cell); clearly a highly satisfactory regeneration.

Dr Hickling continued: "The treatment does not seem to affect the cells disadvantageously in any way, and there was no undue shedding of active material." He suggested that when a lead-acid cell is allowed to stand for long periods, particularly in a discharged state, the fine particles of lead sulphate in the cathode tend to dissolve in the electrolyte and reprecipitate as larger and more insoluble crystals on the electrode, so that the area of lead sulphate is much reduced, and the capacity of the cell lowered: "however, on charging with a sodium sulphate electrolyte the liquid in the vicinity of the cathode becomes alkaline owing to the discharge of hydrogen ions, and the lead sulphate dissolves, the lead being then subsequently deposited on the electrode in a finely divided form and the cell restored to its original condition."

He believed that the merits of this regeneration treatment deserve to be much more widely known in order to prolong the useful active life of batteries that would otherwise be discarded. While this was more important during wartime and lead acid batteries have been improved in a number of ways during the post-war period, there is no doubt that sulphation remains a problem. As reported already in *TT*, several readers have found that they can regenerate modern car batteries effectively using this procedure.

Treat rechargeable batteries kindly

Apart from such specialized applications as memory back-up or where miniature button types are required, the most cost-effective batteries are undoubtedly rechargeable units: lead-acid cells where weight is of little consequence: nickel cadmium for portable units.

Some notes on batteries in *Zerb* Autumn 1984 (the journal for the Guild of Television Cameramen), bear repetition. Batteries, often carried in the form of battery belts or as hip packs, have become a vital feature of electronic news gathering operations.

This short article points out that because batteries have never been regarded as "glamour" hardware, users often make little attempt to understand the whys and wherefores and neglect to adhere to good practice in operation and maintenance — and then blame the batteries and their manufacturers when they fail at a critical moment.

Zerb considers that lead-acid batteries tend to be more cost-effective than nicad units, but seldom withstand as many charge/discharge cycles. A danger signal to watch out for is when the cells lose a good deal of their capacity, resulting in unusually short charge and discharge times (note this is often due to sulphation, and cells can be regenerated with a dose of Glauber's salts). An advantage of lead-acid cells is that they will work over an extended temperature range, often quoted as from 10°C (50°F) upwards, tending to work significantly better at around 10°C than nicads.

Nicad cells are lighter for a given capacity, and most will withstand fast recharging provided that the necessary precautions are taken to prevent overcharging, and will survive more charge/discharge cycles when treated carefully. But note that a brand-new nicad cell usually requires at least three charge/discharge cycles before it reaches full capacity. A disadvantage is the so-called "memory effect", unless care is taken to ensure that the cells are occasionally deeply discharged. A fully-discharged nicad cell provides about 1·1V, but note that cells should never be left on load when fully discharged (ie less than 1·1V) as this can lead to such problems as polarity reversal in one or more series-connected cells.

Some hints for the care and feeding of nicad batteries include:

(1) Bring a battery to room temperature before recharging.

(2) Before attempting fast charging (charging currents greater than 0·1C where C is the Ah capacity of the cell) check that the battery is suitable for such treatment. While nicads intended for use by tv cameramen are generally suitable for fast charging, others may not be.

(3) Never attempt to fast charge a nicad cell at a low temperature.

(4) Never over-charge a nicad battery, this is particularly important at any rate over 0·1C.

(5) Treat all batteries with respect, they don't like being dropped etc.

(6) Check wiring and connections from time to time and never pick up a battery by the connecting leads etc. □

4-2-70

*by Ken Willis, G8VR**

WE COME TO THE END of another year that has seen continued growth in the hobby of amateur radio, with increased activity on the vhf/uhf bands. What did 1984 bring for you in the way of vhf achievement? On the whole, it was not a particularly outstanding year in radio terms, though there was some spectacular sporadic-E to Russia during the summer, which gave many newly-licensed operators (and a few old timers!) a taste of real vhf dx. The very big auroras of 1981–3 are now only a pleasant memory, but auroral activity has continued at a level somewhat higher than might have been expected. Really big tropospheric openings seem to have given 1984 a miss, but there were enough minor events to give plenty of opportunity for long distance working. Meteor scatter has become much more commonplace and looks certain to be an accepted mode in the future. On 50MHz the results of the initial tests have encouraged the licensing authority to issue a further 60 permits, which can only be regarded as a good omen for a possible future general allocation on that band. Let's see what 1985 will bring.

SSTV on 144MHz

Richard Thurlow, G3WW (March, Cambs), who was a leading vhf dx operator in past years, now specializes in amateur tv. He wishes to remind 144MHz operators, especially newcomers to the band, that 144·500MHz is the calling channel for sstv according to the current band plan. He reports that G1AMR (Merseyside) and his friend G6YBC, both sstv addicts, get a lot of abuse from others when they call "CQ-TV" using sstv on 144·500MHz, since many operators do not recognise the signal for what it is and accuse them of causing deliberate interference! Richard is firmly of the view that any frequency designated a calling channel should be used only for that purpose and no other.

Those vhf operators with microcomputers who are seeking new fields to conquer might do worse than look into the possibilities of amateur tv. Richard says that G1AWK (Colchester) is using a BBC-2 micro which produces slow-scan pictures of extremely high quality with 90 per cent detail and hard-copy on a printer. Another exponent of this mode is G3LUI (Hockley), who since the early days of amateur tv has been an inveterate home-brew builder of equipment, and he too confirms the high quality of the G1AWK transmissions. No doubt a letter to any of these enthusiasts with sae enclosed would result in useful practical advice on how to get started, though if this results in a flood of correspondence *4-2-70* will be pleased to act as a secretariat.

On 15 October G3LUI had a two-way sstv contact on 144MHz with GU6EBI on Guernsey. On the same day G3WW was troubled by fm QRM on the sstv calling frequency (144·50MHz), so he makes a plea for the bandplan to be honoured. G3WW also had a contact on 144MHz with ON4ADI, when the Belgian station was using computer-composed sstv for his CQ call.

50MHz

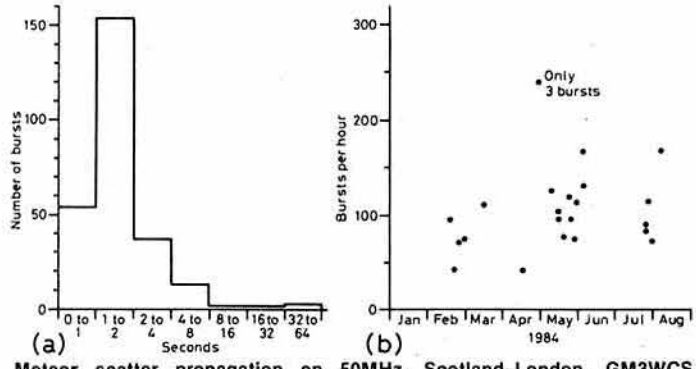
A further 60 special permits for 50MHz operation have now been issued by the licensing authority. To those impatient to see a general release of a 50MHz band in the UK—it must be remembered that UK Band 1 tv transmitters will not finally close down until January 1985, while most European countries have no plans to abandon their own tv emissions in this part of the spectrum. Consequently, there is a need to proceed cautiously, though the Society will continue to liaise with the licensing authority in these matters. One thing which has emerged, to the great credit of the current permit holders, is that no interference to other services has apparently been caused by their activities, and the very responsible attitude adopted by these operators has certainly not harmed the amateur movement in any way.

The usual "out of tv hours" contacts have been reported, with many of the 50MHz operators now regarding meteor bursts as commonplace, whereas when the experiment started, several had no previous experience of this mode of propagation. Bursts of up to 3min have been observed on these frequencies at times, especially during the major showers. Although prevented from working crossband with 50MHz stations several Class-B operators regularly monitor the band as it appears to have a fascination for some. Roland Jeffery, G6DSA (Cheshire), has sent in very detailed lists of things heard on an almost daily basis during August and September, and these will be useful for assessment by the Propagation Studies Committee. Roland hears the beacons GB3SIX and GB3NHQ very well, using these as an indicator of conditions.

Much further north Chris, GM4SDG, and Laurence, GM4DMA, have been carrying out a systematic study of the reception of beacons GB3VHF, FX0THF, and, more recently, GB3NHQ. As they say, being a long way from the normal rat-race of 144MHz in the London area they now have the opportunity to develop other skills by listening to ms pings from remote beacons. (They define a "plop" as an ms ping with Doppler shift!) Equipment used for the 50MHz beacon monitoring is a five-element Yagi at 40ft with nearly 200ft of very low-loss feeder, and an MM 50/144 receiving converter into a Trio 9000. AGC voltage is fed out into a graph plotter which moves through 6cm/hr with an fsd of 50mV representing an S9 signal. An illustration which they sent to me shows reception of GB3NHQ at their Aberdeenshire location between 1am and 5am. Numerous very strong and quite lengthy meteor reflections are evident from the graph. A significant rise and fall in noise level which the graph shows at its base is attributed to a galactic source as it passes across the beam as the earth rotates. This also shows the sensitivity of their system. They comment on the importance of GB3NHQ as an indicator of 50MHz (and therefore possibly 70MHz) conditions, though we in the south would like to see a north-pointing 50MHz beacon in the north as an auroral warning. GB3NHQ is occasionally heard with auroral tone by these operators.

Another station to carry out serious observations on the 50MHz band is G3IMW (London). Jeremy copied the ms reflections from GM3WCS and GM3WOJ during a series of contacts between those stations and G4IJE, G3ZIG, G4BAO and G3IMW, and has plotted the results shown in the illustrations. It will be noted that the bulk of reflections are of 1–2sec duration, though several in excess of 8sec were recorded. A great deal of information can be passed in a period of this length, especially when high-speed cw is used.

Graham, G3TCT, made a study of sporadic-E propagation, using the unusual opening of 30 June 1984 for his data. On this day ZB2BL was worked by many UK stations, and later GJ3YHU worked a number of W's and VE's at very high signal strengths, though these were not audible at G3TCT in Surrey. F0FDB (G4JCC) was able to work GU and G during the day (28/70 crossband) when Es backscatter was much in evidence. CT1WW worked many G stations crossband (28/70), and Graham found that signals from GB3SIX and the Meldrum tv transmitter could be received over a wide range of beam headings, again suggesting backscatter propagation. Graham said that in nearly 20 years of operating on 70MHz he had never been convinced that he had heard Es backscatter on that band, and the June



Meteor scatter propagation on 50MHz, Scotland-London, GM3WCS, GM3WOJ transmitting, G2IMW receiving, (*a*) Histogram showing total number of bursts received, in categories of duration; over 21 listening periods February–August 1984. Average length of period 15min 7·5s in receive mode. (*b*) Equivalent burst rate/Date of contact

*11 Old Downs, Hartley, Kent DA3 7AA

event showed signals backscattered on 28 and 50MHz but not on 70MHz. He wonders if this correlates with other stations' observations; is there, for example, much evidence for E-layer backscatter on 144MHz?

G3TCT sums up by saying that when listening on 50MHz to morning contacts between GM stations and stations in the south, strong backscatter occurs, there are strong ms bursts, and often a residual signal which he calls iono-scatter, unaffected by tropo conditions. He observes little or no ms on ZB2VHF on 50MHz, though admits that the distance is rather long for this. Gdansk, however, on 70·31MHz shows much ms enhancement, but this is a high-power station and somewhat closer than the ZB2. He concludes that ms and Es mechanisms, though occurring at about the same altitude, are quite different, and that one would expect these results if Es clouds are very flat, thin and horizontal, while if ms ionization follows the downward path of the meteor it would be tilted and subject to very rapid change. If all ms ionization is tilted it might explain the ZB2VHF observations, but how does this square with long distance 144MHz ms contacts? Does the ms cloud "look" different at the higher frequency?

Repeater news

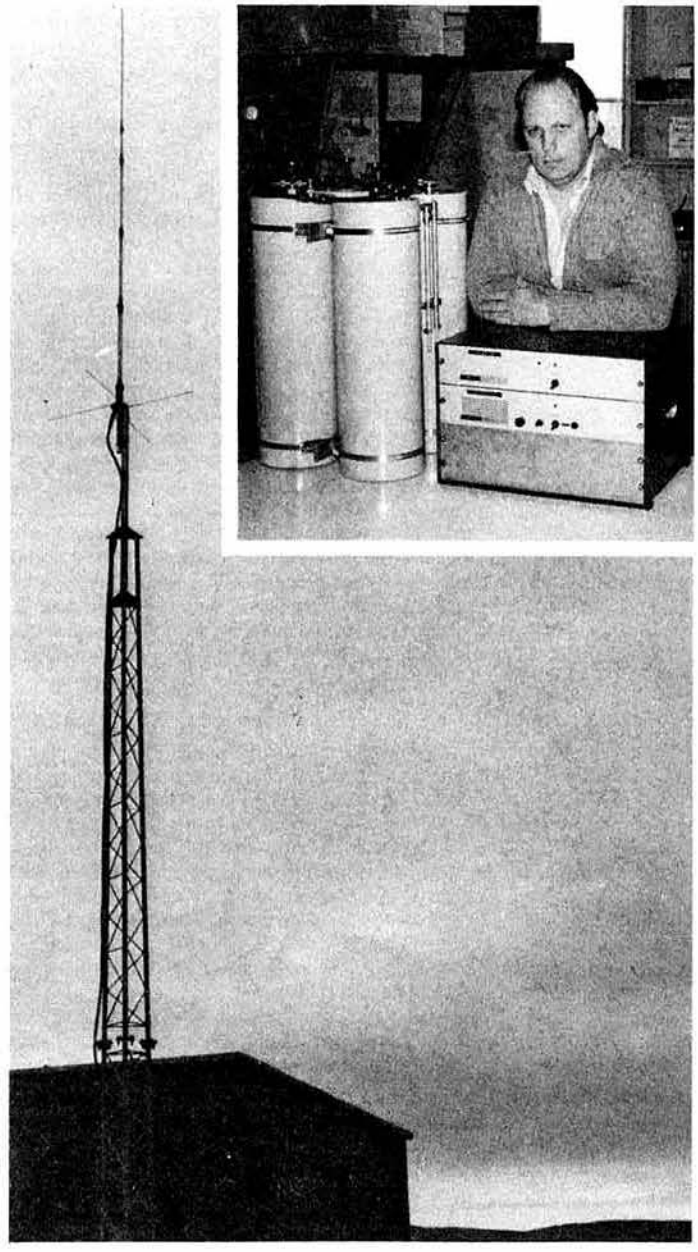
A new 144MHz repeater was launched on 6 October when GB3TY, Northumberland, commenced operation on channel R6 from the BBC site at Stagshaw, some 8km northeast of Hexham (YP80d)). This was the culmination of four-and-a-half years of negotiating and constructional work, the repeater being sponsored entirely by G3UVU, G8SFA amd G8VDM, who hope that this "subscription-free" status can be continued into the future. The transceiver is a converted Storno CQF612, with a 6dB colinear being used on receive and a λ/2 dipole for transmit, both mounted on a 34m mast 215m asl. Access is by normal toneburst, with carrier re-access, and currently no time-out restriction is employed. Users are requested to respect this feature by keeping overs to a reasonable length. Coverage should fill gaps between GB3TW, GB3AS and GB3BT, including Hadrian's Wall and the Kielder Forest areas of the Northumberland National Park. The group wishes to thank the BBC, North-Eastern Electricity Board, the RSGB and local amateurs for help and support in this project. Further information from Henry, G8VDM, QTHR.

The October newsletter of the Sussex Repeater Group contains much information on the activities of that group, including some interesting constructional articles. One group project is a modem designed by G8XVZ for which pcbs are being provided. The group plans to reinstate GB3WX in the near future, and the modem described will enable its weather telemetry data to be decoded, as well as having applications in rtty and Ascii data transmission. Other information from the group is: GB3BR has been completely overhauled and returned to service with a new antenna array and cavity duplexer, with greatly improved performance even though the receiver sensitivity could be improved; logic assemblies for GB3CP are assembled and ready to be installed in the transmitter; the callsign change for GB3BP (to GB3WS) has been approved and will be implemented shortly; work has started on rebuilding GB3WX, based on the hardware of GB3CP so compatability will be maintained between the group's 23cm units; and one of the new logic units has been fully tested and will shortly be integrated with the GB3NX transceiver. Clearly a very active group indeed. They also mount a "roadshow", illustrated by slides, which visits clubs and is taking bookings for 1985; club secretaries please note. The contact is Andy Clark, G8TJQ, QTHR, who will also be pleased to recruit new members to the group.

The owners of the proposed site at Biggin Hill for repeater GB3KB have withdrawn their permission for it to be used for this purpose. This will require the submission of new proposals, so a delay of some months is now envisaged before this repeater becomes operational, while channel RB0 which had been assigned may not now be used. The Kent Border Repeater Group is currently looking at new sites and would welcome suggestions and observations from any amateurs in the Biggin Hill area. Any correspondence should go to G8TOK or G4STA, both QTHR. The group wishes to take this opportunity to thank all those who have already made donations to this repeater project and apologise for the delay in commissioning the machine.

The Cambridgeshire Group is another to issue a newletter full of useful technical and topical information as well as providing an update on the machines which it operates and administers. The modifications to permit GB3PT to handle data transmissions were mentioned briefly last month. The group now reports that GB3PI, which was put out of action in September by a lightning strike (not the NUM sort!), was back on the air within 24h thanks to the availability of a standby transmitter and some stalwart work by the technical boys. It suffered a similar fate last June, so someone up there seems to have it in for this particular installation. PI now has full battery back-up facilities which will keep it on the air for up to 11h during a power failure, and plans are afoot to transmit some coded information to indicate when the system is using this source of power. GB3PY has been granted permission for its site change, but this will entail much hard work in moving the equipment and erecting the new antenna system, which will be fed with Heliax LDF4-50 which was kindly donated to the group. GB3PS is still being constructed, with the aim of getting a technically-sound repeater/beacon on the air as soon as possible, leaving certain "frills" to be added at a later date.

Not all of our repeater users like to hear about dx being worked through their machines, but it does happen from time to time and when done properly it can surely cause no real harm. Eric Fensome, G6ZJD (Bucks), was out and about on Dunstable Downs during the tropo lift of 15 October, carrying with him an FT208R and "rubber duckie" antenna. Between 1320 and 1500gmt he noticed that up to three repeaters were audible on every channel. He had a contact with G1HAC (Oldham) through GB3VT. G1JXZ/M then came up on the same repeater while mobile in Oxfordshire. Eric then turned his attention to GB3CF (Leicester) and worked G6ZDD/M who was southbound on the A41 near Watford. They made a QSY to GB3VA on R4 which is local to G6ZJD, but the mobile station could hear Eric much better through CF. G3IXN/M was heard and worked on GB3CF, and it transpired that he was driving through Hampshire, and during this contact a station broke in from the Cleveland area. Other



The Shetland repeater, GB3LU, the most northerly in the UK. The equipment hut with mast and antenna, with (insert) Jim, GM3ZMA, in the Lerwick Radio Club with the Wacom duplexer and the transmit/receive/logic unit. ***Photos:*** **GM4LBE**

contacts made were with G4YIG/M through GB3MH, when a weak GW6 station was also heard but not worked, and G6LZU near Birmingham was contacted on GB3VM. A glance at the map showing these repeater locations and the positions of the mobiles will indicate how widespread the tropo was on this occasion.

Tropo

There was a good tropo opening over the weekend 13–15 October which seems to have started in an E–W direction and later to have swung round to embrace southern France and Spain. Jim, G8LFB (Whetsone), worked several Y22/23 stations in squares GM, GL, GN, FL, FQ and HN on 144MHz during the evening of 13 October. He said the band seemed fairly free of QRM, perhaps because many of the big guns were attending the Midlands VHF Convention at that time! There was also an East German contest in full swing which probably accounted for the high proportion of operators heard from that country during the opening. On the following evening, G8LFB heard the Spanish beacon EA1VHF briefly, and found the 144MHz band open between Scotland and "the F-line of squares" in France, with much of the good stuff going overhead at his north-London location.

John Palfrey, G4XEN (Northants), found that things peaked with him on the evening of 15 October. On 144MHz he was hearing beacons GB3CTC S9+, GB3ANG S9+, FX0THF S8, FX3THF S6, HB9HB S6, EA1VHF S2, and FX8VHF S6, a very fine all-round coverage. On 430MHz he copied FX1UHF S5, FX3UHF S7 and an interesting one, HB9F S3, heard also on 14 October. I understand that this last beacon beams N–S, is not heard too often in the UK, and runs 15W erp. John worked many French stations on both bands, getting a number of new squares in the process, and he commented that many newly-licensed G1 stations were "having a whale of a time joining the pile-ups". Up to 1300gmt on 16 October John was hearing some of the beacons, and he wishes that we had a beacon in EI or GI on 144MHz.

From his super location in the Channel Islands, Geoff, GJ4ICD, sent in a report of this opening which makes one want to sell up and go there, even if it meant renting out deck-chairs on the beaches. On the night of 12 October a ridge of high pressure started to diminish, then rose again with 99 per cent humidity and temperatures falling from 18° to 8° as night fell, producing what he called "the setting for a big one". It all started to happen on 13 October when he worked, on 432MHz, PA,DL,OZ, SM, Y, GW and G, plus some good 1,296MHz dx to some of the same areas. He then looked at 144MHz and heard OZ, SM7, SM6, SP, Y23,OK,OE2,HB9,F, GM, GW, GU, GJ, G, EA, I, ON, PA and DL, a total of 18 countries in all. He had many contacts on 432 and 1,296MHz and was still burning the midnight oil in the early hours of 16 October when much was still being heard there. He says he must have worked the whole of the north of England on 432 and 1,296MHz, and he also claims a first-ever GJ–GD 432MHz contact by working GD2HDZ. This seems to have been a very nice opening. Predictably G8VR was in darkest Shropshire at the time with no radio. Get my holiday dates in your diary and you'll never miss a major event on vhf/uhf!

Recent awards

With the present level of activity on our vhf/uhf bands, there is no space to report all the awards which are regularly claimed and approved by the vhf awards manager, G5UM. However, there have been one or two in recent months which are sufficiently unusual to justify some publicity. Peter, GM4BYF (Edinburgh), was awarded a 144MHz Senior certificate for working 15 countries and 60 counties. However, he did it all on cw, and all through auroral contacts! The shortest distance covered was with GM4IHJ (Fife), only 25 miles away but with beams pointing towards the auroral curtain, signals were entirely tone-A. GM4BYF operates from a very screened location, and his award represents seven years of operating with several thousand contacts, in one case more than 150 in a single day.

Another 144MHz Senior went to Frank, G4LAW, who made all his contacts while operating mobile. He used a halo or sometimes a λ/4 whip antenna, and among his cards were some from contacts with Shetland and Czechoslovakia (OK1KHI/P was worked with 10W while mobile using the whip antenna). Frank says that his lack of an antenna at the home QTH encourages him to go to high ground to work mobile, and he can run as much as 100W from the car rig when required. The cards for the Senior also resulted in a squares award, also for all-mobile operation.

G5UM also reports a claim from GW8FKB for the first-ever GW–EA9 (North Africa) contact when he worked I0SNY/EA9 in Ceuta on 7 July 1983. GW8FKB pointed out that it considerably predates the UK–Mediterranean dx worked during the 1984 *Es* openings on 144MHz

The first G1 to claim an award was Mrs Diana Segal, G1DMS, of Cricklewood, who qualified for a 144MHz certificate, No 682.

Finally, G3TUX, Haslemere, claimed a 10 countries 40 squares award on 144MHz, making 32 of the contacts on cw from a very poor location. Although he is 550ft asl, Gibbet Hill, Hindhead, rises to 890ft to his north, and Blackdown at 920ft due south. Local obstructions block the east, so his only clear path is a small arc between southwest and northwest. By perseverence he has worked plenty of dx, and finds circular polarization a "must", since signals arrive at his QTH by several paths which results in severe phase distortion if linear polarization is employed. A recent QSO with HB9 was achieved by firing due north!

Maidenhead maps

John Ridd, G8BQX, reports being very disappointed by the new map of the Maidenhead locator system produced by RSGB. He says that the map contains no scale of distance, and the squares are less than a quarter of the size of the equivalent areas on the "trusty old QTH Locator map". Furthermore, there is no subdivision of squares on the new map, so he feels it will be impossible to use the map to score with sufficient accuracy in contests and the like. He goes as far as to recommend that the introduction of the new system be postponed until suitable maps are available, and offers some constructive advice on the preparation of such maps.

In response, RSGB headquarters has pointed out that the first map which has been introduced, the "IARU Locator of Europe", is **NOT** intended to be used for contest purposes. In fact, the way the map is constructed makes it unsuitable for this purpose and hence no absolute scale can reliably be provided. This new map is an overview only of the whole of Europe, and only provides sufficient detail for the first two "fields" of the new IARU system. Apart from providing an overview, the most likely use for the map will be on the shack wall to provide an instant guide to main squares as they are worked or confirmed, and for this reason the map is not laminated. A map of Western Europe intended for contest use and position fixing should be available early next year.

From here and there

If you are one who complains about the mayhem on the 144MHz band these days, it may come as a surprise to learn that some consider the UK amateur to be very mannerly and well-behaved. Petra, G4KGC, recently visited the German VHF Convention where she was able to see the new DARC vhf manual *(UKW Handbuch)*. In a section dealing with "lifts" she read (and the translation is hers) "When German stations beaming to the UK call in search of (say) XN or XO only, then British stations are well disciplined. On the other hand, when G-stations call for HM, GN or GI only, they are pounced upon by DL stations not in those squares". The writer goes on to deplore such behaviour.

Doug, VK4AIZ, has been on an extended visit to Europe, during which he operated on the 144MHz band from near Watford. While travelling through Yugoslavia he noticed that in the northern part of that country there were many large 144MHz arrays, especially in country areas. Doug has also been in Scandinavia, where he spent some time with Frans, LA6QBA, and the postcard which he sent from Oslo portrayed a massive visual aurora in progress.

Tony, G4NRV (Kent), worked a very rare square during last summer's sporadic-E, but when the card arrived it did not have the QRA locator marked on it. Tony returned the card with an irc with the request that it be marked accordingly, but his English was apparently misconstrued, for it brought forth the amazing response that "for 100 irc's, QSLs can be provided for any of the squares you need in our country, and the stations providing the cards would like one back from you". Some sample cards were enclosed bearing totally fictitious QSO information, all purporting to be contacts with G4NRV on 144MHz! Are we now to be offered mail-order vhf dx with glossy catalogues displaying the choicer QSL cards and discounts for 100-square lots, I wonder?

Alan, GI8YDZ, is very active from WP square using a 4CX350, 2 × 10-element Yagis at 55ft, and an MGF 1400 GaAsfet at the masthead providing a 0·93dB nf, and asks stations to occasionally turn their beams towards him. As he says, "There *is* life in WP square", and with that set-up you should have a good chance of working him on 144MHz (he is also on 1·3GHz).

GW2HCJ chides me for always mentioning Tonnas which, he says, are "No better than many other designs". True, but when I write "Tonna" it is because someone has told me they are using one or more of them. If you prefer a Spitzenpopper-17 or a piece of wet string I shall be glad to report that also!

Congratulations to Geoff Brown, GJ4ICD, for being the first-ever UK single-operator station to make more than 1,000 contacts during a contest. Geoff worked 1,037 contacts during the IARU VHF & SWL Contest in September. Conditions were good on tropo for part of the time with contacts down to Andorra being made by some stations.

SWL News

*by Bob Treacher, BRS 32525**

Lower frequency band challenge

Time again to draw attention to my lf challenge. I am hoping for a really good entry, both from here and abroad, this year. The main reason for the challenge is to tempt more listeners on to the lower frequency bands in January, so that their all-time scores can be improved during a period in the calendar when conditions on each of the three bands are usually at their best. Following the extremely successful challenge in January 1984 the rules for 1985 are the same. The challenge is to amass as many points as possible based on the number of countries heard on 7, 3·5 and 1·8MHz as follows:

7 and 3·5MHz: each European country logged counts 1 point, each dx country counts 3 points.

1·8MHz: each European country logged counts 5 points, each dx country logged counts 15 points.

One station only may be logged from each country on each band. A multiplier checklist, in prefix order, *must* accompany each entry. Entries should be sent to Bob Treacher, BRS32525, 79 Granby Road, Eltham, London SE9 1EH, England, to arrive no later than 25 February 1985, giving date, time, RS(T), *full* callsigns of the stations heard and points claimed.

Good luck, and here's hoping conditions are favourable. For some tips on lower frequency dxing the information on p1090 of *SWL News* December 1983 might prove worth studying.

1985 Countries Tables

Just as I felt that interest in the 1984 table was beginning to wane a few more entries appeared. Consequently the table will stand in its same format next year. For those who have recently joined the Society as listening members, or for G6, G8 or G1 licensees who would like to continue listening on the hf bands, the rules are as follows. The table will reflect the number of countries on each band (1·8 to 28MHz, excluding 10, 18 and 24MHz) taken from the RSGB Countries List (available from RSGB HQ, price 48p) between 1 January and 31 December 1985. Each different country logged should be noted and the *totals only* (not a list) for each band, a grand total, and the number of different countries should be sent to me by the first deadline date quoted in this column each month. In an attempt to get more entries earlier in the year, there will be *no* starting score.

The All-time List will appear only three times in 1985 (in March, September and December) because of shortage of space. At least one entry must be made during the year in order to keep a place in the table. The starting score will remain at 750. Several entrants to this year's table are already on the way to the magic 750, so keep your 1984 lists and use them as the basis for an All-time table entry later in 1985.

Overseas news

Stan Porter's prayers have been answered at last. This month I have four reports from overseas. Let me first welcome Vaughan Hutchins, ORS86650, currently based at Paderborn-Sennelarger, West Germany, and Tez Watson, ORS53635, also in West Germany at RAF Bruggen. I also have a letter from Michel Monteil, FE8957, and the usual update from Stan himself.

Vaughan wrote mainly with regard to the reference in October's *SWL News* to the "worst QSL card". He was concerned that "new boys" like himself might be unaware of what to include in a report. It is unfortunate that Vaughan was not a member of the Society earlier this year when an extensive item on QSLing techniques appeared. Copies can be obtained from me if an sae is sent to the address at the foot of the page. Vaughan's main interest is rtty. He uses a Trio 9R59DS and Pan Crusader-X into a long wire and a Windom antenna. A BBC computer and home-made terminal unit complete the station.

Tez also hopes to become involved with rtty in 1985. He has a CBM64 and is keen to obtain a terminal unit to use in conjunction with a Philips AL990 receiver, home-brew atu and an inverted "L" antenna. He is licensed as DA4FH and G1FRG, is a communications technician, and had managed a few hours of listening to catch 4K0B, C6ANU, XT2BR, 8R1RBY, J88AQ and HZ1AB on 14MHz.

Michel's letter mainly concerned vhf happenings, which will be covered later. On hf he monitors 28MHz regularly, and with a dipole heard FH4AA, FH8CB, 3X4EX, 5N3BHF, CX4ABZ and Z23JO early in October.

Stan concentrated on 7MHz and had added a good number of countries to improve both 1984 and all-time countries lists. He had added CE0AA on 7 and 14MHz. Stan monitors 14,180kHz on Saturday mornings when his brother-in-law ZS5ZS skeds ZS1FW. 5X5GK was a newcomer to the bands, and was heard regularly on 21,330kHz at 1230. 7D7CM had also been very active around 21,317kHz. Z21EV had hoped to be on the lower frequency bands by the time this was read. I do hope that more dx readers will write with their news and table scores now that someone has broken the ice.

UBA SWL Competitions

Marc Domen, ONL6945, sent the third interim results of the UBA's 1984 SWL Competition. Very few British listeners entered this year and Marc was hopeful that the 1985 competition would see greater participation from G-land. In an attempt to increase British activity the simple rules are—one point for each country heard on each band from 1 January to 31 December 1985, multiplied by the number of different countries heard during the same period. There are three categories—phone, cw or rtty. Special log sheets and further information can be obtained from Marc by sending three ircs to Gebr Blommestraat 14, B-2200 Antwerpen-Borgerhout, Belgium.

Worst QSL card

Unfortunately, my idea caught on very quickly! G8TOK, on behalf of GB4NSY, and G3XTT, on behalf of GJ6UW, provided three further examples of swls' bad habits. The "entry" from G3XTT consisted of three cards from a PA and two from a UA1 swl who sent reports to GJ6UW. On both occasions the UA1 heard GJ6UW in QSO with UK1TBB, while the PA listener logged signals from GJ6UW on three bands working PA2TMS each time. Quite a coincidence. Both listeners may have heard GJ6UW by sitting in the shack of the stations concerned at the time the QSOs were made. Alternatively, they might have simply made the QSL cards out, having noted the loggings from the respective station's logbooks after the QSOs took place. The message is clear. Good advice is to sit on a station for five minutes and give the station concerned the callsigns of at least two stations worked by the station you are reporting to. This will avoid any doubts such as those aired by G3XTT.

The "entry" from G8TOK was far more worrying, not simply because the report was from a BRS4. . . ., but because it was sent to GB4NSY when the listener had not even heard the station on the air! The listener concerned remarked "Sorry I missed the special event station but I was away, but I thought I would send you one of my cards". If that was not enough, the listener sent the card direct with no stamp or sae. The report—if you can call it that—was of course totally worthless, and yet another case of a listener tarnishing the good image that the majority of us try to project. To soften the blow somewhat G8TOK remarked that he had received a few "worst QSLs" from licensed members too.

I have in the past tried to give hints on what to *include* in listener reports. With luck this series of what *not* to do might have as much, if not more, impact. Any further examples will be brought to light next month.

Newcomers

Anthony Baker, BRS50688, wrote for the first time. He uses a Uniden CR2021 and a B40 into a half-sized G5RV, but finds little time to monitor the bands. However, early October was quite profitable, as he logged some interesting stations on 21MHz.

GW6VZW wrote on behalf of his seven-year-old son Stephen, ARS85951, who seems quite adept at catching the dx on a JR310 receiver with atu and CP5 trapped vertical. QSL cards had been received from XU1SS and YI1BGD, while during September and early October 17 separate KL7s and 15 KH6s were logged on 14MHz. On 7MHz KH6XX was the pick of some useful dx, and on 3·5MHz VP8ML and HK0HEU had been copied. GW6VZW entered his son's all-time countries total (which your scribe feels must have included some degree of assistance from dad!) and hoped to report regularly in future.

David Hunter, BRS84664, introduced himself to me at a local radio society meeting. An FRG7700 with a half-sized G5RV at 25ft have paid handsome dividends to David, who has only recently become interested in the hobby. He hoped to enter a table score but poorish conditions on 21 and 28MHz had meant staying on 14MHz, with the occasional foray to 3·5MHz. The higher band had produced DJ0SB/C6A, VP8ASO, XN3XY, ZD9CA, 5N24SHE and YU3AG/MM (off 3V8). 3·5MHz had delivered good signals from JA4CQS, ZL4AP and 7X5AB.

