RADio COMmunication

January 1985

Journal of the Radio Society of Great Britain

RSGB

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Prices correct going to press, E. & O.E. **CLOSED MONDAY** **Goods normally despatched by return.**

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

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

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

Sole Distributor Lowe Electronics Ltd.
Chesterfield Road, Matlock, Derbyshire DE4 5LE.
Tel: 0629-2817, 2430, 4057, 4995

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Tel: Belfast 658295

Devon Reg Ward & Co Ltd.
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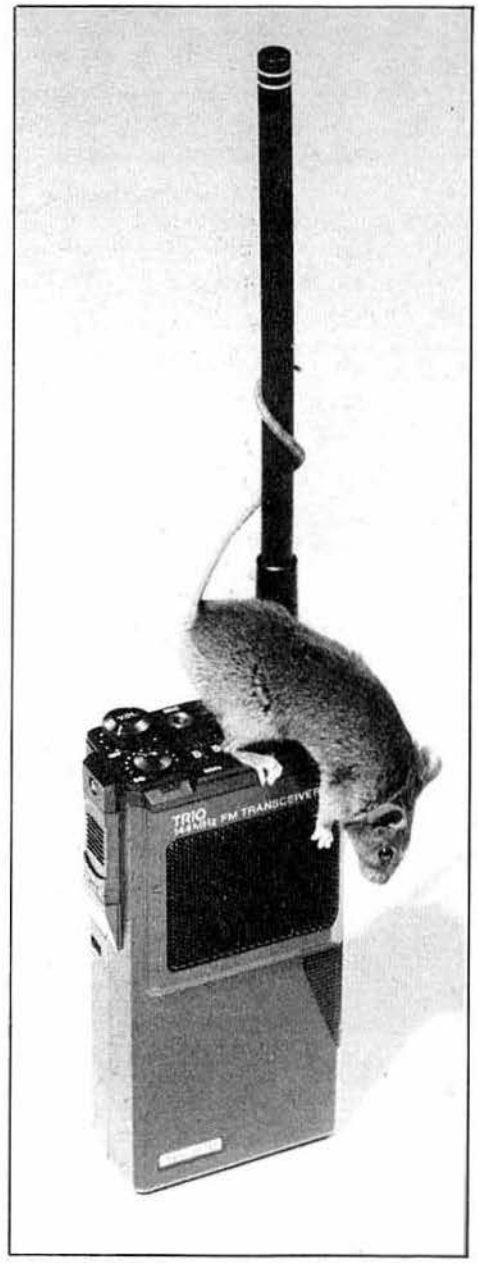
Tel: 0297 34918

W. Yorkshire Amateur Radio Shop
4 Cross Church Street, Huddersfield.
Tel: 0484 20774

Kent Thanet Electronics Ltd.
143 Reculver Road, Herne Bay, Kent.
Tel: 02273 63859/63850

the TH21E two metre hand-sized handheld, the rig that not even a mouse could hide behind!



I am not for one moment suggesting that current hand-helds should be photographed with an elephant but I have heard many amateurs refer to their existing hand-helds as "bricks". That the TH21E could not be called. In fact, I am tempted to say it is the rig that not even a mouse could hide behind. Over the fourteen years I have watched amateur radio equipment develop from cumbersome to perfection. I remember John, G3PCY, showing me the first TR2400 and our mutual amazement at how TRIO could put so much radio in such a small package. Later developments produced the TR2500 and its 70 centimetre version, the TR3500 and left me in no doubt that TRIO would soon produce a compact inside pocket transceiver. At the same time it became apparent that a simpler rig with performance would have great appeal. That transceiver is the TH21E and being typically TRIO is right first time. Size is not the most important feature, it's just the way the transceiver feels when picked up, impossible to put down. I am not going to give its dimensions, I will just say that it is hand-sized, the true inside pocket transceiver. As an owner and with the rig always on your person the hobby of amateur radio expands to an all day event. **Never miss a contact, never miss a friend.**

- 1 watt output in high power position, 150mW in low position.
- Full coverage of the 2 metre amateur band from 144 to 146MHz.
- Frequency selection by simple thumbwheel switches.
- Full repeater facilities including reverse repeater.
- The rig comes complete with nicad pack and charger.

TH21E including nicad & charger, £179.48 inc VAT.
TH41E 70cm version, £199.00 inc VAT.

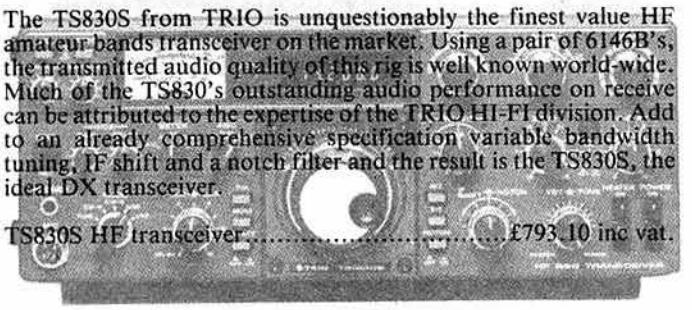
TRIO-KENWOOD CORPORATION

Shionogi Shibuya Building, 17-5, 2-chome Shibuya, Shibuya-ku. Tokyo 150, Japan

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

just a part of the TRIO range.....

the TS830S,



The TS830S from TRIO is unquestionably the finest value HF amateur bands transceiver on the market. Using a pair of 6146B's, the transmitted audio quality of this rig is well known world-wide. Much of the TS830's outstanding audio performance on receive can be attributed to the expertise of the TRIO HI-FI division. Add to an already comprehensive specification variable bandwidth tuning, IF shift and a notch filter and the result is the TS830S, the ideal DX transceiver.

TS830S HF transceiver.....£793.10 inc vat.

the TS430S,

The TS430S combines the facilities of a solid state HF transceiver with those of a general coverage receiver. It's the ideal rig for the radio amateur who not only wants to communicate with his fellows but also enjoys listening to the world. As an amateur band transceiver the rig covers top band to ten metres, as a short wave receiver coverage is from 150 kHz to 30 MHz. Operating on AM, FM, USB, LSB and CW the TS430S is extremely compact and, as such, is the perfect transceiver for mobile, portable or base station operation.

TS430S HF transceiver with general coverage receiver £733.55 inc vat.

the TS711E,

Although careful design has enabled current mobile 2 metre transceivers to be also used in the shack, there has always been demand for a "true base station", a continuation of the TS700 series. The new TS711E is that transceiver. There is also a 70 centimetre version, the TS811E. Each produce 25 watts RF output and can be operated from either 13.8 volts DC or 240 volts AC. Comprehensively equipped the rigs have 2 VFO's, 40 memory channels, + or −9.9kHz of RIT, switchable speech processing, frequency and memory scan, USB, LSB, CW and FM modes of operation, priority channel, net channel and, of course, DCS. For those with failing sight or a blind operator the TS711E/TS811E is a dream come true, not only is the operating mode identified by the appropriate CW letter sent in the tone (F for FM, U for upper side band, etc.) but, when fitted with the optional VS1 board, a digitally encoded girl's voice will, when required, announce both frequency and whether the rig is switched to repeater shift.

TS711E 2 metre base station with DCS.....£792.15 inc vat.
TS811E 70 centimetre base station with DCS.....£898.00 inc vat.

the TR2600E,

To improve the TR2500 some would have said was an impossible task but this TRIO have done, the result is the TR2600E. Of higher specification the TR2600E does not replace the TR2500 but complements it. Improved features include both timed and carrier operated hold whilst scanning, the ability to look for either a busy or clear channel, a priority channel and a simple method of locking out unwanted memory channels whilst scanning. The TRIO TR2600E also has an improved key pad, S meter and a memory that holds not only frequency but whether or not repeater shift is required (a 70 centimetre version, the TR3600E will be available February/March). If the above were not enough the TR2600E also has DCS (digital code squelch).

TR2600E 2 metre hand held with DCS.....£281.60 inc vat.
TR3600E 70 centimetre hand held with DCS.....£299.89 inc vat.

the TW4000A,

Taking into account the amount of activity on the 2 metre FM channels it is not surprising that many people have turned their attention to the wide open spaces of 70 centimetres. With the TW4000A, TRIO have produced a dual band FM transceiver that gives its owner the best of both worlds. Facilities include 10 memories, two VFO's, priority channel, full repeater operation, band scan and memory scan. In memory scan mode the rig can be instructed to look for either 2 metre or 70 centimetre signals. The transceiver produces 25 watt RF output on both bands and comes complete with mobile mount and microphone. For greater safety whilst mobile the optional VS1 board will announce frequency, memory channel and whether or not the rig is set on repeater shift.