Henry Driffield, BRS35408, is a long-established member of the Society

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HF SWL CONTESTS CALENDAR 1985

Contest	Organizer	Date-time	Mode
LF Challenge	Bob Treacher	1-31 January	ssb/cw
UBA SWL	UBA	1 January-31 December	ssb/cw/rtty
White Rose	WRARS	2nd w-e January Sat 1200 to Sun 1200	ssb/cw
UBA	UBA	Last w-e January	cw
7MHz	RSGB	1st full w-e February Sat 1200 to Sun 0900	ssb
YU-DX	SRJ	1st full w-e February Sat 2100 to Sun 2100	cw
PACC	Dutch	2nd full w-e February Sat 1400 to Sun 1700	ssb/cw
1st 1·8MHz	RSGB	2nd full w-e February Sat 2100 to Sun 0100	cw
7MHz	RSGB	Last full w-e February Sat 1200 to Sun 0900	cw
UBA	UBA	Last full w-e February	ssb
Commonwealth	RSGB	2nd full w-e March Sat 1200 to Sun 1200	cw
Town & County	RSGB	3rd w-e March Sat 2100 to Sat 2400	ssb
Helvetia	USKA	Last full w-e April Sat 1300 to Sun 1300	ssb/cw
CQ-M	USSR	2nd w-e May Sat 2100 to Sun 2100	ssb/cw
RRU	RSGB	3rd Sunday May	cw
LZ-CW	Bulgaria	1st full w-e September Sun 0000 to Sun 2400	
CVRS	CVRS	3rd full w-e September Sat 1800 to Sun 1800	ssb/cw
SAC	Scandinavia	3rd full w-e September Sat 1500 to Sun 1800	cw
SAC	Scandinavia	Last full w-e September Sat 1500 to Sun 1800	ssb
VK/ZL	WIA/NZARTS	1st full w-e October Sat 10000 to Sun 1000	ssb
VK/ZL	WIA/NZARTS	2nd full w-e October Sat 1000 to Sun 1000	cw
21/28MHz	RSGB	2nd Sunday October Sun 0700 to Sun 1900	ssb
Y2DX	DDR	3rd full w-e October Sat 1500 to Sun 1500	ssb/cw
21MHz	RSGB	3rd Sunday October Sun 0700 to Sun 1900	cw
HF Challenge	Bob Treacher	Last full w-e October Sat 0000 to Sun 2400	ssb
HF Challenge	Bob Treacher	Last full w-e November Sat 0000 to Sun 2400	cw
UBA 14/3·5	UBA	3rd full w-e December	ssb/cw

Note: Dates and times of contests are always subject to change. For rules of each check Contest News/MOTA/SWL News in *Radio Communication* for the latest information.

and a member of RAIBC. He was prompted to write as a result of the "worst QSL" item in October. He explained that to his mind the "worst QSL" is the one which licensed amateurs do not send to swls in reply to their listener reports. Some callsigns were given but to spare their blushes I will say no more! On the brighter side, cards had been received from GK0JFK, GB4DD and GB0GMT. Henry uses an FRG7 with atu donated by the RAIBC, and several wire antennas on which he was pleased to hear Y33TB on 1·8MHz early in October.

HF contest participation

In an attempt to increase the number of listener entries to contests sponsored not only by the Society, but other concerns, I have published here a list of contests for 1985 which are known to have swl sections. As a result of a paper put forward by the Society at the Cefalu conference earlier in the year which pointed out the need for listener participation in major contests, the number of events with swl sections might well be greater than those reproduced here. There is no guarantee that I have found all the contests with listener participation, but the list is quite comprehensive. If listener sections *are* well supported, there will be less likelihood of them being withdrawn.

VHF news

Michel Monteil, FE8957, reported hearing FX8VHF, which had recently become FX4VHF, from a site at AF68e on 144·955MHz. The erp is currently 100W. F6BUF/P had been very active from BF square on both 144 and 432MHz, while DC square had been activated by F1KTI/P at the end of August. Unfortunately conditions were not favourable for good dx. In BF square Michel heard their signals only twice—once at 41 and the second time at 52. However, a nice square if conditions are favourable. During the UHF Region 1 event only three EAs in BC square running high power into stacked 21-element Yagis were heard. Michel heard no French stations from his QTH.

Probably the best tropo lift of the year on 432MHz occurred on 15 October. Dave Whitaker, newly on 432MHz, Martin Parry and I added useful squares on the band in western France. Some of the stations logged were F1AGO (AG22e), F6ECI (AF57b), F1GHP (ZG65c), F1FHI (ZH63d) and F1ARR (ZI13h). Dave also heard GM3JFG (XR), while I heard GWs in XL and YN squares with signals well over 59. Conditions on 144MHz were not so good, but Dave heard EA1ECD (VD58d), F8XT (ZF50e), F1HGO (AF51a) and F1GTR (ZG65g). Martin fared quite well from YN square, with stations heard in AF, AG, AH, AJ, BG, BJ, ZG, ZH, ZI and ZJ squares.

HF news

John Goodrick, BRS44395, reported a poor period of hf conditions but a good claimed score in the CVRS Contest. He also entered the SAC-CW event and claimed 16,000 points. He had received the ADXA certificate from JARL and upgraded his DUF2, Region 1 IARU, and IARU 28MHz certificates.

During September I had the pleasure of meeting three dx stations, namely SP5HS, T30AT and VE7CON. T30AT was in G-land for a few weeks before heading back to the Pacific. He now has a new QSL manager, G4GED, who will QSL all swl reports. VE7CON passed on the news that with USA stations able to transmit down as far as 14,150kHz, many VE7s now look for Europe on or around 14,125kHz. VE7CON QSLs all listener reports.

Harold Moss, BRS18529, has obtained a copy of the 1936-7 *Callbook*,

ALL-TIME COUNTRIES LIST

(Entry score 750)

Station	28	21	14	7	3.5	1.8	Total	Mode
BRS25429	279	313	335	254	231	89	1,501	ssb
BRS32525	267	305	318	254	253	72	1,469	ssb
BRS8841	254	292	315	226	207	57	1,351	ssb/cw
BRS48909	216	253	291	198	165	63	1,166	ssb
BRS52543	193	235	243	180	170	61	1,082	ssb
BRS1066	193	210	268	165	109	74	1,019	ssb/cw
BRS18529	155	210	263	177	139	50	994	ssb
ORS45992/7Q7	212	250	262	128	106	12	970	ssb
BRS44395	168	219	235	138	78	59	897	cw
FE8957	203	197	232	75	98	33	838	ssb
ARS53844	127	180	165	128	116	45	761	ssb
ARS85951	122	181	234	119	103	0	759	ssb
Average	199	237	263	170	148	44	1,061	

1984 HF COUNTRIES TABLE

Station	DXCC	28	21	14	7	3.5	1.8	Total
			G-listings					
BRS8841	246	88	192	220	155	139	43	837
BRS48909	229	94	157	196	158	131	49	785
BRS52543	228	101	149	191	144	139	46	770
BRS25429	220	111	144	182	127	132	53	749
BRS44395	—	96	151	145	100	61	49	602
BRS10906	207	72	138	176	91	93	11	581
BRS31879	178	103	119	131	99	73	41	566
BRS1066	175	69	136	138	88	57	55	543
BRS18529	132	1	59	56	71	89	16	292
BRS44984	—	41	65	86	56	40	0	288
BRS50134	149	4	8	13	106	103	36	270
ARS53844	—	—	—	—	88	96	30	214
BRS44083	131	28	60	84	20	17	3	212
RS49875	94	31	50	42	28	20	3	174
			DX-listings					
ORS45992	231	119	149	206	104	70	5	653
ORS53635	95	—	28	65	22	40	0	155

1984 UHF/VHF TABLE

Station	QTH loc	70MHz Squares	70MHz DXCC	144MHz Squares	144MHz DXCC	432MHz Squares	432MHz DXCC	Total via
BRS52543	YN	27	7	81	19	24	9	167 a-d
BRS25429	ZN	—	—	76	18	37	11	142 a, b, c
BRS32525	AL	—	—	67	23	26	7	123 a, b, d
BRS62088	AL	—	—	25	8	10	3	46 a, b, d
FE8957	BF	—	—	30	8	2	2	42 a
BRS18529	AL	—	—	20	5	—	—	25 a
RS49875	YN	—	—	13	5	2	2	22 a
BRS44984	AL	8	2	—	—	—	—	10 a

* a = tropo; b = Es; c = Ar; d = Ms.

which listed stations throughout the world, although in those days far fewer stations were licensed. Ceri Jones is now GW1JCB but still uses his swl call on the hf bands with a Trio R600 and long wire.

On the sstv scene, Les Hobson, BRS84809, has erected a two-element Gem quad and was about to purchase an SC1 scan converter. I hope to reproduce some photos of sstv signals copied by Les when space permits.

Brad Bradbury, BRS1066, has been concentrating on 1·8, 18 and 24MHz. In early October, 34 countries were copied on 1·8MHz, including W1-3, VE, UG6, UL7, UM8 and TK. W1JBW was 569 as early as 2230. On 18MHz CT2FN and PJ2MI took Brad's tally of countries to 16, while on 24MHz I0FUQ and HB9AYU made it 12 on the band.

Dave Whitaker, BRS25429, reminded me of the White Rose LF Band SWL Contest on 12 and 13 January, (see "Contest News" in this issue). He had logged CE0AA on 21, 14 and 7MHz, and had intended to enter the Society's 21/28MHz contest, but he could hear very little G activity. This is because contest stations who know "what they are doing" tend only to give their own callsign. Therefore a string of contest stations working a G cannot be logged because the full QSO details cannot be copied when the G is inaudible. Do other swls encounter this? If so, I will see what the HF

Contests Committee makes of the situation, and whether a solution can be found.

Martin Parry, BRS52543, mentioned PJ8QQ, 4K1GAG, CE0AA on 3·5MHz, while TL8CK was heard on 7MHz. Paul Crankshaw, BRS48909, also copied the FL8 on 7MHz and the CE0 on 3·5MHz. He also heard ZL7PO on the higher band, but VK9ZA had proved elusive. Robert Small, BRS8841, managed CY9SPI, SU1ZU and 9M2CO on 3·5MHz. On 7MHz BV0W and C6ANU were two new ones. Other dx on the band included TT8CW, ZS6BUX/A22, JY5CI, V44KF and J28DQ. Conditions on 14 to 28MHz were generally poor.

Mail is also acknowledged from BRSs 10906, 44083 and 52868. CQ WW will no doubt feature in next month's piece, but initial thoughts from this QTH suggest that conditions were quite reasonable. Over 100 countries were logged during only 8h, with, as usual, much activity from the Caribbean; VP2VCW, VP2EC, K0GU/8R1, 4V2C, VP2MW, HI0A, to note a few. On 1·8MHz 42 countries were heard in little over 4h; VP2VCW was heard at good strength, but D44BC and Y22TO provided two all-time "newies".

Finale

To close, let me wish all my readers a very Happy Christmas, with sincere thanks to all those who have contributed to *SWL News* during the year, and who have helped to maintain and even, dare I say, improve the content of this, your page.

News, views and table scores for February 1985 should reach your scribe by 11 December with late copy no later than 22 December. □

QRP

by Rev George Dobbs, G3RJV*

The G-QRP Club is 10 years old

Late in 1974, having contacted several stations who used low power, home-built equipment on the hf bands, I invited interested radio amateurs to write to me with a view to forming a QRP group. About 30 people wrote, and during the Christmas of 1974 a simple duplicated newsletter, called *Sprat*, was produced, and the G-QRP Club began.

The club quickly adopted a badge and a slogan, "Devoted to low power communication" and defined QRP as using a power not exceeding 5W DC input. They also began a series of awards and trophies for achievement in low power communication. From the first issue *Sprat* began to reflect the interest of members in design and construction of their own equipment. Over the years *Sprat* has developed into an influential quarterly magazine, two-thirds of which is devoted to practical items for the home constructor. In 1982 the club produced the *G-QRP Club Circuit Handbook*, and sold the 500 copies before it was printed. The handbook is now published and sold by the RSGB.

For many years the club grew steadily, and by 1979 there were over 600 members, In the two years between 1982 and the present, however, the club has doubled its membership, which is now just under 3,000, with members in over 60 countries. The G-QRP Club offers a range of awards for achievement, a datasheet service of circuit ideas, an internal QSL bureau, morse training tapes, badges and other club insignia items. The club has regular hf band skeds and activity periods to enable QRP stations to work each other on the air.

Information about the G-QRP Club, an application form and a sample of the journal *Sprat* can be obtained by writing to the membership secretary, Fred Garrett, G4HOM, 47 Tilshead Close, Druids Heath, Birmingham B14 5LT, or writing to me at the address below.

The G-QRP Club Winter Sports 1984

An end-of-the-year activity period for QRP cw operators from 26 December 1984 to 1 January 1985, inclusive. It is not a contest but a series of activity periods at set times on specified bands, with the object of working as many two-way QRP QSOs as possible. Call, or listen for, "CQ QRP", according to the daily plan set out below. If band conditions are poor, progress downwards until a suitable band is found.

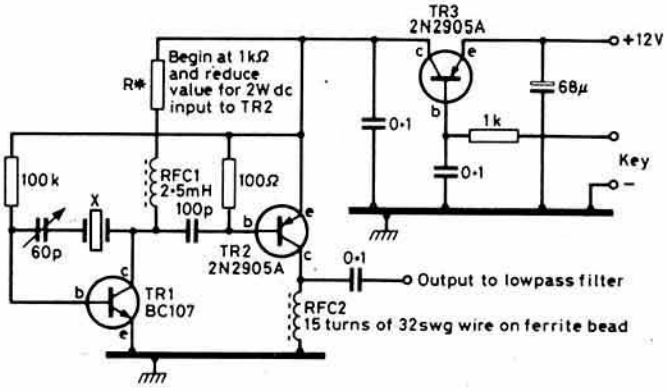
Time (gmt)	CW QRG	Time (gmt)	CW QRG
0900-1000	14,060	1500-1730	21,060/28,060
1000-1100	21,060/28,060	1730-2000	14,060
1100-1200	7,030	2000-2100	7,030/10,106
1200-1300	3,560	2100-2200	3,560
1300-1400	10,106	2200-2300	14,060
1400-1500	3,560		

Reports may be sent to C. J. Page, G4BUE, Alamosa, The Paddocks, Upper Beeding, Steyning, West Sussex, in the form of log summaries and/or remarks and observations. The G4DQP Trophy is awarded to the station thought to have contributed most to the winter sports event.

The STX transmitter circuit

Some of the most successful circuits published in *Sprat* have been small "fun transmitters". These are little hf band transmit circuits that can be easily and cheaply built and yet are capable of useful QSOs on the amateur bands. *Rad Com* October 1983 included the OXO mini-transmitter by George Burt, GM3OXX. That circuit proved to be very popular, especially among Class A licensees who had never built a transmitter before they tackled the OXO. Since that time, GM3OXX has produced another, even simpler little transmitter circuit, which he calls the "STX" (simple transmitter).

The G-QRP Club produced etched circuit boards for the transmitter and sold 100STX kits at the RSGB National Convention in 1984. Many of these little transmitters have been built and some quite amazing QSOs have been gained by them in the hf bands. The circuit can be built by a complete beginner with little expertise or expense required. It uses fundamental crystals for "X" in either the 3·5, 7, 10·1 or 14MHz bands, with a series variable capacitor that can shift the frequency of the crystal a little to dodge QRM. The original was built-up in minutes on a tagboard, but most constructors have used etched circuit boards.



The STX transmitter circuit

One unusual point about the circuit is the use of a pnp transistor in the pa stage. This is used because the transmitter was designed to become part of a very simple transceiver in which this stage is switched to act as a diode detector. A suitable npn device could be used with the emitter to ground and the rf choke (RFC2) and output capacitor in the collector. However, the 2N2905A is a very cheap and commonly available transistor. The unmarked resistance R* requires adjustment so that the pa transistor (TR2) runs at around 2W DC input. This may be measured by adding a milliammeter in series with the collector lead. Begin with R* at 1k and reduce the value until the correct current is obtained in the key down position.

Alternative transistors could be employed for TR2. A whole variety of medium power switching transistors with an f_t of 150-200MHz could be tried. The keying transistor, TR3, is included so that the transmitter may be keyed with one side of the key connected to ground. This enables the use of electronic keyers, but if a hand key is being used TR3 could be omitted. The 12W supply would then be keyed at the point occupied by the collector of TR3 in the circuit. This would make a very simple circuit indeed.

Like all simple transmitters the STX requires a good low-pass filter circuit to be added to the output. In *Rad Com* August 1984 I included in this column details of the W3NQN standard value capacitor seven-element low-pass filters. A filter constructed from the data in that article would be ideal for this simple transmitter, and at this power level the smaller, cheaper T37 cores could be used for the inductors.

Suitable fundamental amateur band crystals for this transmitter on the international QRP calling frequencies of 3,560, 7,030 and 14,060KHz or 20m band crystals on 14,030, 14,040 and 14,050KHz can be obtained from P. R. Golledge Electronics, Merriott, Somerset. The cost per crystal is £3.50 for G-QRP Club members, and £4 for non-members. Both of these prices include VAT and postage. □

*St Aidan's Vicarage, 498 Manchester Road, Rochdale, Lancs OL11 3HE.

Computing

*by John Morris, GM4ANB**

THE INTRODUCTION of this computing column certainly seems to have met with approval. My thanks to the many who took the time and trouble to write with comments and ideas. I hope to cover as many of the suggested subjects as possible in coming issues.

One topic which has aroused more interest than any other is packet radio. I shall be devoting a complete column of *Computing* to packet radio in the near future. For this time there are one or two matters arising to deal with.

Finding preferred values

A sure sign of a badly-written program is one that gives results to many more significant figures than have any meaning. A print-out claiming, for example, that the bearing from point A to point B is "231·441987 degrees" should be taken with pinch of salt, unless you really do know both positions within a few centimetres. For a contact from the UK to Japan an error of one in the least significant figure represents about the same distance as that between the Q and P keys on the computer.

The same affliction occasionally affects programs used to aid circuit design. Who wants to know that in a perfect world a resistor should be 59·88376Ω, when only five per cent preferred value components are available? The extra figures are only a distraction.

Being a great believer in getting the computer to do the boring bits, I usually include the short routine shown in Program 1 in all my circuit design type programs. Given a computed component value, which will not be a nice round number, it finds the most appropriate preferred value.

Program 1

```
10 DIM P(12)
20 FOR J=1 TO 12: READ P(J): NEXT
30 DATA 1.2,1.5,1.8,2.2,2.7,3.3
40 DATA 3.9,4.7,5.6,6.8,8.2,10
100 INPUT R: GOSUB 200
110 PRINT L,H,R: GOTO 100
200 I=1: M=10↑INT(LOG(R)/LOG(10)): L=M
210 H=M*P(I): IF H)R GOTO 230
220 I=I+1: L=H: GOTO 210
230 M=H: IF ABS(R/L)(ABS(H/R) THEN M=L
240 R=M: RETURN
```

Lines 10 and 20 set up array P with the base values of the E12 series, reading them from the DATA statements in lines 30 and 40.

Lines 100 and 110 form a simple calling routine, just for demonstration.

The interesting subroutine starts at line 200. It takes a value in R, and returns the next lowest and next highest preferred values in L and H respectively. R is updated to whichever one of these which gives the smaller fractional error, compared with the original value in R.

Line 200 uses a bit of arithmetic trickery to find the appropriate decade. Then lines 210 and 220 search the list of legal preferred values, multiplied by the decade factor, until one bigger than R is found. This is put into H, and the next lower one left in L.

Line 230 puts one of L or H into M, depending on which has the smaller fractional difference from R. M is copied into R in line 240 and the routine exits.

To modify the program for the E24 series just insert the extra values in the DATA statements and change the figure 12 in lines 10 and 20 to 24. Note that the last DATA value in the list should always be 10.

The routine is not restricted to resistors; it can also be used with capacitors, or any other components that come in preferred value sequences. Which value you select; the next lowest (L); the next highest (H); or the one with the smallest fractional error (R); will depend on the application.

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Locator programs

The locator programs I gave in my article "The new locator system", *Rad Com*, October 1984, attracted a lot of attention, and my phone was kept busy with queries. The ngr-to-locator program was especially popular. I am indebted to G3YMS, G3XVA, G4AXA and several others for pointing out a subtle bug in the program when run on some computers.

The program uses CHR$ in line 1020, and it has come to light that different computers implement CHR$ in slightly different ways. Specifically, the computer on which the program was written, and by co-incidence all three that it was tested on, truncate the value given to CHR$ before returning the character. It turns out that some computers, including the popular ZX Spectrum, round the value instead, making the program give incorrect results. The fix is to change the last part of line 1020 as follows:

L$ = L$ + CHR$(INT(T + E)) + CHR$(INT(T + N))

The added INT functions ensure that the values are truncated instead of rounded, and so give the right answers.

To tell whether your computer truncates or rounds, type-in the following line:

PRINT CHR$(ASC("A") + 0.9)

The ASC may have to be changed to CODE, depending on the computer. If the response is an "A" then CHR$ truncates, and all should be well. If you get a "B" then CHR$ rounds, so you should add the INTs as above. If you get anything else then either you have a very unusual computer, or you typed the line in wrong.

Program 2 in the article, which converts old squares to new ones, has the same potential problem. If your computer rounds then add INTs to all of the CHR$ functions in line 60.

Some correspondents have had trouble getting the ngr-to-locator program running on the Spectrum, mostly due to the differences in string handling between Microsoft and ZX Basics. The changes needed are as follows:

Line 10, change ASC ("A") to CODE("a");
Line 520, change ASC(MID$(N$,PT,1)) to CODE(n$(pt));
Line 1020, add INTs, as described above;
Throughout the program, add LETs as appropriate.

With these adaptions the program works quite happily on the Spectrum. The change fron "A" to "a" in line 10 will make the whole program work in lower case. The ngr should therefore be entered in lower case, and the locator will be returned in the same way. Thus typing in "sd 562 183" will give "io83qp", and similarly for the other examples in the article.

The other two programs need similar language translations for the MID$ and ASC functions to run on the Spectrum.

I see that the Sinclair QL has hit the high streets. The ngr-to-locator program also works on this, with much the same modifications as for the Spectrum, except that LETs are not needed. In addition the " + " used for string concatenation in line 1020 must be changed to "&", which the QL uses for the same purpose, and all occurrences of variable T in lines 1000 to 1020 should be amended to T1. This is because there is an array T in the program, and the QL objects (with a rather uninformative "not implemented" message) when a simple variable has the same name as an array.

Oddbits

The festive season is almost upon us, the traditional time for fun and games for all the family. In keeping with the seasonal spirit I am pleased to present the world's first four-line, amateur radio Christmas party computer game (Program 2).

Program 2

```
10 POKE 49091,15: I=49089: O=49089
20 S=20: DIM M(S): F=1/16
30 FOR J=1 TO S: POKE O,M(J)
40 M(J)=PEEK(I)*F: NEXT: GOTO 30
```

The idea is very simple. The victim sends cw on an ordinary hand key. It is given a short time delay, and played back. The result, especially after moderate consumption of my adopted homeland's most popular export (and I don't mean the oil) can be interesting. I am told it has something to do with confusing the brain's feedback circuits. Whatever the reason, even the most proficient cw sender will produce embarrassingly bad code with this set-up. Take it along to the local club and see.

To get the program going you will need a morse key, a cw practice oscillator, and an i/o port on your computer. The version shown uses a 6522 VIA chip at address BFC0 hex. The key was attached to bit 4 of port A, and the practice oscillator to bit 0.

Line 10 of the program sets up the VIA to make these lines an input and an output respectively. The FOR loop pokes the state of the key at some earlier time to the output, then polls the state of the input. Dividing by 16 using F shuffles the bit representing the key to the right place for later output, and the result is saved in array M.

Adjust the PEEK and POKE addresses and the divide value, F, in lines 30 and 40 to suit your own hardware set up. Depending on the facilities of your computer it may be possible to get rid of the POKE and external oscillator and use the built-in sound instead. It may also be possible to use the computer keyboard instead of the PEEK and external key.

The time delay can be adjusted by varying the value of S. The best seems to be a few tenths of a second.

Incidentally, a very similar effect can be had using a transmitter, receiver, satellite antenna, and Oscar 9, though the computer version works out a bit cheaper.

Merry Christmas! □

EPHEMERIS
Satellite news and views
*by R. O. Phillips, G4IQQ**

Oscar 10

The satellite has passed through the autumnal equinox period without any major problems arising from operation under eclipse conditions. A considerable amount of fine tuning has been carried out to the operating schedule so as to maximize the availability of the satellite without risking any damage to it. Consequently it is not possible at this time to give an accurate schedule for December. The best advice to obtain the current status is to monitor the general beacon transmissions on 145·825MHz, where information is provided using cw transmission for the first 3 or 4min past the hour and half hour. The cw rate is about 13 words/min but, if this is too fast, try recording the transmission and playing it back at a lower speed. Alternatively, the information is contained in the Rtty transmissions at approximately 15 to 20 and 45 to 50min past the hour.

Several months ago I mentioned the moves to increase awareness of the 400-baud psk transmissions on the general beacon. A major step in this direction was taken by the publication in the October and November issues of *Wireless World* of a description of a suitable decoder. The circuit avoids the use of tuned circuits and should be compatible with most computers having either an RS232 or eight bit parallel interface. A printed circuit board for the decoder as well as suitable decoding software for the BBC microcomputer, is available from AMSAT-UK. Details can be obtained with the usual stamped addressed envelope.

Oscar 10 has now passed the point when it produces maximum elevation angles in the northern hemisphere; however, angles of around 55° still occur when the satellite is at apogee at a bearing of 180°. Such an example was on 25 November when maximum elevation of 57° occurred with the satellite at a bearing of 185°. At the beginning of December the maximum elevation will be around 35° and falls to a minimum on the 6th, thereafter it starts to rise again.

The weekly news bulletin service through Oscar 10 continues, and a number of stations now operate on a rota system to provide the up link. Transmissions are made on the special services channel H2, 145·962MHz, using the call sign GB2RS. At the end of each broadcast the up link station moves approximately 10kHz lower in frequency for any reception reports, using his own call sign. The schedule for the Sundays in December is given below:

Date	GMT	Elevation	Azimuth
2 December	1135	22	100
9 December	1930	25	247
16 December	1400	44	153
23 December	0930	7	89
30 December	1630	36	221

The bearings given are for the south of England, and will be slightly different for other locations.

*170 Shirehall Road, Hawley, Dartford, Kent DA1 7SN.

Uosat

Uosat-Oscar 9 continues to experience excellent health, and a recent assessment of the state of the spacecraft indicated that it may well continue for another two years. No further changes have been made to the operating schedule since last month, the only variable being the alternation between the 21MHz beacon with that on 2·4GHz.

Evaluation of Uosat-Oscar 11 systems has progressed very well, with particular emphasis given to data transmission experiments at 9,600bit/s using the 435MHz downlink. The University of Surrey team has developed an i.f. decoder to operate at this bit rate which appears to have very good performance. Design information may be released later if it seems that reproducible results can be achieved. Clearly the use of such a high transmission rate offers considerable advantages over the more typical 1,200 bit/s, but the penalty to pay is an increase of about 12dB in the required signal level.

Unfortunately the results obtained so far using the on-board ccd camera have proved to be very disappointing, though efforts continue to improve the picture quality.

The telemetry channel 13 was not assigned to any specific parameter on launch, but recent tests have calibrated it for its default mode of operation which is to monitor the 435MHz transmitter vco control voltage.

There has been some good news from the university for the large number of users who obtain the latest information on the two satellites from the recorded message service. A second line has now been obtained so that more data can be provided within the available time. The existing line, Guildford (0483) 61202, will be used for Uosat-Oscar 11, and the new line, Guildford 61707, will be dedicated to Uosat-Oscar 9. The heavy demand for this information demonstrates the continuing high level of interest in the two projects.

RS satellites

The early demise of RS6 on 16 October reduced the number of active Russian satellites to three: RS5, RS7 and RS8. The cause of the RS6 failure is likely to have been associated with the batteries, though, as with some of the earlier models, it is quite likely that the satellite beacon will be heard in the future, operating directly from the solar cell output. Indeed, RS1, or is it RS2, can still be heard occassionally due to this effect.

Other news

The 1984 annual general meeting of AMSAT was held on 10 November in Los Angeles. On the same day the second amateur radio satellite symposium took place, the programme for which covered a wide range of topics from PACSAT to the Solar Sail project. It will be very interesting to see if any new proposals emerge from this forum of activists.

The Federal Communications Commission, recently granted special permits for 21 USA amateurs to carry out Teleport operations. The trials, which have been approved for a period of 180 days, will allow those authorized to act as automatic relay stations between packet radio networks on the ground and amateur satellites. With the increasing availability of packet radio equipment in this country, similar developments might be expected in the not too distant future.

AMSAT-UK is carrying out a survey of its members to establish if there is sufficient interest to embark on a construction project for either a complete spacecraft or part of one. The questionnaire asks for proposals on the type of orbit, frequency bands to be used and whether scientific experiments should also be carried. The results should be available in the new year and could mark the beginning of a further contribution by the UK to the amateur satellite service. □

The Month on The Air

*by John Allaway, G3FKM**

ANOTHER YEAR GONE, and before proceeding with the normal contents of *MOTA* your scribe would like to take this opportunity to thank all those who contribute regularly to the column, and to wish every reader a very happy and successful holiday season and New Year.

No prize for those who spoted the mistake in Ted Allen's callsign in this spot last month. It should of course have been G3DRN, not G3DME. G3DME is the beacon co-ordinator and he does not become involved in handling QSL cards for his charges—although I *have* heard beacons being called.

DX news

Some activity was expected from OH2JL, who has been in Somalia with the Finnish Red Cross for the past few weeks. He was there last year and used the callsign T52JL. This time he has an FT707, a TH2Mk3 beam and some dipoles. He will be returning home soon.

A22WZ has been active in the 14,275–14,295kHz area around 1800, and also near 14,250kHz at 2000. *DX-NL* says that D68WB keeps schedules with ZS stations at 1600 on Mondays and Fridays on 14,200kHz. The same source says that F6EUX should have arrived in Kerguelen Is at the end of November and that his call sign on the island will be FT8XA.

5H3SG is with the Menonite Mission hospital in Sharopi and is often near 21,260kHz from 1900. Gerry, VE7FXX, who is at present in Uganda and using the callsign 5X5GK, apparently without authorization, is hoping to receive a beam and to be active on more bands. He is said to be trying to obtain proper operating permission.

Those looking for FH8CB should try listening on 18,116kHz — *DX News Sheet* reports that he is active daily on this frequency at 1600 when he works with stations in South America and South Africa. Alain, 5R8AL, is back from leave in France and has been worked on 21MHz ssb around 1600 — usually around 21,335kHz.

S79CW is a new station located in the Seychelles, and has been worked on 14 and 21MHz ssb.TT8CW is being operated by F6AJN (ex-FB8ZQ) and F6GXB, and they have been worked on 7MHz cw and ssb.

LU4ZS is located on Marambio Is in Antarctica, and is often on 14,342kHz around 1900. 4K1CEY has often been on 7,004kHz around 2200, and is easy to work there. He has also been on 14,006kHz in the late afternoon, and has been reported on 3,503kHz after 2200. The *Long Island DX Bulletin* says that a group of Japanese operators has been given permission to operate as 3Y0AA from Peter 1st Is during the periods 1 January to 1 March in 1985 and 1986. Transportation could be the big problem! 4K1GAG, in the South Shetland Is, is on 3,505kHz on Sunday from 2200, and is also regularly on 7 and 14MHz.

T30BY, in Kiribati, is often to be found on 14,315kHz at 0800, in company with T32AN and T32AO. T32AB has been reported on 14MHz cw and ssb around the same time. T2ADE can be found between 0730 and 1000 on weekdays on 14,285kHz, and is said to keep schedules on Tuesdays and Fridays at 0710 on the same frequency.

XU1SS is still very active in the 21,185–21,195kHz area between 0700 and 1000, and on Saturdays VS6CT makes lists at 1430 on 14,245kHz. CW activity on 14,010kHz between 1300 and 1400 has been noted. Also, according to *DX'press,* YI1BGD is active on Wednesdays and Sundays between 1200 and 1600, and the current operators seem to prefer 14MHz — none of them uses cw. The station used the special callsign YI0BIF during November to mark the occasion of the Baghdad International Fair.

DX News Sheet quotes from a letter received by G4ISK from KL7Y. In it KL7Y says that a lot of Alaskan amateurs will be making an effort to work into Europe this winter. The optimum time is around European sunrise, and calls to listen for will include KL7U, KL7AF, KL7NT, KL7H, AL7BL, KL7KJ, and KL7Y himself — most have good antennas. KL7Y also commented to *DXNS* direct that there were too many repeat QSOs on 3,795kHz between the stronger USA and stronger European stations, and that these meant that the KL7s (who were copying Europe) could not get into the action.

GM3ITN reports that he has answered all VP8AEN and A4XYF QSL card requests, but anyone still needing a QSL card should apply direct. He still has the South Georgia logs but would like to finish the QSL task by the end of 1984.

Rafiq, JY5CI, now has a UK QSL manager, G4WFZ. His address will be found in "QTH Corner".

ROARS club contest (0500 to 1700 on 7 December) should produce a flurry of A4X activity, as should the same society's Anniversary Individual Operators Contest (0400 20 December to 2000 21 December). The Oman field day will take place early in 1985, and details will be given later.

Canadian stations may use special prefixes between 13 October and 13 December to celebrate the centennial of the Greenwich meridian. These are XN1–XN8 for VE1–VE8 respectively, and VY1 becomes XO1. VO1 and VO2 become XL1 and XL2.

Overseas news

Steve Bowden, G4KIV, is on Ascension Is for one year and he is on the air most days — mostly on 14, 21, or 28MHz, but also sometimes on 3·5 and 7MHz using his ZD8SB call. He promises to QSL all who contact him.

David, 9M2DC, reports that new Malaysian amateurs include 9M2FD, who comes from the Netherlands and who is MARTS member, and 9M2TK and 9M2QA who are not (and therefore cannot be QSLd via the MARTS bureau).

The Sierra Leone ARS will be operating a special event station from the Childrens' International Summer Village Camp which will take place in Freetown from 16 December to 9 January 1985. Its callsign will be 9L1CIDV, and both phone and cw will be used — frequencies mentioned include 7,060, 14,310, 21,240, and 28,600kHz.

G3HUL, G3IOR, and wives recently visited Moscow, where Pat gave a talk on satellites. While there the lady who manages the RSF QSL Bureau apologised for the rather long delays which have occurred in handling cards at Box 88 during the past year and said that in future the service should be much better. The USSR will be launching a new satellite towards the end of next year which will carry a 21–29MHz transponder in addition to the normal 145–29MHz component. This, at a time of low muf and sunspot minimum, will maintain amateur use of 21 and 28MHz. Normally mutual "line of sight" would give QSOs from Britain to all W and VE call areas, the nearer South American countries, all Europe, about 80 per cent of Africa and 70 per cent of Asia, but not Australasia. However, some re-angulation of the signals — particularly of the 21MHz uplink — while not permitting earth return of ground-emanated signals — may well result at times of high ionization.

A small gathering at the home of V85SS in Brunei: l to r, V85PP, V85SS, W9KVC/DU1 and V85GF (G2GC)

*10 Knightlow Road, Birmingham B17 8QB

Older readers will remember Angus Murray-Stone, 5N2AMS (and other calls). He is now G4EWQ/PJ2 and is also the rector of All Saints Church in Willemstad, and as such has responsibility for a large area of the Antilles. He is therefore restricted with his operating times, but tries to be on the air on Tuesdays and Fridays at 2130 to keep a schedule with G2ABC. Other callers are welcome, and particularly so if they are RNARS members, as Angus has associations with sailors' societies.

Top band

Now that winter is here interest in this band is returning, and GD4BEG has sent details of the "O'Brien Pacific 160 Test". This is being held in honour of W2EQS/W9NFC — founder of the CQ 160 Contest (together with VE3BWY and W1BB) in 1960. The test will run from 0001 on 15 December to 2359 on 15 January — frequencies are given as 1,800-2,000kHz, and QSOs should only be with Pacific stations (in *CQ* 'Zones 13, 6, 7, 10, 12, 19, 24, 25, 26, 27, 28, 29, 30, 31, and 32). Exchange RST and zone. Score is number of "first-time" stations worked multiplied by the sum total of zones and countries worked. Certificates will be given to those making at least one QSO over 5,000 miles in distance who submit a log and three ircs by 1 March to Roger Mace, W6RW, 8600 Skyline Drive, Los Angeles, 90046, USA.

Mike also commented on recent poor conditions and feels that auroral absorption has been high for much of the time as he has been hearing stations further south working dx which he cannot hear himself. There is a daily "160m DX Information Net" which meets at 1800 on 14,185kHz with 4X4NJ acting as co-ordinator. The current GD4BEG DXCC total is 153 countries worked, with 150 confirmed.

The other Mike — VK6HD — reports that he is still active on this band around sunrise in Western Australia. On 2 December this will be at 2145. His preferred frequencies are 1,822, 1,832, 1,837, 1,845 and 1,849kHz, and he says that he often hears UK stations talking to each other both on cw and ssb!

WIA 75th anniversary

The Wireless Institute of Australia celebrates it's 75th anniversary in 1985, and special activities are being organized to mark the event. The special station VI3WI was mentioned in October *MOTA*, however, this is not directly connected with the event but with the 150th anniversary of the first European settlement in Victoria. All dx bands and all modes will be used, and a commemorative QSL card will be available either direct or via the bureau. A special award certificate will also be available for radio contact (or confirmed logging) with one VK3 station between Novemeber 1984 and 30 April 1985. The QSL card for the qualifying QSO, together with a congratulatory message on Victoria's 150th Anniversary, plus AS2.00 or equivalent should be sent to Victoria 150 Award, Wireless Institute of Australia, 412 Brunswick St, Fitzroy, 3065 Vic, Australia.

WIA is also running an International RTTY Art Competition. Entries must contain no more than three overlinings, and be submitted with a hard copy printout and baudot tape. There are three categories: (1) Best hand-generated original submitted by it's author outside VK, (2) Best ditto generated by a VK author, and (3) Best non-original hand-generated or computer-generated rtty picture. Entries close on 31 August 1985 and must be sent to WIA 75 RTTY Art Competition at the address given in the previous paragraph.

IARU Region 1 HF Championship 1985

This is a new venture and the result of a paper presented by RSF (the USSR society) at the 1984 Region 1 Conference. It is open to all licensed amateurs living in the region. Points are scored by taking part in Region 1 society contests which abide by IARU decisions concerning contest-preferred segments, time limitations etc. The organizers of these are also required to have submitted details of their top 10 placings to IARU by 1 August 1986. No more than 10 contests may be counted for scoring purposes, and contests are in two groups — those in which the rules provide for contacts with at least five other member countries, and those which do not. In the former category position/points are as follows: 1st = 100; 2nd = 90; 3rd = 80; 4th = 70; 5th = 60, 6th = 50; 7th = 40; 8th = 30; 9th = 20; and 10th = 10. In the second category points for each position are half these. In contests with separate categories for entrants from the organizing country only half the relevant score is gained and only one such contest may be entered.

National societies are being invited to present cups/prizes for top scorers in their own countries, and the organizing society for the year may do likewise. Cups and diplomas will be awarded to winners. The Radio Sports Federation of the USSR has been invited to act as judge in 1985.

1984 SIX BAND TABLE No 5

	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total
G3XQU	8	88	121	**176**	**183**	**140**	716
G3SXW	49	89	**126**	145	133	88	630 (CW only)
G3TXF	54	90	114	147	114	85	604 (CW only)
G3KDB	40	71	99	123	137	98	568 (CW only)
G3XTT	**74**	78	101	113	81	75	522
GW4OFQ	13	128	102	116	95	39	493 (SSB only)
G4SKI	2	46	9	111	131	109	408
G4OTU	23	34	67	118	103	55	400 (CW only)
G4GOF	6	12	24	60	60	51	213

Band leaders are listed in bold type. Next deadline, *15 January*, with scores *to 31 December only*.

CURRENT COUNTRIES TABLE No 2

	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total
G3KMA	90	**218**	**288**	**315**	**313**	**299**	1,523
G3MCS	45	199	244	311	311	294	1,404
G3GIQ	60	**97**	235	310	311	292	1,395
G3HTA	61	164	223	308	284	244	1,284
G3XTT	97	175	208	273	271	243	1,207
G3UML	24	192	210	313	282	242	1,263
G3ALI	2	198	204	297	267	230	1,198
G2DMR	42	148	156	289	291	256	1,182
G4FAM	51	148	211	262	260	240	1,172
VK9NS	53	152	211	278	232	177	1,103
G3TXF	57	160	177	248	244	204	1,090
G3RUR	1	141	169	279	256	225	1,071
G3XQU	8	123	161	267	265	238	1,062
G3IGW	90	134	227	224	197	180	1,052
G3NOF	4	83	74	310	307	263	1,041
G3YMC	71	92	153	228	232	182	958
G4LJF	1	120	134	227	195	186	863
GMYOR	61	87	128	192	185	175	828 (CW)
GM3PPE	45	120	142	181	167	138	793
GW4OFQ	31	151	108	151	157	107	705
9K2BE	41	67	78	125	166	178	655
Average	44	146	178	257	247	218	1,091

Next deadline is for "All-time" (ie with deleted countries)—*15 January*.

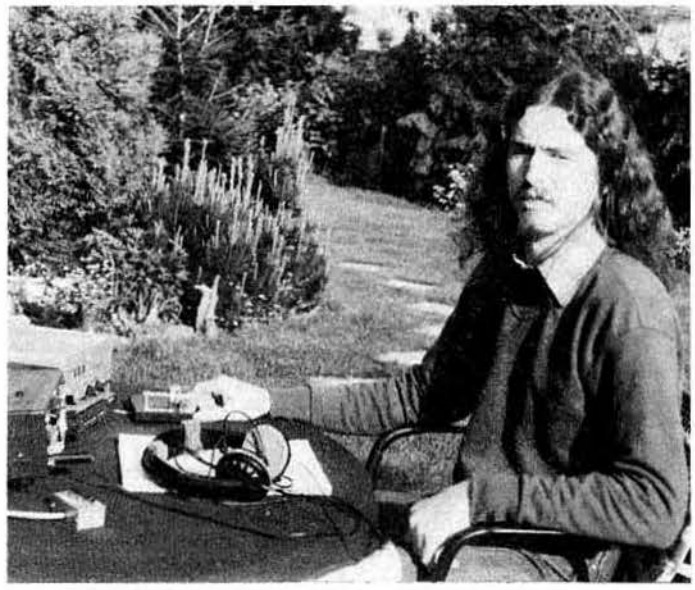
1984 28MHz TABLE

G3XQU—141	G3TXF—85 (cw)	GW4TEJ—51	G4FVK—29 (ssb)
G4SKI—109	G4PEL—83	G4GOF—51	G4RHW—23
G4VJK—108 (ssb)	G4DXW—72	GM4HX—47	G4SXK—20
G4MUW—101 (ssb)	G4NXG/M—66	GW4OFO—39	G3URA—18 (cw)
G3KDB—98 (cw)	G3XTT—59	G4OBK—38	GI4PCQ—17
G4RAB—95	G3WVG—58 (cw)	G4SDZ—36	G4RWP—14
G4TTR—91	5B4DN—55	G3KSH—36	G4LZZ—13 (ssb)
G3SXW—88 (cw)	G4OTU—51 (cw)	GMLKJ—35	G2FQR—13

The final table for 1984 will appear in January issue and the first for 1985 in February.

SSTV

GD4HOX reports that although many G stations are active on sstv on 14,230kHz there appears to be very little activity on the lower frequency bands. With this in mind GD4HOX, EI6EU, and EI3CZ have been very active on 3·5MHz and would welcome others to join in. They can be found on 3,730kHz most Saturdays at 1430, on Sundays at 1015, and often during the week at 1315 (your scribe feels that these may be clock-time and not gmt).



Dieter Dippel, DF4RD, who was active as DF4RD/SV9 last spring

QTH CORNER

CY9SA	(UK only) via G3NBC, K. Hurrell, "Bracklyn", 4 Flanders Grove, Marnhull, Sturminster Newton, Dorset.
HU11FI	YSDX, PO Box 05-43, San Salvador, El Salvador.
JW0EQ	LA5NM, M. Bjerrang, Box 310, 9401, Harstad, Norway.
JY8CI	P. Marsh, G4WFZ, 28 Orcheston Rd, Bournemouth BH8 8SR.
G4EWQ/PJ2	Rev A. Murray-Stone, All Saints Rectory, Heelsumstraat, Steenrijk, Curacao.
K1KI/PJ4 **P44A**	via N1AR, J. Brooks, 91 Peters Spring Rd, Concord, Ma, 01742, USA.
TT8CW	F6GXB, J. Calvo, Box 70, F-91650 Savigny Cedex, France.
VK0GC	VK3RK, O. C. Benning, 194 South Rd, E Brighton, 3187 Vic, Australia.
VP2CW	N6CW, T. Baxter, 4639 Katherine Place, La Mesa, Cal, 92041, USA.
YI0BIF	YI1BGD, Scientific Centre, Box 5864, Baghdad, Iraq.
9M2RY	KB6UF, R. Jones, 12136 Lester Court, Chino, Cal, 91710, USA.

Miscellany

Steve, GW4BLE, writes to say that he is *not* QSL manager for GW8GT, and is no longer associated with the group. It seems that there is some delay in sending out QSL cards and Steve feels that operators who make many contacts during contests should try not to forget the chores which follow. GW8GT cards may be available via GW3KYA or GW8GT at the address given in the *RSGB Callbook*.

G4XPR reports that his call sign is being used by "Bob" on the hf bands, and anyone working G4XPR on hf is advised to try to make sure it is the right one.

Congratulations to GM3ITN who has just received his DXCC/RTTY No 82. This was achieved in nine months, and Les wonders if this is a record (timewise)? He also reports a QSO with GW4JAD/MM on board the survey ship *Discovery*. The callsign was GB3DIS and has been issued for a trip into the South Atlantic around the New Year period. The ship has three amateurs on board and activity is expected on all bands.

Welcome

To the following who joined the Society during September: F1CVU, F1HSU, GM4/N6ITL, I7BB, LX1RF, OE1ZUS, OZ1HDB, W0LXQ, 5N0ELT, and D. Barnsley (EA).

Awards

The 289 Award

This was established by members of the VERON District 17 (Gouda) on 1 August 1984 and is a Delft blue tile (size 15 x 15cm) indicating the applicant's callsign or listener number. To obtain it 17 points are needed. These are made by QSOs with District 17 in the following way — on hf each counts three points, on uhf/shf two points, and on vhf one. Listeners or licensed amateurs need only send copies of log entries certified by two other amateurs. Repeater QSOs are not valid, but mobile stations may be counted. The award costs US$3.00 or 10 ircs, and further information may be obtained from, and applications sent to, C.J. van Leeuwen, PD0OFP, Waterruit 11, 2804 PA, Gouda, Netherlands.

Contests

ARRL 10M Contest

0000 8 December to 2400 9 December

All stations operate no more than 36h. Single-operator phone, cw and mixed, and multi-operator mixed-code classes. W/VE stations give RS/T plus state/province. Rest of world RS/T plus QSO number from 001. Four points per cw QSO, two per phone. QSOs with USA novices count eight. Multiplier is total of USA states, VE call areas, DXCC countries (except W and VE), and ITU zones of /MM or /AM stations worked. Stations may be worked once on phone and once on cw, and no phone QSOs may be made below 28,300kHz. Logs should give time, mode, call and exchanges. Multipliers should be marked clearly the first time worked, and entries with more than 500 QSOs should enclose a duplicate sheet. Post logs before 11 January 1985 to ARRL, 225 Main Street, Newington. CT, 06111, USA. Official entry/log forms are available from this address in exchange for ircs—not from G3FKM.

UBA SWL Competition

0000 1 January to 2400 31 December 1985.

The intention is to log as many DXCC countries as possible on 3·5, 7, 14, 21, and 28MHz during the year. Each country counts one point on each band, and each counts once as a multiplier. There are three categories — phone, cw, and rtty, and all are single-operator. A special log must be used, and this may be obtained from UBA SWL Manager Marc Domen, ONL6945, Gebr.-Blommestraat 14, B-2200 Antwerpen-Borgerhout, Belgium, in exchange for three ircs. Interim logs must be submitted three times — postmarked before 1 March, 1 June, and 1 September. Further details are available from Marc.

Full results of the **1984 Bermuda Contest** have been received and UK scores listed are as follows:

G4CNY—376,770	G4FJT—12,750	G4RVV—775
G4UOF—141,400	G4MKT—7,345	G3NT—660
GW4BKG—42,315	G4GFH—6,375	G3YBH—510
GD4HOO—36,040	G4IJW—1,330	G3NHF—465
G4DSY—33,150	G4BYA—855	G4MTC—95
G3UPS—16,550		
G4OTU—13,335		

G4CNY has already visited Bermuda to collect his certificate, and other top scorers making the journey were DF6PK, VE3BGY, and K1RM. Judi Davidson, VP9IJ, was winner for Bermuda. The 1985 contest will take place on 16 and 17 March, and rules will appear later.

The following *"73 Magazine"* contests will take place in 1985:-
12 January — **40m World SSB Championship**
13 January — **75m World SSB Championship**
19-20 January — **160m World SSB Championship**
26 January — **15m World SSB Championship**
27 January — **20m World SSB Championship**
23 February — **RTTY World Championship**
Copies of rules are obtainable from G3FKM (sae please).

UK scores in the **1984 CQWW 160m DX Contest** were as follows:

Callsign	Points	Callsign	Points	Callsign	Points
G3SZA	257,720	G3TXF	61,103	GM3OXC	21,547
G3XWZ	93,666	G4OBK	56,832	G4ARI	10,040
G3IGW	82,707	G3SXW	30,165	G3BDQ	5,400
GM3YOR	77,881	G3BBD	25,385	G2CIL	3,515
G3XTT	71,958				

In the phone section, G3SZA scored 77,252 points, and GM4KHE 24,564 points.

Apologies in advance for any slight error in the above, which was copied from a very indistinct copy received from W1WY. There is no doubt about the order — only some of the actual points-scored totals.

GJ6UW and **GU3HFN** were inadvertently missed from the **1983 CQ WW DX Contest (Phone)** scores published last month. Their scores were 4,861, 632 and 839,496 respectively.

G3RRS was top G in the multi-operator single-transmitter section; this was not made clear last month.

Around the bands

Many complaints about poor conditions this time, but perhaps the most disappointing comments concern what seems to be an increasing use by some UK stations of A3J on 10MHz. Sadly the calls heard include some which are well known and belong to those who should know better.

The following kindly provided logs and information for this month's column: G2HKU, G3YY, G5JL, G3BGM, GJ3EML, G3s GIQ, GVV, IGW, GM3ITN, G3s KSH, NWG, YRM. GD4BEG, G4s EHQ, FVK, GW4KGR, GM4KHE, G4NXG/M, G4s OBK, UOL and 10906.

Stations using A1A are listed in italics:

1·8MHz. 0100 *C31OF, RA9AKM, UG6GAO,* WB3GCG. **0300** *UO5OLW, 3D6AK.* **0400** *KD5M, SV0AA.* **0500** *K0KVB, W1,2,8.* **0600** *WA3EUL.* **2100** *EA6KZ,* EA8QL, *HB0NL, OE3REB.* **2200** LX1JAE, *RF6FFW, UL7MAN, 4X4NT.*

3·5MHz. 0300 J88AQ. **0500** *CN2AQ,* CT2AK, *W6TEX/CT3, HK1QQ, LU, W1,2,6,9, ZL2OM, 7X2MB, 8P6MS.* **0600** 3X4EX. **0700** DJ0SB/C6A, EA9IE, *ZL3LKH.* **1600** VK3FY (to 1800), VK6IR. **1800** LX1B1. **2000** AP2SQ. **2100** JA1ELY, *JY8KL,* SU1ER. **2200** AP2ZA, TL8CK, VK6LK. **2300** XL1FG, 9M2CO.

7MHz. 0000 *TR8IG.* **0300** *PA0JLS/PJ2,* OE8AJK/YK. **0500** *OX3KP, PZ1DC, ZL* (to 0800), *K6XN/8P6.* **0600** *CM, LU,* VK2,3,5 (to 0800). **0700** D44BC, HB0BHA, KL7RA, *VP9C.* **0800** OA4OS, *W6EUF/OH0,* V2ARS, VP2VCW, 9Y4VU. **1700** JA6ENF, *VK2,3,* YB2DI, 5B4JE. **1900** JA6NM, *ZL2BZ.* **2000** *WP4C.* **2100** CY9SPI, *TA2CN, VK3MR,* east-coast W, *YV1ADR.* **2200** CN8ES, TL8CK, *TT8CW,* VP2MW, 3V8WJ. **2300** FG7XJ, *KA2DIV/V2A, VK6RU, VP2MGR, 5T5RY.*

10MHz. 0000 *SV0AH* (Rhodes). **0300** *FB8WK, LU, 5B4OG.* **0600** *VK3, ZL4.* **0700** *T77C, VK2,3,7, ZLs 3BJ, 4IJ.* **0800** *JA6HW* (LP), *JY8CI, KL7, VK2,3,7, ZL3,4.* **0900** *VK4RF.* **1600** *KC0DS.* **1700** *4X4WF.* **1800** *ZS6, VO2CP.* **2000** *KA2DIV/V2A, VK2, east-coast W.* **2100** *VE3AX, W0TIV, DL2GG/YV5, ZC4EPI/A, 9H1BB.* **2200** *FG4DE, HZ1AB, NC8Q/V2A, W1-W3.* **2300** *TR8SDP, PY, W7BNK/0.*

14MHz. 0500 AP2AU. **0700** C21AM, FK8s *CA,* CE, HV1CN, JA, TR8JLD, VK9ZA, 5W1EJ. **0800** *G5JPIJW* (3W) *KX6s BU, DS, OY7ML,* YI1BGD, ZL4KO/B. **0900** AP, JA, V85GA, VK, ZL. **1000** C30LBV. **1100** BY4AA, HI0FMP. **1200** JW6BAA, ZL1AXB. **1300** BY5RA, CY9SPI, P29JS, VK2, W6-W7, *G3IAD/5N4.* **1400** KH0AC, UA1OT (FJL), XU1SS, 9M2DF. **1500** V85GA, *9V1TL.* **1600** *N5TP/DU2, JY8YD,* KL7RA, V2ARS, V85s GF, HF, *VS6FI,* W6-W7, *3D6AK.* **1700** *FY7CM,* HV2VO, OD5NZ, VPs 2MW, VCW, 5AP, *4K1CEY,* 8Q7OW, *9H3JAM.* **1800** *A6XJC,* A71BJ, *JX5DW,* KH6CD, S83H, *TT8CW, W6-W7,* VE6-VE7, ZD7CW, 3X4EX, 8Q7BZ. **1900** TF3CW, V2AZM, W6-W7. **2000** KG4DX, VE8YQ, *ZL1AH.* **2100** CE0AA. **2200** EL2J, VP8ASR. **2300** VP8ML.

18MHz. 0800 *ZS6AVM.* **1500** *DL2GG/YV5.* **1600** *CT2FN.* **1700** *ZS6JWA.* **1800** *LU1DOW.*

21MHz. 0700 HZ1HZ, TR8CR, TA1UA, 5N24RTF. **0800** JA. **0900** *JY9WR.* **1000** S79CW, *TR8JLD,* VQ9DG, *4S7CR,* 5Z4DE, 6W2EX. **1100** FR0FLO, VS6CT. **1300** *H5ADX, J28AG,* VP2VCW, W1-W5, *YC2FE,* 3X4EX. **1400** FR7ZB, *TU2TL,* 5R8AL. **1500** *A22ME,* HH2PV, *TA2TA, TN8JYC,* W5UAW, W6, *4K1CEY, 9M2RY, 9V1TL.* **1600** C53EK, J4ODC, P44A, PZ1AP, 3D6AL, 5N8YPM, 6W1NQ. **1700** A22TE, PS7AAW/PY0F, S83H, T5TI, TL8DC, *TR8DM,* VP8ZV, ZD9BV, 3D6AN. **1800** CE, *CX,* HP, *LU, PY.* **1900** CE0AA, D44BC, J37AH, VP8QP. **2100** *CE0AA.*

24MHz. 0900 *DL, HB, OE.* **1000** *ZS6BMS.*

28MHz. 1000 Z23JO, 3B8FP. **1100** HZ1HZ, ZS3GB, 4S7NMR. **1200** FH4AA, 3D6DX, 9J2BO. **1300** HZ1AB, TR8IG. **1400** 9K2BE. **1500** D44BC. **1700** EA8, LU, PY. **1800** VP8ML. **1900** CE3DQO.

Thanks to all who contributed and to the following for items extracted: *CQ Magazine* (W1WY), *DXNL* (DL3RK), the *Long Island DX Bulletin* (W2IYX), *DX News Sheet* (G3XTT/G3ZAY), the *EX-G Radio Club Bulletin* (GI3OEN/W6), *Long Skip* (VE3GCO), the *Lynx DX Group Bulletin* (EA2JG/EA3CBQ), and *DX'press* (PA0TO/PA0GAM).

All items for **February** issue must reach G3FKM no later than **28 December.** □

HF propagation predictions for December 1984

Using the table

The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band, ie ♀ = 0000, ♀ = 0200, ♀ = 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 RED and lowest probability in GREEN type.

	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	.	.	4	31	.	.	58	86	.	.	188	886	.	431	676	678	422	986	644	346	888	††	5	.	24	†††
Malta	.	.	13	21	.	.	68	772	.	.	188	889	2	563	665	568	754	998	743	347	899	†††	4	.	4	†††
Gibraltar	.	.	1	11	.	.	16	653	.	.	88	888	2	242	186	667	852	898	764	335	898	†††	†	3	.	2	5††
Iceland	.	.	.	.	.	.	2	551	.	.	18	898	1	1	.	67	778	61	675	165	557	875	†††	†	42	224	†††
ASIA																								
Osaka	.	.	.	.	.	.	2	.	.	.	73	.	.	.	164	223	111	1	.	131	125	664	.	.	.	.	24†
Hong Kong	.	.	11	.	.	.	65	1	.	.	167	62	.	1	.	134	443	11	1	.	11	125	675	.	.	2	5†4
Bangkok	.	.	35	1	.	.	78	61	.	.	146	664	.	2	.	14	357	323	3	.	1	125	787	.	.	2	5†5
Singapore	.	.	46	41	.	.	78	86	.	.	136	675	.	2	.	13	357	324	2	.	1	125	786	.	.	2	5†3
New Delhi	.	.	43	2	.	.	78	71	.	.	346	661	.	521	113	355	224	731	.	.	125	788	5	.	.	2	5††
Teheran	.	.	55	41	.	.	188	86	.	1	555	675	.	643	322	357	445	883	1	.	125	788	†5	.	.	2	5††
Colombo	.	.	45	42	.	.	168	87	.	.	224	676	.	32	.	1	357	545	51	.	.	125	788	3	.	.	2	4††
Bahrain	.	.	54	31	.	.	277	75	.	1	533	675	1	743	2	1	347	655	873	.	.	25	788	†5	.	.	2	4††
Cyprus	.	.	56	54	.	.	188	883	.	321	776	788	321	886	643	468	877	997	311	135	898	††	4	.	.	2	5††
Aden	.	.	54	43	.	.	166	782	.	2	422	478	221	823	1	.	147	877	872	.	.	24	788	†4	.	.	.	4††
OCEANIA																								
Suva (S)	.	.	.	.	.	.	.	31	.	.	.	5	663	.	.	34	456	2	.	.	42	125	2	.	.	.	2	.
Suva (L)	.	.	11	.	.	.	75	31	2	.	111	186	666	731	.	1	363	346	51	.	.	231	13	2	.	.	.	.	.
Wellington (S)	.	.	.	.	.	.	3	41	.	.	.	47	661	.	.	.	64	455	.	.	32	125	1	.	.	.	2	.
Wellington (L)	.	.	.	.	.	.	21	.	1	.	112	75	423	532	.	1	263	346	42	.	.	131	13	1	.	.	.	.
Sydney (S)	.	.	23	2	.	.	77	74	.	.	.	276	673	.	.	.	144	456	11	.	.	21	125	51	.	.	2	2	.
Sydney (L)	.	.	.	.	.	.	3	1	.	.	1	56	542	541	.	.	.	44	345	731	.	.	21	113	41	.	.	.	.
Perth	.	.	46	42	.	.	178	87	.	.	.	246	676	.	.	1	.	13	357	533	.	.	1	125	762	.	.	2	53	.
Honolulu	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	11	.	11	225	41	.	14	.	41	124	2	.	.	2	4	.	.	.
AFRICA																								
Seychelles	.	.	12	43	.	.	145	782	.	3	.	212	478	221	.	821	.	.	147	877	84	.	.	24	788	†	.	.	.	4††
Mauritius	.	.	34	43	.	.	166	783	.	32	.	222	478	322	.	851	.	.	147	888	73	.	.	24	789	4	.	.	.	4††
Nairobi	.	.	55	44	.	.	166	684	.	41	.	422	268	542	.	963	1	.	37	898	872	.	.	14	788	†4	.	.	.	4††
Harare	.	.	12	441	.	.	55	686	.	54	.	322	258	754	.	983	2	.	25	899	872	.	.	3	789	†4	.	.	.	4††
Capetown	.	.	2	552	.	.	45	677	1	.	53	222	236	775	.	984	2	.	13	699	873	.	.	1	478	†4	.	.	.	5†
Lagos	.	.	36	553	.	.	87	678	1	.	661	252	136	876	.	996	52	.	3	799	888	3	.	1	588	5†5	.	.	.	2††
Ascension Is	.	.	15	434	.	.	57	667	2	.	564	63	223	676	.	998	43	.	1	489	888	51	.	.	169	†††	2	.	.	.	3†
Dakar	.	.	6	654	.	.	48	767	2	.	454	74	224	775	.	889	451	.	1	589	888	72	.	.	279	55†	4	.	.	.	4†
Las Palmas	.	.	5	553	.	.	48	888	1	.	233	87	667	853	.	889	575	335	798	.	989	852	112	589	†††	†	2	.	.	2††
S AMERICA																								
South Shetland	.	.	1	122	.	.	45	666	2	.	344	76	533	343	.	466	343	21	123	.	233	321	.	.	1	.	.	.	.	.
Falkland Is	.	.	1	144	.	.	25	566	2	.	344	76	322	233	.	688	353	1	24	.	467	531	.	.	1	.	34	2	.	.	.
Rio de Janeiro	.	.	2	1	1	.	6	444	2	.	344	66	322	344	.	889	363	.	147	.	889	73	.	.	15	.	†††	5	.	.	2
Buenos Aires	.	.	1	.	2	.	15	445	2	.	234	76	322	233	.	789	364	1	24	.	689	731	.	.	2	.	3††	5	.	.	.
Lima	.	.	.	454	.	.	.	876	2	.	2	1	632	221	.	557	223	3	13	.	588	741	1	.	1	.	2††	5	.	.	.
Bogota	.	.	.	453	.	.	.	876	2	.	1	13	632	221	.	547	144	3	14	.	788	641	1	.	2	.	4†5	5	.	.	.
N AMERICA																								
Barbados	.	.	.	454	.	.	3	876	2	.	2	6	622	331	.	657	244	3	36	.	887	741	.	.	15	.	††5	5	.	.	2
Jamaica	.	.	.	153	.	.	.	686	2	.	.	11	642	22	.	435	153	31	23	.	778	641	1	.	3	.	4†5	5	.	.	.
Bermuda	.	.	.	253	.	.	.	687	3	.	.	4	654	53	.	435	134	321	245	.	878	641	1	.	16	.	†††	5	.	.	3
New York	.	.	.	43	.	.	.	387	2	.	.	1	665	53	.	324	24	332	343	.	878	442	11	.	25	.	†††	5	.	.	2
Mexico	.	.	.	33	.	.	.	87	2	.	.	.	274	21	.	224	43	341	1	.	478	442	11	.	1	.	††	4	.	.	.
Montreal	.	.	.	32	.	.	.	387	2	.	.	2	676	62	.	323	24	443	343	.	878	442	111	125	.	.	†††	5	.	.	3
Denver	.	.	.	1	.	.	.	161	.	.	.	.	66	41	.	222	31	143	221	.	578	241	121	1	.	.	2††	5	.	.	.
Los Angeles	.	.	.	.	.	.	.	41	.	.	.	.	26	41	.	122	22	44	211	.	268	242	121	.	.	.	4†	5	.	.	.
Vancouver	.	.	.	.	.	.	.	.	.	.	.	.	5	4	.	121	22	26	421	.	367	142	123	111	.	.	4†	5	.	.	.
Fairbanks	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	22	.	13	235	521	355	.	42	124	532	.	24	4	.	2	2	.

The provisional mean sunspot number for September 1984 issued by the Sunspot Index Data Centre, Brussels, was 15·4. The maximum daily sunspot number was 61 on 3 September, and the minimum was 0 on 14, 15, 17, 18, 20, 26-29 September. The predicted smoothed sunspot numbers for December, January, February and March are, respectively: (classical method) 38, 36, 35 and 34; (SIDC adjusted values) 30, 28, 26 and 24.

Contest News

September 144MHz Trophy and SWL Contest Results

Whichever way it is looked at, this was a record-breaking contest—a record number of entries, QSOs and errors, and the highest scores ever recorded in a 144MHz event. Excellent tropospheric conditions prevailed over most of the country throughout at least part of the event, but particularly in the SW of England and S Wales. Almost every entrant worked a number of HB9/HB0 stations, and most leading logs had a fair sprinkling of stations situated in EA, I, C30, OK and OE. At least half of the contacts logged were foreign stations. From late Saturday night until mid-morning on Sunday most southwest station logs resembled a 7MHz contest, with page after page scoring more than 500 points, often 600 or 700. Some stations achieved a scoring rate of 30 points/contact, maintained for hundreds of contacts. By any standards, GJ4ICD's score of 16,429 points, single-operator fixed station, is a remarkable achievement, despite 300 points worth of unmarked duplicates and the relatively rare GJ callsign, GJ4ICD not only beat G4AFF/A in the single-operator section by more than a factor of two, but also beat G4LIP/P, the leading station in the "all other stations" section, by a clear margin, so taking the Thorogood Trophy for the single-operator section; while the Mitchell Milling Trophy was taken by G4LIP/P for the "all other" section.

There were few comments on the cover sheets worthy of quotation. Northern English and Scottish stations complained that they did not benefit from the best of the conditions, and wet and misty weather afflicted several GMs. Nevertheless, several Scottish stations produced very respectable scores.

In view of worries about the state of 144MHz contests expressed by several committee members, a determined effort was made to thoroughly check the logs from this event. More than 45,000 contacts were logged, and a team of four "volunteers", G4IRB, G6ROD, G4NTY and B. W. Gray, was recruited to assist. Altogether, 250 man-hours were spent on the checking, which resulted in the loss of more than 16,000 points for provable errors. The accuracy of many leading logs was poor, some having almost 100 errors. It is clear that many operators do not bother to check callsigns and QTH locators phonetically, and if a piece of information is not heard, a fictitious one will be just as good. As recently pointed out by G2HIF, the giving and receiving of /P suffixes is frequently random, especially among French and German contest stations, and UK operators perhaps should ask these stations to give a complete callsign. It is a sad reflection on the state of 144MHz contests that so many errors were revealed, and that several cases of deliberate, if minor, cheating were detected.

Excessive numbers of unmarked duplicates are clearly an attempt to claim more points, and at least 10 logs exhibited a consistent marking up of distances claimed for contacts falling on radial ring boundaries by a few kilometres in order to claim the next higher ring, in some cases adding more than 50 points illegally to the claimed score. Several complaints of ungentlemanly conduct and deliberate jamming (some heard by the adjudicator) were made, but perhaps some complainants do not realize that at least five stations must occupy a channel simultaneously in order to account for the number of contacts logged.

It is difficult to believe that serious vhf operators will be happy with this state of affairs, and it is hoped that every operator will make a serious effort in 1985 to avoid giving offence to others and to improve the standards of operating and logging, even if it means losing a few contacts.

In place of the usual "best dx callsigns" column in the results, more details of the station's location and antenna have been given this year. The figure after the comma in the "antenna" column is the height in metres of the station's antenna. Your opinion on this change would be welcomed.

As well as the trophies, certificates will be awarded to the leading station and the runner-up in each transmitting section, and to BRS31976 in the listeners section. As usual, the Edinburgh & D A R C will award their GM4HAM trophy to the leading resident GM station in the "all other station section", GM8TSI/P.