TW4000A dual band FM mobile.....£510.97 inc vat.

the R600,

For those who are banned from the house and have to operate from the shed at the bottom of the garden, why not consider an R600 to monitor the bands from the comfort of the fireside? No wife would forbid such an attractive looking receiver in the lounge, after all it could also be used to listen to *Woman's Hour*. The R600 is a basic receiver covering from 150 kHz to 30 MHz and having switched upper and lower sidebands, wide and narrow am and cw. It has a 20 dB attenuator and a noise blanker fitted as standard. Operation is simple, select the mode of operation, turn the MHz dial to the correct band and, by using the VFO knob, tune to the desired frequency. The clear digital readout makes station selection simple. The TRIO R600, your passport to comfortable listening.

R600 general coverage receiver.....£285.26 inc vat.

don't forget!

The following TRIO models although not shown are still current and available.

TS930S . . .	£1250,	TS530SP . .	£698,	TS130S . . .	£598,
TS780 . . .	£934.69,	TR9130 . . .	£479.62,	TR2500 . . .	£257.58,
TR3500 . . .	£277.96,	TM201A . . .	£295.19,	TM401A . . .	£324.45,
TR7930 . . .	£338.03,	TM211E . . .	£377.22,	TM411E . . .	£431.03,
R2000 . . .	£456.63. All prices include Vat. Carriage £7.00				

the **DAIWA** power supply units, a comprehensive range.

PS 50 M
9-15 volts, 5·6 amps
£55.91 inc VAT, carr £3.00

PS 80 M
3-15 volts, 8 amps
£72.68 inc VAT, carr £3.00

PS 120 M
3-15 volts, 12 amps
£87.33 inc VAT, carr £7.00

PS 300
9-15 volts
30 amps max, 20 amps continuous
£176.80 inc VAT, carr £7.00

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.

Each of the units is well constructed, conservatively rated, and cool running. Accurate metering of voltage and current is provided, with electronic fold back current limiting which gives fast, safe protection to both power supply and external equipment. Our demonstration trick is to drop a spanner across the output terminals of the 30 amp supply which promptly shuts down. Remove the spanner and the supply restores itself to the set voltage and carries on happily.

Output voltage is smoothly variable over a sensible range, and is stable to 1% and ripple voltage is less than 1mV, both values quoted at full rated output.

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.

FREE **RADSOFT** RTTY receive/transmit package with each 32K COLOUR GENIE!

Many radio amateurs, very wisely, have not yet **added a computer** to their shack. Apart from the difficulty of which computer to choose, they consider it **over expensive** to purchase the necessary additional soft and hardware to transmit and receive RTTY, create logging facilities or compute distances between themselves and other radio amateurs. **Things have now changed.** LOWE ELECTRONICS have put together a substantial package which includes **FREE OF CHARGE** with every COLOUR GENIE sold from Matlock, the following:

RADSOFT RTTY FULL RECEIVE/TRANSMIT SYSTEM (afsk) with the following features . . .

Split screen . . . enables incoming message to be displayed whilst you "type ahead" your reply.

Memory . . . The facility exists to pre-write information for later transmission. The information can be saved to cassette for future use.

Incorporated into the program are a selection of messages often used by a RTTY operator, eg: **RYRYRYRYRYRYR . . ., THE QUICK BROWN FOX . . ., QRZ DE** (your call sign), **DE** (your call sign).

Connections could not be easier . . . a cassette lead is used between the computer and the 3·5mm socket of the supplied terminal unit (hardware). To input an RTTY signal from the receiver requires a lead from the audio output of the rig to the 3·5mm socket of the terminal unit (one 3·5mm jack plug is supplied). Transmit audio is generated inside the COLOUR GENIE, a lead from the computer audio out to the microphone input of your transceiver completes the connections.
The **List price** of the RADSOFT package is **£56.00** inc VAT. With the LOWE ELECTRONICS computer the system is **FREE!**

In addition, purchases of the **COLOUR GENIE** will receive two other programs also **FREE OF CHARGE**. One is a log system enabling up to 700 stations together with their signal report and QRA locator to be stored, ideal for a contest. The second can be used to quickly tell you the distance between yourself and the station you are working. A map of the UK or, for the DX-er, Europe appears on the screen with flashing dots locating yourself and the other station.

Don't be carried away in your enthusiasm for RTTY, **don't forget,** you will own a COLOUR GENIE, a proven 32K home computer. This is a considerable advantage over the dedicated RTTY system. The COLOUR GENIE has a **"proper"** keyboard just like today's electronic typewriters, not indefinite touch pads. It is not a games plaything but is capable of introducing the family to computing. **That's if you'll ever let it out of the shack.**

complete package £168

INCLUDING VAT. CARRIAGE £7.00

LOWE ELECTRONICS LTD.

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

EMPORIUM NEWS

Good Morning

As this is the **month of January** and hopefully near its beginning, may I take this opportunity of **wishing you all a Happy New Year.**

The past year has seen **two** new shops, one in **Cambridge** and one in **Cardiff** plus, of course, the **London shop** has moved from **Kings Cross to Eastcote.** I am hoping to obtain property on the South Coast so that a new Lowe shop can open during 1985. **If** you know of **any property** in the **Bournemouth, Poole, Southampton** area then please ring me. I am sure you all know my general requirement—good car parking, etc.

Must tell you about a first for amateur radio. On Thursdays I have a regular sked with a good friend. Last Thursday as we signed I was called by **G6GL, Russ, in Oxford.** Quite a strong SSB signal. We exchanged reports and quickly established that we were both using **the new 2 metre TRIO TS711E base station transceiver.** What about testing the reliability on **DCS** over this distance I ventured. We moved to FM. Not knowing anyone in his locality who had the new **DCS** facility Russ quickly set up the standard code 12345, keeping things simple, in code position one and awaited my call. **Nothing.** But a simple easily made mistake had been made; Russ had forgotten to activate the code (**see handbook**). Try again—success and by now conditions had considerably deteriorated in both directions, the **DCS** system worked, activating a rig that was, to all intents and purposes, switched off. It's a pity I hadn't got the **CD10 code display** wired in, I would have known that in my absence from the shack, **G6GL** had called me. Russ seemed pleased and I must admit so was I. It says a lot for the TRIO **"Data correction"** system built into the **DCS** code that with a far from perfect signal the system worked, when set correctly, the first time and continued to do so. Russ explained that he had a friend who was considering purchasing a **TR2600E,** the 2 metre handheld that also has **DCS. "I must tell him about this"** said Russ **"and encourage him to get one straight away!"**

I took the opportunity of asking Russ **how he liked his TS711E. Beautiful** was his comment and went on to explain that although he liked his TR9000, for him a base station should be as the original TS700 series. I agree but then I suppose you would say I am biased!

I have just read in **Amateur Radio Magazine** an article on **second-hand equipment:** in this month's copy the **TS510, TS520** and **TS830** are covered, interesting reading and the prices quoted are also sensible. In fact, we have been on the look out for some time for a **"looked after"** transceiver for the young nephew of a **good friend** of the company in **North Wales.** Success! He has just taken delivery of a mint TS520, cost £295.00—satisfaction all round.

Our Keith, **G8YQX** has just come up with a CW practice program designed for the Colour Genie. Priced at £9.95 the program is extremely clever. It's the only one that I know of that **teaches as a human would do.** Let me cover just two features. Learning the code is easy. **The Colour Genie** sends at twelve words a minute (so you get the correct feel straight away), the individual letters of the alphabet beginning, would you believe, at **"A".** As you recognise the letter key **"A"** on the Genie is pressed. If the key is not pressed quickly the letter that has been sent appears on the screen and is sent again. On identification another letter is sent, **as you improve** the thinking time **decreases** and things certainly **speed up.** As you progress additional letters are added until you are coping with the entire alphabet. To encourage, you can check your progress by asking the computer to tell you how you are doing. **Very clever** and just the right amount of encouragement that is required. In addition, the programme will send groups of five characters and print them out after sending. In this mode you have to write down the groups on paper. The scoring system does not work in this mode which is no problem as you quickly get to know how good or bad you are. **Plug in a morse key** using the din connector (serial port) and the Colour Genie **will check your sending.** A system is working here at Matlock for those who want to try before they buy but **at £9.95 why not just send the money,** carriage 50p.

Daiwa have just brought out a new range of rotators. Of special interest are **two new concepts.** The first is that the range includes a **high speed version.** Having a full rotation time of **39 secs,** you will see that this is a great improvement over existing types. Ideal for the VHF UHF operator who needs, quite often, to slew his beam quickly to work a rare DX station that has just appeared 90° away from his present beam heading. Applicable to both range of rotators is **their ability to have both turning capacity and brake torque increased** as the size of one's array increases. We have always said, "buy the most expensive rotator you can afford and do not buy it for what you are putting up at that moment". We all suffer from the same affliction. **What is big** enough as an antenna today will not be big enough in one year's time. The **modest** 5 element (just the size to start with that won't attract the neighbours' attention) soon becomes an 8 element. After everyone else has worked the DX and you haven't **it becomes a 10 element.** As your enthusiasm gains momentum, a **vertically polarised beam** is added to work mobiles on FM or maybe a **circular polarised beam** for an uplink on 70 cm for Oscar 10, **4 phased 10 elements** for meteor scatter and the final straw, **a 3 element Tribander** at the bottom of the array when the morse test is passed. The point I am trying to make is that the new rotators from Daiwa **cope with this growth** of antenna. By adding up to 3 additional motor units around the base of the initially purchased rotator which includes the first motor, additional turning capacity and braking torque is achieved. **Each is easy to fit.** As you put up another antenna, an additional motor can be plugged in (no need for additional cable)—simple and yet very clever. An additional advantage is that should a motor fail then it can be easily removed, repaired and replaced without the central part having to be removed. **Prices of the new rotator** are as follows: MR750E standard model with one motor, **£193.95**. Pre-set version, the MR750PE, **£217.64**. Motor Unit, MR750U, **£64.64**. Lower mast clamp, LMC, **£14.01**. All prices include VAT. Carriage on rotators, £7.00. There is also to be two high speed versions. Ring for details or send for a full colour descriptive leaflet on the new Daiwa range.