Thanks to all who took part, and to the team of adjudicators—especially to the one who after 5h checking one night, woke up in the small hours, thumped his wife and declared "it's a ****** duplicate". *G4JLG*

SINGLE-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	Pwr dBw	Ant	Best dx(km)	Hght asl(m)
1	GJ4ICD	16,429	1,023	YJ70	26	1×10P, 12	1,076	121
2	G4AFF/A	8,569	586	YK38	25	1×13Y, 7	1,197	165
3	GM4YXI	7,319	665	YO05	26	1×17Y, 9	1,127	29
4	G4NDG/P	6,146	452	YK03	26	1×14P, 6	1,168	285
5	G4DFI	2,195	185	AL41	23	1×16Y, 9	873	61
6	G6HKM	2,105	202	AL13	14	1×17Y, 21	830	61
7	G4AGQ	1,813	163	ZL66	10	1×9Y, 10	1,014	160
8	G3YDY	1,562	150	AL23	16	1×7Y, 9	836	76
9	G4YTL	1,393	126	ZL14	19	1×7Y, 7	981	60
10	G1DZS	1,258	145	ZM34	15	1×6Q, 9	923	90
11	G1CVS	1,198	119	ZK24	14	1×5Y, 9	893	39
12	G6HXU	1,045	110	YN68	13	1×6Q, 10	989	38
13	G1DOX	950	120	YM28	20	1×17Y, 11	929	121
14	G8YGO	922	83	ZL67	10	1×8Y, 8	805	91
15	G4RYV	921	104	ZL56	10	1×9Y, 9	893	58
16	G6YEP	804	118	ZN55	19	1×17Y, 10	912	28
17	G6YYP	789	105	ZL40	20	1×9Y, 8	919	30
18	G3XTQ	755	86	ZL07	15	1×4Y, 6	800	151
19	G3TUX	618	82	ZL77	14	1×8XY, 10	717	160
20	G6KUI/P	600	70	ZM14	20	1×8Y, 3	828	136
21	G6NUZ	534	71	ZM10	15	1×13ZL, 10	420	3
22	G8UYD	533	79	ZN64	12	1×6Y, 8	460	124
23	GM4SGB	530	54	YQ62	10	1×8Y, 6	725	151
24	G6YRG	425	51	ZN12	20	1×9Y, 14	515	74
25	G6CSY	407	59	AL41	7	Halo, 4	708	70
26	G1FUO	379	52	ZN32	9	1×8Y, 9	475	35
27	G8UDV	376	40	XK40	10	1×9Y, 11	786	124
28	G8FAT	367	25	ZL39	11	1×16Y, 8	855	74
29	G2DMV	366	70	AL41	10	1×7Y, 7	399	45
30	G1AMX	294	39	ZP73	4	1×9Y, 10	520	15
31	G4VRC	265	36	ZL68	10	1×4Q, 6	711	46
32	G6RJZ	118	22	ZL38	4	1×4Y, 18	770	24
33	GM4WLL	86	32	YQ73	12	1×12Y, 5	336	94
34	G8NMQ	77	17	ZL37	20	1×8ZL, 6	317	49

ALL OTHER STATIONS SECTION

Posn	Callsign	Points	QSOs	QTH	Pwr dBw	Ant	Best dx(km)	Hght asl(m)
1	G4LIP/P	14,862	1,173	AN61	26	4×17Y, 15	1,224	61
2	GW4NXO/P	13,178	923	YL25	25	1×16Y, 9	1,168	470
3	GW8SJP/P	12,557	984	YM44	26	4×9Y, 13	1,142	550
4	G4VWH/P	12,298	688	XJ05	26	2×16Y, 10	1,358	91
5	G1HHH/P	11,992	829	AK14	26	4×17Y, 24	1,019	174
6	G3ZIG/P	11,608	900	AM06	26	2×17Y, 27	1,422	91
7	G4ZDA/A	10,329	780	AL34	26	4×16Y, 11	1,050	47
8	G4APA/P	9,850	790	ZO48	26	4×9Y, 15	1,020	258
9	G6EKR/P	9,520	730	AL56	25	1×19Y, 12	1,043	30
10	GW3OXD/P	9,332	742	YM55	23	4×9Y, 12	1,128	600
11	G3WQK/P	8,636	580	AK12	24	2×16Y, 14	956	160
12	G4DZO/P	8,395	538	AK11	23	1×16Y, 9	1,055	216
13	GD4GNH	8,270	690	XO67	26	2×16Y, 9	1,237	212
14	G4SIV	7,941	587	ZM29	26	2×16Y, 9	1,145	45
15	GW6BK/P	7,867	734	YL06	23	1×13Y, 6	1,036	424
16	GW4MGR/P	7,846	795	YN75	26	4×8Y, 10	1,163	560
17	G4CRA/P	7,770	660	AL05	22	2×17Y, 18	987	45
18	GM4CCC/P	7,467	631	YP42F	22	1×17Y, 11	1,157	727
19	G3ZMS/P	7,426	652	ZK10	23	1×16P, 8	982	235
20	G4WET/P	7,357	708	ZM71	26	2×14Y, 12	1,121	300
21	G3VEF/P	7,347	622	ZK05	26	4×9Y, 15	1,039	200
22	G4SSS/P	7,249	523	YL72	26	2×11Y, 11	1,360	483
23	G3WOI/P	7,342	578	ZL53	19	1×16Y, 12	1,041	295
24	G4CDA/P	6,863	753	ZN61	24	2×13Y, 9	1,212	439
25	G4HRC/P	6,828	526	AL17	26	1×15Y, 12	1,006	21
26	GW2OP/P	6,752	574	XL07	25	2×17Y, 7	1,169	530
27	G4NUT	6,580	621	ZM77	26	1×19Y, 12	995	91
28	G8SDS/P	6,460	520	YK28	21	1×17Y, 11	1,256	158
29	G4NVA/P	6,457	601	ZN53	26	1×17Y, 12	1,134	423
30	G8MBI/P	6,283	633	ZL09	26	8×9Y, 9	984	187
31	G3ISO/P	6,163	484	ZK07	22	2×16Y, 12	1,014	248
32	GM8TSI/P	6,146	550	YP44	23	1×17Y, 6	1,203	840
33	G2XV/P	6,072	556	AM72	22	1×14Y, 13	1,098	123
34	G3WRS/P	5,929	559	ZO46	21	2×16Y, 12	1,335	401
35	G4VAT/P	5,636	621	ZL09	22	1×12ZL, 8	1,056	172
36	G4UHF/P	5,410	542	ZL15	23	1×16Y, 11	1,081	190
37	G8ZKE/P	5,390	566	YM48	19	1×13Y, 9	1,247	540
38	G4OAE	5,107	462	ZL46	26	1×15Y, 30	1,015	85
39	G3ULT/P	5,046	416	ZL54	22	1×13Y, 9	1,058	—
40	G1FKN/P	5,026	403	AK02	20	2×17Y, 9	1,110	167
41	G3WKS/P	4,979	396	AL73	20	1×14P, 12	958	121
42	G4EFX/P	4,944	351	ZK10	26	2×16Y,12	941	195
43	G3UKC	4,922	385	AL56	21	1×19Y, 23	847	61
44	G4ARE/P	4,728	409	YK13	23	1×16Y, 9	1,272	258
45	G2ASF/P	4,628	530	ZM63	26	1×16Y, 11	896	91
46	G4CDC/P	4,490	429	ZN49	26	4×11Y, 15	1,111	161
47	G5LK/P	4,459	443	ZL60	20	1×10Y, 12	983	220
48	GW4RNM/P	4,367	325	YL32	4	2×4Q, 8	1,084	551
49	G4HVC/P	4,263	475	ZN75	20	4×9Y, 11	1,095	144
50	GW4CZZ/P	4,258	544	YN64	26	2×11Y, 10	1,179	454
51	G3GJL/P	4,233	468	YM70	26	1×14P, 11	1,078	76
52	G3UHF/P	4,075	487	ZN61	23	2×14P, 11	1,138	450
53	G4LUA/P	4,069	418	AM36	26	4×9Y, 18	886	43
54	G3IGO/P	3,926	374	ZO56	26	1×14P, 10	1,148	180
55	G6BSE/P	3,909	331	AM64	23	1×16Y, 13	959	119
56	G4WAR/P	3,863	440	ZM36	19	2×12ZL, 14	1,045	182
57	G3LCH/P	3,743	435	ZL60	23	1×16Y, 10	1,012	136
58	G1IBM	3,528	386	ZL39	26	1×17Y, 33	1,021	100
59	G4GTT	3,453	415	ZL38	20	1×19P, 36	910	24
60	G4YRU/P	3,388	467	ZN51	22	2×16Y, 9	1,144	468
61	G8LIR/P	3,252	311	ZN07	25	1×17Y, 15	1,055	182
62	G8OMR	3,066	300	ZK19	18	1×9Y, 12	934	49
63	G6JDC/P	2,979	336	ZN34	26	2×6Y, 9	1,125	348
64	G6GRG/P	2,723	345	YL47	20	1×16Y, 15	934	97
65	G4CAR/P	2,632	319	ZM21	20	1×17Y, 11	1,037	236
66	GM6MGS/P	2,564	203	YO08	20	2×11Y, 6	862	454
67	G4KVI/P	2,533	346	ZL27	20	1×14P, 10	950	230
68	G4SRS	2,198	279	YL30	19	1×16Y, 9	1,011	227
69	G1CUO	2,174	281	ZN24	10	2×10Y, 18	1,170	61
70	G8VYK	2,088	181	AL33	13	1×16Y, 13	1,029	15
71	G8BBC	1,917	215	ZL40	+14	1×14P, 30	915	36
72	G6LFP	1,889	177	ZL34	20	1×9Y, 9	959	24
73	G4DRV/A	1,668	148	AL71	20	1×6Q, 6	860	197
74	G4TAW/P	1,655	166	AL52	12	1×9Y, 6	825	197
75	G4WFK/P	1,401	182	ZM17	20	1×9Y, 9	867	91
76	GM6LNM	1,355	132	XP07	24	1×17Y, 11	790	180
77	G4VBG	1,152	126	ZO03	14	1×9Y, 8	868	121
78	G6AMW	1,151	118	ZK04	20	1×9Y, 18	909	27
79	G3CMH	793	94	YK07	20	1×9Y, 6	962	106

LISTENERS SECTION

Posn	Station	Points	QSOs	QTH	Pwr dBw	Ant	Best dx(km)	Hght asl(m)
1	BRS31976	1,831	217	AL34		1×9Y, 10	772	10
2	BRS52543	1,416	167	YN15		1×12ZL, 8	1,009	7
3	BRS25429	1,272	161	ZN03		1×8Y, 11	1,075	182
4	BRS28198	1,140	128	AK04		2×8Y, 9	1,140	58
5	BRS32525	646	103	AL41		1×9Y, 8	723	76
6	BRS62088	200	18	AL41		1×9Y, 8	723	76

Checklogs received from G3SZS, G1BRS, G6UT/P, G4ARI/P.
Disqualified—G4BBX, Rule 2a.

144MHz Low Power Contest 1984 results

Although entries were slightly down compared with last year's low power event, this contest still remains one of the most popular in the calendar. A number of stations were first-time contest entrants.

The new format involving county and country chasing was generally well liked, as the following comments will demonstrate: "I would like to see more contests using multipliers, as it adds interest and requires more technique than just 'point the beam east and call CQ for 24h'"—*G4ILO/P*; "More interest with the county being given in the report, and also trying to find that elusive county for an extra multiplier"—*G4CAR/P*; "In general we like very much the county hunting scoring system as it seemed to keep the Gs' beams turning north"—*GM4JUK/P*; "It added a bit of skill to winkle out the rare ones"—*GW6DTD/P*. The only group not in favour was G6HH/P, as they "were forced to work in their worst directions in order to get some multiplication".

GW6GS/P and a few others ask for clarification regarding the multipliers. The rule is that all new countries worked (including G, GW, GU, GD, GJ, GM and GI) counts towards the final multiplier, whereas counties in Eire, French Departments etc do **not** count. A number of entrants had not marked counties and countries worked in their logs or on a separate list, which made checking very difficult—these stations lost 10 per cent of their overall score for failing to observe this rule.

Conditions appeared to be flat to average, but several contestants reported enhancements, and some good dx was worked by most stations. Widely-differing weather conditions were experienced across the country, from "Very sunny, nice day"—*GW6DTD/P*; to "Torrential rain and high wind during morning—tent tried to go hang-gliding!"—*G4SKG/P*.

Many contestants enjoyed QRP operating and noted the scarcity of poor quality signals. Only one station was cited, but here the parties involved solved the problem amicably and no action had to be taken by the adjudicator.

Congratulations go to the winners and runners-up, and to the winner of the swl section, all of whom will receive certificates of merit.

G4KGC

FIXED STATION

Posn	Callsign	Points	QSOs	Mult	QTH loc	County	Best dx	Km
1	G4SHC	88,956	192	63	YN40	MCH	F6GIF/P	614
2	G1BRS	72,789	198	57	YK19	DOR	G4ADD/P	491
3	G3BZU	47,223	167	53	ZK05	HPH	DC3DV/P	581
4	G4PIQ	46,461	113	51	AL16	ESX	F6HMQ/P	527
5	G3IGQ	40,091	133	47	ZL68	SRY	EI2VPS/P	498
6	G6UBE	39,321	133	51	AL33	ESX	EI2VPX/P	570
7	G3TBK	37,153	112	53	ZN77	NOT	F6HMQ/P	562
8	G6WBP	34,263	163	47	ZL38	LDN	DK9TF	528
9	G6HH	31,880	146	40	AK03	SXE	GM3KJF/P	548
10	G4HVC	30,732	87	52	ZN78	LCN	F6HMQ/P	565
11	G4DFI	26,187	106	43	AL41	LDN	GM3KJF/P	430
12	G6CHD	25,480	97	49	YN78	CHS	F6HMQ/P	526
13	GW6ZUQ	24,016	105	38	YL37	GWT	F0GAL/P	521
14	G4NRJ	18,204	64	41	ZM39	CBE	F6GIF/P	453
15	G6UKO	17,794	91	41	ZM47	NHM	F6HMQ/P	499
16	G8JQQ	16,835	55	35	AM26	NOR	GM3KJF/P	434
17	G3YDY	15,960	94	40	AL23	ESX	GM3KJF/P	475
18	G4FVK	15,390	61	38	ZM39	CBE	F6HMQ/P	531
19	G1FUO	15,228	66	36	ZN32	YSW	GM6JUK/P	384
20	GW4KHQ	15,015	66	39	YL44	GNS	G4KOT/P	338
21	GM4SGB	14,314	43	34	YQ62	CTR	G4MDP/P	621
22	G8PNN	13,440	72	32	ZP52	NLD	G4MDP/P	493
23	G4DDL	12,996	71	38	ZL47	BRK	G4KTP/P	384
24	GW3POM	11,104	61	32	YL34	GNM	G4SFY	351
25	G6YHI	10,110	55	30	AL15	ESX	GM3KJF/P	476
26	G1CBD	8,583	46	33	ZN24	YSW	GM6JUK/P	365
27	G8TLC	7,812	40	31	ZM25	LEC	F6HMQ/P	512
28	G8OMI	7,520	41	32	ZM41	WMD	F6HMQ/P	465
29	G1AMX	7,300	44	27	ZP73	NLD	G4RLF/P	455
30	G8UDV	3,100	21	20	XK40	DVN	G4SHC	364
31	GM4WLL	1,148	24	14	YQ73	FFE	G8GBY/P	263
32	G2DHV	605	21	11	AL41	LDN	GW8SJP/P	250
33	G6IOM	400	16	8	AL67	KNT	GW4MHC/P	309
34	GW3XWK	310	15	10	YL37	GWT	G8SDS/P	102

ALL OTHERS SECTION

Posn	Callsign	Points	QSOs	Mult	QTH loc	County	Best dx	Km
1	GW8SJP/P	302,216	442	74	YM44	PWS	DF0VK	752
2	GM3KJF/P	214,895	336	59	XO19	DGL	F1CBC/P	658
3	GW4MHC/P	201,825	331	69	YL25	GWT	DK9TF	713
4	GW6BK/P	168,560	310	70	YL06	GWT	DF8KV	693
5	G4VXE/P	145,728	321	69	YL20	GLR	GM4HIG	583
6	G4NVA/P	127,232	312	64	ZN53	YSS	DF7DJ	652
7	G8LNC/P	127,063	289	61	ZK35	IOW	GM6JUK/P	710
8	GW6GS/P	126,685	269	65	YM75	PWS	DJ9UX	710
9	G8GBY/P	114,816	283	52	ZO77	YSN	F9NW	518
10	GW4CZZ/P	112,385	255	65	YN64	CWD	PA3BKH	610
11	G4RLF/P	110,288	251	61	YK10	WLT	EI8EF	637
12	GW4MGR/P	109,053	252	63	YN75	CWD	F6APE	654
13	G8ZK/P	102,438	254	63	ZM16	LEC	GM1ELP	522
14	G3SRT/P	99,540	273	63	YM48	SLP	F1DME	526
15	G4KOT/P	98,658	208	63	YO35	CBA	F6HMQ/P	680
16	G6LJO/P	98,226	289	54	YN70	CHS	F6GIF/P	570
17	G4WET/P	96,655	257	65	ZM71	HWR	GM6JUK/P	549
18	G4MDP/P	95,760	259	57	ZK08	SXW	GM3OBC/P	634
19	GW3SSK/P	94,123	209	61	YL32	GNM	PE1JSE	581
20	GW6DTD/P	90,272	222	62	YM05	CWD	PA2CHR	609
21	G4MRQ/P	89,900	267	58	ZN61	DYS	F6GLQ/P	565
22	G4RVS/P	88,440	216	67	ZN53	DYS	PE1FCE	510
23	G6EKR/P	83,445	170	57	AL56	KNT	EI6BA	664
24	GM1BHA/P	81,730	149	55	XO29	DGL	G6EKR/P	526
25	G4CIZ/P	80,830	209	59	ZL33	OFE	GI4TAJ/P	471
26	G4WAR/P	79,493	251	63	ZM36	LEC	GM6JUK/P	493
27	G1FKN/A	78,880	227	50	AK02	SXE	G4ADD/P	505
28	G3WOR/P	78,644	237	57	ZK09	SXW	EI2VPX/P	521
29	G4ADD/P	76,500	174	51	ZP51	NLD	G8LNC/P	521
30	G6XWA/P	74,670	198	57	ZN11	YSW	F1GIF/P	625
31	G4TVI/P	73,872	202	48	AL24	ESX	GI4GVS	557
32	G3YMD/P	68,634	205	54	AL76	KNT	G4KTP/P	458
33	G6XKH/P	67,628	200	58	YL39	AVN	GM4CXM	505
34	GM6JUK/P	65,646	131	42	YQ08	GRN	G8LNC/P	710
35	G8HSG/P	65,320	117	46	ZN07	HBS	F6BBO	605
36	G4ORC/P	61,506	191	51	ZN31	YSW	F6FSE/P	616
37	GW4WXM/P	58,724	188	53	YN75	CWD	G3YMD/P	365
38	G4WWD/P	58,050	228	54	ZL77	SRY	DK9TF	549
39	GW1FOF/P	56,232	148	44	XL40	GNW	GM6JUK/P	607
40	GU8XQS/P	55,751	135	47	YJ30	ALD	F1KSL	568
41	G8PNM/P	54,926	189	58	ZN52	DYS	PE1IML	461
42	G4NOK/P	54,556	173	46	ZN23	YSW	F6FLE	398
43	G4SJK/P	50,976	170	54	YL20	GLR	DJ9UX	641
44	G4CAR/P	45,815	175	55	ZM21	SFD	F6GLQ/P	505
45	G4XPE/P	40,015	150	53	ZN71	SFD	F6HMQ/P	539
46	G4XSC/P	39,216	111	48	YK28	DOR	GM6JUK/P	690
47	GI4TAJ/P	32,501	82	41	XO11	ATM	G4TVI/P	569
48	G4WFS/P	31,416	142	44	ZM64	NHM	GM6JUK/P	530
49	G4CRA/P	30,690	100	45	AL05	ESX	EI2VPX/P	588
50	G4TAW/P	26,752	96	38	AL45	KNT	EI2VPX/P	595
51	G4NRG/P	25,953	137	41	AL32	ESX	F6EAH/P	717
52	G4NVC/P	25,704	131	42	YL20	GLR	F6GIF/P	456
53	G4OXZ/P	24,654	105	42	ZO46	YSN	F6HMQ/P	697
54	G1AYM/P	24,420	105	44	YL29	GLR	GM6JUK/P	579
55	G4SKG/P	23,780	93	41	AN61	LCN	EI2VPX/P	540
56	G4UPI/P	23,421	141	37	AK11	SXE	F6APE	391
57	G4WSW/P	17,638	92	41	ZL26	OFE	EI2VRO/P	524
58	G4ILO/P	16,596	58	36	YO55	CBA	G1FKN/A	441
59	G4PDP/A	14,800	56	37	ZM80	HFD	GM3KJF/P	417
60	G4DRV/A	10,725	59	33	AL73	SXE	G4KTP/P	446
61	G6BDV/P	7,992	84	27	ZL38	BKS	G6XWA/P	263
62	G3VEF/P	7,840	60	28	ZK15	HPH	G6DEW/A	303
63	G6KEY/P	5,445	77	25	ZL49	SRY	G8GBY/P	289
64	G4CYC/P	3,588	32	23	ZK06	HPH	GW4MGR/P	270

SHORTWAVE LISTENERS

Posn	Station	Points	QSOs	Mult	QTH loc	Best dx	Km
1	BRS52543	29,106	90	49	YN15	G3BDQ	409
2	BRS32525	18,291	97	39	AL41	GM3KJF/P	467
3	BRS31976	11,040	72	30	AL34	GM3KJF/P	488
4	BRS54203	5,712	62	28	ZM51	F6HMQ/P	451
5	BRS28198	2,924	30	17	AK04	GW4CZZ/P	357

Checklogs received with thanks from: G4UPS, G6GVI, G8BBC and G2CWY.

432MHz Low Power Contest 1984 results

This proved to be a highly successful and popular contest, with the county/country multiplier providing a new dimension of interest compared with the conventional vhf/uhf contest. Most entrants managed to do a simple sum as follows: add counties and countries (including your own) and use this as a multiplier to be applied to the QSO sum using radial rings. The most helpful entrants displayed their homework in a neat and tidy manner, easing the task of the adjudicator. A few posed a "hunt the thimble" problem before their resultant sum could be cross-checked. More than one entrant generated a magnificent score by multiplying counties by countries by QSOs. Such entries have been readjusted. One station, GK0JFK, caused some research (thanks to G3XDY) to determine that although Runnymede is US territory it still only counts as Surrey, England.

Some comments from entrants included: "I think the county multiplier was a worthwhile experiment and well worth repeating — it made the contest more interesting" — *G4DDL;* "Did not like the county scoring system as it favours the stations in the centre of England. What about French departments or Dutch regions? A fairer system of multipliers should be QRA large squares" — *G4MVN* ; "The timing of this weekend coinciding with Woburn Mobile Rally was poor. Also the timing of the 70cm contest was bad" — *GW8KQW;* "I thought the VHF Contests Committee was trying to encourage people to try bands other than 2m. People are discouraged from entering a 70cm contest which causes the station to be dismantled at midnight" — *G4FRE:* "Overall enjoyed the contest" — *GW3XVA.*—This station is to be congratulated on a beautifully presented log with a summary showing the score calculations very clearly.

To help entrants it has been suggested that a county list should be made available to use as a score card. Consideration will be given to this.

Overall conditions were poor but activity was high. The winners and runners-up in each section will receive certificates. Thanks to G2DHV and G6GVI for check logs.

G3FZL

FIXED STATIONS

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
1	G4SHC	10,944	54	YN40	EI3VPB/P	415
2	G3XDY	8,120	48	AM77	F6CTT	493
3	G8FMK	7,821	53	ZL26	G6SQH	245
4	G8HHI	6,816	53	ZL56	GM3KPF/P	456
5	G8YTF	6,524	41	YN30	G3NJA/P	348
6	G6UBE	6,475	75	AL33	G3NJA/P	306
7	G4HAY	5,790	49	ZL30	GW4MGR/P	248
8	G4DDL	5,427	47	ZL47	G8YTF	264
9	G6ZEK	4,230	49	YN79	EI3VPB/P	423
10	G4FOH	3,888	36	ZM60	PE1JSE	320
11	G4AOR	3,510	40	ZL29	GW4MGR/P	245
12	G8IEM	3,340	29	ZK16	G4SHC	321
13	G4FVK	3,059	29	ZM39	G8KBQ	260
14	GM8TSI	2,856	18	YP16	G3UAX/P	510
15	G6XSU	2,580	37	ZL19	GW4MGR/P	232
16	G4VXR	2,086	28	AM26	F6CTT	551
17	G1EWE	2,023	35	AL41	GW4MGR/P	280
18	G8PNN	1,968	17	ZP52	GW4BVY/P	406
19	G8BHD	792	22	AL41	GWBVY/P	229
20	G3IGQ	611	19	ZL68	GW4BVY/P	182

ALL OTHER STATIONS

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
1	GW4BVY/P	41,538	131	YL25	PE1JSE	534
2	G4YTT/P	37,975	129	YN53	PA0EZ	468
3	G4ERP/P	32,806	126	YL10	GM6MGS/P	556
4	G3UAX/P	31,820	134	ZL53	GM8TSI	510
5	GW8KQW/P	28,350	92	YM44	PA0FRE	529
6	GW4MGR/P	27,690	115	YN75	GM6MGS/P	436
7	G6EKR/P	16,731	83	AL56	PE1CQQ	377
8	G3WOR/P	14,973	110	ZK09	F6CTT	336

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
9	G6ISY/P	14,949	76	ZK35	GM8TSI	590
10	G4FRE/P	14,728	75	AM65	F6CTT	491
11	G8JAY/	12,896	83	YL20	PA0FRE	453
12	G8ZK/P	11,104	85	ZM16	PA0FRE	380
13	G4MVN/P	10,585	75	AK02	F6CTT	355
14	GW3XVA/P	10,494	72	YN64	G3YMD/P	376
15	G4CRA/P	8,034	65	AL05	G3NJA/P	348
16	G3YMD/P	6,512	63	AL76	F6CTT	394
17	G4XVW/P	5,551	50	ZL52	F6CTT	381
18	G4TAW/P	4,780	51	AL45	F6CTT	416
19	G6SPS/P	4,047	61	AL14	G3NJA	328
20	GM3KJF/P	3,168	22	XO19	G4CQR	517
21	G8GBY/P	2,880	39	ZO77	G6ISY	368
22	G8AQO/P	2,668	34	ZL36	GW3XVA/P	249
23	G8HSG/P	2,448	33	ZN07	GW4OVY	297
24	G8JXV/P	2,394	48	ZL60	GW8KQW/P	244
25	GM6MGS/P	2,100	17	YQ08	G4ERP/P	557
26	G3RSD/P	1,430	30	ZN49	G6LZO	221
27	G4RVS/P	1,155	31	ZN53	G3UAX/P	217
28	G4NWZ/P	1,005	21	ZM57	GW4BVY/P	177

LISTENERS

Posn	Station	Points	QRA	Best dx	Km
1	BRS32525	1,683	AL41	F6CTT	385
2	BRS52543	684	YN15	G4ERP/P	220
3	BRS28198	231	AK04	GW4BVY/P	270

ROPOCO 2 1984 results

The second Ropoco of the year proved to be very popular, and almost all entrants had only praise for this delightful little contest of skill. It is encouraging to see so many new calls among the entrants—a hint perhaps to those who think cw is a dying art?

The standard of logs, while not poor, could still show an improvement if only stations would log what they receive, and not attempt to reconstitute the unrecognisable post code just received! Points are lost if you fail to log what has been sent—irrespective of whether it is a correct post code or not! The winner was Fraser Robertson, G4BJM, operating G4NUT/A, with a total of 68 QSOs. Second was G3SXW, with 62 QSOs, and third, G3RTE, with 60 QSOs.

The adjudicator would like to thank all who entered the contest, and G3TVW for his check log.

G4DJX

Posn	Callsign	Points	Posn	Callsign	Points
1	G4NUT/A (op G4BJM)	671	26	G4UMS	474
2	G3SXW	620	27	G4WWH	467
3	G3RTE	594	28	G4IZZ	454
4	G4BWP	584	29	G4PDQ	424
5	G3PDL	574	30	G3MCK	410
6	G4OBK	570	31	G4OGB	404
7	G4DJX/A	560		G4ECI	387
8	G3OLB	558	32	G3HKO	387
	G4UPS	558		G4IXF	387
10	G4XFB	547		G4OAY	387
11	G4BUO	540	36	G4EOF	384
	G4KGG	540	37	G3SB	380
	G5LP	540	38	G3MCX	347
14	G4OTU	529	39	G4NSE	344
15	G3JKS	511	40	G3BRM	341
16	G3NKS	507	41	G3AWR	337
17	G4MUL	504	42	G4TFU	330
18	G3GC	500	43	GW4PXQ	327
19	G4KRS	497	44	G3GMM/A	287
	G4IUZ	497	45	G4KTI	277
21	G3JJG	494	46	G3CCZ	267
22	G3SJE	490	47	G3CQR	247
23	G4UML	480	48	GM3UM	230
	G2HLU	480	49	GM4OSS	197
25	G4BOU	477	50	G4PVB	127

Affiliated Societies Team Contest 1985 rules

1. The general rules for RSGB hf contests, published in the supplement to the January 1985 issue of *Radio Communication*, will apply.
2. **When.** 1300 to 1700gmt, Sunday 13 January 1985.
3. The Affiliated Societies Team Contest is a competition between teams of stations, each team or teams representing an RSGB affiliated society. Each such society is encouraged to enter as many stations and teams as it can.
4. **(a)** A society entering one team will have its placing determined by the aggregate scores of the five highest scoring stations in its team.
   (b) A society may enter more than one team. The aggregate scores of the five highest scoring stations will be placed in team "A", the next five highest scoring stations placed in team "B", etc.
5. **Eligible entrants.** Each operator must be a member of the society he represents, but need not be a member of the RSGB.
   (b) Each station may be single- or multi-operator, but no operator may use more than one callsign during the contest period.
   (c) All stations representing a society must be operated within 50 miles of the normal society meeting place.
   (d) No station may represent more than one society.
   (e) In the case of a society with national coverage, eg RNARS, each team may define a different society meeting place, but this should be a place of recognizable significance, eg a naval base. For all purposes, other than the indication of affiliation, each such team entry will be considered to be entirely separate.
6. **Contacts.** CW (A1A), only in the band 3,510 to 3,590kHz.
7. **Exchange.** RST and serial number commencing 001.
8. **Scoring.** Each contact will be worth 10 points.
9. **Entries**
   (a) Each individual entry shall conform to the general rules. In particular each log must be accompanied by an hf contest summary sheet (Form HFC2). All entries from one society are to be sent in one package to RSGB HF Contests Committee, c/o N. S. Cawthorne, G3TXF, 10, Wilton Grove, New Malden, Surrey, KT3 6RG. Packages underpaid and bearing postage-due stamps will be returned to the sender.
   (b) Each package must include a declaration signed by an officer of the society that each entrant is a member of that society, and the normal meeting place address must be given.
   (c) There should also be included a note stating the number of teams representing the society as well as a summary of the scores of each team. If the package does not include this information it will be assumed that the society wishes to enter only one team.
   (d) Packages must be postmarked not later than Monday 28 January 1985.
10. **Awards**
    (a) The Edgware Trophy will be awarded to the leading affiliated society.
    (b) A certificate of merit will be awarded to the station having the highest individual score.
    (c) A certificate of merit will be awarded to the leading affiliated society in each RSGB zone.

First 1·8MHz Contest 1985 rules

TRANSMITTING SECTION

1. **Aim of contest.** To encourage the use of the 1·8MHz band.
2. **Eligible entrants.** Single-operator stations only. British Isles entrants must also be members of the RSGB. **Entrants must operate in accordance with the terms of their licences.**
3. **Period.** 2100gmt Saturday 9 February to 0100gmt Sunday 10 February 1985.
4. **Sections**
   (a) British Isles stations.
   (b) Overseas stations including EI.
5. **Frequencies/mode.** 1·81-2·0MHz cw only. British Isles stations should note that overseas stations may be allocated different parts of the band.
6. **Contest call and exchange.** CQ test, RST plus serial number starting at 001. British Isles stations must also give their county code as shown in the list to be published in the January 1985 issue of *Radio Communication*.
7. **Scoring**
   (a) British Isles section. Three points for each contact, with a bonus of five points for the first contact with each new British Isles county/region, and the first contact with each new country outside the British Isles.
   (b) Overseas section. Three points for each contact with a station in the British Isles (not EI), with a bonus of five points for the first contact with each new county/region.
8. **Logs.** Entries must be clearly written or typed on one side only of RSGB hf contest log sheets (Form HFC1) or international A4 size paper using blue or black ink. Log sheets to be headed: date/gmt; callsign; RST/number sent; RST/number received; code received; bonus points. Duplicate contacts must be logged and clearly marked as duplicates without claim for points. For unmarked duplicate contacts for which points have been claimed, additional penalty points may be deducted (eg 10 times the claimed score for the contact).
9. **Declaration.** Each entry must be accompanied by the following declaration, signed and dated: "I declare that this station was operated strictly in accordance with the rules and spirit of the contest, and agree that the decision of the Council of the RSGB shall be final in all cases of dispute".
10. **Address for logs.** British Isles entrants: RSGB HF Contests Committee, c/o R. A. Treacher, BRS32525, 79 Granby Road, Eltham, London SE9 1EH, England. Overseas entrants: RSGB HF Contests Committee, c/o PO Box 73, Lichfield, Staffs, WS13 6UJ.
11. **Closing date for logs.** Logs must be postmarked no later than Monday, 25 February 1985.
12. **Awards**
    (a) The Somerset Trophy will be awarded to the winning station in the British Isles section, and certificates of merit to the second and third placed entrants.
    (b) The Maitland Trophy will be awarded to the Scottish entrant with the highest aggregate number of points in this contest combined with the second 1·8MHz Contest 1984.
    (c) Certificates of merit will be sent to the first three stations in the overseas section, and to the leading entrant from each overseas country.
    (d) A certificate of merit will be awarded to the highest placed log from an entrant who has not entered a First 1·8MHz Contest before. Candidates for this award should mark their entries "First-time Award".
    (e) A certificate of merit will be awarded to the highest placed UK entrant who has achieved pensionable age on or before 10 February 1985. Candidates for this award should mark their sheet "Senior Citizen's Award".

RECEIVING SECTION

1. Transmitting section rules 1, 2, 3, 4, 5, 7, 8, 10 and 11 will apply.
2. **Logging.** A station may appear once only in the column headed "station heard". The callsigns of the stations being worked may only repeat once in every three contacts logged. Entrants should log the callsign of the station heard; RST/serial number and county code given by that station; and the callsign of the station being worked.
3. **Awards.** Certificates of merit will be awarded to the leading three receiving stations.
4. Holders of British Class B licences may enter the receiving section.

White Rose ARS 5th SWL Lower Frequency Bands Contest rules

1200-1200gmt 12-13 January 1985

The rules for this contest are similar to those printed in the October 1981 issue of *Radio Communication*. Copies of the rules can be obtained from Mr John Hart, G3ZGA, c/o White Rose ARS, 146 Street Lane, Leeds LS8 2AD, on receipt of an sae.

Logs should be sent to the same address, to be received not later than 15 February 1985.

Cumulative Contests 1985 rules

As previous events in this series have proved very popular, the HF Contests Committee has decided to continue with them. Please note in the exchange rule each session recommences at 001.

Dates and times: 1·8MHz. Tuesday 15 January and Thursday 24 January. Both sessions from 2000 to 2200gmt.
3·5MHz. Sunday 6 January and Saturday 12. Both sessions from 1000 to 1200gmt.
7MHz. Saturday 19 January and Sunday 27 January. Both sessions from 1000 to 1200gmt.

Frequencies: All contacts should be within the following band segments: 1,835 to 1,865kHz, 3,520 to 3,550kHz, 7,015 to 7,040kHz.

Exchanges: RST followed by a serial number (commencing with 001 in each session).

Operators: All entrants must be members of the RSGB. Both single-operator or club entries will be accepted (but entries must state which section). Single-operator entries should show if the entrant is a member of an RSGB affiliated club or society.

Listeners: Logs from short wave listeners will be welcomed. These logs should show date/gmt, the callsigns and reports from both the stations that are in contact.

Scoring: Each completed contact (or logged exchange by an swl) scores three points.

Logs: All logs should be sent to RSGB HF Contests Committee, c/o R. L. Glaisher, G6LX, 279 Addiscombe Road, Croydon CR0 7HY, to arrive not later than Monday 11 February 1985.

Certificates: A certificate will be awarded to the entrant in each section who submits the most accurate log. In the event of there being several faultless logs, the award will go to the entrant having the highest score. The swl certificate is subject to a minimum of three logs being received.

RSGB HF Contests Championship 1983-4 results

Posn	Callsign	Contests 1	2	3	4	5	6	7	8	9	Total
1	G3RRS (OpG3UKS)	80		5				90	60		235
2	G3MXJ	60		35	35			80			210
3	G4DRS	30	30		0	15	60	0	15	25	175
4	G3SJJ		15	30	25	40			35	20	165
5	G4BUO	40	40	20	0			60	0		160
6	G3RRS (OpG4CEB)					70	70				140
7	G3FXB				25	0		100			125
8	G3XBY	70						50			120
9	G3RVM		50	40	15						105
10	G3SXW		0	0		60		0	40		100
11	G2QT	0	0		0	10	50	30			90
12	G4CNY		60			20					80
	G4IUF	50					30				80
14	GM32SP			15	10				50		75
15	G3PEK						0	70			70
16	G3TXF		0	0	10	50		0	0		60
17	G3PDL			10	0				20		30
	G4AFJ	5					25				30
19	G3FKH		20	0							20
	G3SWH			0	20			0			20
21	GU4NYT					0	15				15
22	GM3YOR			0	0			10			10
23	G3CCZ			0		5		0			5
	G5MY	0						0	5		5

Contests
1 21/28MHz Telephony
2 21MHz CW
3 Second 1·8MHz
4 First 1·8MHz
5 7MHz CW
6 7MHz Telephony
7 Commonwealth
8 Region Round-Up
9 Town & Country

Awards
The G2QT Trophy to D. R. Vizard, G3UKS. Runner-up certificate to D. J. Andrews, G3MXJ.

RSGB Listener Championship 1985 rules

1. RSGB hf receiving contest general rules do not apply.
2. No entries for the championship are required.
3. The championship will be decided on the basis of the listener contests held between 2 February and 20 October 1985.
4. Points will be awarded to the leading eight UK receiving stations in the results published in *Radio Communication* as follows:

Contest	Position 1	2	3	4	5	6	7	8
7MHz Phone	70	55	50	45	35	25	15	5
7MHz CW	70	55	50	45	35	25	15	5
1·8MHz Town & County	50	35	30	25	20	15	10	5
Region Round-up	50	35	30	25	20	15	10	5
21/28MHz Phone	80	65	55	45	35	25	15	5
21MHz CW	80	65	55	45	35	25	15	5

5. A table will be published in *Radio Communication* showing the points gained by each receiving station, and certificates will be awarded to the winner and the runner-up.

BARTG Spring HF Contest 1984 results

The single-operator section was won by ON4UN with 817,028 points. British scores were as follows: 20. G3HJC, 135,608; 27, GW3EHN, 91,728. G4NMU, 91,180; 38. G8VF, 63,038; 46. G4OJJ, 50,256; 58. G4CJJ, 32,480; and 60. G4EDR, 29,550.

In the swl section, NL4483 was the winner with 272,448 points. There were three English entries: 3, BRS47426, 228,942; 7, G8CDW; and 12, G16936, 29,638.

Contests Calendar

1-2 December	EA DX CW *(Rules in November* MOTA*)*
2 December	144MHz Fixed *(Rules in October issue)*
8, 9 December	Hungarian CW *(Rules in December* MOTA*)*
8, 9 December	ARRL 10m *(Rules in December* MOTA*)*
16 December	70MHz CW *(Rules in October issue)*
1985	
1 January-31 December	UBA SWL *(Rules in December* MOTA*)*
January-February	BATC ATV Winter Cumulative *(Rules in* CQ-TV*)*
12 January	40m World SSB Championship *(Rules from G3FKM)*
6, 12 January	3.5MHz Cumulative *(Rules in December issue)*
12-13 January	White Rose RS SWL *(Rules in December issue)*
13 January	AFS *(Rules in December issue)*
13 January	75m World SSB Championship *(Rules from G3FKM)*
19-20 January	160m World SSB Chapionship *(Rules from G3FKM)*
15, 24 January	1.8MHz Cumulative *(Rules in December issue)*
19, 27 January	7MHz Cumulative *(Rules in December issue)*
23 January	RTTY World Championship *(Rules from G3FKM)*
26 January	15m World SSB Championship *(Rules from G3FKM)*
27 January	20m World SSB Championship *(Rules from G3FKM)*
27 January	70MHz Cumulative
2, 3 February	7MHz Phone *(Rules in September issue)*
3 February	144MHz CW
9, 10 February	1st 1.8MHz *(Rules in December issue)*
10 February	70MHz Cumulative
17 February	432MHz Fixed
24 February	70MHz Cumulative
23, 24 February	7MHz CW *(Rules in September issue)*
2, 3 March	144/432MHz
9, 10 March	Commonwealth *(Rules in October issue)*
10 March	70MHz Cumulative
16 March	Town & County
24 March	70MHz Cumulative
31 March	432MHz CW
7 April	ROPOCO 1
21 April	Low Power
21 April	70MHz
May-September	10GHz Cumulatives
May-September	Microwave Cumulatives
4, 5 May	432MHz-24GHz
18, 19 May	144MHz
19 May	Region Round-up
1, 2 June	HF NFD
8 June	1,296MHz Trophy
9 June	432MHz Trophy
22, 23 June	Summer 1.8MHz
6, 7 July	VHF NFD
13, 14 July	SWL
21 July	Low Power Field Day
27 July	432MHz Low Power
28 July	144MHz Low Power
18 August	1,296/2,320MHz
25 August	ROPOCO 2
7, 8 September	IARU Region 1 FD
7, 8 September	144MHz Trophy and IARU
2, 10, 18, 26 September	28MHz Phone Cumulative
22 September	70MHz Trophy
5, 6 October	432MHz-24GHz and IARU
8 October	432MHz Cumulative
13 October	21/28MHz Phone
16 October	1,296/2,320MHz Cumulative
20 October	21MHz CW
24 October	432MHz Cumulative
27 October	70MHz Fixed
1, 17 November	1,296/2,320MHz Cumulative
2, 3 November	144MHz CW
9, 25 November	432MHz Cumulative
9, 10 November	2nd 1.8MHz
11, 19, 27 November, 5, 13 December	28MHz CW Cumulative
1 December	144MHz Fixed
3, 19 December	1,296/2,320MHz Cumulatives
11 December	432MHz Cumulative
15 December	70MHz CW

BARTG Spring VHF/UHF RTTY Contest Results 1984

The first five entries were as follows: (144MHz single-operator) 1. G6CZV, 354; GU6JST, 305; 3. G8MWU, 291; 4. G8IMB, 195; 5. G4SBK, 173, (144MHz multi-operator) 1, G4PDY/P, 428; 2, G3WOR/P, 335; 3. G6LUT, 320; 4 G8KMK/A, 300; 5. G4VSV, 293.
Other sections of the contest had very little support.

Club News

The following is the latest information received by RRs from RSGB affiliated societies, clubs and groups in time for inclusion in this issue. Basic unchanged information on other affiliated organizations will be published again in the January 1985 issue.

RSGB affiliated organizations are requested to report all programmes and new items to their regional representatives regularly. Information for inclusion in the **February 1985** issue should reach them by **11 December** and for the **March 1985** issue by **15 January.**

Club programmes are given in order of date, subject, 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 B. Donn, G3XSN, 7 Thurne Way, Liverpool L25 4SQ. Tel 051-722 3644.

Blackburn (East Lancs ARS)—4 December (AGM). Last Tuesday in each month, social gathering, 7.30pm. Conservative Club, Cliffe Street, Rishton, Blackburn. Pro Stuart Westall, G6LXU.

Bury (BRS)—11 December (AGM with wine & cheese to follow), 8 January (TBA), 10 February (Hamfeast, contact G1BWN), 8pm. Mosses Centre, Cecil Street. The remaining meetings are informal. Licensed members may operate the BRS, hf and vhf transceivers. Callsigns G3BRS and G6BRS on vhf. Sec Brian Tyldsley, G4TBT, tel Burnley 24254.

Chester (C&DRS)—11 December (Annual construction contest), 18 December (Xmas meeting, buffet, xyls, and yls welcome. Tickets from G4EZO), 10 January (AGM), 17 January (Construction contest winners), 8pm. Chester Rugby Union Football Club, Hare Lane, Vicars Cross, Chester. Further details from Alan Warne, G4EZO, tel Chester 40055.

Fylde (FARS)—4 December ("Radio astronomy", by Ken Porter, G3KEN), 18 December (Xmas party at the Kite Club), 1 January (No meeting), 15 January (AGM). Kite Club, Blackpool Airport. Sec H. Fenton, G8GG, tel Lytham St Annes 725717.

Isle of Man (IoM ARS)—Mondays, 8pm. 11 December (AGM). Kepple Hotel, Creg-ny-Baa. Hon Sec Mrs Anthea Matthewman, GD4GWQ, tel 0624 22295.

Liverpool (& DARS)—4 December (Quiz), 11 December ("CEPO", by Eric Harrison), 18 December (Bring your own booze party in training for Xmas), 8 January (Bring & buy sale), 15 January (Old timers' talk about the Society). Churchill Conservative Club, Church Road, Wavertree. At the AGM on 2 October the following were elected to office: president, Bert Donn, G3XSN; chairman, Bill Emanuel, G6DXF; Albert Webb, G6XBK; treasurer, Frank Mills, G4XCY. Committee members, Ben, G4MUC; Jim, G3XCP; Trevor, G4PHQ. The retiring president Bill McKune, G8CFM, was honoured with life membership in recognition of his 30 years with the Society.

Liverpool Raynet Group—G1KOP is the newest callsign to join G6WRG, Wirral Raynet Group, and G1DDD, St Helens Raynet Group. These groups, with Southport Raynet Group, now cover the county of Merseyside. Membership of G1KOP is open to all within the boundaries of Liverpool and the organizer, G6DXF, tel 051-427 9350, will be pleased to receive applications to join the group.

Manchester (SMRC)—1 December (Club social night), 7 December ("Origins and uses of Smith Charts", by Dave Bolton, G8UQC), 14 December ("Three years of SSB Field Day", by Ron Smith, G3SVW), 21 December (Club Xmas party), 28 December (No meeting), 4 January ("Developments in oscilloscope design", by Tim Winter, G4AOK), 8pm. Sale Moor Community Centre, Norris Road, Sale. Sec David Holland, G3WFT.

Preston (PARS)—December meetings are purely social. 6 December (Party night, hoping to raise money for the purchase of a caravan for contests), 21 December (Buffet dance, free to members, at local hotel). Meetings held at The Lonsdale Club, Fulwood Hall Lane, (near Deepdale Football Ground), Preston. Sec George Earnshaw, G3ZXC, tel 0772 718175.

Stockport (SRS)—12 December (AGM), 19 December (Morse practice/informal meeting), 8.15pm. Blossoms Hotel, Wellington Road South, Stockport. Sec Mel Betts, G4FFW, tel 061-224 7880.

Thornton Cleveleys (TCARS)—3 December (Talk by Dave Gregson, G6IGV), 10 December (Advanced morse class), 24 and 31 December (No meetings), 7.45pm. 1st Norbreck Scout Hut, Carr Road, Bispham. Sec Mrs J. S. Ward, G8YOK, tel 0253 890114.

RR1 would like to extend Christmas greetings to all members in his region. *G3XSN*

REGION 2—RR P. N. Butterfield, G4AAQ, 43 Lynwood Crescent, Pontefract, West Yorks, WF8 3QT. Tel 0977 791071.

Halifax (H&DARS)—First Tuesday in each month, 18 December (Visit by SMC Leeds to demo equipment), 15 January (Visit by RR), 7.30pm. Running Man PH, Pellon Lane, Halifax. Details from sec D. L. Moss, G1GZE, tel 0422 202306.

Hull (H&DARS)—7 December (Talk on QRA locator by G3RDM), 14 December (TBA), 21 December (Members' and xyls evening), 28 December (Informal), 8pm. West Park Recreational Centre, Anlaby Road, Hull. Details from sec D. Coldbeck, G6ABG.

Leeds (White Rose RS)—5 December ("The art of QSLing", by G3ZGA), 7 December (Annual dinner at Moor Allerton Golf Club) 12 December (Christmas radio quiz against North Wakefield ARS), 19 December (Natter night), 26 December (Club and shack open!), 2 January (AFS contest briefing), 9 January (Construction contest), 8pm. Moortown Rugby Football Club, Moss Valley, Alwoodly, Leeds 17. PR sec G3KWT, tel Leeds (0532) 688821.

Maltby (MARS)—7 December ("Using test equipment", by G3XXN), 14 December ("Projects—getting it to work", by G3ZVG), 21 December (Christmas junk sale), 4 January ("Working Oscar", by G8VHB), 7pm. Old School Buildings, Church Lane, Maltby. Details from I. Abel, G3ZHI, tel Rotherham 814911.

Pontefract (P&DARS)—6 December (Talk on radio control modelling), 13 December (Christmas party), 20 December ("Video", by Mr Rosenbrook of the Pontefract Historical Society), 3 January (AGM), 7.30pm. CW classes on Mondays. Carleton Community Centre, Carleton, Pontefract. Details from sec Ron Tams, G4TCG.

Spen Valley (SVARS)—13 December (Christmas gathering), 10 January ("View data" by G4OTL), 8pm. Old Bank Working Men's Club, Mirfield. Details from T. Clough, G4PHR.

Wakefield (NWRS)—6 December (Natter night), 7 December (Christmas dinner at the Swallow Hotel), 12 December (Quiz against the White Rose ARS), 13 December. (On the air night, G4NOK), 3 January (Natter night), 7.45pm. Carr Gate Working Men's Club, Wakefield. Members are reminded that subs are due at the beginning of the New Year. Sec S. Thompson, G4RCH, tel Leeds 536633.

York (YARS)—Fridays, 14 December (Christmas party in clubroom), 11 January (AGM). 7.30pm. United Services Clubroom, 61 Micklegate, York. The club held its annual dinner last month which by all accounts should have been a good "do". Details from sec K. R. Cass, G3WVO.

Would secs intending to book RR to give a talk at your club *please* check that the date is satisfactory *first!*

I'm sure that all members will join me in congratulating Dave Smith, G4DAX, in his appointment as Zone A member of Council, to succeed Mrs Joan Heathershaw, G4CHH, who becomes our first lady President in 1985.

It only remains for me to wish all members in Region 2 a merry Christmas and a happy New Year. *73 de Phil, G4AAQ.*

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

Birmingham (South Birmingham RS)—12 December (Club Christmas party), 8.30pm. Large Scout Hall. Lectures return to the first Wednesday in each month starting 2 January 1985, 7.45pm. Hampstead House, Fairfax Road, West Heath, Birmingham. Sec Tim Scrimshaw, 10 Somerdale Road, Birmingham B31 2EG.

Halesowen (MEBARC)—11 December (Club Christmas party (guests welcome)), 8pm. MEB Social Club, Mucklow Hill, Halesowen. Sec G4RWH, tel 021-747 8784.

Hereford (HARS)—7 December ("Interference investigation", by G8HGF), 21 December (Club quiz), 25 December (Christmas day nets on 14 and 145MHz), 8pm. The Old Gaol, Gaol Street, Hereford. Sec G3WRQ.

Malvern Hills (MHARC)—11 December (AGM), 8pm. Sec G4TXG, tel Malvern 65802.

Much Wenlock (MWARES)—10 December (Discussion night), 15 December (Christmas dinner (special event)), 8pm, Raven Hotel, Much Wenlock. Sec G3ZSL, tel 07462 861332.

Redditch (RARC)—13 December ("Aerial Circus" (RSGB video)), 8pm. WRVS Centre, Ludlow Road, Redditch. Sec G3EVT.

Rugby (RARS)—12 December (Talk by Warwickshire Repeater Group), 7.30pm. Cricket Pavilion, "B" entrance, Rugby Radio Station. Sec G4TWH.

Stourbridge (StARS)—First and third Mondays, 3 December (Informal meeting), 17 December (Main meeting (no details available)), 8pm. Robin Woods Centre, School Street, off Enville Street, Stourbridge. Sec G8JTL, tel Lye 4013.

Stratford-on-Avon (SoAARC)—Second and fourth Monday in each month. 10 December ("Designing pcbs", by G6DCL), 7.30pm. The Control Tower, The Radio Station, Bearley, nr Stratford. Sec G8OVC, tel Stratford-on-Avon 750584.

Sutton Coldfield (SCARS)—10 December (Mince pies and natter), 8pm. Public Library, Sainsbury Centre, Sutton Coldfield. Sec G6UFD, 233 Calshot Road, Great Barr, Birmingham B42 2BY.

Telford (TARS)—5 December (AGM), 12 December (Quiz night), 19 December (Videorama night), 8pm. Sec Tom Crosbie, tel 597506.

Warwick (Mid-Warks ARS)—Second and fourth Tuesday in each month. 11 December (Christmas meeting (no details available)), 8pm. 61 Emscote Road, Warwick. Sec G4TIL, tel Southam 4765.

G4PRC was operated to celebrate the 500th anniversary of Pontefract's Royal Charter. Seen here are (l) Alan, G4PRE, and (r) Alan, G4SAV, who both helped run the station. *Photo:* G4SU.

Wolverhampton (WARS)—4 December ("Packet radio", by G4JCP), 11 December (General meeting (mini agm?)), 18 December (Christmas social at the Anchor Inn (provisional)), 8pm. Electricity Sports Club, St Marks Road, Chapel Ash, Wolverhampton. Sec K. Jenkinson, tel 0902 24870.
Worcester (W&DARC)—3 December ("The Spectrum computer", by G6CQK), 17 December (Skittles & social. At the "Old Pheasant")), 8pm. Oddfellows Club, New Street, Worcester. Officers: Chairman D. Fry, G4JSC, sec D. Batchelor, G4BRD, 14 Oakleigh Heath, Hallow, Worcester.
Wordsley (WRC)—13 December ("Slow scan tv", by G4JBV), 27 December (Social evening, guests welcome), 8pm. Vine Inn, Camp Hill, Wordsley. Sec G4VJU.

Would club secretaries please note that for information to be included in this section it must reach me no later than the 20th of the month, ie about five weeks before publication date. If your club is not included here it is because I have no information from you!

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

Buxton (BARS)—11 December (Open forum). Christmas dinner date to be announced, 8pm. Egerton Hotel, St Johns Road, Buxton. Sec Dave Cooper, G6MIF, tel Buxton 6174.
Derby (D&DARS)—5 December (Junk sale), 12 December (Constructors contest), 19 December (Christmas party, in the clubroom), 26 December (No meeting, clubroom closed), 2 January (New Year bring & buy), 7.30pm. 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.
Grantham (GRC)—No meeting during December. Third Tuesday in each month, 8pm. Shirley Croft Hotel, Harrowby Road, Grantham. Sec John Kirton, G8WWJ, tel Grantham 65743.
Lincoln (LSWC)—12 December (Family get-together/home-made wine competition), 26 December (Nothing programmed), 8pm. City Engineers Club, Waterside South, Lincoln. Sec Pam Rose, G4STO, tel Gainsborough 788356.
Mansfield (MARS)—7 December (Buffet Disco), 8pm. Victoria Social Club, Princes Street, Mansfield. Sec Keith Lawson G4AAH.
Melton Mowbray (MMARS)—21 December (Bring and buy sale & Christmas raffle), 7.30pm. St John Ambulance Hall, Asfordby Hill, Melton Mowbray. Sec Richard Winters, G3NVK, tel Melton Mowbray 63369.
Nottingham (ARCON)—6 December (Forum and Christmas quiz), 13 December (EI expedition), 20 December (Social evening), 27 December (Activity night), 3 January (Forum), 7.30pm. Sherwood Community Centre, Woodthorpe House, Mansfield Road, Nottingham. Sec Jim Towle, G4PJZ.
Scunthorpe (S&DARC)—4 December ("Astronomy", by G4GZA), 11 December ("What is amateur radio?", by G3PDL and G3CCH), 18 December (Christmas party), 7.30pm. Grange Farm Hobbies Centre, Franklin Crescent, Scunthorpe. Sec Ida Aizlewood, G6ZCA, tel Scunthorpe 732268.
Skegness (S&DARS)—6 December (Meeting at County Jnr School, Pelham Road, for two RSGB videos, "Two pioneers of radio" and "Silicon Glen"), 7.30pm. Sec Clive Ironmonger, G6HYF.
Spalding (S&DARC)—14 December (Social and junk sale), 8pm. The Maple Room, White Hart Hotel, Spalding. Sec Betty Whitley, G4ZGT, tel Spalding 2781.

Would club secs please bear in mind that the news is prepared about six weeks in advance of publication, any news after this date to GB2RS please. RR4 is always available to visit your club, why not give me a ring. Best wishes for Christmas and the New Year to all members in Region 4.
G3SZJ and xyl G4EYM.

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

Cambridge (C&DARC)—7 December (Junk sale). Venue to be announced.
Dunstable Downs (DDRC)—7 December (Christmas tv show), 21 December (DDRC Christmas party). Sec Phil Morris, G6EES.
Milton Keynes (MKARS)—18 December ("Fibre optics", by G4IUM). Sec G3ZPA.
Peterborough (GPARC)—13 December (Christmas social). Sec Frank, G4NRJ.
Shefford (S&DRS)—6 December (Junk sale), 13 December (Judging of constructors' contest), 20 December (Chairman's wine and mince pie night and prize giving), 27 December (Club closed). Club reopens 3 January. Church Hall, Amptill Road. Sec Alan, G4PSO.
Wellingborough (Nene Valley RC)—5 December (Technical Topics night), 15 December (Construction Trophy entries and judging), 19 December (Christmas buffet and social), 26 December (Club closed). Dolben Arms, Finedon, Nr Wellingborough. Sec L. Parker, G4PLJ.

My xyl and myself wish all clubs in the region a Merry Christmas and a Happy New Year, even those clubs that do not send me news!
G3DOT

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HA3 7EA. Tel Penn (049481) 4240.

High Wycombe (Chiltern ARC)—18 December (Club Christmas party, Orchard End Cricket Club. Tickets £2 from G4CYR at door, or G3NCL). Talk-in on S22, GB4CXP. Details from sec G3NCL, tel High Wycombe 712020.
Mid-Thames (MTRDFC)—17 January (Two Brewers, St Peter's Street, Marlow, Bucks. NGR SU852 862). Please note the new sec is Doreen Pechey, tel Checkendon 680552.
Slough (Burnham Beeches RC)—3 December ("History of amateur radio", by G3SSJ), 17 December (Pre-Xmas meeting). 8pm. St John Ambulance HQ, Burlington Road, Slough. Further details from sec G6DVC.

Season's wishes from the RR. Would clubs please send in their club news for the coming year.

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

Ashford (Echelford ARS)—10 December (Social evening—venue tba), 27 December (Bring & buy sale), 7.30 for 8pm. The Hall, St Martin's Court, Kingston Crescent, Ashford, Middx. Sec Bob Crane, G4PHS, tel 01-977 4157.
Biggin Hill (BHARC)—18 December (Junk sale), 8.30pm. St Mark's Church Hall, Church Road, Biggin Hill. Sec Ian Mitchell, G4NSD.
Coulsdon (CATS)—2 December (Annual bazaar with well-known traders and raffle, all welcome (note this is a Sunday), 10 December (AGM), 8pm. St Swithun's Church Hall, Grovelands Road, Purley. Details from Alan Bartle, G6HC, tel 01-684 0610.
Cray Valley (CVRS)—6 December (G3RWL talks on "Oscar"), 20 December (Natter night), 8pm. Christchurch Centre, Eltham High Street, Eltham SE9. Sec P. Clark, G4FUG, tel 0689 29230, evenings.
Croydon (SRCC)—First and third Thursday in each month, 3 December ("SSB", by G4MVS), 8pm. TS Terra Nova, 34 The Waldrons, South Croydon. Sec John Simkins, G8IYS, tel 01-657 0454.
Crystal Palace (CP & DRC)—15 December (Social evening with film and/or video), 8pm. All Saints' Parish Room, Upper Norwood, SE19. Sec Geoff Stone, G3FZL, tel 01-699 6940.
Dorking (D&DRS)—Second and fourth Tuesday in each month, 11 December (Informal meeting), 8pm. Star & Garter Hotel, Dorking Station.
Guildford (G & DARS)—7 December (Quiz night), 21 December (Party night), 8pm. Model Engineers' HQ, Stoke Park, Guildford. Sec Lew Bright, G4BHQ, tel Guildford 567375.
Kingston (K & DARS)—Third Wednesday in each month, 8pm. Alfriston, Berrylands Road, Surbiton. Sec Brian Smythe, G3ODH, tel Epson 26005.
Redhill (RATS)—18 December (Constructional contest), 8pm. The Constitutional & Conservative Club, Warwick Road, Redhill. Sec T. I. P. Trew, G8JXU.
Sutton & Cheam (S & CRS)—Third Friday in each month, 3 December (Natter night), 21 December (Christmas get-together), 8pm. Downs Lawn Tennis Club, Holland Avenue, Cheam. Sec Alan Keech, G4BOX.
Thames Ditton (TVARTS)—4 December (Robin Highes, G3TDR, on a subject tba), 8pm. Thames Ditton Library, Watts Road, Giggs Hill, Thames Ditton. Details from Peter Firmin, G4SES.

Thank you for your hospitality to all those clubs I have visited. Merry Christmas and a prosperous New Year to all in Region 7.
RR7

REGION 8—RR M. Elliott, G4VEC, 20 Haysel, Sittingbourne, Kent ME10 4QE. Tel 0975 70132.

Canterbury (East Kent ARS)—6 December (Natter night), 20 December (Annual pre-Christmas Cheese & Wine party), 7.30 for 8pm. The Cabin Youth Centre, Kings Road, Herne Bay. Details from Stuart, G6LZG, tel Canterbury 68913, or Wally Broad, G8GTF, tel Canterbury 63104.
Crawley (CARC)—Fourth Wednesday in each month (formal) at Trinity Church Hall, Ifield, Crawley. Second Wednesday (Informal), club member's QTH. 12 December (Skittles evening, The Haycutter, Oxted, 7.30pm. Fun for all, ploughman's food, smooth mead, only £3 per person). Details from David, G4IQM, tel Crawley 882641.
Dartford (DDFC)—4 December (Pre-hunt meeting: Horse & Groom PH), 9 December (Club hunt), 18 December (Ext gen meeting: Horse & Groom PH). Pre-hunt meetings held on Tuesday evenings after 9pm at Horse & Groom PH, Leyton Cross, Dartford Heath, Dartford, Kent. Details from Pete, G8DYF, tel Greenhithe 844467.
Dover (SEKYMCARC)—Wednesdays, 7.45pm. Mondays, RAE classes. Tuesdays, morse tuition. 5 December (Natter night), 12 December (TBA), 19 December (Christmas social), 26 December (No meeting). Dover YMCA, Godwynehurst, Leyburne Road, Dover, Kent. Details from Alan, G3VSU, tel 0304 822738, or Jeffrey, G6AGK, tel 0277 721601.
Eastbourne (EE&ARC)—Sundays, 7.30pm. Note change of meeting days. The Archery Youth Centre, Seaside, Eastbourne. Activities include RAE and cw courses, construction and chat evenings. Details from Peter, G1EJB, or Mart Sullivan, tel Eastbourne 765701.
Eastbourne (Southdown ARS)—First Monday in each month, 7.30 for 8pm. December (No date as yet: Christmas social). Chaseley Home, South Cliffe, Eastbourne. Details from Tom, G4MVN, or Peter, G8IQO, tel Eastbourne 763123.
Edenbridge (EARS)—Club has change of venue and day. Second Wednesday in each month. The Scout Hut, High Street, Edenbridge. Details from John, G8VCH, tel East Grinstead 24748.
Hastings (HERC)—Third Wednesday in each month at West Hill Community Centre, Croft Road, Hastings, Fridays at the Club Room, Ashdown Farm Community Centre, Downey Close, 7.45pm. 19 December (Christmas social). Details from Dave, G4NVQ, tel Hastings 420608.
Medway (MARTS)—Fridays, 7 December (Junk sale), 14 December (Natter night), 21 December (Christmas social), 28 December (No meeting), 7.30 for 8pm. St Lukes Church Hall, King William Road, Chatham. Details from Andy, G4TQS, tel Medway 363960.
Sussex Repeater Group—The SRG Roadshow has been well received at both Crawley & Chichester clubs. Visits to Horsham club in October and Marconi E & ARS in November rounded off the 1984 season. Details from A. J. Clark, G8TJQ, sec.
Tunbridge Wells (West Kent ARS)—7 December (Informal meeting), 14 December (Annual dinner), 21 December (Informal meeting), 28 December (Cheese & Wine party), 8pm. Adult Centre Annexe, Quarry Road, Tunbridge Wells, Kent. Details from Brian Guinessy, G4MXL, tel 0892 32877, after 7pm.

REGION 9—RR R. W. Jones, G3YMK, c/o 10 Oaktree Close, Upottery, nr Honiton, Devon. Tel 040486 468.

Axe Vale (AVARC) (G8CA)—First Friday in each month, 7.30pm. Cavaliers Hotel, Axminster. Bookings are now being taken for the club dinner to be held in "The Cavalier", Axminster, early in December. Further details from Bob Newland, G3VW, tel Lyme Regis 5282.
Barnstaple (North Devon RC)—5 December, 7.30pm. The club now has a new meeting place, "Micro Chips", Castle Street, Barnstaple. Contact George, G4CG.
Exeter (EARS)—!0 December (Introduction to club construction project. The idea is for all members to build a simple frequency marker using a basic design. Complete projects will be tested and a prize awarded). Community Centre, St David's Hill, Exeter. At a recent agm the following were elected: Rex Williams, G3RSJ, chairman; Francis Stower, G6FGS, sec; Ray Donno, G3YBK, treasurer; Roger Tipper, G4KXR, pro; and David Pay, G4WTU, and Nigel Smith, G6FAK, committee members. 5 January (Annual Christmas Dinner, Exeter Arms Hotel, Exeter. Bookings through Nigel, G6FAK). Details from pro, 11 Chancel Court, Chancel Lane, Pinhoe, Exeter EX4 8QE, tel Exeter (0392) 68065.

Penzance (Cornish ARC)—Meets in the Church Hall, Treleigh, nr Redruth. Contact pro G3IUE, tel Germoe 3402, for details of dates and times.
Tiverton (South West RC)—Mondays. Queens Head, Tiverton. The club owns an hf rig and the landlord of the Queens Head has allowed various antennas to be erected, as well as giving full use of the skittle alley as a "base" station! The club call is G4TSW, and an award is offered known as the "Tiverton Ten", qualified for by contacting 10 Tiverton stations. The club dinner takes place on 14 December. Details are available from G. Draper, G4ZNV, 19 Sunnymead, Copplestone, Crediton, tel Copplestone (03634) 235.
Torbay (TARS) (G3NJA & G8NJA)—Fridays. Club HQ, Bath Lane (rear of 94 Belgrave Road), Torquay. A Christmas party is being held on 22 December which is described as a "good bun fight"! Don't forget the club nets on 3·755MHz each Monday, Wednesday and Friday and 10am on Saturdays. The club now has a new sec, Brian Wall, 48 Pennyacre Road, Teignmouth TQ14 8LB.
West Devon Raynet Group—The group continues to gain members in the Plymouth area and its net on Tuesdays on S9 is growing each week. Further details from the Group Controller, John, G3TGR, tel Plymouth 45478.

Even though G3YMK has now moved to Aberdeen mail is still forwarded and I look forward to hearing from secs until a new RR is appointed.

May I take this opportunity to wish all members of Region 10 and of course anyone else who reads these notes, a very Happy Christmas and a very successful New Year. I hope to be hearing from more of you in the near future. *73, John, RR10*

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)—13 December (Sale of silent key's equipment), 8pm. Green Lawns Hotel, Bay View Road. Sec Mr J. N. Wright, GW4KGI, tel 0745 823674.
Hawarden (Alyn & Deeside ARS) (GW3TZR)—13 December (Natter night), 20 December (Committee meeting), 8pm. Shotton Conservative Club, King George Street, Shotton, Deeside. Sec Mr P. Duffield, GW1DPD, tel 0244 545669.
Porthmadog (P&DARS)—4 December (Christmas dinner), 7.30pm. National Milk Bar, Porthmadog. All future club meetings to be held in Harbour Cafe, Ffestiniog Railway, Porthmadog. Sec Mrs L. Jones, GW4WKQ, tel 0758 740445.
Rhyl (R&DARC) (GW4ARC)—3 December (Activity night), 17 December (Evening out), 7.30pm. 1st Rhyl Scout HQ, Tynewydd Road, Rhyl. Sec Mr M. Allington, GW1AKT, tel 9170 469.
Bangor (Dragon RC)—New sec Mr Bill Williams, 31 Ty Croes Est, Llanfair PG, Gwynedd, Anglesey, tel 713941. No further particulars.

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

Aberdeen (AARS)—7 December (Junk sale), 7.30pm. Club Rooms, 35 Thistle Lane, Aberdeen. Details from sec Don Travis GM4GXD, tel 04676 251.
Dundee (Kingsway Technical College ARC)—Tuesdays. Kingsway Technical College, Dundee. Details from sec Berni Deans, GM4TQN, 4 Deanbank Street, Dundee.
Forfar (F&DARC)—Club Room, 91B West High Street, Forfar. Details from sec Ken, GM3XKP, tel 0307 63095.
Perth (P&DARG)—Tuesdays, 8pm. Perth City Sports & Social Club, Leonard Street, Perth. Details from Mike, GM6OFO, tel 0738 28621. RAE classes start on 7 January, and a morse class will be run if required.

The Open Learning Unit at Kingsway Technical College, Dundee, is running an external course for the RAE. (No college attendance required). Details from Allan Ramsey, GM6BML, Open Learning Unit, Kingsway Technical College, Dundee, Angus.

The Scottish Amateur Radio Convention 1985 (to be known as SARCON 85) will be held at the College of Education, Cardyne Road, Dundee, on Saturday 21 September 1985. The event is being jointly organised by the Forfar, Perth, Kingsway Tech Clubs and Tayside Raynet. Details from SARCON secretary John Robb, GM4WMN, Culhawk, Kirriemuir, Angus. Tel 057581 222.

Please note the club news file is now empty. No more news for Region 12 can be published unless club secretaries supply news from their clubs. *RR12*

REGION 13—RR Andrew Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife KY1 2LH. Tel Kirkcaldy (0592) 200335.

Edinburgh (Lothians RS)—Second Wednesday in each month, 7.30pm. The "Wedgewood" Room, Harwell House Hotel. Details from GM1CQC.
Glenrothes (G&DARC)—Wednesdays and third Sunday in each month, 16 December (Fire safety films), 20 January ("Expeditions", by GM3YOR), 7.30pm. Clubrooms, Provosts Land, Leslie, Fife. Details from Bob, GM4LYQ, tel 745047.

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

Falkirk (F&DRC)—First and third Wednesdays in each month, 7.30pm. The Grange Centre, Redding Road, Brightons by Falkirk. Details from sec Bill Pennycook, GM4WZY, Cedar Dale, Earls Road, Grangemouth.
Glasgow (West of Scotland ARS)—30 November ("A night with GM3KXQ"), 14 December ("Amateur television", by Norrie, GM4BVU), 18 December (A visit to Kilmarnock & Loudon ARC—inter-club quiz night), 7.30pm. Club Premises, 22 Robertson Street, Glasgow. Details from Des, GM8YBP.
Helensburgh (HARC)—Thursdays, 7.30pm. New meeting place for this club is Cairndhu House Ltd, Rhu Road, Helensburgh. At a recent agm new office bearers were elected: president, GM6JOA, Allan White; treasurer, GM8VAM, George Brozier; sec, Dave Reid, GM6JLQ, tel Cardross 841452.
Kilmarnock (Kilmarnock & Loudon ARC)—18 December (Inter-club quiz for "The Bright Spark Trophy"), 7pm. The Broomhill Hotel, London Road, Kilmarnock. Details from sec L. J. Paget, 68 Hunter Road, Crosshouse KA2 0LD, tel 0563 3483.
Motherwell (mid-Lanark ARS)—29/30 November (special event station to commemorate St Andrew's Day. Operation from club premises), 2 December (Contest, 144MHz fixed from club premises), 7 December (Bring & buy sale), 21 December (Film show by Gordon Hunter, GM3ULP). Details from new sec Anne Hood, GM4UXX, tel 0698 350926.

Club secretaries, please keep RR updated with information. Please indicate interest in a meeting of club reps from each club in Region 14. The RR would like to wish all members and their families in the region a very merry Christmas and best wishes for a happy and prosperous New Year, and would like to thank all club secretaries for their help and forebearance since his becoming RR.

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, 11 December (Christmas party and computer night), 8 January ("FM and repeaters" by GI4BWM), 8pm. Fairview Primary School, Ballyclare. Details from GI4PRH, tel Ballyclare 41655.
Ballymena (BARC) (GI3FFF)—Meetings weekly. RAE class, Wednesday 8pm. Morse class and club night, Thursday 8pm. Club meeting Sunday 4pm. Next quarterly business meeting Thursday, 3 January 1985. Club Rooms, 70 Nursery Road, Grace Hill, Ballymena. Officers: Chairman, GI4OZT, vice-chairman, GI4POV, sec GI4HCN, treasurer, G. Williamson, QSL manager, GI4SFZ, morse instructor, Sam Gilmore, RAE instructor, GI4OZT, Pro GI4VJC.
Banbridge (Mid-Ulster ARC)—Second Sunday in month at QTH of GI4BAC. Special meeting Wednesday 12 December at Armagh Planetarium for Star Show, 7.30pm. Admission £1. Officers: Chairman, GI8KXU, secretary GI4SJQ, Treasurer GI3WEM, assistant treasurer GI4GUH, contest manager GI4BDL, morse instructor GI3CVH.
Bangor (B&DARS) (GI3XRQ)—First Friday in

Conwy Valley ARC lecture on antennas by Mr Louis Varney, G5RV, on 6 September. L to r: GW4NNL (Club treasurer), G3WIO, Mrs N. Varney, G2AMB (RSGB past-President), G5RV, GW4KGI (Club secretary), GW3MDK (Club chairman), GW2FLZ (Region 11 RR). *Photo:* GW2FLZ

each month at Sands Hotel, Bangor, 8pm. 7 December ("Weather satellites", by GI3HXV and GI3UBA). 11 January (Note date change. "AMTOR" by GI4AHP). Officers: Chairman GI4CXO, vice-Chairman GI4POC, sec/pro GI4OCK, treasurer GI3USS.

Belfast (COBYMCAARC) (GI6YM, GI6YMC)—Tuesdays, 7pm. Saturdays, 2.30pm. Club Room, 4th Floor YMCA, Wellington Place, Belfast. Officers: Chairman F. Campbell, vice-Chairman GI5UR, secretary GI6BJO, treasurer GI3IVJ.

Coleraine (NWARC) (GI4DBB)—First Tuesday in each month, 8pm. Scout Hall, The Crescent, Coleraine. Officers: Chairman GI4HVI, secretary GI8NBW, treasurer GI4KIG, QSL manager GI4JFP, contest manager GI4AHD, station manager GI3KVD. It is hoped to establish a station on the air regularly at the meeting location.

Londonderry (NW of IARC) (GI3CFH)—First Monday in month, 7.30pm. Prehen Municipal Boathouse, Victoria Road, Londonderry. Meetings planned include videos of club events and demonstrations. Officers: Chairman GI4JIP, vice-Chairman GI4ONL, secretary GI4OUN, treasurer GI6MYQ.

Moy, (Armagh, Dungannon & DARC) (GI4VFN)—Second Tuesday in each month, 8pm. The Pony Club, Killymann Street, Moy. Meetings being arranged include weather satellites, constructors' nights, and other attractions. Details from GI8RNX.

Club secretaries: please send details of programmes to Zone Manager/RR at least six weeks before publication date of *Radio Communication*.
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REGION 16—RR Alan Owen, G4HMF, 102 Constable Road, Ipswich, Suffolk IP4 2XA. Tel 0473 51319.

Braintree (B&DARS)—5 December (Essex, International Jamboree—Dave, G6CJA, and Jeff, G6OIX), 19 December (Open Forum), 2 January (Club Night). St Peter's Church Hall, St Peter's Road, Bocking End, Braintree. Net on non-meeting Mondays (G6BRH), S15, 8pm. Sec Leslie Whitehead, G6XJC, 24 Gilchrist Way, Braintree CM7 7SY, tel 0376 25587.