This month I have listed on our **TRIO page** the equipment still current but for which I have not sufficient space. Please don't think that because there is **no photograph** or **description** it has been **discontinued.** Check with us first. Another service, **before** buying a piece of equipment on the second-hand market, **feel free to ring us**—many people already do—to find out what you would have to pay if buying the same item from us. We will be only too happy to advise and if necessary point out the pitfalls to be avoided. **Part of the Lowe Electronics' service.**

Following my comments on Beryl, our Receptionist, and her holiday photographs, I understand that there have been requests that she appear on this page. Indeed, a group of amateurs in the South East of England who have talked to her but, unfortunately, frequent our London Shop have said it's about time **we had a Beryl centrefold**—I'll give it some consideration (and so will Beryl).

Gud DEes 73es FBYLS, XYLS, esFBOM, etc.

David G8GIY

the **TELEREADER** range

Those of you who have seen TELEREADER products will know that outstanding performance allied with ease of operation are the hallmarks of this particular company. The four models in our range are the CWR685E combined transmitter and receiver, the CWR675E having receive only and built in monitor, the CWR670E being a CWR675E without monitor and the CODE MASTER CWR610E which not only receives CW and RTTY (Baudot and ASCII) but doubles as a morse tutor. TELEREADER also have an AMTOR unit, the AMTOR10A, details for this are available on request.

The CWR685E has many outstanding features . . . . . .

CW, Baudot and ASCII receive and transmit: CW at 3-40 wpm, RTTY at 45.45-300 bauds (six speeds).

Built-in 5" green phosphor screen giving a clarity and brightness that I have not seen before.

An external QWERTY keyboard housed in a substantial metal case and supplied with 3 feet of connecting cable. Not a "rubber key or plastic faced touchpad" but a true keyboard.

6 Memory channels (63 character capacity each). In addition the 4 standard test transmissions (RY, QBF, Baudot all characters, ASCII all characters) are permanently stored in memory and can be recalled and transmitted in a variety of formats. 480 characters of transmitting buffer memory are also included.

Automatic and manual transmit/receive switching.

Printer output: Centronics compatible parallel interface for hard copy.

The TELEREADER CWR675E has a similar specification to the CWR685E having the built-in 5" green monitor but not including the transmit facility. The CWR675E provides for both the enthusiastic radio amateur and short wave listener access to both the amateur and commercial world of RTTY as well as providing a visual display of received morse code. The CWR670E is as the CWR675E but does not have the monitor.

The TELEREADER CWR610E Code Master is a compact CW/RTTY converter which also doubles as an audio-visual morse tutor. Features of the CWR610E Code Master are . . . . . .

CW, RTTY (Baudot and ASCII reception).

CW: 3-40 wpm, Baudot/ASCII: 45.45-600 bauds (seven speeds).

CW morse practice at 2-30 wpm.

Display characters: 612 characters × 2 pages.

Centronics compatible parallel interface for printer output.

UHF/VIDEO display output.

CWR685E....	full receive/transmit.....	**£771.64** carr £7.00
CWR675E....	receive only with monitor.....	**£449.17** carr £7.00
CWR670E....	as above but without monitor.....	**£392.80** carr £7.00
CWR610E....	codemaster.....	**£195.00** carr £3.00
PK675.....	printer for CWR675E.....	**£189.00** carr £7.00
AMTOR10A.	amtor unit.....	**£253.20** carr £3.00

all prices include VAT.

Whenever you enter a LOWE ELECTRONICS' shop . . .

. . . . be it Glasgow, Darlington, Cambridge, Cardiff, London or here at Matlock, then you can be certain that, along with a courteous welcome, you will receive straightforward advice. Advice given, not with the intention of "making" a sale, but the sort which is given freely by one radio amateur to another. Of course, if you decide to purchase then you have the knowledge that LOWE ELECTRONICS are the company that set the standard for amateur radio shops and after-sales service. The shops are open Tuesday to Friday from 9.00 to 5.30pm, Saturday from 9.00 to 5.00 pm and close for lunch each day from 12.30 till 1.30pm.

In Glasgow the LOWE ELECTRONICS' shop (the telephone number is 041 945 2626) is managed by Sim GM3SAN. Its address is 4/5 Queen Margaret's Road, off Queen Margaret's Drive. That's the right turn off Great Western Road at the Botanical Gardens' traffic lights. Street parking is available outside the shop and afterwards the Botanical gardens are well worth a visit . . .

In the North East the LOWE ELECTRONICS' shop is found in the delightful market town of Darlington (the telephone number is 0325 486121) and is managed by Don G3GEA. The shop's address is 56 North Road, Darlington. That is on the A167 Durham road out of town. A huge free car park across the road, a large supermarket and bistro restaurant combine to make a visit to Darlington a pleasure for the whole family.

Cambridge, not only a University town but the location of a LOWE ELECTRONICS' shop managed by Tony G4NBS. The address is 162 High Street, Chesterton, Cambridge (the telephone number is 0223 311230). From the A45 just to the north of Cambridge turn off into the town on the A1309, past the science park and turn left at the first roundabout, signposted Chesterton. After passing a children's playground on your left turn left again (between the shops) into Green End Road. Very quickly, and without you noticing it, Green End Road becomes High Street. Easy and free street parking is available outside the shop.

For South Wales, the LOWE ELECTRONICS' shop is located in Cardiff. Managed by Richard GW4NAD, who hails from Penarth, the shop (the telephone number is 0222 464154) is within the premises (on the first floor) of South Wales Carpets, Clifton Street, Cardiff. Clifton Street is easily found, being a left turn off Newport Road just before the Infirmary. Once in Clifton Street, South Wales Carpets is the modern red brick building at the end of the street on the right hand side. Enter the shop, follow the arrows past the carpets, up the stairs and the "Emporium" awaits you. Free street parking is available outside the shop.

LOWE ELECTRONICS' London shop is located at 223/225 Field End Road, Eastcote, Middlesex (the telephone number is 01 429 3256). The shop, managed by Andy G4DHQ is easily found, being part of Eastcote tube station buildings and as such being on the Metropolitan and Piccadilly lines (approximately 30 minutes from Baker Street main junction). For the motorist, we are only about 10 minutes' driving time from the M40, A40, North Circular Road (at Hanger Lane) and the new M25 junction at Denham. Immediately behind the shop is a large car park where you can currently park for the day for 20p. There is also free street parking outside the shop.

Although not a shop there is on the South Coast a source of good advice and equipment—John G3JYG. His address is 16 Harvard Road, Ringmer, Lewes, Sussex. (telephone 0273 812071). An evening or weekend telephone call will put you in touch with John.

Finally, here in Matlock, David G4KFN is in charge. Located in an area of scenic beauty a visit to the shop can combine amateur radio with an outing for the whole family. May I suggest a meal in one of the town's inexpensive restaurants or a picnic on the hill tops followed by a spell of portable operation.

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IC-751

The IC-751 could be called the flagship of the ICOM range as it features 32 memory channels, full HF receive capability, digital speech synthesizer, computer control and power-supply options. The 751 is fully compatible with ICOM auto units such as the AT-500 and IC-2KL. The IC-751 now has a remote push-button frequency selector pad

Standard features include: a speech processor, switchable choice of J-FET pre-amp or 20dB pin diode attenuator and two VFO's, marker, 4 variable tuning rates, pass band tuning, notch, variable noise blanker, monitor switch, direct feed mixer in the front end, full break-in on CW and AMTOR compatibility.

The first IF is 70.045 MHz. Any XIT and RIT adjustment is shown on the display. The transmitter features high reliability 2SC2904 transistors in a low IMD (-32dB@ 100W) full 100% duty cycle. For more detailed information on this excellent set, please get in touch with us.

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.

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.

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

Gordon also sells Yaesu products.

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Please note that we now have a new retail branch at 95, Mortimer Street, Herne Bay, Kent. tel:69464. Give it a visit, BCNU.

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Dept RC, 143 Reculver Road, Herne Bay, Kent. Tel:(02273) 63859/63850

Have you made any New Year resolutions, Bernie?

ARE

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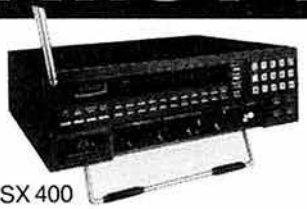

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★ Memory and scan facilities
★ VHF converters available

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AMT-2 ALL MODE TERMINAL UNIT

A new standard in intelligent terminal units, the AMT-2 gives superlative AMTOR/RTTY/CW/ASCII performance when used with any computer equipped with a serial interface and ASCII terminal emulation software. Incorporates its own microprocessor for code conversion, leaving your own computer free to do other creative tasks.

Many programmable features and excellent 'on air' performance. The AMT-2 is the logical successor to the proven AMT-1 which is presently in use on all continents and by both ARRL and RSGB headquarters stations. The AMT-2 offers the following features:

- —Built in 'panadaptor' type LED tuning indicator
- —12 Volt DC input
- —Programmable data rates
- —Wide/narrow receive shifts
- —CW receive as standard
- —300/1200 Baud RS232 computer interface
- —RTTY 'Squelch' to prevent printing on noise
- —Excellent demodulator circuit with 4 pole bandpass filter
- —European IARU tones
- —FSK and AFSK outputs

Your computer needs no specialised RTTY software.

Price: **£229.95**
P&P: £2.50

Whilst the AMT-2 will operate with any general purpose ASCII data communications software, specialised software is available from ICS for the following micros which incorporates additional amateur radio operating features:

Computer	*Items supplied*	*Price*
Commodore 64	Cartridge or disc plus cable	**£51.75**
VIC-20		**£51.75**
BBC Model B		**£44.85**
IBM-PC		**£23.00**
Apple II		**£23.00**

Add £1.00 p&p

THE AMT-2 IS FIRST CHOICE FOR THOSE WHO WANT MAXIMUM PERFORMANCE AND VERSATILITY; MAY WANT TO WRITE THEIR OWN CONTROLLING SOFTWARE, OR MAY WISH TO CHANGE COMPUTERS IN FUTURE WITHOUT BUYING NEW SOFTWARE.

USA made

CP-1 TERMINAL UNIT

This excellent modulator/demodulator incorporates its own 'magic eye' tuning indicator and comes with an external 240 Volt power supply. Separate mark and space filters link to a front panel tuning control which permits adjustment for any shift up to 1000Hz. The CP-1 has the sensitivity to pick out RTTY signals close to the noise level and it also incorporates an excellent CW demodulator. Interface to the computer is at TTL or (optionally) RS232 levels. Unlike the AMT-2, this unit does not incorporate its own microprocessor and therefore requires special RTTY software to run in your computer. It is compatible with most available RTTY software.

Other features are:

- —IARU tones
- —FSK, AFSK and oscilloscope outputs
- —Front panel tone reversal switch
- —Simple connection to SPKR, MIC, PTT lines on your transceiver.

Price: **£189.95** p&p £2.50

Compatible software available from ICS is as follows:

Computer	*Modes*	*Price*
Commodore 64	RTTY/CW/ASCII	**£39.00**
Commodore 64	AMTOR/RTTY/CW/ASCII (MBA-TOR)	**£69.00**
VIC-20	RTTY/CW/ASCII	**£39.00**
BBC Model B	RTTY only	**£39.00**

Add £1.00 p&p

The price of the software includes a made up interface cable, keyboard overlays and manual.

THE CP-1 IS FIRST CHOICE FOR THOSE WISHING FOR THE BEST POSSIBLE PERFORMANCE ON H.F. USING RTTY CODE CONVERSION SOFTWARE RUNNING ON A HOME MICRO COMPUTER.

UK made

RM-1 RADIO MODEM

The RM-1 is a ruggedly built, low cost modem which offers the minimum needed to get on the air with conventional RTTY or high speed ASCII data communication. It is designed primarily for use on VHF with AFSK, where signal levels are generally good and QRM levels are relatively low. The RM-1 lacks the extensive filtering and tuning indicators of our other units, but the performance is surprisingly good for the price. It is also provides adequate performance on HF, provided you do not want to work extremely weak signals.

Three modes are selectable:

- 170 Hz IARU tones for RTTY use
- Wide shift IARU tones for ASCII data transmission at up to 1200 Bauds (can also be used to demodulate 425, 850Hz shift RTTY).
- CW transmit and receive.

Other features are:

- —Interface and software compatible with the CP-1 and AMT-2
- —Plugs in in place of the AMT-2 for high speed data trasmission.
- —Both TTL and RS232 level interfaces are provided
- —Tone reversal switch
- —12 Volt DC input
- —Simple MIC/SPKR/PTT connection to transceiver.

Price: **£89.50**
p&p £1.50

All software listed for the CP-1 is also suitable for the RM-1.

THE RM-1 IS FIRST CHOICE FOR THOSE STARTING OUT ON RTTY WITH A RESTRICTED BUDGET AND FOR EXPERIMENTERS WANTING TO SWAP PROGRAMS AT HIGH DATA RATES ON VHF.

For details of full product range, see November and December RADCOM

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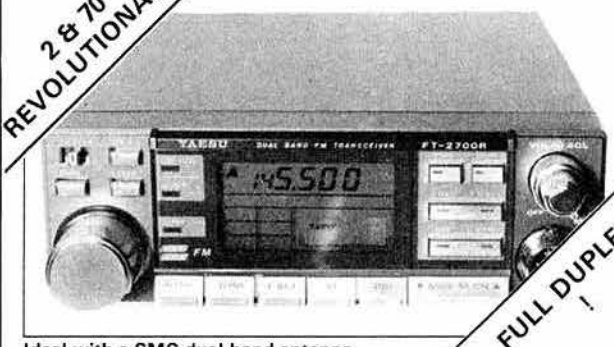

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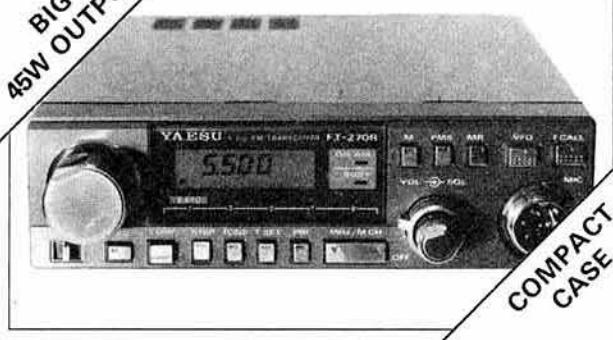