Chelmsford (CARS)—4 December ("10m fm" by John Greenwood, G3KRZ), 1 January (Annual film show), 7.30pm. Marconi College, Arbour Lane, Chelmsford. Details from Andrew Mead, G4KQE, tel Silver End 83094.

Colchester (CRA)—13 December ("Power supply units," by Ron, G4JIE), 7.30pm. Colchester Institute, Sheepen Road. Details from Frank Howe, G3FIJ, tel Colchester 851189.

Dengie Hundred (DHARC)—6 December (Test instruments and their use), 20 December (Practical evening), 7.30pm. Burnham Sailing Club, The Quay, Burnham-on-Crouch. Details from G6ZSJ, 7 Eastern Road, Burnham-on-Crouch CM0 8BS, tel Maldon 784225. Club net starts on S20 at 8pm on non-meeting Thursdays (G8YEZ or G6ZGJ).

Great Yarmouth (GYRS)—6 December (RAE revision), 20 December (Informal evening), 3 January (Social evening), 7.30pm. STC Sports & Social Club, Beevor Road, South Denes, Great Yarmouth. Details from A.D. Besford, G3NHU, tel Great Yarmouth 721173.

Ipswich (IRC)—12 December (Ipswich v Stowmarket club quiz), 8pm. Club Room, Rose & Crown, Norwich Road. Details from Jack Tootill, G4IFF, tel Ipswich 44047.

Leiston (LARC)—4 December (Film show), 7.30 for 8pm. Sizewell Sports Club, King George's Avenue, Leiston. Details from Mrs Ivy Westcott-Freeman, G6ORK, 16 Hayling Road, Leiston. Tel Leiston 831597.

Loughton (L&DRAS)—7 December (CW practice), 14 December (Christmas dinner), 21 December (Informal evening), 7.30pm. Loughton Hall, Rectory Lane, Loughton. Details from C. Knowles, G6FWT, tel 01-508 7190.

Rochford (R&DRC)—No programme, but meets second Monday in each month. Civil Defence Building, Rochford. The club has a net with German twin club in Haltern at 8pm Sundays and Thursdays on 3,730kHz. Details from Denis Taylor, G3FGC.

Stanford-le-Hope (SLH&DARC)—3 December (Natter night), 10 December (Demonstration for Grays BB), 17 December (Christmas party), 31 December (Planning for 1985), 8pm. St Joseph's Parish Rooms, Scratton Road, Stanford-le-Hope. Details from Jim Thomson, G4OVG.

Stowmarket (S&DARS)—3 December (Christmas Social), 12 December (Quiz, Stowmarket v Ipswich), 7 January (Presidential Address, G4BJO Weather part 2), 7.30pm. Red Cross Hut, Station Yard. Details from Jim Lowe, G8SCB, tel Needham Market 721296.

RR16 would like to make contact with the Norfolk, Thurrock, Southend, Romford, Mayland and Ilford clubs.
G4HHF

REGION 17—RR T. Emery, Wilverley, Old Lyndhurst Road, Cadnam, Southampton SO4 2NL.

Basingstoke (BARC)—11 December (Social evening), 7.30pm. The Village Hall, (opposite "The Swan"), Sherborne St John, Basingstoke. Chairman G4WIZ, tel Tadley 5185.

Bournemouth (BRS)—7 December (Natter night), 21 December (No meeting), 7.30pm. Kinson Community Centre, Kinson, Bournemouth. Sec G4EKE, tel 0202 877945.

Eastleigh (Itchen Valley ARC)—7 December (Christmas social), 21 December (Open meeting), 7.30pm. The Scout Hut, Brickfield Lane, Chandlers Ford. Sec G6DIA, tel 0703 863039.

Fareham (F&DRS)—5 December (Natter night), 12 December ("Oscar Ten" operation by G6XHR), 19 December (Amateur slide show, Bring your own slides) 7.30pm. Portchester Community Centre, Portchester. Sec G4ITG, tel Fareham 234904.

Farnborough (F&DRS)—12 December (Social evening), 26 December (No meeting), 7.30pm. Railway Enthusiasts' Club, Access Road, off Hawley Lane, Farnborough. Pro G4MBZ, tel Farnborough 837581.

Horndean (H&DARC)—15 December (Note the date—Christmas dance, organizer, G4UVP, 8pm. First Monday of each month in larger room at Merchiston Hall, London Road, Horndean. Membership limit raised. Information from G4BEQ.

Liphook (Three Counties ARC)—8 December (Note the date—Christmas party). Alternate Wednesdays, 8pm. Railway Hotel, Liphook. Sec G3TBT, tel Passfield 368.

Southampton (SARS)—Wednesdays, 7.30pm. Hall of Aviation, R J Mitchell Museum, Albert Road, Southampton (near Dock Gate 1). Sec G6CPE, Tel Romsey 514811.

Southampton (Waterside SWC)—11 December (Informal), 25 December (No meeting), 7.30pm. Fawley & District Community Centre, Blackfield, Southampton. G6DLJ, tel 0703 891975.

Swindon (S&DARC)—Thursdays, 13 December ("MARS", by G4YQZ), 20 December (Informal), 7.30pm. Oakfield School, Marlowe Avenue, Swindon. Pro G4ZAZ.

Weymouth (SDRS)—4 December (Annual quiz), 7.30pm. Army Bridging Camp, Wyke Regis. Sec G6KHD.

Wimborne (FRARS)—2 December (Daytime—144MHz Fixed Station Contest; evening—"Technical rambles", by G4WHO), 9 December ("Canadian radar system", by G3MXF), 16 December (Contest fun night with *prizes!*), 7.30pm. Flight Refuelling Social Club, Merley, Wimborne. Sec G8MCP.

May I take this opportunity of wishing all clubs in Region 17 a happy Christmas and a prosperous New Year.
G3KWU

REGION 18—RR to be appointed

Consett (Derwentside ARC)—Mondays, 7pm. Consett Association Football Club, Belle Vue Park, Consett. Details from June Wallis, G1AAJ.

REGION 19—RR R. J. C. Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ. Tel 01-989 6741.

Cheshunt (CDARC)—5 December ("Remote imaging" by Les, G8LOK), 12 December (Natter night), 19 December (Christmas party), 26 December (No meeting), 8.15pm. The Church Room, Church Lane, Wormley, nr Cheshunt, Herts. Details from Roger Frisby, G4OAA, tel 09924 64795.

Chiswick (ABCARC)—18 December (General discussion), 7.30pm. The Committee Room, Chiswick Town Hall, London W4. Sec W. G. Dyer, G3GEH, tel 01-992 3778.

Edgware (EDRS)—13 December (Junk sale). The Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. Sec J. Cobley, Hatfield 64342.

Ealing (EDARS)—Tuesdays, 4 December ("Packet radio" by I. Wade, G3NRW), 7.30pm. Hanwell Community Centre, 71a Northcroft Road, W13. (Nets on S9, SU49). Sec Anton, G4SCR, tel 01-997 1416.

Grafton (GARS)—14 December (Constructors' evening and Christmas party. All welcome). Finchley Cricket Club Pavilion, behind the Middx CC Sports Centre. Details from Martin, G4GRS, QTHR.

Harrow (RSH)—7 December (Informal and practical), 14 December ("Spring Valley" computer lecture), 21 December (Grand Christmas party), 28 December (No meeting). The Harrow Arts Centre, High Road, Harrow Weald. Details from Dave, G8XBZ or G4AUF, tel Rickmansworth 779942, or 01-868 5002. Talk in on GB3HR (B14).

Hillingdon (HARC)—This club has recently become affiliated to RSGB and welcomes newcomers wishing to talk amateur radio. Tuesdays, 8pm. Treaty House, Uxbridge. Sec Howard, G6STI, 45 Saxony Parade, Hayes End, Middlesex, tel 01-561 2917. The club has started a net on Thursday evenings, 144·575 fm at 8pm. All are welcome to join in.

Havering (H&DARC)—5 December, (Informal), 12 December (TBA), 19 December (Christmas party), 23 December (Informal), 30 December (TBA), 8pm. The Fairkytes Arts Centre, Billet Lane, Hornchurch, Essex. Details from G4UQR, tel Upminster 26904.

London (CSARS)—The Civil Service Amateur Radio Society will be starting 20m and 40m operation from Monck Street from 1 December. They also run a net on Tuesday evenings on 144·575MHz and 3·720MHz net. Control G3ENV. Details from C. P. Woolley, G6IMM.

St Albans (Verulam ARC)—11 December (Informal), 18 December (AGM and bun fight), 7.45 for 8pm. RAFA HQ, New Kent Road, St Albans. Sec Hilary, G4JKS, tel St Albans 59318.

Southgate (SARC)—13 December (AGM), 8pm. St Thomas Church Hall, Prince George Avenue, London N14. Details R. Snary, G4OBE, 12 Borden Avenue, Enfield.

Stevenage (SDARS)—Fairlands Hall, Archer Road, Stevenage, 8pm. Details from G4BGP, tel 0462 893736.

Watford (WRC) (RS853552)—7 November (Talk by John Nelson of RSGB), 21 November (Informal), 8pm. Tudor Arms, Bushey Mill Lane, North Watford. Details from Gordon, G8XXV, tel 01-950 3611.

Wanstead (WRSGBG)—Meetings on third Sunday in the month. Wanstead House, The Green, Wanstead, London E11. Details from Tony Martin, G4VIF, tel 01-594 0291.

REGION 20—RR N. F. O'Brien, G3LP, 26 Southfield Road, Gloucester GL4 9UD. Tel 0452 34890

Bath (B&D ARC)—12 December, 8pm. Englishcombe Inn, Englishcombe Lane, Bath. Club station G4TMH regularly operating. Full details from Colin Ashley, G4UMN, tel Frome 63939.

Bristol (BARC)—4 December (Visit by N. F. O'Brien, G3LP, RR20), 11 December (Talk by police on crime prevention), 18 December (Christmas festivities), 1 January (Club open), 7.30pm. YMCA, Park Road, Kingswood, Bristol. Details from Trevor Cockram, G8GFZ, or Alan Williams, G3ZKI, tel 0272 553020.

Bristol (North Bristol ARC)—7 December (Committee meeting), 14 December (Junk sale), 21 December (Horizon Electronics open), 28 December (The Christmas party), 7pm. SHE, 7 Braemar Crescent, Northville, Bristol. Details from Ted Bidmead, G4EUV, including advanced morse class by Phil Brouder, G3ZJH.

Bristol (South Bristol ARC)—5 December (Lecture—"test equipment", by G4KUQ/G4SDR), 12 December (HF cw activity night, Colin, G4SQQ) 19 December (Club families evening, Muriel, G4YZR) 26 December (Club closed), 2 January (Discussion "What's legal?" by Mike, G3OUK, 7.30pm. Whitchurch Folk House, East Dundry Road, Whitchurch, Bristol BS14 0LN. Club details from Len Baker, G4RZY, tel 0272 834282.

Cheltenham (CARA)—7 December (AGM), 7.30pm. Stanton Room, Charlton Kings Library, Cheltenham. 21 December (Christmas party at the Hobnails, 7.30pm. Names to Terry, G3JFH, asap. Tickets, £2.50 each). Club details from John Holt, G3GWW.

Cheltenham (Smiths' Industries RS)—7 Decem-

Cheltenham ARA and neighbouring clubs in Herefordshire, Gloucester, Worcester, Smiths' Industries in GCHQ organized a joint meeting on 12 October. The speaker was Lady Virginia Fiennes, who conceived the idea of the trans-globe expedition led by her husband, Sir Ranulph Fiennes. Lady Fiennes was the radio operator for the whole of the expedition, and gave her talk on that subject.

The evening was attended by a record number of amateurs, their friends and families. It was judged to be an enormous success. In the photograph are, from l to r: Terry Adams, G4CHD, chairman of Smiths' Industries RS, Lady Virginia Fiennes, and John Holt, G3GWW, chairman of CARA.

ber (Party), 13 December (Meeting), 27 December (No meeting). Club House, Newlands, Bishops Cleeve. Details from Roger Hawkins, G8UJG.

Gloucester (GARS)—5 December ("Conversion of cb rigs to amateur use", lecture by John Everingham, G4TRN), 12, 19 December (Natter nights), 26 December (No meeting), 7.30pm. St John Ambulance Headquarters, Heathville Road, Gloucester. Club information from Nick Negus, G6AWT.

Stroud (S&DARS)—4, 11, 18 December (Natter nights), 7.30pm. Scout HQ, Parliament Street, Bisley Road, Stroud. Details from Mike Mills, G3TEV.

Taunton (T&DARC)—Fridays, 7.30pm. In the basement of the County Hall, The Crescent, Taunton. New officers were appointed at the agm in October. For further details contact sec, L. S. J. Forde, G4ZLF, 23 Laburnum Road, Wellington, Somerset.

Thornbury (T&DARC)—5 December ("Pye Systems", talk by G4DZE), 7.30pm. White Horse Inn, Groves End (A38). Full details from Alan Jones, G8AZT.

Weston-super-Mare (WsMARS)—10 December (Constructor's competition along with buffet supper by ticket). Details from Dave Restrick, G4/KA0NGP tel W-s-M 28482.

Yeovil (Y&DARC)—6 December (DEEBEES8, G3GC), 13 December ("Packet radio", by Ed Harland, G3VPF), 20 December ("Sky wave absorption", by G3MYM), 27 December (Natter night), 7.30pm. Recreation Centre, Chilton Grove, Yeovil. Details from Eric H. Godfrey, G3GC, Dorset Reach, 60 Chilton Grove, Yeovil, 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 will be increased to £2 for 40 words or less from 1 January 1985. Each advertisement must be accompanied by the correct remittance, either as a cheque or postal order made payable to Radio Society of Great Britain.

The closing date for the **February 1985** issue is **Monday 17 December.**

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS
Do not post to RSGB HQ or Advertising officer.

FOR SALE

Sharp MZ80K, 48k of memory, comp with i/o box, £300 worth of games and business programs, hardly used, £275 ono. G4KMF, QTHR. Tel Orpington (0689) 29324, evenings, 01-283 5347, daytime.

Belcom LS20XE pocket tx/rx, 1W switchable, fully synthesized, comp with box, whip antenna, manual, etc, two sets of nicads, virtually brand new, hardly used, a very good radio, automatic toneburst, repeater shift, bargain, £100 ono. G1ELN. Tel Disley (06632) 2545.

Kenwood Trio R599S all band hf rx, in exc cond, good reason for sale, £160, incl delivery. Interested? Tel 0532 484030, anytime after 6pm, Monday to Friday.

Mirage B3016 linear amplifier, 25W in, 160W out, no marks or mods, fm/vhf, ssb, £120. G8WTM, QTHR. Tel Chelmsford 466915.

Yaesu FT480R 2m multimode, boxed, manual, leads, mount, etc. Going QRT 2m due to London area. Full working order, £240, carriage extra, G4PLH NOT QTHR. Tel Richard, 01-642 3836.

Minibeam TET HB33M, 10-15-20, used once, planning permission refused, £200. G4SSX NOT QTHR. Tel Ruislip 30627.

Trio TS510, PS510, ssb/cw, pair for sale or exchange for MM4001KB. G4YUG, QTHR as G6WZF. Tel 0473 830147.

Kenwood TS530S, new cond, used little, £470. Trio LF30A lpf, new, unused, £10. ZX81 computer, 16k ram, psu, basic book, £15. Collector's item: BC1031A panoramic adaptor, ex-US Army, offers? G3JFC NOT QTHR. Tel 0474 872743.

Sale, going temporarily QRT: hf/vhf/uhf rigs, masts, linears, video, etc, everything must go!

Yaesu FT-ONE, the ultimate rig, fm, memory units fitted, used very little, orig packing, pristine cond, new cost now over £1,600, £995. P60 60ft tower, post mount, with remote controlled electric winch, incl 120ft cable, £299. Two 16ft ali poles, £10. Daiwa rotator, 180ft cable, £95. Hygain TH3JNR hf beam, £99. Drake AK75 all band wire, £10. 2m 14-el Parabeam, £25. Vertical 80/10 base coil, damaged, £3. 70cm 15-el quad loop, £10. 180ft RG8, good quality, £20. KW1000, 1kW hf linear, £225. 2m 4CX250, 600W linear, psu, relay switching, £225. KW107 Supermatch, hf atu, pwr meter, £99. Hansen swr meter, £5. Grid dip meter, £15. MMT144/28 transverter, £65. MMT432/28S transverter, £99. Trio SP5D spkr, £10. Trio LF30A lo-pass filter, £15. Lo-pass filter, £3. Shure 444D desk mic, £30. Yaesu YM38 scan mic, £15. MMA 144V 2m rf sw preamp, £20. 12-14V psu, 25A, very stable, £40. Frequency counter, built inside 12-14V psu, 7A, £40. JVC GXN5 colour video camera, very good quality in low light conditions, (10 lux), with Hitachi 6500 portable video, comp with spare batts, charger, etc, £950 (may split). MMC435/600 tv converter, £15. MTV 435 atv tx, £99. Baird 43 thruline power meter, £99. Elements 100/250MHz, 25W, 100/250MHz, 250W, 2/30MHz 250W, all £20. 95/125MHz 1W, £15. Various leads, coaxial relays, bnc, N type, adaptors, five years *Rad Com*, £10, or free to deserving cause. Dave Roberts, G4GSR. Tel 051-227 1919, day, 051-428 1845, evening (Liverpool).

Black Star frequency counter, 600MHz, power supply, mint, boxed, £60 ovno. G4PCM, QTHR.

HW8 power supply, four bands, Vernier scale, rit, filter, preselect, circuit diagrams, handbook, exc example, £140. 10-turn 50k pots, chrome Vernier fine tune with lock, ideal for rit/itt, £3 each. Alec Janaway, G4VFD. Tel Wellington 4109.

Computer, Colour Genie 32K, Radsoft receive tu, rtty cw program, LC24 loading stabilizer, all exc cond, demo and Lowe program cassettes incl, all in orig packing, £95 plus carriage. GM4NHL, QTHR. Tel 0847 65460, evenings.

Realistic DX200 rx, exc cond, boxed, hardly used, £80 ono. FT101ZD, nine bands, fan, hand mic, speech proc us, otherwise good cond, £400. Will consider delivery for cost of petrol or will post. G4UYI, QTHR. Tel Bob, Cleator Moor 810205.

Heathkit SB102 tx/rx, seven bands, ssb, cw, psu, £190. Complete Vic 20 computer system, £100. Dual crystal impedance bridge, £15. TV test modulator, £10. Exchange radar, radio telescope, Eddystone 770U rx or w.h.y? G4TJY, QTHR. Tel 0449 720937.

Marconi CR300/2 rx heater circuits, modified for 12V ac, requires power supply, comp manual and schematic, £25. G3VDG, QTHR. Tel 091-253 3605.

Nascom Two programmable character generator, 2k ram, £20. 80-bus graphics card, monochrome, 512 by 512 pixel resolution, uses EF9365 graphics display processor, 64k display ram, £80 or offers. Colclough. Tel 0892 22793, evenings, and 22443, ext 27, daytimes.

DX200, communication rx, good cond, boxed, £50. John Davies, 19 Elm Gardens, Lichfield, Staffs WS14 9AH. Tel Lichfield 56898.

Microwave Modules transverter, 28MHz in, 144MHz out, brand new, unused, plugs, attenuator, £85. G3SCD, QTHR. Tel 0507 84283, evenings.

IC2F six xtal channel fm yak box, ideal for new mobile op, £30. Some vintage (1920s) components for sale or exchange. *Wanted:* Ralph Strangers *Science Review*. W.H.Y. pre-1939? G3SSJ, QTHR. Tel Alresford (096273) 3816.

Gem quad, two-el three-band with upgraded balun, used only four weekends, £175. Marine vhf Neptune, 55ch synthesized, full duplex, dual watch facility, UK type approved, comp with manual, £295. UK mainland delivery included. G3SWC. Tel Rudgwick (040372) 2444, evenings.

Yaesu 227RB, fm, scanning memoriser with 25kHz, stepper, remote mic, 10W, exc cond, £135. G4WDH. Tel Southampton (0703) 433616.

Trio YK88C 500Hz cw filter, suitable TS130, 430, 530, 830, unused, £25. G4DPJ, QTHR. Tel 0272 621509.

Cushcraft ATV5 10-80m vertical antenna, exc cond, full instructions, good results but new location permits more experimentation, £45 ono. Philips N1702 video, working but needs attention, £40 ono. Will haggle. Help with delivery possible. G4GIY. Tel 0485 41978 (near Kings Lynn).

SSM Europa B 2m transverter, £20. Hansen FS5E, £20. Fax paper rolls, electro-sensitive, phone for details. 70cm 18-el, £15. 2m 6/6 slot, £6. G3LTN, QTHR. Tel 0295 710623.

Racal frequency meter 801RZ, handbook, £50. Rtty test gear in exc cond, TGS10 sig gen, TDMS70, handbooks, £50. New and unused Yaesu antenna tuner FC102, £145. Handbook for Racal rx RA17C-12, £10. J. Morris, G3PHA. Tel Bolton 52384.

FT101 hf tx/rx in good cond, comp with manual, 160-10m, £310 ono, buyer collects. FC902 atu, unused, £140 ono. Tel Maidstone (0622) 26569.

Creed 444, exc cond, tape punch, tape reader, complete silence cover, ST5 tu, £85. G3KXT, QTHR. Tel 01-462 7637.

AR88, working when stored 12 months ago, suitable restoration or spares, buyer collects, £35. G3KNF, QTHR. Tel 0202 671348.

Yaesu FRG7700 with FRT7700 atu, exc cond, used little, only one year old, £270. G4WBH. Tel Retford (0777) 701405, after 4.30pm.

TR2500, charger, £180. Daiwa CNW518 atu, £150. Daiwa 22A psu, £100. Tono 350 rtty, Ascii, cw, rx, £150. GM4PSF. Tel 0294 62955.

Computer printer, as new, Anadex DP9501 with graphics, orig ribbon, used very little, cost £1,200, best offer secures or will swop for top condition FT101 or what have you. GI1BZT, QTHR. Tel Les, Ballyrowan (064887) 264, or 350 (work).

FDK Multi 700AX 25W 2m fm tx/rx, £140. 10XY Yagi, and AR40 rotator, £75. 144/28 transverter, still under guarantee, £75, or will exchange all the above for FT480R or IC290E 2m multimode. G4OXD. Tel Terry, 0462 35248, after 6pm.

Marconi sig gen, £30. Marconi sig gen, £20. B & O tape recorder, general radio sig gen, hf, £15. General radio sig gen, vhf, £15. G3LVO. Tel Roystone 41380.

FT7B, YC7B, not used mobile, boxed, £275. MMT 144/28 transverter, £65. Yaesu YM38 desk mic, £20. Offers for Hewlett Packard 1740A 100MHz dual channel delayed-sweep oscilloscope. *Wanted:* TS780. High power 2m linear. G4YOE. Tel Fred, 061-483 5991.

MEMBERS' ADS RATE INCREASE

See page 1030

Icom IC215 fm portable, 5λ/8 whip, vgc, never used mobile, brand new six-el 2m Jaybeam antenna, the lot, £175 ono. G3OML, QTHR.

WS No 123, cw spare valves, incl pa, manual, 12V inverter, interconn cables, earpieces, £65 ono. CT436 dB scope, dc 6MHz, manual, ditto for spares, £60 ono. G4JSX, QTHR. Tel 085881 570.

Yaesu FRT7700 ant tuner, £25. FRV7700A vhf converter, 118-150MHz, £55, both as new. Handbook, orig packing. G3ISP, QTHR. Tel 0632 837401, after 6pm.

Collins 51J4 gen cov rx, 500kHz-30MHz, 30 switched bands, 1kHz readout, full manual, £120, no offers, G3VYN, QTHR. Tel 050842 423, evenings.

Trio R2000, VC10, 100kHz-30MHz, 118-174MHz, 240/12V, mint cond, boxed, £400. Acorn Atom keyboard/case, £20. Koss Pro/4AA stereophones, used little, boxed, £20. Mk14/SCMP development board, with proper hex keypad, £15. G6WER, QTHR. Tel 0942 729202.

FT757GX hf tx/rx, nine bands, cw/ssb/a.m./fm, transmit 100W output, 0.5 to 30MHz rx, two vfos, eight memories, speech compressor, processor, inbuilt cw keyer, narrow filter, full QSK and Amtor, £600. GM4SID, QTHR. Tel 0224 584774.

R1000 rx, mint cond, boxed, manual, £195, or exchange with cash adjustment for IC211. G4YPN, QTHR under G6UPN. Tel Rainham (Essex) 23487.

Microwave Modules 23cm/144MHz transverter, new model, £190. Tonna 23cm Yagis, new, £25 each. Shure 444D mic, mint, £28. SSB 137MHz N0AA etc weather satellite rx, £185. Cushcraft 70cm X-Yagi, new, £33. Possible part exchange hf gear. G4XHF, QTHR. Tel 0292 515201.

HF beam antenna, Mosley TA32 two-el triband Yagi, £80. HF linear, Yaesu 2100Z, price new now, £599, just the job for those dx pile-ups, £350 ono. G4KHG, QTHR. Tel Newton-le-Willows (Merseyside) 5927.

Icom IC720A, cw filter, immac, £650. AEA woodpecker blanker, rf switched, mint, £45. PF1 tx/rx, wkg well on RB0, £40. Fraser, G4BJM. Tel 0908 56762, evenings.

Yaesu FT-ONE, "the ultimate" hf rig, exc value, £995. Yaesu 101ZD, comp with fan, cw filter, mic, manuals only, £375. Yaesu FL2100Z linear, £375. All boxed in orig cartons. All as new. G4UJW. Tel 01-346 8597.

Teleprinter, paper tape built-in, Friden model 1F Flexowriter, wkg, incl spares, needs 110V ac, first reasonable offer secures, buyer inspects, collects or arranges carriage. Godfrey, G4GLM, 63 The Drive, Edgware, Middx HA8 8PS. Tel 01-958 5113, evenings or weekends.

KW2000B, just checked by KW, vgc, psu, mic, £175. G3AGZ, QTHR. Tel Chesham (0494) 782604.

Yaesu FT707 tx/rx, FP707 psu, cw YM35 mic, £375 ono. G3ZZR, QTHR. Tel Witney (0993) 3792.

£300 is what I must lose in order to meet a pressing commitment in January by selling my IC2KL kilowatt linear for £1,049. Broadband ten to top band six protection circuits, a joy to operate. G3FNJ, QTHR. Tel 01-866 4680.

RTTY and cw equipment, immac Creed 444, stand, pag based tu with extra features, manuals, paper, cabled to fit FT290, immac Creed 2300 printers, as featured in BARTG's *Datacom* mag, Datong morse tutor. Tel 0782 618855, evenings, and haggle.

HF5 vertical with radials, £35. Yaesu FF501 low pass filter, £15. Modified Tono 2m 100W linear, SRF1397 pa, BF981 preamp, 80W (min) constant, £80. Now have QRO. Three-band trap dipole with balun, £12. G4RNI, QTHR. Tel 0632 381441.

Sony ICF2001 short wave rx, a.m./fm/ssb, 150kHz-30MHz, 76-108MHz, £85 ono. Roy Bailby, G6WLE, QTHR. Tel 048839 441.

Rank Mitre handheld 4ch vhf fm hi-band (two), charger, spares, £45. Solidstate linear hf amp, new, 200W, faulty, £30. Comp WS19 installation, WS38, 88s, T1154, comp R4187 installation, offers. SAE list. Cain, 18 Oaky Balks, Alnwick, Northumberland.

FT200, FP200, hf tx/rx, good cond, seen working, £200 ono. Buyer collects. G4KTV, QTHR. Tel 0924 469489.

HL82V 2m linear, 10W in, 80W out, £100 ono. Lunar 2m linear, 10W in, 80+W out, both with 12dB preamp, £100 ono. G8TPR, QTHR. Tel Gordon, 01-864 8261, anytime.

FT101ZD Mk2, good wkg cond, will accept £300. Enquiries to Read, G4KCB, 2 Princess Avenue, Great Sankey, Warrington WA5 3JF. Tel Penketh 7749.

HF vhf swl station, mint cond, FRG7700, FRV7700, FRT7700, all boxed, manuals, four months old, £300. DP CP4 40-10m four-band trap vertical antenna, as new, boxed, £45. GM4XEQ. Tel 0292 268055.

Video Genie computer, 48k ram, incl eprom programmer, over 60 utility and games programs, editor assembler, Z-chess, Scripsit word processing, £120 ono. IBM golfball printer, interface for Genie, £120 ono, or £225 the lot. G6IGU. Tel Colchester (0206) 865260.

Microwave Modules converters, 4m, 2m, 70cm, £10 each, plus p&p. Transformers up to 300V secs, *Bulletins, Wireless World,* books, sae for list of clearance items. G3CBU, QTHR. Tel 0256 58921.

Communications rx DX302, Radio Shack, Tandy, 10kHz/30MHz a.m./ssb/cw, 120/240/12V digital readout, this was the best one they made 2-3 yrs ago, perfect order, £190. GM6JWR, QTHR, owner GM6LXN.

Yaesu CPU2500R 25W synth fm tx/rx complete, keypad mic, mounting bracket, used base station only, £180. KW77 rx, gwo and cond, dial needs recalibration, hence £30 only. Heathkit OS1 'scope, working order, £15. G4XKT. Tel Lockesheath 84340.

Codemaster, cw/rtty model, CWR610E, used 4h, £130 ono. Will swop for 2m handheld or mobile rig. G4OBV, QTHR. Tel 01-590 2744.

Yaesu FRG7700M, FRT7700 atu, mint cond, used little, boxed, manual, offers of £285 ono will secure. Tel Paul, 0734 667901, after 6pm please.

KW2000A, ac ps, cw mic, handbook, some spare valves incl 6CH6 driver, good cond, £150. G4GKW, QTHR. Tel 0622 55809.

Commodore 64 computer, Commodore cassette player recorder, Basic manuals, in orig packing, hardly used, £190. Reason for sale buying new hf rig. G4DZV, QTHR. Tel 01-524 3193.

Trio TR2300 2m fm portable, case, nicads, charger, £100. FDK multi 700EX 2m fm 1-25W mobile with mount, £130. Joystick antenna, £5, plus postage. G3PFE, QTHR. Tel Sleaford (Lincs) (0529) 304233.

10FM mobile station, modified DNT 50W linear, mobile antenna, connecting leads etc, DNT cw xtal filter, 3SK88 front end, full details of all mods, £65. Tel 0458 823475, mornings or weekends. G4UKF, QTHR.

New 6146B valves, suit Yaesu FT101ZD/901/902, pair, £12. Mobile spkr, £5. Mosley TA32JR, 2-el tribander, £60. G5RV antenna, twin feeder, new £15. Jaybeam 2m four-el quad, £10. G4NRR, QTHR. Tel Nigel 021-744 8672.

FT707 hf tx/rx, 100W, FP707 power supply, mic, manual, £450. FDK Multi 700E, 25W 2m fm tx/rx, mic, manual, £150. All mint cond, used little, G3XSZ, QTHR. Tel Reigate 46051, after 7pm, or weekends.

Vespa and matching power supply, vgc. G3NEU, 5 High Hatters Close, Downham Market, Norfolk. Tel Downham 382582.

Datong morse tutor D70, as new, £40. G4YNZ, QTHR as G8HSZ. Tel 0726 73647 (Cornwall).

FT290R, as new, boxed, mods 5/10/12·5/25kHz, 144 to 148, improved front end, listen-on-input, nicads, charger, case, straps, mobile mount, £230. Reason for sale, want base station. G6YLA, QTHR. Tel John, Bracknell (0344) 428218.

Vertical four-band trapped antenna radials etc, £30. 10m three-el beam, £25. G4SFO, QTHR. Tel Norman, Rugby 810344, evenings.

Sell/exchange Tono 5000E, rtty, Amtor, morse, only few months use, bargain, £600. *Wanted:* quality hf linear. Dual beam 20MHz 'scope, solidstate. Genuine reason for sale. G4ULQ, QTHR. Tel Bournemouth (0202) 875065, after 5pm or before 7.45am.

Trio R600 rx, perfect, as new, boxed, manual, etc, £255. Buyer collects. D. Mathews. Tel 01-876 7868.

Trio 9500 70cm multimode mobile, good cond, £275. Icom IC120 23cm fm mobile, good cond, £275. G8ELA. Tel Bedford (0234) 751397.

Icom 260E multimode, boxed/manual, mobile mount, spare scanning mic, as new, £240. G6ZPS. Tel 01-394 1465.

FT290R, orig packing, no mods, used little, nicads, charger, £200. Wavemeter, £10. MMS2, advanced morse trainer, as new, £110. BNOS psu, 13·8V, 6A, £35. Gone hf. Buyer collects or pays carriage. G4ZLY. Tel Buxted 2617.

HF5V vertical antenna, £20. SEM three-way ant switch, new, £10. Pye Cambridge xtals, R4, R5, want R0. Amidon toroidal balun core, I.200.2, £3, plus carriage. GM3UNJ, QTHR. Tel 0333 29596.

FR50B hf rx, 80–10m, gwo, no mods, £60 ono. G4GER, QTHR. Tel Swindon (0793) 32340.

Trio TS120S, YK88C cw filter, £340. Unused MB100A mobile mount, £10. PS30, £65. VF120, £60. Comp, £450. All boxed, plus carriage. Tel 0565 873205.

FT290R, nicads, case, charger, mic, wavemeter, psu, all mint cond, £200. Heathkit rx HR10B with manual, mint cond, £70. Anytime. P. Darcy, G4YBP, 254 James Greenway, Lichfield, Staffs.

Andrews dish, 1·8m, 0·25fD, spun aluminium, support spider, el-az mount, horn support tripod, 4GHz copper tube feed horn, as used for satellite tv, highest offer over £200 secures. Buyer collects. Video monitor with sync inputs, £9 ono. G3CQU, QTHR. Tel 01-660 5474.

Sony CRF220 global radio, (£375), 22 bands, vhf, lw, mw, 1·6–29·8MHz, a.m., fm, cws, ssb, mains, battery, telescopic antennas for sw/vhf, broad and sharp selectivity, handbook, £150 plus carriage. *Wanted:* 450/500V 100mF electrolitics, G3IDW. Tel Swindon 822055.

Texas TI99/4A software, morse, sends groups of letters, numbers or both then displays text, contest check log, checks if station previously worked and if so gives S/No up to 2,000 QSOs, both programs on one tape, £5. G8PQG. Tel Dave, Oxford 67165.

Trio R1000, exc cond, £195. Ten-Tec Delta 980 hf rig, incl psu, ext vfo, superb rig, £495. Have B40 rx, to go, vgc, £40. Yaesu FTV901R transverter, 2m, £195. Excellent Kenwood TS520SE, superb, £375. G4TNY. Tel Hornchurch 57722.

Trio TM201A 25W 2m mobile, £200. T1200 4W 2m synth handheld, £100. G4RUS, QTHR. Tel 085885 343.

TenTec Century 21, cw, five-band, tx/rx, full break-in, £130. Icom 2E, £115. Icom 4E, £115. Base charger, £30. G4VZZ NOT QTHR. Tel Ashford (Middx) 44265.

Comp rtty system: G3PLX Mk 2 tu, Clare-Pendar KB5 keyboard, 12in vdu, £65 ono. All items, buyer collects. G3UXH, QTHR. Tel 0634 250562.

RA17L, fully wkg, manual, £160. G3TEL, QTHR. Tel Wantage 4019, evenings or weekends.

Newbrain computer, comp with psu, all cables, incl printer cable, assembler/monitor, word processor, directory, programs, user and technical manuals, all as new, £130, or exchange 2m fm mobile rig. Tel Jim, 0202 518828.

Trio TR7930 2m fm 25W, very comprehensive scanning and memory facilities, absolutely mint cond, never been used mobile comp, £270 ono. G4SPO, QTHR. Tel Plymouth 982012.

Creed 444, good cond, comp with spare paper rolls, perf paper, comp service manual, £40 the lot. Buyer collects. G6BOP, QTHR. Tel 0962 55405, after 6pm please.

4m transverter, MM, new, air tested, all plugs etc, incl literature, five-el Yagi, as new cond, MET, £120. Post extra. G3JZN, QTHR. Tel 061-723 2529, anytime.