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FMUTONE	FM unit	46.00
XF8.9KA	6KHz AM filter	19.35
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XF8.9KC	600Hz CW filter	19.35
XF10.7KC	800Hz CW filter	17.65
FTV107R	Transvertor (main frame only) 2 band capability	39.00*
D3000227	Modification kit Fan	7.30
D300253	Modification kit Noise Blanker	12.25
SETONE	Extender Board kit	54.80
WMTONE	Workshop Manual	15.00
PARTONE	Parts List	10.00
FT77	Transceiver 8 band mobile multimode 100 watts	479.00
FT77S	Transceiver 8 band mobile multimode 10 watts	449.00
MRKT77	Calibration marker unit option	10.75
FMUT77	FM Board option	28.35
AMUT77	AM Board option	23.75
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XF8.9KC	600Hz CW filter	19.35
MMB16	Mobile mounting bracket	14.95
FV700DM	Digital V.F.O.	209.00
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FRB757	Switch box for FT757GX to FL2100Z	9.95
MMB20	Mobile mount for FT757GX	19.95
FIF61‡	Computer interface for PC6001 (NEC)	TBA
FIF65(A)‡	Computer interface for Apple II	54.80
FIF80(A)‡	Computer interface for PC8001 (NEC)	106.20
FIF232C‡	Computer interface RS232C	58.65
TST757	Technical Supplement FT757	8.50
FT980	Transceiver General Coverage Rx Amateur Tx	1475.00
D2000035	General Coverage Tx Kit	9.95
D3000286	Curtis Keyer	31.05
SP980	External speaker with audio filter	64.40
SP980P	External speaker with phone patch	86.25
XF455-8MCN	300Hz CW filter (455KHz 8 pole)	48.70
XF8.9HC	600Hz CW filter	29.90
XF8.9GA	6KHz AM filter	29.90
D410004	Interconnect lead FT980 to FC757AT	26.45
TST980	Technical Supplement FT980	8.50
FL2100Z	Linear 160-10M (9 band) 1-2KW P.I.P	649.00
FRG7700	Receiver 0-15-30-0MHz AM/CW/SSB/FM	385.00
FRG7700M	Receiver c/w 12 channel memory	455.00
DCRG7700	DC modification kit	1.50
MEMG7700	Memory option	74.75
FRT7700	Antenna tuner/switch	48.30
FRA7700	Active antenna	43.70
FF5	Low pass filter 500KHz	10.75
FRV7700A	Convertor 118-130, 130-140, 140-150MHz	89.70
FRV7700B	Convertor 118-130, 140-150, 50-59MHz	90.85
FRV7700C	Convertor 140-150, 150-160, 160-170MHz	85.10
FRV7700D	Convertor 118-130, 140-150, 70-80MHz	92.00
FRV7700E	Convertor 140-150, 150-160, 118-130MHz	94.30
FRV7700F	Convertor 150-160, 160-170, 118-130MHz	94.30
WMRG7700	Workshop manual FRG7700	9.00
FRG8800	Rx 0-15-30-0MHz AM/CW/SSB/NBFM	525.00
FRV8800	Convertor 118-175MHz	95.00
FRVWFM	Module for wide band F.M.	TBA
YM24A	Hand 2K, 6 pin min, speaker/mic, handheld	23.75
YM36	Hand 600, 8 pin, noise cancel	18.80
YM37	Hand 600, 8 pin	9.20
YM38	Stand 600/50K, 8 pin scan	32.95
YM39	Hand 600, 6 pin min keyboard	46.00
YM47	Hand 600, 7 pin, scan control	12.65
YM48	Hand 600, 8 pin, keyboard	46.00
YM49	Hand 600, 7 pin, speaker/mic	20.30
YM50	Hand 600, 7 pin, keyboard	46.00
YE7A	Hand 600, 4 pin	9.20
YD148A	Stand 600/50K, 4 pin	26.45
MH-1B8	Hand 600, 8 pin scan adjustable tone	16.85
MD-1B8	Desk 600, 8 pin scan adjustable tone	64.40
SP55	External Mobile speaker	14.95
YH55	Headphones padded low Z ¼" jack	14.95
YH77	Headphones lightweight low Z ¼" jack	14.95
MF-1A3B	Boom Microphone Mobile	19.95
YH1	Lightweight mobile headset/boom	14.95
SB1	PTT switch box wired for FT208/FT708	17.25
SB2	PTT switch box wired for FT290/FT790	14.55
SB3	PTT switch box wired for FT202	15.70
FT203R	Tx/Rx Thumbwheel, 2M, 1-5W c/w FBA5 case	155.00
FT203R	Tx/Rx Thumbwheel, 2M, 2-5W c/w FNB3	185.00
FT203R	Tx/Rx Thumbwheel, 2M, 3-5W c/w FNB4 Nicads, CSC7	190.00
FT703R	Tx/Rx Thumbwheel, 70cm c/w FBA5 cell case	TBA
FT703R	Tx/Rx Thumbwheel, 70cm c/w FNB3 Nicads, CSC6	TBA
FT703R	Tx/Rx Thumbwheel, 70cm c/w FNB4 Nicads, CSC7	TBA
FBA5†	7-2-9V cell case only (6 × AA)	6.50
FNB3†	10-8V Nicd Pack (425mAH)	35.00
FNB4†	12-0V Nicd Pack (500mAH)	40.00
CSC6	Soft carrying case (FBA5 or FNB3)	5.75
CSC7	Soft carrying case (FNB4)	6.90
FTS7†	Sub Audio Tone Board (replaces FTE-2)	29.90
YH2†	Headset (PTT via vox)	14.55
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MMB21†	Mobile hanging bracket	7.65
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NC9C†	Charger mains (FNB-3)	9.60
SMC8-9AA†	Charger mains (13 Amp style)	8.45
NC18C†	Charger mains (FNB-4)	9.60
NC15†	Charger quick/DC adaptor	57.50
YHA14	Antenna helical (BNC fitting) 2M	7.30
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FT209R	TX/Rx "Keyboard" 2M, 2-7W c/w FNB3	239.00
FT209R	Tx/Rx "Keyboard" 2M, 3-7W c/w FNB4	249.00
FT209RH	Tx/Rx "Keyboard" 2M, 2-3W c/w FBA5 case	229.00
FT209RH	Tx/Rx "Keyboard" 2M, 3-7W c/w FNB3	259.00
FT209RH	Tx/Rx "Keyboard" 2M, 5-0W c/w FNB4	269.00
FT709R	Tx/Rx Keyboard, 70cms, c/w FBA5 cell case	TBA
FT709R	Tx/Rx Keyboard, 70cms, c/w FNB3 Nicads	TBA
FT709R	Tx/Rx Keyboard, 70cms, c/w FNB4 Nicads	TBA
CSC10	Carrying case (FBA5/FNB3)	6.90
CSC11	Carrying case (FBN4)	7.65
FT208R	Tx/Rx Handheld, 2M, 2-5W, Keyboard	209.00
FNB2	Nicad Battery Pack	23.00
FBA2	Battery pack sleeve (fits FNB2)	3.85
FBA3	Charging sleeve (for use with FT207 acc)	6.50
SMC8.9AA	Slow charger (13A style)	8.45
NC9C	Slow charger	9.60
NC7C	Base Master	34.65
NC8C	Base Master with quick charge and PSU	56.75
PA3	Battery eliminator and charger from 12V	16.85
SMCFLC5	Heavy duty leather case	25.30
FTS32	Tone squelch unit	76.65
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WMT708	Workshop Manual FT708	8.00
FT230R	Transceiver 2M FM 25W synthesised	269.00
FT730R	Transceiver 70cm FM 10W synthesised	239.00
MMB15	Mobile mounting bracket	14.55
FT270R	Transceiver 2M, FM, 25W synthesised	325.00
FP270RH	Transceiver 2M, FM, 45W synthesised	380.00
FT2SNYTH	Voice synthesiser module	TBA
FT690R	Transceiver 6M 2-5W multimode synethesised	289.00*
FT290R	Transceiver 2M 2-5W multimode synthesised	309.00
FT790R	Transceiver 70cm 1W multimode synthesised	299.00*
SMC2-2C	Nicad cell, 2-2 A/hr 'C' size	2.70
NC11C	Slow charger (180mA)	10.75
SMC8C	Slow charger (220mA) (13A style)	9.60
MMB11	Mobile mount	28.75
CSC1A	Soft carrying case	4.60
Q3000020	Antenna telescopic (spare)	6.15
YHA15	Flexible helical antenna	5.75
YHA44	Antenna 70cms, 0-5 wave, semi-flexi	7.65
YHA44D	Antenna 70cms, 0-25 wave, semi-flexi	9.95
FL2010	Linear amplifier 2M 10W	69.00
FL6010	Linear amplifier 6M 10W	50.00*
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FP80A	Power supply unit	57.50
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WMT480R	Workshop Manual FT480R	13.00
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TST726	Technical Supplement 726	8.50
FT2700R	Tx/Rx, 2M/70cms, 25W/25W, full duplex	520.00
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QTR24D	World time clock quartz	34.50
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SCANNING RECEIVER

MS-8400

From S.M.C. the MS-8400 VHF/UHF microprocessor controlled scanning receiver with 40 programmable memory channels, keyboard entry of frequency or command; automatic band search, AM and FM selectable, 4 selectable scanning steps, priority channel, connections for external antenna, DC supply and loudspeaker. Supplied c/w telescopic antenna mounting bracket, etc.

SPECIFICATIONS

Frequency Range:	Low VHF 68.000 MHz ~ 88.000 MHz Mid VHF 108.000 MHz ~ 136.000 MHz High VHF 136.005 MHz ~ 174.000 MHz UHF 360.000 MHz ~ 512.000 MHz
Scanning steps:	5, 10, 12.5 and 25 KHz VMF (10, 12.5 and 25 KHz UHF)
Channels:	40 programmable memories
Modes:	AM or FM selectable
Scan rate:	Approximately 18 channels per second
Scan delay:	2 seconds **Priority sampling:** 4 seconds
Audio output:	1.2 Watts
Selectivity:	Better than – 60 dB @ ± 25KHz
Power supply:	DC 12V ~ 16V 0.6A max
Memory backup:	9 volt, battery (PP3)
Antenna:	Telescopic antenna or External
Loudspeaker:	2.5" × 4" oval speaker
Size:	190(W) × 250(D) × 85(H) mm
Weight:	1.7kg

£249.00 inc.

Price includes free carriage

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PMH4/2M	Harness 4 way 144MHz	**£31.62**	£1.65
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MBM28/70	28 ele Multibeam	11·5dBd **£23.00**	£2.65
MBM48/70	48 ele Multibeam	14·0dBd **£37.95**	£2.65
MBM88/70	88 ele Multibeam	16·3dBd **£51.75**	£2.65
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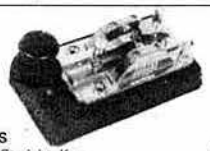

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SMC11V11S	Glass fibre loaded radials	**£32.95**	£2.65
SMC10SE	10M Mobiie whip	**£15.95**	£2.00
RSL-28b	Yaesu 10M mobile whip	**£10.65**	£2.00
SMCGCCA	Gutter mount and cable	**£10.95**	£2.00
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GW BASE	Base for all G. Whips	**£6.90**	£1.00
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NB. PRICES INCLUDE VAT AT 15%
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KR600RC

9502B

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KR400	Bell	6 Core	Matches KR500	**£109.95**
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KR400RC	Bell	6 Core	Medium Duty	**£132.50**
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KR600RC	Bell	8 Core	Heavy Duty	**£189.50**
HAM IV	Bell	8 Core	Heavier Duty	**£299.00**
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RC8W	8 Way	mtr **£0.59**	£1.90
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KC038	Lower Mast Clamp for KR400 600 etc	**£12.85**	£2.50

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HF ANTENNAS

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EX14	Explorer 10-20m	£335.00	£5.95
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
HO1	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			
12AVQ	Vertical 10-20m	£54.00	£2.75
14AVQ	Vertical 10-40m	£73.00	£2.75
18AVT/WB	Vertical 10-80m	£119.00	£2.75
18V	Vertical 10-80m taped	£38.50	£2.75
C4	Vertical 10-20m	£69.00	£2.65
SMCHF5V	Vertical 10-80m	£65.00	£2.65
SMCHF5R	Radial Kit for above	£39.85	£2.65
TRAP DIPOLE			
SMCTD/HP	High Power 10-80m	£47.50	£2.65
SMC TD/P	Portable inc coax	£67.50	£2.65
MOBILE			
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

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

POWER METERS

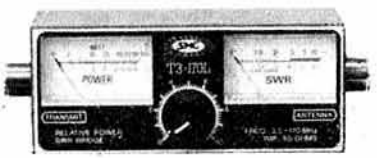
IN LINE POWER/SWR BRIDGES P.E.P., AVERAGE 1·8-440MHz

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 Internl 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	41.50
FS7	145&(432 MHz)	5/20/(200)	(200W on 144 only)	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, 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 ¼λ	5.75	0.85
SMCT144h	Telescopic 2M ¼ wave BNC	9.95	0.85
SMC6P2T/BNC	Telescopic 2M BNC fitting ¼λ	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 ½ wave BNC 2.5dB¼	7.95	0.65
SMC2QW	2M ¼ wave 0dB¼ 1.6'	2.70	1.85
SMC2NE	2M ¼ wave fold 3.0dB¼ 4.3'	7.95	2.00
SMC2VF	2M ¼ wave fold 3.0dB¼ 3.5'	13.65	2.00
SMC78F	2M ¼ wave fold 4.5dB¼ 5.7'	15.95	2.50
SMC78B	2M ¼ wave ball 4.5dB¼ 5.6'	15.95	2.59
SMC78SF	2M ¼ wave short 4.7'	15.95	2.50
SMC88F	2M 8/8 wave 5.2dB¼ 6.5'	21.95	2.50
SMC118M	Colinear 2M 11/8 7dB¼ 9.7'	33.35	2.65
SMC258	70cm 2×½ fold 5.5dB¼ 3.1'	15.60	2.00
SMC268C	70cm 2 section colinear 6dB¼	25.95	2.00
SMC358	70cm 3×½ 6.3dB¼ 4.7'	19.65	2.00
SMC70N2M	Dual band 2M 2.7dB¼ 70cm 5.1dB¼ (½λ & 2½λ)	19.65	2.00
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 PL259	5.65	1.50
SMCSOCAL	Cable assembly 6M PL259	5.95	1.50
SMC50CALLR	Cable assembly 5M PL259	6.50	1.50
SMCROL	Rollet, 10mm thick (for above)	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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See preceding pages for complete addresses and phone numbers of branches

RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY REPRESENTING ALL UK RADIO AMATEURS

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

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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

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

COUNCIL OF THE SOCIETY

PRESIDENT: J Heathershaw, G4CHH (Mrs)

EXECUTIVE VICE-PRESIDENT *(To be elected)*

IMMEDIATE PAST-PRESIDENT R G Barrett, GW8HEZ

HONORARY TREASURER P F D Cornish, FCA, G3COR

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D S Evans, PhD, FIM, CEng, G3RPE
H M Holmden, G4KCC
G R Jessop, CEng, MIERE, G6JP
B O'Brien, G2AMV
D M Pratt, BEng, CEng, MIEE, MIERE, G3KEP
G R Smith, BSc, MBIM, G4AJJ
K E V Willis, BSc, ARCS, CEng, MIEE, G8VR

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Zone A	*(Regions 1, 2 and 18)*	D S Smith, G4DAX	**Zone E**	*(Regions 10 and 11)*	*(Post vacant)*
Zone B	*(Regions 3, 4 and 5)*	H S Pinchin, BSc, MBIM, G3VPE	**Zone F**	*(Region 15)*	J T Barnes, GI3USS
Zone C	*(Regions 7, 8, 16 and 19)*	W J McClintock, MSc, G3VPK	**Zone G**	*(Regions 12, 13 and 14)*	F Hall, GM8BZX
Zone D	*(Regions 6, 9, 17 and 20)*	J N Gannaway, G3YGF			

REGIONAL REPRESENTATIVES

Region 1	*(Cheshire, Cumbria, Gtr Manchester, Isle of Man, Lancashire, Merseyside)*	B Donn, G3XSN.
Region 2	*(Humberside N of Humber, North, South, West Yorkshire)*	*(Post vacant)*
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Region 5	*(Bedfordshire, Cambridgeshire, Northamptonshire)*	J S Allen, G3DOT. Tel 0582 21151.
Region 6	*(Berkshire, Buckinghamshire, Oxfordshire)*	F S G Rose, G2DRT. Tel 0494 814240.
Region 7	*(Gtr London S of Thames, Surrey including part of London N of Thames administered by Surrey)*	R Sykes, G3NFV. Tel 0372 372587.
Region 8	*(Kent, East Sussex, West Sussex)*	M Elliott, G4VEC. Tel 0795 70132.
Region 9	*(Cornwall, Devon)*	*(Post vacant)*.
Region 10	*(Dyfed, Gwent, Mid Glamorgan, Powys, South Glamorgan, West Glamorgan)*	E J Case, GW4HWR. Tel 0222 810368.
Region 11	*(Clwyd, Gwynedd)*	B H Green, GW2FLZ. Tel 0492 49288.
Region 12	*(Grampian, Highland, Island Authorities, Tayside)*	M R Hobson, GM8KPH. Tel 0796 2140.
Region 13	*(Borders, Fife, Lothian)*	A Givens, GM3YOR.
Region 14	*(Central, Dumfries and Galloway, Strathclyde)*	T G Wylie, GM4FDM. Tel 0505 22749.
Region 15	*(Northern Ireland)*	*(Post vacant)*
Region 16	*(Essex, Norfolk, Suffolk)*	A Owen, G4HMF.
Region 17	*(Isle of Wight, Channel Islands, Dorset, Hampshire, Wiltshire)*	T M Emery, G3KWU.
Region 18	*(Cleveland, Durham, Northumberland, Tyne & Wear)*	*(Post vacant)*
Region 19	*(Greater London N of Thames, Hertfordshire)*	R J Broadbent, G3AAJ.
Region 20	*(Avon, Gloucester, Somerset)*	N F O'Brien, G3LP.

HONORARY OFFICERS

Aerial Planning Panel co-ordinator: (c/o MSO, RSGB HQ)
Audio Visual Library co-ordinator: R G Auckland, G2PA
Awards managers. HF: P Miles, G3KDB; **VHF:** Jack Hum, G5UM
HF manager: E J Allaway, G3FKM
Microwave manager: D S Evans, G3RPE
Observation Service organizer: R J Osborne, G4FJN
Slow morse practice transmissions organizer: M A C MacBrayne, G3KGU
VHF manager: K A M Fisher, G3WSN

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

ANNUAL SUBSCRIPTION RATES

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

RSGB QSL BUREAU

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

A list of QSL Bureau sub-managers was published in 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

RSGB USER REPORTS

This issue contains, as a loose insert, the first of what we expect will be a series of questionnaires intended to tap members' experience with their commercial amateur radio equipment. It is hoped that, given this opportunity to share their knowledge, sufficient members will co-operate in producing what should be an invaluable consensus of opinion.

In this first questionnaire (which owes much to an earlier *Ham Radio* (USA) version) the equipment is not specified: members may choose the equipment on which they wish to report. It may be that sufficient replies will be received concerning the more popular equipment to enable reasonable conclusions to be drawn from this first questionnaire. If not, it will be obvious which equipment is of greatest interest, and future questionnaires will specify the particular equipment on which additional reports are required.

If successful, these user reports should give a broad picture of how a large number of users (and, in general, critical users) have reacted to the equipment as regards its effectiveness, ease of handling and reliability, perhaps over a very long period. They should also give a picture of the success or otherwise of different ways of buying it and having it repaired. The reports will therefore complement, and certainly not replace, the well-established technical reviews which appear regularly in *Radio Communication*, and which place their emphasis on the technical aspects of recently-introduced pieces of equipment.

The value of these user reports will strongly depend on getting a representative set of replies which fairly reflect the strengths and weaknesses of the equipment. One risk of this type of review seems to be that of distortion caused by the greater pen power of those who wish to complain compared with those who would praise. For this reason, we would like to see as many replies as possible from satisfied as well as dissatisfied users.