Equipment in exc cond: Trio TS130V, narrow filters, AT130 atu, lpf and MC50 mic, comp, £415. IC2E with accessories, £120. MML 144/25 linear, £35. Datong D70, £35. Tonna nine-el 144MHz antenna, £8. G4SYB, QTHR. Tel Farnborough (0252) 549852.

FT290R, nicads, charger, whip, case, pwr/swr meter, Ringo Ranger colinear, £210. Four coils with brass spokes (homebrew) for mini beam, £20. Leson dynamic stand mic for hf, £12. G4SOM, QTHR. Tel Sheffield (0742) 451702.

MML 144/40 2m linear amp, bnc plugs, preamp, £25 ono. Portable mast, 32ft, 2in diameter telescopic, ex-government, £30. Ideal for contest group. G8XMP NOT QTHR. Tel 0724 872727.

Trio 7200G 2m fm 1–10W, 22ch, xtalled R0–7, S12–23, 145·800, mobile mount, 0·25W whip, gutter mount, manual, £65 ono. Consider QRP hf cw gear in exchange. Dunne, G4VLB, QTHR. Tel 061-480 1549.

FTDX560 with Shure desk mic, cooling fan, 160m, manual, spkr, spare valves, £270 the lot. FT207 2m handheld, charger, carrying case, £110. G4XKN. Tel Tisted (Hants) 306, ask for Darren, after 6pm.

NASA solidstate satellite rx filters, 10kHz, 30kHz, 100kHz, 300kHz, frequency synthesizer, cost $24,740.00. Frederick message generator. Collins 51J4 with filters, NATO vhf rx, £45. Tuning heads, 36MHz–12GHz, with schematic, £35 each. R216 unit, £25. RS46829. Tel 0942 55948.

KW2000, ac psu, cw handbook, circuits, £110 ono. G4GSD, QTHR. Tel Leicester 705855.

HQ1 mini quad hf beam antenna, in exc cond, £45. Buyer collects. Tel 021-360 9307 (Birmingham).

FTV107R transverter with 4m module, £100. G3SYS, c/o C.P. van Hagen, G1BIJ, 18 Fraser Court, Handbridge, Chester. Tel 0244 676570.

Video Genie EG3003, EG3014 expander, 48k ram, disk and printer interface, S100 bus, editor/assembler, software, Radsoft rtty software and interface, all manuals, information, £300 or exchange for FT101 or similar with cash adjustment. G3HQX, QTHR. Tel 0962 880312.

Icom IC720A tx/rx, psu, boxed, unused, £645. Valves 4CX350A, new, £25, used, £4. 4CX250B, used, £4. G3RJS. Tel West Wellow 23032.

EC10 Mk2, vgc, £60. LG300, fair cond, £25. ZX81, 16k, psu, keyboard, all in sloping top metal case, £55, G4UFQ, QTHR, Tel 0922 33979.

G4MH minibeam, six months old, £45 or offers. Mosley vertical, £5. 2m Yagi, £8. G8DT, QTHR. Tel Alderton 422.

Trio TS520S, exc cond, cw filter, remote vfo, trap dipole if required, £325 ono. Heath DX100, £20 ono. G4ENO, QTHR. Tel Otley (0943) 464147.

TR2200G, nicads, xtals, 10ch, £60. IC202S, xtals 144·0–144·60, vgc, orig packing, manual, £100. PSU 13·8V 5A, £10. SWR meter, £6. Going QRT. G8YCP. Tel 0632 591752, after 5pm.

KDK FM2025 144MHz fm mobile tx/rx, 25W rf, vgc, with mount, orig box, mobile spkr, 10 memories, scan, l.e.d. display, leads etc, £120. G8ITB NOT QTHR. Tel 01-698 4403 (Bromley).

FT290R, vgc, £180. Alinco 2m 25W linear, £25. Welz SP10 swr meter, £20. Hirschmann rotator, £25. G6OBM, QTHR. Tel 01-979 2378.

ATV station, camera monitor, Wood & Douglas ATV2, W&D linear, less than 4h use, the lot, £300. G4EQT, QTHR near A580, M62.

Drake 2C, unscratched, immac, triple conv rx, 10kHz per rev, £90. HB 160m converter, SBL1 mixer tuning 20m, £15. Ambit hf lin amplifier, 1W in, 20W out, £20. 10m 16dB preamp, £10. Tests welcome. Zegati twin meter, 1–15V reg, protected psu, 8A int, 6A cont, £25. BP1 'scope tube, base, m/metal shield, £8. Turns counter, 4in diam, £8. QRO roller coaster, 4in diam, square wiper, £10. 2 x 125pF s/stater, variable capacitor, £10. Hi-Q 1-to-1 balun, £6. W2AU 4-to-1 balun, unused, £12. G3RHM, QTHR. Tel 01-423 0306.

Property of late G3FVE: Sommerkamp FR100B rx, £80. Sommerkamp FL200B transmitter, some mods, comp manual, speaker, £80. Eddystone 840rx, gen cov, vgc, £100. Asahi power swr meter ME11B (3–150MHz), £8. LCL 10m fm tx/rx, mods by Amtronics Ct/bridge, Kent, £25. Power supply 3A, 5A surge, £10. Vic 20 computer starter pack, as new, £80. Super 8 projector, reel, £80. G6SYN, QTHR. Tel Mere (Wiltshire) (0747) 860 839, evenings and weekends.

FT101ZDFM Mk3, nine bands, additional 26–28MHz professionally fitted, extras include 600Hz cw filter, fan, mic, 12AVQ vertical, all vgc, £400, no offers please. Barclaycard/Access possible. Western 70TV 70cm transverter, fm/ssb etc, 10W out, 28MHz drive, repeater shift, inbuilt psu, Yaesu style cabinet, working ok but front end needs a tweak on a decent signal generator, £50 ono. Phil Bridges, G6DLJ. Tel Southampton (0703) 891975.

HQ1 minibeam quad, instruction manual, £45. Scope D33, dual beam, manual, leads, £50. BC221 frequency meter, mains psu, £15. G3FWA, QTHR. Tel 0234 48272.

Jaybeam DC wb antenna, 2m, 70cm, was erected but never used, cost £41.40, what offers? Tel Honiton 850501.

JIL scanner SX200N, new, £160. FP700, 20A power, spkr, £70. KR400RC rotor, comp, £70. RTTY tx/rx, MM4001 and RCA asii keyboard, new, £100. HK707 morse key, £12. Dummy load SMCL 150PL, £15. 7/8–2m antenna gutter incl clip, £12. G6LMD. Tel 0270 623538.

Yaesu FT107M Ivory, fitted memory fm board, cw filter, matching external psu, spkr, £395. FTV107 transverter, fitted 2m, £110. American Vomax split band processor, £50. Drake R2B, £75. *Wanted:* Dentron atu MT3000, Tokyo HC2000 medium rotator. Shure 444T. G4EMG. Tel Bill, 01-534 3460.

Yaesu FT208 2m handheld, £160. Yaesu FT708 70cm handheld, £150. Both mint cond, nicads etc, used little portable, Yaesu NC8 quick charger, power unit, £40. All ono. Delivery to the south possible. G6JJC NOT QTHR. Tel Hull (0482) 508124, evenings.

TS120V solidstate hf tx/rx, mic, orig packing, as new, £300. 70cm 18-el parabeam, £10. TR2200 fm tx/rx, S19–21, R0–7, nicads, charger, orig packing, £50. Microwave Modules transverter, 144/28, £65. Buyer to inspect and collect. Tel Chelmsford 442241.

Icom IC211E multimode, Mutek front end, RM3 remote control unit, £350. Dressler D200C 2m linear, never unpacked, 180W fm, 220W p.e.p. ssb, £235. Sharp MZ80K computer, over £100 software, literature, £225. G4CCK, QTHR. Tel 0228 26502.

For sale or swap: FT708 70cm handheld, case, boxed, matching pa, triple 5λ/8 colinear, λ/6 x 5λ/8 mobile whip, £190 lot or swap for FT208 2m handheld. Colinear/pa, never used. G6ALZ, QTHR. Tel Bloxwich 401256.

FT201, 10–80m tx/rx, vgc, £200 ono. Pair unused 6JS6C (NEC), £15. G3RB, QTHR. Tel Tyneside (091) 2530504.

1984 *DX/USA Callbooks,* unopened, sealed polythene, £9.50 each. Icom SM5 desk mic, boxed, unused, as new, £21. PCBs, most components, WB4VVF Accukeyer, memory, photocopies of articles, £5. *Rad Com* back to 1953, offers. SAE details. Postage. G3IZJ, QTHR. Tel 0252 548561.

Jaybeam LW10/2M, as new, boxed, £15. Pair LAR 40m traps, £10. Unadilla 4:1 balun, unused, £15. HS50B 1:1 balun, unused, £12. C Canon 310XL cine zoom, f1 lens, cost £110, used once, exchange vhf tx/rx similar value/condition. G2FZU, QTHR. Tel Southwell 813847 (Notts).

KW E-Zee Match, £35. MFJ 721 cw/ssb filter, new, (audio), £40. Yaesu xtal filter, brand new, 300Hz, £10. G3HQH, QTHR. Tel 0663 44087.

Trio TR7500, good cond, manual, orig packing, £100 ono. Icom IC202S, good cond, fitted satellite xtal, manual, orig packing, £100 ono. Commodore Vic 20, many extras, orig cost over £300, accept £200 ono. G8OMB, QTHR. Tel 0203 396936.

16-el F9FT, £20. AJH 80W amp, £75. AEI SK610 base, £10. 40ft LDF450 plus connectors, £25. Mad? if so sell me your SK620As. G6HKS, QTHR. Tel Wisbech 584640.

Trio R2000 communications rx, many facilities, mint cond, must go to make way for hf tx, £325 ovno. 2m 100W pa, £60 ono, or swap for Datong FL1 a.f. filter. G4IRX NOT QTHR. Tel Nottingham (0602) 502716.

Dressler D200 144MHz high power linear amp, 600W output on Bird 43 wattmeter, cost £600, offers. *Wanted:* 8877 to complete project for 1985 contests. GI4TAP, QTHR. Tel 0232 620728.

KW202 rx, matching spkr, nine bands, usb/lsb/a.m., built-in Q multiplier, notch filter, instruction manual, exc cond, suit new swl or as second rx for established station, £125. G4YYV. Tel Southport (0704) 79825.

Collins TCS6 tx/rx, comp with RCU atu, motor generator, mains psus, mic, vgc, box spare valves, some for above incl 807s etc, small Radiocraft tx, 10/20/40, xtal, coils, £90 the lot. Buyer collects. G3DDA, QTHR. Tel 0702 72037.

Microwave Modules transverter, allows any 144MHz ssb, fm, a.m., or cw equipment to be used at 70MHz, £65. G3TKU, QTHR. Tel Nantwich 624792.

48k Spectrum, DKtronics keyboard, Alphacom 32 printer (incl three spare rolls of paper), suitable cassette recorder and £50 worth of software,

£200, no offers. G4UHM NOT QTHR. Tel 0245 468149, after 7pm.

Creed 444 teleprinter, 50 baud, exc wkg cond, used little from new, has RS232 interface and integral magnet supply, £48 ono. Rod Brown, G8CXV NOT QTHR. Tel Nottingham 606235, out of working hours.

KW2000B, ac/psu, external vfo 4B, manual, some valves, £190. Zycomm Z5800 144-148MHz handheld, leather case, mic, spare nicad charger, £100. *Wanted:* manual for Telequipment serviscope type S51A, buy or copy, all expenses refunded. G4RNR NOT QTHR. Tel Leicester 867855.

Yaesu FT708R, λ/4 and λ/2 ants, battery charger, case, used little, £130. FTV250 trans, 28/144MHz, in good cond, leads for FT101Z, £100. Buyer to arrange collection. G4IZI, QTHR. Tel Rugby 75758.

HW101 hf ssb, good cond, £180 ono. TR7010 Trio 2m ssb, mobile bracket, good cond, £90 ono. Liner 2 2m ssb, wkg, £70 ono, or swap for 70cm Westminster or w.h.y? G1EZJ. Tel 0782 46570, anytime, ask for Chris.

Tono 550 communications terminal, reads rtty/Ascii, 45-600 baud, reads cw 5-50 wpm, autotracking, built-in iambic keyer, 5-50wpm with memory for tx, morse tutor facility, together with 9in video monitor, £200. G4FMK, QTHR. Tel 0268 683805.

Kenwood TR9130, comp with instruction manual, orig packing, as new cond, less than 10 months old, used very little, £365. G3OPJ. Tel Radnage (024026) 2718.

Realistic DX300 rx, good cond, 10kHz to 30MHz, manual, orig packing, £150 ono. Buyer collects. Tel 01-539 4624.

Exchange (sell) BBC 32k 1·2OS computer for hf rig, solidstate base or mobile or sailing dinghy. Video Genie 16k EG3003, £85 ono. G4GZZ, QTHR. Tel 021-422 6440.

KW2000B, new pas, re-alignment, £150. Exchange Sentinel 2m linear, and preamp, 10W in, 50W out, for similar 3W in, 30W out. G3NQX. Tel 0539 28166.

Polyskop 2 sweep generator with display, £110. Marconi generator 80A, £25. UHF TF1060/2, £115. Texscan analyser, 10-300MHz, £100. HP power meter with head 430C, £60. Generator 801D, £120. Oscilloscope calibrator, £40. HP 1712A 200MHz, 'scope, £1,200. Tel Ashford (Middx) 53661.

Trio TS700S, base station, 2m rig, slight electrical fault, believed to be in one of the voltage regulators, works perfectly most of the time, sensible offers invited. Sked by arrangement (any mode). G5BM, QTHR. Tel Newent 820960.

Creed 444, vgc, unmodified, fitted electronic converter for single current (if required), £35. TDMS5, TDMS6, £20. TSG10, TOMS70, £35. 80-0-80V supply unit, new Cable-Wireless, £10. Creed auto TX6S6, £5. Scott. Tel 091-252 7141.

Yaesu FT230R 25W fm, almost new, cost £279, for sale at £235. Bremi 5A psu, £10. TS520S, good cond, mic, £340. Tel 0283 840667.

Valradio 12dc/230ac converter, £20. Swan PSU5 power supply, 13·8V regulated, £85. Solatron oscilloscope, 2in screen, internal psu, £20. Eagle power/swr meter, dual impedance, mint, £15. Cushcraft 2m Ringo kit, unused, £20. Window-clip 12m antenna, comp, £7. G3MIN. Tel Shoreham (Sussex) 3552.

Manpack tx/rx, solidstate, 2-9MHz xtal/vfo, 10W ssb/cw, internal rechargeable batts, charger, tunable whip antenna, technical handbook, £80. Facsimile equipment suitable weather satellite, technical handbook, £40. *Wanted:* computer 5in disc drive unit. G3BIK. Tel 0670 513994, evenings.

DX6V vertical antenna, £45. Tel 0463 241211.

Drake TR4CW, RV4C, vfo, AC4 power unit, as new, 300W input, ssb, handbook, orig packing, £295. G2FLB, QTHR. Tel 01-467 1078.

Look here! All the following are in exc wkg order: Trio TS780 dual band base station, external spkr, only three months old, £700. Dragon 32k with morse and rtty cartridge, cable, pag unit, Creed 444 teleprinter, all interconnected, in exc operational use, only £180. Yaesu 208 2m handheld, £150. Yaesu 708 70cm handheld, £150. Rotator cable, control unit, 17-el Tonna, £130. All the above only a few months old. Buyer collects please or Securicor delivery. G1DRR, 25 Thornham Close, Armthorpe, Doncaster, South Yorks.

Logbook programs for Commodore 64, comp with full operating instructions, stores date, times, callsigns, modes and frequencies, displays in log book type columns and stores onto tape, will also search files for callsigns, £4 each. GW6ZZP, QTHR.

Racal RA117E, perfect cond, £215 or part exchange 2m or 70cm mobile set-up. W.H.Y? Any interesting exchange. Tel 029922 279 (Clows Top, Worcs).

ICs: 16 TMS4416 8k, £1 each. 30 emproms, TMS2532. G4KDL. Tel Alan, 0502 66289.

FT200, just realigned and very lively, ideal beginner's rig, cw well-made homebrew psu, many spare valves, prefer buyer inspect/collect or carriage extra, £170. *Wanted:* FL101, would consider part exchange for above. G3VRU, QTHR (Notts).

FT290R, Tono 2m 50W linear, LAR vhf atu, colinear, 5/8 mobile antenna, gutter mount, £200. Ten-Tec speech processor, £25. Heathkit QRP atu, £25. C4 vertical antenna, £25. G4NZP, QTHR. Tel Mike, Portsmouth 754014, after 7pm.

Sharp MZ80B, 74k of memory with P5 printer, dual disc drives, cp/m, lots of other software, exc cond, £1,000 ono, or will consider splitting. G8SGR NOT QTHR. Tel Didcot (0235) 817921, after 6pm.

Yaesu FTDX560 QRO hf tx/rx, £200. FV400S vfo, £30. G4RJC, QTHR. Tel 04022 21523, evenings not Sundays.

Lowe SRX30 gen cov rx, good cond, used little, £85 ono. G3OKH, QTHR. Tel 021-770 5091.

Yaesu FT290R, exc cond, only used mobile, £200 ono. 50ft Telomast (five-section), no guys, used little, £40 ono. Jaybeam 2m 14-el Parabeam, £15 ono. Buyer collects or arranges carriage. G4CZZ NOT QTHR. Tel Richard, 07073 21939.

Datong morse tutor, new cond, £35. *Wanted:* HF5V, and radial kit or similar. Yaesu YM24A spkr mic. G6XRL, QTHR. Tel Poynton (Cheshire) 876192, work 061-489 3770.

Microwave linear MML 144/50S, transverter MMT144/28. Jaybeam 10-el Yagi LW10/2M, 13m H100 cable, all new June 1984, used little, cost £236, accept £190 or exchange hf linear with cash adjustment. G3OJS NOT QTHR. Tel Frinton (Essex) 5041.

FT780 70cm multimode tx/rx, manual, 2 × 5/8, mount, £260. G1DSN. Tel Brian, 01-460 2808, evenings.

MEMBERS' ADS RATE INCREASE

See page 1030

Yaesu FT221R, vgc, boxed, manuals, used little, £250 ono. G3RCE. Tel 0705 524900.

Telereader model CWR670E, only three months old, comp with AVT Electronics monitor DM091G, bargain, £295. Trio TR7730, 25W, 2m, fm, mobile, used little, £145. Unused Panorama 5λ/8 2m mobile ant, £10. G3FIF 160m mobile ant, in good cond, £5. J. Morris. Tel Bolton 52384.

Yaesu FT707, as new, boxed, manual, 80-10, new bands, £345. Matching FC707 atu, as new, boxed, new bands, £50. G3XKF NOT QTHR. Tel Stoke Mandeville 2672.

Yaesu FT480R, 2m multimode, boxed, £285. 12V psu, 10A, £30. 50W linear by QM, £25. Rotator with cables, suitable for beam, £25. Eight-el 2m beam, £9. All as new, come and try. G8PNQ, QTHR. Tel 01-641 5542 (Cheam, Surrey).

Yaesu FRG7700 rx, as new, manual, orig packing, used only approx 20h, £240. Tel Wix 780 (NE Essex).

MM transverter 28 to 432, sat converted, £50 ono. Wood & Douglas fm tx/rx, built, case, uhf two repeater, two simplex, £30. G4ISQ, QTHR. Tel Credley Heath 61905.

2m groundplane, £2.50. Search 9 Daiwa rx, 10 xtals, £27. 60W mono amplifier, kit, ps, £7. 250-115V 75VA, offers. Commodore 64, tape, tape instruction, books, games, rtt term unit, interface, £200. G3OAB. Tel 021-747 8489.

Silver Eagle candlestick base mic D104, brand new, boxed, £70 ono. Tel 0772 433215, evenings.

Dragon 32 computer with £50 worth of software, incl program for rtty, £95, or would swap for gen cov rx, ie FRG7 or similar solidstate. G3JYJ, QTHR. Tel Thanet (0843) 593279.

Trio Kenwood TS430S, comp line-up, incl PS430, SP430, £690 or will split. Icom automatic atu AT500, £270. Yaesu FC902 atu, £85. All items as new, boxed. G4MCK NOT QTHR. Tel Stevenage (0438) 317216, daytime.

Barlow Wadley XCR2 rx full service manual, vgc, £50. Sommerkamp FL200 200W tx, good cond, manual, £50. CR100 vintage rx, wkg order, service data, £30. G3UFI, QTHR. Tel Hastings (0424) 753949.

Yaesu FT780R 70cm multimode, no mods, vgc, £250. Jaybeam MBM48, three months old, £30. G4MWP, QTHR. Tel 0203 462035.

CBM3016, lots of software, 80col matrix printer for CBM, box of paper, used little, offers/exchange. Combined frequency counter/swr/power/fs meter, hf-2m, new, £45. Three-el 10m mini-beam, 3m sq, one new, £35, one used, £22. Tel Rayleigh 774089, evenings.

Katsumi keyer MK1024, £80. AR2001 scanner, £295. Realistic DX302 rx, £150. G4XRU. Tel Worthing (0903) 690415.

KW2000B, ac psu, handbook, £160 ono. Buyer collect or pay carriage. *Wanted:* Ten-Tec linear type 405 for Argonaut 509. G8QM, QTHR. Tel 091-488 1070.

FT102, a.m./fm board fitted, MH1B8 mic, six months old, still under warranty, genuine sale, no offers, £600. Securicor extra. GM4WYR NOT QTHR. Tel 0383 736401.

Trio R300 gen cov rx, exc cond, £85. Eddystone 770R/1 vhf communications rx, vgc, manual, £75 ono, or swap for Eddystone gen cov rx in clean cond, age immaterial. Ferrograph Super Seven reel-to-reel, stereo, Dolby, 10·5in spools, NAB adaptors, exc cond, boxed, £295. Avo Minor Mk5, vgc, £17. Hitachi colour video camera VK/C770E, manual, zoom, mint cond, £250 ono. *Wanted:* clean HRO rx, for personal radio collection. Tel Ken or Ray, Basingstoke (0256) 56732.

Cushcraft beam, 10, 15, 20, 40, A3 with A4 kit, still in box, cost over £230, bargain, £150 G6XIH, QTHR. Tel 075 786 499, Yorks.

Westminster W15U, 10 channels, 13W output, toneburst, preamp, RB2, RB4, RB6, SU8, SU20 fitted, comp with control unit, £80. Wight traps, standard, £5. Carriage extra. GW4HAT, QTHR. Tel Swansea (0792) 290770, evenings.

Datong UC1 up-converter, full shortwave coverage on 28-30MHz, 144-146MHz, good wkg order, clean, £95. Telford, TC7, 28-30MHz tunable i.f. all mode rx, £25. G4CYZ, QTHR. Tel Burgess Hill (Sussex) (04446) 2303.

Drake tx T4XC, rx R4C, MS4 power supply, spkr, £500. 60ft tower, fixed, three sections, will split, £120. RF clipper by Datong, £25. G4URG (Manchester area). Tel 061-330 7529.

TS520SE, late 1980, plug-in digital (lcd) frequency readout, mint cond, no mods, orig packing, £390. Heathkit HW32A 20m ssb tx/rx, 180W p.e.p. in use, unmarked, homebrew mains psu, £85. G3CVK, QTHR. Tel Worcester (0905) 356826.

70cm IC4E 430-440MHz, nicad pack, charger, λ/4-λ/2 antennas, Icom spkr/mic, vgc, box, manual, £150. UR67, 50m, new, £25. K-tone boards, ideal for contest work, fit any radio, full fitting instructions, £4.50 each, plus p&p. G6XZM, QTHR. Tel 01-949 6327.

Versatower P40. Transverters: MMT28/144 (2m tx/rx to 10m antenna), MMT70/144 (2m tx/rx to 4m antenna), MML70/100 (4m linear amplifier, 100W). Commodore C2N cassette deck, KW108 monitorscope, LG300, Ferrograph three-speed recorder, rtty tu. *Wanted:* YO901P. G3AZI, QTHR. Tel 0772 37815.

Exchange FT101E with cw filter, fan, 12V dc, and mains for Icom ICR70. W.H.Y? *Wanted:* frequency counter, 600MHz. Tel Skegness 810192.

Acorn Atom, fully expanded, some software, recently serviced by Acorn, £75 ono. GM4MIM, QTHR. Tel 0955 3960, after 6pm.

KW202 amateur bands rx, recently overhauled, £100 ono, or will swap 70cm gear. w.h.y? G4VUX NOT QTHR. Tel Graham, Watford (0923) 776254.

FT101ZD Mk3, mic, fan, immac, still under guarantee, three months use, property of the late Dr Ranga Nathan, G4IYY, £550 ono, and w.h.y? G4BZE, QTHR. Tel 0392 81425, evenings.

Two Avo a.m./fm 0·455-220MHz sig gens: one in good cond, all test leads, handbook, revalved, £60; one needs two oscillator coils refitting, mains lead missing, handbook, £18. Sorensen 3kW 240V ac voltage regulator, input 190-240V ac, handbook, swap for 1kW+ hf linear. Might sell. Collection only (very heavy). GW4WWE, QTHR. Tel Swansea (0792) 872070.

Creed LTT2300 printer, need att, tape punch, reader, in exc order, comp with full manual, £50. Prefer buyer collects, but can assist with transport (petrol cost). G6XIH, QTHR. Tel 075 786 499 (Yorks).

Bird MOD43 power meter, two elements, £125. Pye F9U uhf base, wkg on RB2, comp with tt panel, £65. G8HED NOT QTHR. Tel 074988 609, weekends only (Somerset).

Kenwood SP120 spkr, £15. AT130 atu, £50. MMT 144/28MHz transverter, unused, £60. Daiwa CN540 cross needle swr/power meter, 50-150MHz, 20/200W, unused, £25. Tonna four-el 144MHz antenna, unused, £10. G4MBP, QTHR. Tel Cheltenham 527651.

TS520, cw filter, mains/12V, 80-10m, immac, exc performance, one owner, never used mobile, prefer buyer inspect and collect, £300. Reason for

sale, purchased TS830S. G2HLU, QTHR. Tel Reading (0734) 61622.

Trio TS7500, 2m fm mobile or base synthesized, readout by channel Nos, mic, mag mount, manual, mint, orig packing, £150. Homebrew 3A psu, £15. Five-el Jaybeam, £15. Ringo Ranger, £15. M-whips, gutter mount, £8. G2KF NOT QTHR. Tel Newquay (Cornwall) 78741.

Standard C8800 2m fm tx/rx, six memories, scanning handbook, boxed, good cond, £145. G6SPI, QTHR. Tel Ruislip 35158.

Akai VT110 portable video recorder, monochrome, reel-to-reel, camera, six-to-one zoom, power unit, manual, offers invited or consider exchange for hf equipment. Storno Viscount for 4m fm, 70·26, 70·475, manual, £25. Ajax yacht tx/rx, 12V, a.m. only, six marine hf band xtals, would convert for top band or 80m, manual, £25. Solartron sb scope CD1012, 25MHz, circuit, £65. G4ULR. Tel Norwich (0603) 51656.

FT208, nicads, case, charger, used one hour on transmit, need cash for hf, this item is as new, only £170. G4XXI. Tel 01-204 5040.

FT708 70cm Yaesu handheld tx, spkr, mic, carrying case, keyboard, frequency selection, 10 memories, rptr shift, £130. G3XTQ NOT QTHR. Tel Leighton Buzzard 24281.

Shack clearance: FT221R, Mutek, TS120V, AT120, PS20, VFO120, DFC230, MMT144/28, MMT432/28, MMT432/144, MML432/100, MML144/100, gasfet, 144 pa, 50V/15V supply, 4CX350A, 4CX250B, SK610, SK620, QY4-250, IMO-0-170 for 250B/lin, 50V/20A transformer, M40/10FM 12V/15A transformer, offers, part exchange. G6ICR NOT QTHR. Tel 051-428 9259, evenings.

2m rig, Belcom LS20XE handheld, brand new, unwanted gift, nicads, battery pack, car charger, soft case, cost £175, selling for £110 ono. G4LDB, QTHR. Tel 0703 733626.

Trio R1000 rx, as new, boxed, instructions, £200 cash, no offers. G6TOZ. Tel Fareham (0329) 286292.

Datong D70, perfect, £35. Good speech processor with talk-up facility, commercially built, perfect, £20. 8A Variac, old but wkg, heavy, £15. Will haggle within reason. *Wanted:* minibeam, G4MH type. G4VRR NOT QTHR. Tel Steve. Staines (0784) 51126.

Hilomast NK12, pneumatic multi-section mast, 42ft max height, tripod stand, in gwo, £200. Buyer collects. G6AQC, QTHR. Tel Oxford 243634, after 6pm.

Mast, 35ft tilt-over, winch, must sell due to house move, bargain at £50. Buyer collects. G4WIJ. Tel Staines 51532.

Hand generator, 10W, Mk2, as used for second world war wireless sets, No18 Mk3, No 48 Mk1, comp with seats, straps, satchels, vgc, £30. For wireless set No 48 Mk1, set of valves, 10, loose, £8. Set, 10, in orig compartmented metal case, £12. Two battery carrying boxes, £3. Operating instructions book 1 for WS48, 32 pages, book 2 for hand generator Mk2, 14 pages both books under one cover, £4. G3GOS, QTHR. Tel Axminster 34259, after 6pm.

Corsair from KW Ten-Tec, external vfo, atu, all filters, 250Hz, 500Hz, 1·8kHz fitted, this rig is exceptional, see reviews, £895, no offers. Over £500 less than today's price? G3RCQ, QTHR. Tel Dave, 01-594 3495, 9am-5pm.

Icom IC202S, 3W, ssb, cw, vxo, portable, fully xtalled, power supply, astatic mic, coaxial cable, nine-el Yagi, all this for £150. Might just split. G4TFH. Tel 01-885 1162.

C78 Standard 70cm uhf portable mobile rig, base station use only, as new, now surplus to requirements, charger, nicads, case, £190 ono. G4LJZ. Tel 0749 77250 (Somerset).

Sommerkamp FRG7700M gen cov rx, comp with memory, FRA7700 active antenna, list price £499, £350. Will consider FT290R with accessories and cash adjustment. Tektronix 535A scope, type B plug-in leads, probe, manual, £100 ono. Solartron CD1400 scope, needs attention, £25. Akai 1710 wl reel-to-reel tape recorder, metal spools, lots of tape, £80 ono. Bryan 9000 stereo amp, fault on one channel, £25 ono. Two large Ragonda column spkrs, £15. Telescopic tubular aluminium masts, 10m, £25 ono. Prefer buyer collect or negotiate carriage. Tel 0772 313092.

FDK Multi 2700 2m fm, ssb, cw base station, good cond, power supply, ac, dc, Oscar downlink, 10m fm receive. £270. G3JDO, QTHR. Tel 091-489 8239, after 6pm.

TW4000A, Trio, voice synthesis module, dual band whip, magnetic mount incl, £300. G8LLB, QTHR. Tel Vince, 01-531 0716, after 6pm, weekdays, or anytime weekends.

CCTV camera, RCA low-light, without lens, gwo, £55. TV zoom lens, f2, 11·5-90mm, unused, £70. Heavy duty outdoor pan tilt mechanism, £95. G4ZEF. Tel 0204 592387, evenings (Lancs).

Transformer PR1, 110/220V, 770VA, sec 264-385V, 2A, £5, buyer collects. *Wanted:* details of all EF50 sw rxs (c 1946). G3SSJ, QTHR. Tel Alresford (096273) 3816.

Fortop TVT435 atv tx, Fortop up-converter, both used little, together, £115, will split. Sony HVC 2000P colour video camera, tripod, ac adapter, vhs converter, extension mic, extension cables, £275 ono. G6MUK NOT QTHR. Tel 0837 3207.

Trio TS520SE tx/rx, as new cond, boxed, used little by Droitwich ARC, £375. G4PQZ. Tel Eddie, Droitwich (0905) 773181.

FT480R 2m multimode tx/rx, one owner, swr/power meter, five-el Yagi, gp ant, £275. MM 40W linear preamp, in/out switch, £45. Buyer collect or pays carriage. G4EOI, QTHR. Tel 01-648 6117 (Morden, Surrey).

Shack clearance: P40 tower, two IBM diskette drives, Terminette 1200 printer, monitorscope, noise generator, 16/F9FT, ptfe sheet/rod suitable W2GN etc linears. *Wanted:* IC202/402 23cm transverter, 70cm fm handheld. *Dubus VHF Comms*. G6ICR NOT QTHR. Tel 051-428 9259, evenings.

Icom 720A solidstate gen cov tx/rx, matching psu, recent service, mint cond, £650 ono, or w.h.y? Tel Dave, 0757 618943.

FT50 rx, £70. FL50 tx, 50W, £60 or £110 pair. 10-80m TET vert ant, 10-20m, £25 or exchange for G-whip, 10-80m. G4JFE, QTHR. Tel Newbury 41613.

Petrol generator, 2kW, reliable, just serviced, £180. AR240 2m handheld case, charger, flexible ant etc, £100. Yaesu FRG7 rx, ssb filters, fm unit, 2m converter, £125. All above with manuals etc. G8TFI, QTHR. Tel 0453 860307.

One LAR ant tuning unit, swl Omni-match, JR310, Trio rx, atu, £36. JR310, £90. Tel Wood, Clochen 378.

Yaesu FT208R handheld, spare nicad pack, YM24A spkr/mic, SMC89AA charger, all as new, boxed, only six months old, £17 ono. MML 144/25 2m linear, £35 ono. G4KSI, QTHR. Tel 0703 692820.

Heathkit SB401 tx, SB300 rx, 100W, 80-10m, run as separates or tx/rx, all filters fitted, both manuals, vgc, £180. G4RNO, QTHR. Tel 061-652 5403.

FT101E, 10MHz, cw filter fitted, mint cond, orig packing, £320. Drake MN7 matching network, 300W, combined atu, power, vswr meter, £70. G4REO, QTHR. Tel 0538 722825 (North Staffs).

Transformers, 15 + 15V, 50A, toroidal, and others larger, £4. 25MHz dual beam, dual timebase scope, large, valved, so only £45. *Wanted:* memory plug-in for FT225, £50 cash waiting, or buy comp FT225RD. G4NVA, QTHR. Tel Holmes Chappel (Cheshire) (0477) 33011.

Yaesu FT707, FP707, hf tx/rx, hardly used, in fb cond, £410 or swap for Yaesu FT790 with cash adjustment. G3ZQF, QTHR. Tel Medway (Kent) 723694.

KW Atlanta, fan, psu, serviced August KW, £160. Yagi LW8/2M, £12. Yagi PBM18/70, £25. Corner array CR23CM, £25. Four coaxial relays, CX120A, Toyo, £7 each. SMC 12V, 4A psu, £10. Datong FL3 filter, £90. Collect. Carriage extra. G2JR. Tel 0203 455021.

Yaesu FT230R mobile fm, 25W tx/rx, boxed, one year old, £190. Jaybeam eight-el quad, £24. G6DEL, QTHR. Tel Chandler's Ford 63232.

Tono MR 150W linear N sockets, comp with leads, plugs, UR67, as new, £100. G6BJP, QTHR. Tel 0284 4649.

Mullard high-speed valve tester cards. List of numbers available. Send sae. Cards at 50p each or offers invited for quantity. G6ONE, QTHR, Tel 0302 857526.

Icom 290E, 2m multimode, 10W, boxed, manual, slidemount, auxiliary spkr, £250. Would consider Icom 2E as part exchange. G6HCX, QTHR. Tel 09012 3123 (North Yorks).

Yaesu FT230 tx/rx, 25W, 2m, fm, as new, boxed, still under guarantee, no mods, hardly used, £200. PSU, 13·8V, 10A, fully regulated, protected, £25. G1BFF. Tel 020630 2714.

Fortop 70cm TVT435 tx, £120. TVD100 demodulator, £15. 70cm convertor, MM435/600, £20. Wattmeter, T435, 70/144MHz, £25. Above unused. BW camera, Ikegami, cw lens, £45. Pye 17in bw tv monitor, £30. Collect, carriage extra. G2JR, QTHR. Tel 0203 455021.

Yaesu FT200B/SP200 hf tx/rx, 240W p.e.p., exc cond, cooling fan, spare pas, instruction manual, orig packing, £195. Carriage can be arranged. GM4FSB, 16 Kilnburn, Newport-on-Tay, Fife. Tel 0382 543069, evenings.