David Evans, G3OUF

CLASS B LICENSEES TO USE MORSE

Mr John Butcher MP, Parliamentary Under Secretary of State for Industry, announced on 7 December that, as a result of discussions between the Department of Trade & Industry and the Radio Society of Great Britain, holders of the Amateur Radio Licence (B) who wish to use morse code in their radio contacts may do so for an experimental period of one year.

The experiment will start on 1 April 1985 and last until 31 March 1986. Any Class B licensees interested in participating in the experiment should request a letter of variation to their licence to permit them to transmit morse code from their station address. Requests should be sent to: The Secretary, RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JW. Applicants should enclose two first-class stamps *(34p)* to cover costs and postage. There is no selection process. All applicants who hold a current Amateur Radio Licence (B) will receive a letter of variation and a copy of a leaflet called *Guidelines for Class B licensees using morse.*

It is hoped that the experiment will encourage Class B licensees to practise the sending and receiving of morse in preparation for the amateur morse test, and help them to see its advantages as a mode of transmission. At present there are in force over 27,000 Class B licences and about 25,000 Class A licences.

The RSGB News Bulletin *included with this issue contains a commentary on this experiment.*

A MESSAGE FROM THE 51st PRESIDENT OF THE RSGB

I would be less than honest if I did not admit to looking forward to being the 51st President of the RSGB with a mixture of trepidation and excitement: trepidation arising from the various tasks that I personally, and we the Society, will face during the coming year; excitement arising from my confidence in the support that I will receive and in the readily demonstratable ability of the Society to tackle such problems.

My own interests and experience are primarily in the field, both through my work as a Zonal Member of Council and in the Raynet organisation. Like my immediate predecessor, I would like to use what influence I can bring to improving the organization of amateur radio at the local level—which surely must represent the real heart of amateur radio. In this I am convinced of the role of affiliated Clubs which have as members such a high proportion of the *active* amateur population.

I look forward to joining with all members in bringing together the best aspects of the national and local organizations in order to advance the interests of amateur radio as a whole. In these endeavours, I extend my best wishes to all for a happy and successful 1985.

Joan Heathershaw, G4CHH

Amateur Radio News

FRONT COVER

The Icknield District Jamboree on the Air station GB2IDS at St Andrew's Scout HQ, Luton, in October last year. The photograph shows some of the operators, G8CBU, G8IXK, G4PCS and G6PPV, plus Scouts and Leaders from Scout groups in the district, watching an sstv QSO with GB2ES, Edlesborough Scouts, Dunstable district. In addition to sstv, hf and vhf stations were also in use. The Scouts all took an active part; log-keeping, filling-in QSL cards, drawing captions for sstv, and sending greetings messages.

More activity on 50MHz

Last November the Department of Trade & Industry selected 60 successful applicants for 50 MHz operating permits additional to the 40 who have already operated in that part of the spectrum for some time. The full list of permit holders is:

GI3RXV, Co Londonderry; GI3ZSC, Co Antrim; GI3ZTL, Co Londonderry; GI4LXL, Co Antrim; GI4MJD, Londonderry; GJ3RAX, St Brelade; GJ3YHU, St Lawrence; GM3DOD, Greenock; GM3JIJ, Stornoway; GM3WCS, Dunfermline; GM3WOJ, Rosemarkie; GM3WTA, Inverurie; GM3YMK, Milltimber; GM3ZBE, Inverurie; GM4BYF, Edinburgh; GM4CXP, St Boswells; GM4DIJ, Edinburgh; GM4FDT, Invergordon; GM4FZH, Newcastleton; GU3UOQ, Guernsey; GW3LDH, Wrexham; GW3MHW, Bontnewydd; GW4BCD, Porthcawl; GW4HBK, Blackwood; GW4HXO, Haverfordwest; G2ADR, York; G2AHU, Leominster; G2AOK, Gloucester; G2SP, Beeston; G3APY, Mansfield; G3AZI, Preston; G3COJ, High Wycombe; G3ENY, Bridgnorth; G3FDW, Retford; G3FIJ, Colchester; G3HZG, Redditch; G3IMW, London; G3JVL, Hayling Island; G3KEV, Scarborough; G3LEQ, Knutsford; G3LTF, Harlow; G3MCS, Aylesbury; G3NCL, High Wycombe; G3NNO, Harrogate; G3NOX, Saffron Walden; G3NSM, Oxford; G3OBD, Poole; G3OHH, Stoke-on-Trent; G3OSS, London; G3PBV, Newton Abbot; G3PWK, Ely; G3RMB, Coventry; G3SNN, Gloucester; G3TAA, London; G3TCU, Godalming; G3UFS, Lancing; G3UGF, Bradford; G3UHH, Driffield; G3USF, Newcastle-under-Lyme; G3UUT, Cambridge; G3VZJ, Arundel; G3WBN, Croydon; G3WZT, Horsham; G3ZIG, Dereham; G3ZJY, Durham; G4AFJ, Leicester; G4ASR, Hereford; G4BAO, Cambridge; G4CUT, Chelmsford; G4DGU, Holsworthy; G4ENA, Stroud; G4FXW, Sheffield; G4GEE, Coventry; G4GLT, Bardon; G4HFO, St Austell; G4HK, Wilmslow; G4HUP, Woodbridge; G4IDE, Wolverhampton; G4IFX, Runcorn; G4IIL, Brighton; G4IJE, Bishop's Stortford; G4JLH, Ryde; G4LOJ, Norwich; G4NBS, Hardwick; G4NVS, Huntingdon; G4OBK, Chorley; G4OTV, Tunbridge Wells; G4OXY, Portishead; G4RXD, Sandbach; G4SHP, Sidcup; G4TRQ, Leeds; G4UPS, Taunton; G4VET, Carshalton; G5GX, Hull; G5KG, Southwell; G5KW, Gravesend; G5UM, Leicester; G6NB, Aylesbury; G6XM, Christchurch; and G8VN, Derby.

An interesting development is that the Norwegian authorities have apparently issued 25 experimental permits for operation on the 50MHz band outside tv hours. Norway is expected to close down its Band 1 television service during 1985-86 and, according to one source, there is "a very good chance indeed" of a permanent allocation to Norwegian amateurs at 50MHz. The vhf/uhf manager of the Norwegian society, NRRL, is now Just N Qvigstad, LA9DL.

Region 2 representative

Mr P N Butterfield, G3AAQ, having resigned this position (see Region 2 contribution in "Club News" p54), an election will be necessary to fill the position of Region 2 representative.

Any five corporate members resident in Region 2 (Humberside N of the Humber, North, South and West Yorkshire) may nominate any other qualified corporate member resident in Region 2 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, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JW, on or before Monday 11 February 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 April 1985 issue of *Radio Communication*.

RSGB at the rallies

The 1985 rally season will shortly be upon us and the Society will once again have a stand at some of them. At present, it is envisaged that a Society bookstall and stand will be present at the VHF Convention, NARSA, the RSGB National Convention at the NEC, the Northern Mobile Rally, the RNARS Rally, the RSGB Mobile Rally at Woburn, the Preston Rally, the Lincoln Hamfest, the Leicester Rally, the Welsh Convention, the Scottish Convention and the Longleat Rally.

Because of staffing difficulties, the number of events which the Society will be able to attend in 1985 is slightly lower than in 1984, and we apologise for any disappointment which may be caused.

Taking the RAE?

The next Radio Amateur's Examination dates are Monday 18 March and Monday 13 May; the associated national closing dates being 15 January and 15 February respectively. Intending candidates should, however, check that their local examination centre has not brought these dates forward.

The examination may be taken at any of some 400 centres which are recognised by the City & Guilds of London Institute. The RSGB will be arranging two centres for the May examination only, one in central London and the other in Derby. Applications to sit the examination at either RSGB centre must be made on the form available from the membership services department at RSGB headquarters; the completed form **must** be returned by Friday 15 February.

Basicode 2 update

Reference "Computers and the RSGB", *Rad Com* October 1984, p837, the name of the translation tape is now Basicode 2+ and costs £4.95. It can be obtained from Basicode 2+, Broadcasting Support Services, 2 Cater Road, Bristol BS13 7TW; cheques to be made payable to Broadcasting Support Services.

RSGB COUNCIL ELECTION RESULT

The result of the ballot to fill three vacancies on Council from 1 January 1985 was as follows:

Candidate	Votes
ORDINARY MEMBER	
E J Allaway, G3FKM	2,394
J Bazley, G3HCT	738
R Royall, G8ESB	743
ZONE C MEMBER	
J Greenwell, G3AEZ	220
I Lundegard, G3GJW	527
W J McClintock, G3VPK	535
ZONE D MEMBER	
E Briggs, G3IJU	150
J N Gannaway, G3YGF	462
F S G Rose, G2DRT	366

Messrs E J Allaway, G3FKM; W J McClintock, G3VPK: and J N Gannaway, G3YGF, were accordingly elected to serve on Council for the three years 1985-87.