Yaesu FT480R multimode, £275. Yaesu FT780R multimode, £275. Trio Kenwood 4000 dualbander, 25W out on 2m/70cm, voice synthesizer fitted, £375. AOR2001 scanner, £275. All items perfect, boxed, manuals, postage extra. G4TPS, QTHR. Tel Kings Lynn 5409.

2m handheld, S20 and S8 fitted, 105W, one wkg, one not, first offer over £40 for both. ZX Spectrum issue 2, all accessories, numerous tapes, Oscar, rtty, games, £95 ono. G4MWR. Tel Bob, York 425619, after 6pm.

Codemaster CWR610E, in perfect cond, as new, a superb decoder, cw, rtty, Ascii, instruction book. BRS41542. Riley. Tel 061-980 4357.

Trio R1000 communications rx, exc radio for the new or old swl, comp with instructions, Global AT1000 atu, a real must with the R1000. £210 the two. G1CZS. Tel 051-355 0384.

BBC 32k morse tuition programs. Random: letters (in random groups): numbers (in fives); words from dictionary of 500 in store, or mixture if desired; 100 plain language morse tests; 70 cw abbreviations/punctuations; send output to internal spkr, external oscillator or let it key your rig; morse keyboard (sends as you type); write, save and replay your own texts; choice of speed; plus other features too complicated to explain here! Learn and pass fast, £4.95. D. Brandon, G4UXD, 1 Woodlands Road, Chester CH4 8LB.

KW202 rx, spkr, KW204 tx, mic, connecting leads, handbooks, £200. G4CNB, QTHR. Tel 0621 782388.

TR7010, 10W ssb, xtalled 144·260-144·455, good cond, mobile mount, orig packing, manual, £110. Carriage extra. G6CLP, QTHR. Tel Ashby-de-la-Zouch (Leics) 414164.

AR88D, Daiwa 2m rx, homebrew 20m rx, hifi system comprising Realistic tuner amp, Sharp turntable, front-load cassette deck, with Dolby and spkrs (Realistic), would like to sell together if possible, £160 ono. Tel Derby (0332) 74115.

Atlas 210X, just serviced, £230. Digital readout, faulty, £5. Creed 75 rx, only two-speed auto cr, lf, £30. Unused tape, Philips 1700, £15. Several FT227 from £100. IC720A, mint, £750. G3LZN, QTHR. Tel Lapworth (05643) 2014.

TH3JR, CDE rotator, approx 20m coaxial and control cable, instructions, buyer collects, £115 cash for the lot. G3GVV, QTHR. Tel Tonbridge (Kent) 353360.

Eddystone EC10, battery and mains psus, 2m converter, one owner from new, immac, £39. Tel Northiam (07974) 2335.

Bolex H16 16mm reflex cine camera, variable shutter, compact pancinor zoom, 17/85, Switars 25mm f1.4 16mm f1.8, case, exchange for hf tx/rx, near value of £475. GW6ZZC. Tel 0654 711221.

Look! Daiwa CN620A swr/pwr meter, 1·5-150MHz, as new, £40. MET eight-el quagi, two off, £35. Nine-el Tonnas, two off, £12 each. Six-el Jaybeam quad, £15. All perfect. Buyers collect or pay postage. G1JHC. Tel Colin, 0905 54140.

Shugart SA801 8in disk drives, two off, comp with logic cards, case, brand new, inc power supplies, maintenance manual, nine disks, £275 ono. G4KCM, QTHR. Tel Fawley (0703) 893200, after 5pm.

FTDX401, FV401, spkr, spare pa/drivers, £200. HP spectrum analyser, offers. Exchange 51J4/R390 Collins rx. Rhode & Schwarz type XUA synthesized signal source, 0·1-30MHz, big but beautiful, £35. Buyers collect please. G8LIU, QTHR. Tel Uxbridge (0895) 30006.

70cm/2m gear, Trio 7500 2m synth fm 15W tx/rx, £120. Trio 8400 synth fm 70cm/10W tx/rx, £150. Mobile mount, suit TS120/30, £10. Both rigs mobile 13·8V types. Carriage extra. G4TBF, QTHR. Tel Ted, Blackpool 700637, evenings.

Trio Kenwood R2000 rx, seven months old, £275. Tel West Drayton 442508.

FT980, fitted cw filter, mic, seven months old, £1,000 ono. TR9130 multimode, £330. 9X/Y Tonna, £16. Hansen FS1 swr/pwr, £30. BNOS 25A power supply, £85. All as new with orig packing. G3KNJ, QTHR. Tel Watford 44069, after 6pm.

Yaesu FT560 tx/rx, spare pa tubes, wkg order, no takers at £195, so final reduction to £150, no offers. G3ZAY, 41 Enniskillen Road, Cambridge. Tel 0223 311714.

1924 *Practical Electronics Pocket Book*, H. T. Crewe, MIMechE, 570 pages, £5. 807 valve, ceramic base holder, £2. Xtal calibrator, early valve by GEC (Salford Electrical), 100, 1,000, 5,000kHz, osc dial, 13·75 by 9 by 7in, £6. *Wanted:* barometric altimeter, G3MBL, QTHR. Tel 01-445 4321.

Drake TR4 ssb, cw, tx/rx, MS4 psu, Shure fist mic, clean cond, in wkg order, £180 plus carriage. Tel Nottingham 582358, evenings.

Oric 1, 48k, Tansoft monitor/assembler/disassembler, £75. Igaduma-built tu with rtty program for Oric, £30. Another professionally-built tu, slight fault, hence £25. G4JLU, QTHR. Tel David, 01-954 9180.
RTTY scarab terminal unit, Spectrum interface and split screen software, offers. Tel 0706 526834.
Icom IC30A 70cm 10W mobile, £125. Multi U11 70cm 10W mobile, £130. MMS2 talking morse tutor, £95. Yaesu FT225 all mode 2m base station, £390. HP 175A dual beam scope, £150. Various tv camera lenses, C-mounts. G8AYN. Tel 04555 57790.

WANTED

Supply unit No5 for WS 38, 18. Eureka portables, Rebeccas, AN/DPN2, AN/DPN1 units. Power supply for B2. Spares box. Any second world war SIS, OSS, SOE portable radio, excellent prices paid. w.h.y? WA4MRR, 5 Rollingwood Drive, Taylors SC 29687, USA.
Mk123 spyset in good wkg order. G4RJC, QTHR. Tel 04022 21523, evenings, not Sundays.
Drake linear amp L4B or L7. Alpha lin amp, TH7 conv kit or TH7 ant. 60ft tower, hd, must be good. Tel Derby 557705.
FT225RD, preferably with Mutek front end, must be mint cond for cash, or TS130S and MC33 mic, PS30 psu, also wanted, HW8. Tom Avery, G4MSB NOT QTHR. 33 Vicarage Close, Worle, Weston-Super-Mare, Avon. Tel 0934 512698.
Buy or borrow handbook or any descriptive information on Layfayette hf rx model HA350. Noise generator and atu. S.D. Mellor, 338 Sandon Road, Meir, Stoke-on-Trent. Tel 0782 395443.
For the Wireless Museum: old radio books, catalogues, service sheets, callbooks (especially 'fifties), manuals, *Radio Times,* QSL cards, valves, beehive or letter neon, car radio testgear, any knobs! Collection arranged. Details please to hon curator G3KPO, Arreton Manor, Newport, IoW.
Books or information leading to purchase of *RF Circuit Design,* publisher Howard Sams. *Sun, Earth and Radio* by Ratcliffe, publisher Weidenfeld & Nicolson. G3CBU, QTHR. Tel 0256 58921.
Wireless set operator cards, metal or cardboard, eg WS18 or 38 etc. Need UK military manuals (army), second world war to present, exc prices paid, all costs refunded. w.h.y? Please write Tony Grogan, 5 Rollingwood Drive, Taylors SC 29687, USA.
ATU for KW2000B with 1·8MHz if possible: valves, atu, cct diagrams, psu for C12 tx/rx: Icom ICB1050 for spares: I also have DEC/PDP8L computer and teletype ASR33 with stand: swop? w.h.y? G4RBR. Tel Chris, 01-398 8172, evenings, 01-979 1798, daytime.
Terminal unit suitable for Creed printer. Any state of repair provided circuit diagrams included. Consider swop for cb suitable for conversion (with circuit diagrams). Alec Janaway, G4VFD. Tel Wellington 4109.
FT221R, in good order, cash awaiting. G4IER NOT QTHR. Tel 0638 720665, evenings or weekends.
KW E-Zee Match atu for beginner. PSU for Heathkit SB104A. Tx/rx morse key. Will collect. G3PMD, QTHR. Tel 01-640 1969, office hours.
Buy or borrow: operating manual for Telequipment D52 oscilloscope. G4XNO, QTHR as G6RLY. Tel Mike, Princes Risborough (Bucks) (084 44) 3269, evenings.
Can you help complete my ex-WD46 set? I need the mic and rxs, head gear assemblies No5, junction box No1, aerial adaptor, antenna rod B. Also any ex-WD radio sets working or not. G4MSF. Tel Keith Watt, 0632 693955.
HF portable/manpacks such as Clansman PRC320 or other British/European models. 2-30MHz ssb, a.m., cw capability, or w.h.y? Parts acceptable, all letters answered. Can be shipped to UK address. WA4MRR, 5 Rollingwood Drive, Taylors, SC29687, USA.
811R/2 Racal? Digital vhf frequency counter, must be in wkg order, handbook if possible, in good cond, any reasonable offers accepted. G6BHN, QTHR. Tel Sileby (Leicester) 3470.
Datong AD270 active antenna, up to £40 paid. G1CIA, QTHR. Tel Rochdale 341274, after 6pm.
The very first issue of *"Acorn User"* July/August 1982. Your price for a good copy. Paul Martin, 3 Birch Close, Broadstairs, Kent. Tel or Prestel 0843 61448.
Shimizu Denshi SS105S hf tx/rx project, noise blanker board, cw filter, marker board, fm boards, anything considered for the SS105S hf tx/rx. Tony Martin, G4XBY. Tel 0530 243248, evenings.
Dymo M4 label maker, early model, green plastic case, Decca radar. w.h.y? G4EZM, QTHR.
TR9130 tx/rx, comp with BO9A base in good working condition. J. Penzer, Apsley House, 27 London Road, Twyford, Berks RG1 5BJ.
Wanted to buy: manuals or copies for signal generators Advance type E model 1. Triplett model 1632. GM4MCB NOT QTHR. Tel 0324-715 624.
HF linear, must be mint cond, full details please. G4SCA, QTHR. Tel 0752 337980.
Circuit diagram and mod details of cb radio "Vice President Roy"; also FRG7 brochure, i.f. frequencies and service details. Mr R. Mills, 48 Lady Bank, Birch Hill, Bracknell, Berkshire RG12 4BH.
Icom 22A, have handbook, would like to buy IC22A in good cond, state channels fitted. G8PB, Peter, "Braxted", Elms Ride, West Wittering, W. Sussex. Tel Birdham 513584.
Datong D75 speech processor, 10-20 or 10-40 vert ant. *For sale:* ZX81 (16k) computer, £24. G3NQX. Tel 0539 28166.
AR88, working, in good cond, no mods, also want any ex-WD radio sets in any cond. G4MSF, QTHR. Tel Keith, 0632 693955.
HRO psu, and info, pin connections, etc, for Racal Mobilcal MA4010 high speed morse unit. G2FXA, QTHR. Tel Stockton (0642) 603595.
Woden plate transformer PTM14A, 425V, 150mA, Parmeko shrouded 250V, 80mA, or near. *QST,* March 1950, April 1951, to buy or to borrow, costs paid. G4IMT, QTHR. Tel Bath 891254.
Interconnecting leads or plugs for WS11, any info, esp vehicle mounting. Details for WS11. Power lead or plug for WS76 tx. Any info on WS76 esp when used with R109 rx. G3VKM, QTHR. Tel 050277 622 (Norfolk).
P60 top 20ft section STD type, Mosley TA33JR, three-el beam. Jaybeam 14-el 2m Parabeam. Yaesu SP901 spkr unit. G4NRR, QTHR. Tel Nigel, 021-744 8672.

MEMBERS' ADS RATE INCREASE
See page 1030

FT290R, Mutek mod and accessories considered. G3RYY, QTHR. Tel Chorley (02572) 62250.
Manual, circuit diagram or any other info about Heathkit SB600 psu/spkr unit and/or HP23A psu. Richard Botterill, G4EPO, 1 Claudian Place, St Albans, Herts AL3 4JE. Tel St Albans (0727) 59789.
Pre-1940 domestic radio sets. Pre-1953 television sets. Valves ECH11, EBF11, EF11, EL11, EM12, AZ11. Service information on German pre-war domestic set Siemens 14W. G4OOW, QTHR. Tel Hinckley (0455) 612091.
HF linear FL2100 or other quality similar, must be first class cond. Dual beam 20MHz scope, modern, will collect up to 100 miles. *For sale:* Tono 5000E, £600 or part exchange. G4ULQ. Tel Bournemouth (0202) 5065, after 5pm.
PAG tu for Creed 7. Will swap for 10W in, 100W out. 2m lin amp (bnos). Need bias reset otherwise ok. Diagram or manual for Creed 7. G4ZCK NOT QTHR. Tel Bristol (0272) 712675, afternoons or evenings please.
For BRT400 valves W81, X81, KT81 or 7C7, 7S7, 7C5. Has anyone a manual or circuit diagram for Pye Cambridge HB fm I could borrow. The rig I have has 12AT7 as oscillator/modulator. G3MBQ, QTHR. Tel 09625 873708.
FV101B external vfo for use with FT101E. Workshop manual for FT101E. GW3YGM NOT QTHR. Tel 0437 2015.
Large rotator, heavy duty linear, 40 monobander, TS830S, T120 Versatower, Bencher paddle, Shure 444. Tel 0565 873205.
TR9500 70cm multimode, in good cond, may consider other 70cm multimode. Cash waiting for right radio. G6KEY, QTHR. Tel 01-979 8230.
Argonaut or Century 21, can inspect and collect within 50 miles radius Grantham. Details please by letter. All letters answered. Armstrong, G4GBL, QTHR. Sorry, no telephone.
Datong FL2 filter. G4UNM, QTHR. Tel IoW (0983) 402273.
Nostalgic GM3RKO wants working R1082 or R1224. Have new 29MHz fm for trade. GM3RKO, QTHR.
Argonaut or Century 21. Can try before purchase and collect 50 miles radius Grantham. Sorry no telephone. All letters answered. G4GBL, QTHR.
Wireless set (Canadian) No29, any items for this set, particularly connecting leads etc. Suitcase tx/rxs, any spares, literature or damaged sets. *For sale:* exc quality leather carrying case, £25. For FT101,or FT277. Taylor, G3UCT. Tel York (0904) 29777.
Volume compressor, high-Z input or circuit. G3FTA, QTHR. Tel Hastings 423828.
VFO for Trio 7200G 2m fm tx/rx. G4VXY. Tel 05432 52753.
SSB tx, good cond, Collins 32S3 or similar, Racal, Signal One, Marconi, etc. Professional quality preferred. Collins KWM2A tx/rx also considered. Must be comp with handbooks etc. G3UGE. Tel 021-553 0409 (Midlands), after 6pm or weekends.
Buy or borrow for copy: circuit diagram and any information on Creed facsimile tx/rx type TR100. All expenses paid plus prompt return. G8NXV, QTHR.
IC251E, preferably with Mutek front-end. Must be in perfect cond and reasonably local to Kent area. Good price paid. G4RGB, QTHR. Tel Mark, Medway (0634) 30822, anytime.
Collins KWM380, must be up to date; or KWM2 tx/rx "round label" TH6-TH7 ant. Alpha linear. Drake linear. Henry linear. 60ft hd tower. Tel Derby 557705.
Lowe SRX30 rx for school radio club. G4LQT NOT QTHR. Tel Stafford (0785) 52604.
Solidstate hf tx/rx, 240/12V supply, matching accessories etc, letters only please with details and best price. No haggling. All replies answered. Keith, G4NPY, QTHR.
DG1 digital display readout for Trio TS820. G4VVK, QTHR. Tel 0706 229026, after 5pm, or 0706 211151, during working hours.
Multi U11 or Icom 24G, must be in good cond, G8CPH, QTHR. Tel Ipswich 831448.
Circuit diagram or copy for Dymar 880 tx portable. Will pay expenses. G4RUJ. 33 Kingsman Drive, Clacton, Essex. Tel Paul, 0255 431435.
Mains transformer for old GEC Miniscope cat No M861B, BW464, serial No 83140, or would consider unserviceable Miniscope provided transformer is ok. G3BRL, QTHR. Tel 0240 29549.
Amtor 1 with interface for CBM64. High-quality printer, with keyboard if possible. Software tapes for CBM64, cw, log-keeping etc. Yaesu FT902DM, FT102, or FT-ONE if reasonable price. Hustler mobile antenna coils, 10, 15, 20, 40-80m. Rotator and 1-to-1 balun for Mosley tri-bander. Sony ICF2001, or Datong up-converter. K. Lee, G4HYQ. Tel 0344-48 3696 (Berks) after 3 December, as I am returning to UK on this date.
Information for Admiralty rx B28, circuit diagrams and or any related information. I believe this rx is similar to the CR100. G4SVR, QTHR. Tel 061-941 3930.
SR9 marine monitor rx, 156-162MHz, price, including post, to G2CVO, 28 Elmwood Drive, West Mersea, Colchester, Essex.
Urgently needed: connection details, info, circuit etc for rx R392/URR, made by Western Electric, 0-32MHz, believed vehicle equipment contains Collins components. Possibly Collins design, help please. Willetts, 5 Ida Road, West Bromwich, West Midlands. Tel 021-553 0409.
Two 572B pa tubes. Two 6146B pa tubes. Set of pa and driver valves for FT101. CW and a.m. filter for Yaesu 901. K. Lee, G4HYQ.
Manual or photocopied manual for Telequipment D31R oscilloscope. If you can help please contact G6NXR, QTHR. Tel Andy, Grimsby (0472) 814290.
Pye Whitehall control head and cable, either type, but the one which controls the repeaters would be preferred. G1DRR NOT QTHR. Tel 0302 835280 (South Yorks).
Drake atu type MN2700. Must be in in mint cond. G4OOK, QTHR. Tel Stuart, 0642 211685.
Ten-Tec Argosy 2. G4PKB, QTHR. Tel 0603 501939, evenings.
Trio TS430S, comp station, incl PS430, SP430, AT250, filters, fm board, fist mic etc, brand new, cost £1,450, will accept £950 ono. G4FUU, QTHR. Tel 01-680 4503.
For HRO, 0·2/0·4, 1/2, 4/8MHz, coil units. Table model case. Phasing knob. MX manual or loan to copy. Any bs coils. AR88D. G3KWJ. Tel Nick, 027-587 2306, after 6pm.
Multiscope, YO901, Yaesu, for FT902DM. G4YFP NOT QTHR. Tel 0303 39866 (Kent), anytime.
Mullard L343 amplifier, comp or rf section only. w.h.y? G3KVT, QTHR. Tel 0603 860452.
Trio 3200 xtals. Most channels needed. TX and rx. G4CFX, QTHR. Tel Romsey 516722.
Yaesu FT780R 70cm multimode, no mods, in perfect wkg order. G4YAN. Tel High Wycombe 446348, or 448939, works number, please ask for Roy.
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G4SSH. Tel Scarborough (0723) 863137, after 6pm or weekends.

Buy or borrow data sheets or manual for valve tester. Taylor model 45D. Will pay any cost involved. Please write or phone. Jack Crompton, G4VCV, 32 Wellow Tyning, Peasedown St John, Bath, Avon BA2 8LJ. Tel Radstock 34224.

Collins KWM380. Top price paid. Must be vgc. G4ZEK. Tel Colchester 851343.

Harmsworth's Encyclopaedia, about 1920, full set (three vols) or single copies, any cond. John Scott-Taggard's *Thermionic Tubes in Radio Telegraphy and Telephony.* Paul D. Tyler's *The Construction of Wireless Receiving Apparatus,* 1922. G3GOS, QTHR. Tel Axminster 34259, after 6pm.

Apple 2e, accounts and scientific software, secondhand. Robert Colson. Tel 01-606 2756.

SOS: would like fellow amateur visit my QTH to repair my KW202 rx and KW204 tx, which have developed fault. Fee paid. Fault explained by letter initially. G3WXT, QTHR (Byfleet, Surrey).

Collector seeks anything: T1083, T1115, T1422, SCR522, TR5043, control type 3 or 4, will rebuild anything Air Ministry, war period or w.h.y.? Buy or swaps. DET25 valves. 52 Bramble Lane, Mansfield, Notts.

Trio TS120 or TS130, V or S model. Yaesu FT101ZD. G3XFB, QTHR. Tel 0902 850033.

Telescopic mast. 2m tx/rx multimode. Tel 01-935 7119, daytime.

Five-band vertical hf ant, with or without ground-plane kit. 9 Poplar Drive, Fareham, Hants PO14 1PZ. Tel Fareham (Hants) 284105.

Racal ssb adaptor RA63G or RA634 or RA63D. Any transmitters or information on same. G6XNC. Tel 01-462 4461.

Enthusiast looking for second world war German or Japanese copies of National HRO rx. RX E348A or B. BC224 or 348 omitting lf band. Details and price please. G8LIU, QTHR. Tel Uxbridge (0895) 30006.

FT101ZD or similar in good cond. Tel 0253 404566.

FT221R or similar 2m multimode base rig. G3XOX. Tel 0734 875373, ext 311.

Circuit diagram of KW2000A. Will purchase or pay all costs to borrow for copying. G4YLA. Tel Warminster 218329.

Morse keyboard. Oscilloscope, Telequipment S51 or similar. Two valveholders for 807s and/or 813s, also valves. Marine tx for 80m, cw, mcw, Ocean Span or similar. E-Zee Match or KW Supermatch atu twin paddle unit. G4AYG, QTHR.

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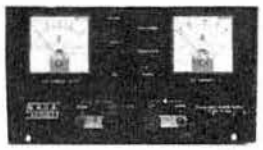

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Typical gain	: 20 dB minimum	**Power requirements**	: 13.8V at 75 mA
Noise figure	: 2 dB	**Power connector**	: 5 pin DIN socket
3rd order intercept point	: +19 dBM (output)	**RF connectors**	: SO239 or BNC, please specify

Size : 110 × 60 × 31 mm (4⅜ × 2⅜ × 1¼")

£42.90 inc VAT (p + p £1.25)

1296 MHz GaASFET PREAMPLIFIER—MMG1296

NEW!

This GaAsFET 1296MHz preamplifier is constructed on high-quality Teflon glass-fibre pcb and includes a microstripline filter which provides excellent rejection to mixer image frequencies and out of band signals. It has a power gain of 15dB and a noise figure of 1·2dB. The power requirements are 13·8V at 35mA and the unit is fitted with 50 ohm type 'N' sockets.

* Utilises NE72089 GaAsFET

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NEW!

This new converter has switched oscillators to provide coverage of 50–54 MHz on a 28–30 MHz receiver. The design utilises MOSFETs in the RF amplifier and mixer stages, and the local oscillator is regulator controlled.

Input Ranges:	50–52 MHz 52–54 MHz	**Output Range:**	28–30 MHz
Overall Gain:	30 dB	**Noise Figure:**	2·5 dB

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STOP PRESS . . . New 2M multi-mode transverter now available. 25W Tx output, GaAsFET Rx, high level Rx mixer, ALC, power output bar graph, repeater shift etc., etc. Phone for further details.

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only £37.45 Basic Kit

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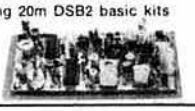
SPECIAL OFFER best selling 20m DSB2 basic kits **only £63!**



ALPHA — SINGLE BAND SSB/CW 50W TRANSCEIVER KIT

20 or 160

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£68!

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HC25/U 18MHz 25 & 20PF	14/15 MHz 20 & 30PF	RO TO R7	S8, TO S23 & S32
HC25	SCANNER XTLS (NOT SR9)	RO TO R7	S8, TO S23 & S32

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1.5 TO 2.0MHz	£5.10
2.0 TO 6.0MHz	£4.75
6 TO 21MHz	£4.55
21 TO 25MHz	£6.50
25 TO 30MHz	£8.50

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5th OVT	60.00 TO 110.0MHz	£5.10
5th OVT	110.00 TO 125.0MHz	£7.40
7th OVT	125.00 TO 175.0MHz	£10.00

DELIVERY 2.0 TO 175.0MHz 2 to 3 weeks
5 TO 999.9kHz 6 to 8 weeks
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COMMERCIAL CRYSTALS: available on fast delivery and at competitive prices.
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THE NEW TS711E possibly the most advanced two metre base station on the market today. SEND FOR DETAILS Price £758.00 inc. VAT and Carriage.
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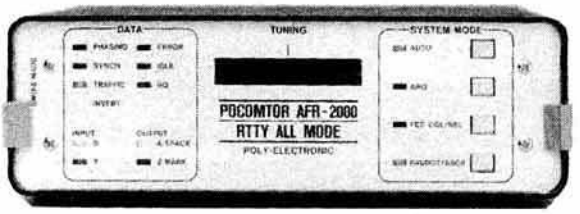

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2. 500mW TV Transceive	(As 1 above plus TVUP2 + PSI433)	60.00
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10. 2M Synthesised 10W Transceive	(R5 + SY + SY2T + SSR + 144FM10A)	120.00
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12. 70cms Linear/Pre-amp	(70LIN10 + 70PA2/S)	45.00

70cms EQUIPMENT	CODE	ASSEMBLED	KIT
Transceiver Kits and Accessories			
FM Transmitter (0.5W)	70FM05t4	48.00	28.75
FM Receiver (with PIN RF c/o)	70FM05R5	65.40	45.80
Transmitter 6 Channel Adaptor	70MC06T	21.30	14.25
Receiver 6 Channel Adaptor	70MC06R	25.20	17.90
Synthesiser (2 PCBs)	70SY25B	88.00	62.25
Synthesiser Transmit Amp	A-X3U-06F	34.15	22.10
Synthesiser Modulator	MOD 1	8.95	5.50
Bandpass Filter	BPF 433	6.50	3.30
PIN RF Switch	PSI 433	7.55	5.35
Converter (2M or 10M i.f.)	70RX2/2	27.10	20.10
TV Products			
Receiver Converter (Ch 36 Output)	TVUP2	27.50	22.80
Pattern Generator (Mains PSU)	TVPG1	42.25	36.50
TV Modulator (For Transmission)	TVM1	9.85	5.75
Ch 36 Modulator (For TV Injection)	TVMOD1	9.80	5.50
Power Amplifiers (FM/CW Use)			
50mW to 500mW	70FM1	18.45	12.80
500mW to 3W	70FM3	23.45	17.80
500mW to 10W	70FM10	41.45	33.45
3W to 10W	70FM3/10	23.95	18.30
10W to 40W	70FM40	65.10	52.35
Combined Power Amp/Pre-Amp (Auto Changeover)	70PA/FM10	56.60	40.15
Linears			
500mW to 3W (Straight amp. no changeover)	70LIN3/LT	27.90	19.90
3W to 10W (Auto Changeover)	70LIN3/10E	41.05	30.15
1W to 7W (Auto Changeover)	70LIN10	44.25	32.50
Pre-Amplifiers			
Bipolar Miniature (13dB)	70PA2	8.10	6.50
MOSFET Miniature (14dB)	70PA3	9.65	7.50
RF Switched (30W)	70PA2/S	24.25	15.25
GaAs FET (16dB)	70PA5	20.10	12.80
6M EQUIPMENT			
Converter (2M i.f.)	6RX2	28.40	20.80
2M EQUIPMENT			
Transceiver Kits and Accessories			
FM Transmitter (1.5W)	144FM2T3	39.35	26.30
FM Receiver (with PIN RF Changeover)	144FM2R5	65.50	47.20
Synthesiser (2 PCBs)	144SY25B	78.75	60.05
Synthesiser Multi/Amp (1.5W O/P)	SY2T	27.90	20.65
Bandpass Filter	BPF 144	6.50	3.30
PIN RF Switch	PSI 144	7.55	5.35
Power Amplifiers (FM/CW Use)			
1.5W to 10W (No Changeover)	144FM10A	24.15	18.50
1.5W to 10W (Auto Changeover)	144FM10B	36.11	26.25
Linears			
1.5W to 10W (SSB/FM) (Auto Changeover)	144LIN10B	38.40	28.50
2.5W to 25W (SSB/FM) (Auto Changeover)	144LIN25B	40.25	29.95
1.0W to 25W (SSB/FM) (Auto Changeover)	144LIN25C	44.25	32.95
Pre-Amplifiers			
Low Noise, Miniature	144PA3	8.60	7.40
Low Noise, Improved Performance	144PA4	12.86	8.40
Low Noise, RF Switched, Full Changeover	144PA4/S	24.30	15.30
GENERAL ACCESSORIES			
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Piptone	PT3	7.50	4.45
Kaytone	PTK3	8.75	6.05
Relayed Kaytone	PTK4R	12.70	8.20
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Solid State Supply Switch	SSR1	5.85	3.70
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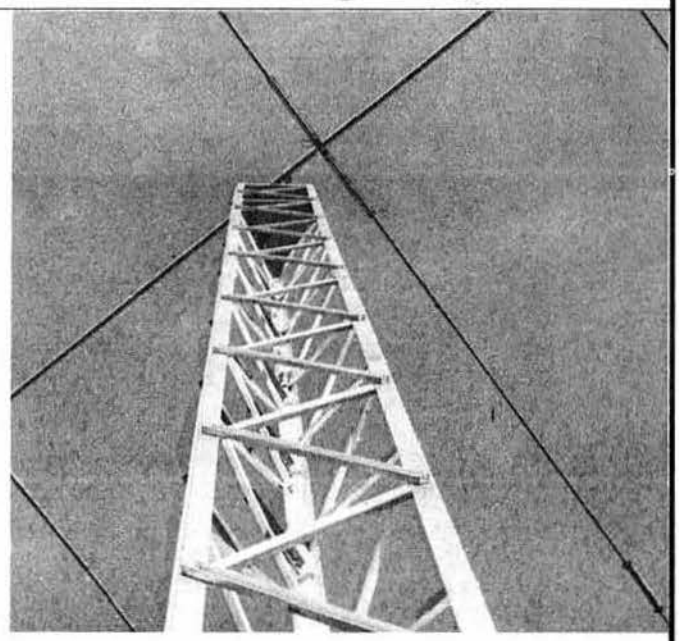

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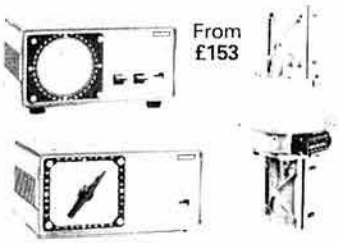

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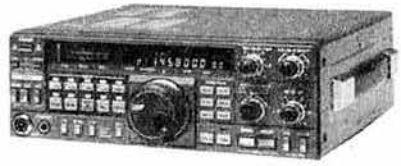

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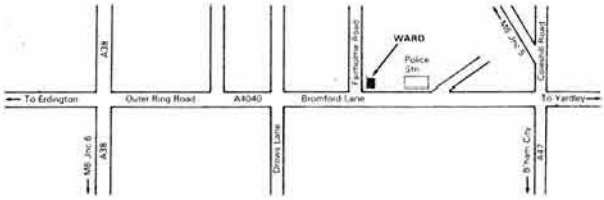

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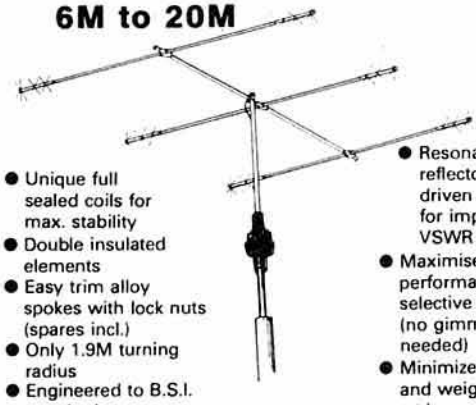

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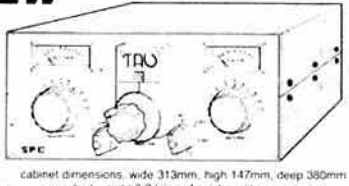

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Supply: 5.5 – 13V DC
IF's: 10.695 – 0.455 MHz
Selectivity: ±6KHz @ –6dB (2:1SF)

FT209R

The FT209R with two 4-bit CPU's and a lithium backed RAM offers features far beyond anything yet conceived, in a package smaller and lighter than any previous CPU-controlled transceiver

Ten memory channels allow storage of either standard + / – shifts, or independent Tx and Rx frequencies for any split or repeater shift on any channel; with touch-key reverse or simplex on either frequency. Scanning capabilities include step-programmable full or partial band or memory bank scanning; calling channel, select memory of dial, priority, scanning/monitoring, etc. etc.,

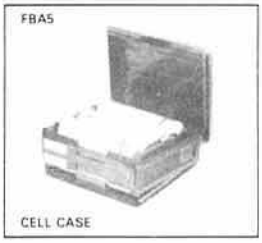
Battery life is greatly extended over standard squelched monitoring, with Yaesu's programmable Power Saver System, which activates the receiver momentarily at programmable intervals.

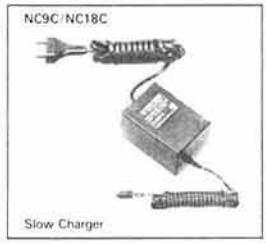
Nineteen soft rubber dual function keys provide greater control than ever, yet operation remains easy: the keypad is carefully arranged, colour-coded, and beeper assisted, most common commands are one-touch operations.

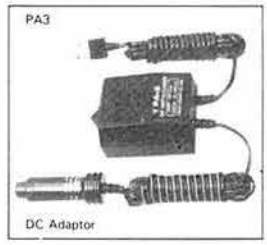
Fat ½" LCD digits are complemented by ten memory and nine special function indicators show operating status at a glance.

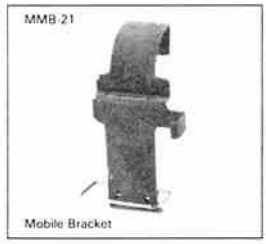
144-146MHz – 25/12.5 KHz
Supply: 6.0 – 15VDC
IF's 10.7 – o.455 MHz
Selectivity ±7·5 KHz @ –6dB (2:1SF)

BATTERY AND CHARGER OPTIONS	POWER OUTPUT (Hi/Lo), FT203R	CASES, FT209R	DIMENSIONS FT209RH
FBA5 Battery Case Only 9v* 6 "AA" Dry, 7.2v 6 "AA" NiCd	1.5/0.2W* CSC6 65W, 34D, 153H mm	1.8/0.2W*, CSC10 65W, 34D, 168H mm	2.3/0.3W,* CSC10 65W, 34D, 168H mm
FNB3 NiCd Pack 10.8 volts, 425mAh NC9C (15 hours), NC15 (1 hour)	2.5/0.3W CSC6 65W, 34D, 153H, 482gms	2.7/0.3W, CSC10 65W, 34D, 168H, 512gms	3.7/0.4W, CSC10 65W, 34D, 168H mm, 512gms
FNB4 NiCd Pack 12.5 volts, 500mAh NC18C (15 hours), NC15 (1.5 hours)	3.5/0.4W CSC7 65W, 34D, 172H, 490gms	3.7/0.4W, CSC11 65W, 34D, 186H, 520gms	5.0/0.5W, CSC11 65W, 34D, 186H mm, 520gms









JOINT SPECIFICATIONS

Good 50 ohm match to liners & antennas
Frequency Modulation (FM-F3-G3E)
Variable Reactance linear modulator
Sensitive quality, 2K ohm condensor mic
±5KHz Max Dev, 16KHz max bandwidth
Transmitter spurious output –60dB

for **SEVENTY** soon
FT703R
FT709R
plus FT103R for 220 MHz

JOINT SPECIFICATIONS

Large Range of Accessories available
Supplied with YHA14A helical antenna
Supplied with appropriate soft case
Sensitivity: 0.25μV for 12dB sinad
1.0μV for 30dB S/N
A.F. Output: 450mW into 8ohms @ 10% THD

SMC

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Totton
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