Discovery on the air

The Royal Research Ship *Discovery*, operated by the Natural Environment Research Council, is undertaking a major scientific expedition to carry out geophysical research in the Antarctic waters of the Scotia and Weddell Seas early this year. The chief scientist on board is Dr Peter Barker, leading a team from the University of Birmingham, supported by technical staff from Research Vessel Services and the Institute of Oceanographic Sciences of the NERC. For part of the expedition, an amateur radio station will be active and will use the "special event" callsign GB4DIS/MM.

RRS *Discovery* left Gibraltar on 7 December 1984, bound initially for Port Stanley, and then for Punta Arenas, Chile. Three amateur radio operators will join the ship at Punta Arenas, and GB4DIS will be active from early February until the ship reaches Montevideo, Uruguay, about 12 April 1985. RRS *Discovery* is scheduled to call briefly at Grytviken in South Georgia from 7 to 9 March, and subject to time being available and permission being granted, some operation from South Georgia on land may be possible.

The operators will be GW4SBB, GW4JAD and GW3RNP, and the station will be active on ssb, cw and possibly rtty in the 14 and 21MHz bands. Spot frequencies of 14,023 and 14,123kHz, for cw and ssb respectively, will be used daily between 1800 and 2000gmt for possible contacts with UK stations. The equipment will be an FT102 with an FT77 as back-up, with dipoles for each band. A special QSL card has been printed, and all contacts will be acknowledged.

Additional information may be obtained from: Dr Charles W Fay, GW4SBB, NERC Research Vessel Services, No 1 Dock, Barry, South Glamorgan CF6 6UZ.

Here is the news...

There are currently vacancies for GB2RS newsreaders in the following areas:

Bristol—additional reader transmitting ssb to the west on 144·25MHz at 1100.
Dumfries—reserve reader required for 145·525MHz fm transmission at 1100.
Dunfermline—transmitting ssb to the south on 144·25MHz at 1100.
Elgin—reserve reader required for 145·525MHz fm transmission at 1100.
Enniskillen—reserve reader required for 145·525MHz fm transmission at 1230.
East Scotland—reader required for 3,650MHz ssb transmission at 1430.
Exeter—reserve reader required for 144·25MHz ssb transmission to the northeast at 1000.

Anyone who is interested in these vacancies is asked to contact the membership services department at RSGB headquarters. Applicants will then be sent a simple form requesting details of equipment, coverage, etc, and a specimen GB2RS script which they will be asked to record on a cassette which will be supplied.

Changing your callsign?

Our attention was drawn in November 1984 to the fact that the UK licensing authority has a policy of not making refunds of licence fees available. This seems especially relevant to Class B licensees who subsequently take up a Class A licence with several months to run to the expiry date of the Class B licence. The Society has been informed by the DTI that, apart from the administrative costs involved in making a refund being prohibitive, the original fee was intended to pay for the cost of issue of the licence, the cost of follow-up administration and also a proportion of Radio Regulatory Division overheads. This being the case, for the present time the Society's advice to members intending to move from Class B to Class A licences is to plan the date of the changeover with a view to minimizing the costs involved in losing a proportion of the original licence fee. It is known that many people pass the RAE and take out a Class B licence in the interim prior to taking the morse test. If the Class B licence is only to be used for a month or so, perhaps the cost of doing so should be carefully considered.

Repeater news

Six new uhf units have recently been licensed: GB3BE at Bury St Edmunds on channel RB6, GB3YS at Yeovil on RB2, GB3AN at Anglesey on RB4, GB3DC at Durham on RB11, GB8LF at Staveley, Cumbria on RB14, and GB3BF at Carlton, Beds on RB15. Some alterations to existing units have also been agreed with the DTI. GB3HN at Hitchin, GB3KS near Dover, and GB3LA at Leeds, all have new sites and should be operational by the time that this is read. The original licence for a 1,296MHz repeater in South London has now been reallocated to a new group, who will establish the unit at Enfield, the callsign of the repeater will be GB3LN. GB3XX at Daventry has changed both its site and its channel and is now operational on RB13. Finally, GB3GD on the Isle of Man has also been licensed; as a consequence, GB3AS, near Carlisle, has changed channel from R1 to R0 in order to accommodate GB3GD on the Isle of Man, which will use R1. The existing GB3GD will change its callsign to GB3RY.

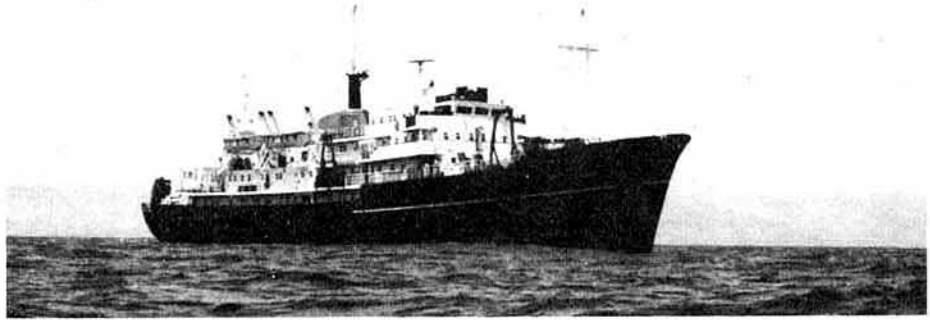
New licence documentation

Full computerization of the amateur licensing process is virtually complete, and some members may already have received licence fee reminders in the new form, using a "data mailer" very like that used by the Society for its membership card etc. In response to many comments over the years, a "validation document" will also be supplied, which will be of a convenient size for carrying in a wallet. It shows the holder's callsign and the expiry date of the licence, and a new one will be supplied when either a licence is renewed or a callsign or address is changed.

Copies of the validation document will normally be acceptable for the purpose of obtaining reciprocal licences etc, since the document confirms the callsign and expiry date of a licence.

News from Canada

Cable television is still a source of problems in Canada. Amateurs in Vancouver who were suffering from interference from catv systems appeared before the Canadian Radio-Television & Telecommunications Commission (CRTC) last February in connection with the re-licensing of a local cable company. The CRTC decision, which appeared in October 1984, renewed the cable operator's licence, but it also required the company to liaise with amateurs to resolve the problems. CRTC also required a progress report from the company to be submitted within two months of the



RRS *Discovery*

Profile—Rajiv Gandhi

The new Prime Minister of India, Mr Rajiv Gandhi, is a licensed radio amateur, callsign VU2RG, and his wife is also licensed as VU2SON. Rajiv Gandhi passed the Indian First Grade amateur examinataion in 1974 and received his callsign on 1 January 1975, and since then he has been quite active on 21, 28 and 144MHz. He built a home-brew hf cw/ssb transceiver and a two-element quad antenna within three months of becoming licensed, and these were in use until 1980.

Mr Gandhi was an airline pilot for several years and has a strong interest in electronics and computing. He has been instrumental in making education in computing available in Indian schools, and he apparently intends to ease restrictions on the importation of electronic equipment into India. According to the Indian national society ARSI, he has taken up various amateur causes such as the wish to allow importation of amateur equipment into India free of customs duty, and individual amateurs may use this facility until 31 March 1985. Mr Gandhi has also been involved in organizing emergency communications via amateur radio during cyclones and floods in the western part of the country, at a time when all other methods of communication failed.

Mr Gandhi's wife, Sonia, passed the First Grade amateur examination in 1975, and has been consistently active on 21, 28 and 144MHz. Their two children, Rahul and Priyanka, are also said to be interested in amateur radio, and they may be on the air in 1985.

To quote from some biographical material suppled by ARSI, it appears that Rajiv Gandhi, his wife and their children find in amateur radio "a quality or way of life", and the Society is delighted that another world statesman is evidently so aware of the positive and beneficial aspects of the hobby.

date of the decision, with a further report within six months.

In March 1983 there were 21,822 licensed radio amateurs in Canada; the corresponding figure for March 1982 was 21,225.

Courses

Waltham Cross

A one-day non-technical course entitled "An introduction to amateur radio" is to be held at Theobalds Park College, Waltham Cross, on 5 February 1985. It will provide basic information to help a newcomer to decide if amateur radio has anything to offer him or her. A special-event callsign has been applied for, and course members may have an opportunity to send greetings over the air.

The course fee is £6, including lunch and beverages, and the tutor is Tony Smith, G4FAI. Enquiries and bookings should be addressed to: The Principal, Theobalds, Bulls Cross Ride, Waltham Cross, Herts EN7 5HH, tel Waltham Cross 37255.

Huddersfield

Two courses for radio amateurs commence this month at Greenhead College, Huddersfield. On 7 January a three-term RAE course will commence, to be held from 7 to 9pm on Mondays; while on 9 January a three-term morse code course will commence, to be held from 7 to 9pm on Wednesdays. The part fee (for first eight-week period) for each course is £10.24. The tutor for both courses is Peter Mercer, G6CPM, tel 33036, from whom further details can be obtained.

Interference from an Ambassador

An out-of-the-way case of interference was recently reported to the Society. A British Telecom "Ambassador" telephone system in Edgware, Middlesex, was found to be radiating signals in the 144MHz band at sufficient strength to block channel S20 at an amateur radio station in a different street. The problem was tracked down to a single handset, which was apparently radiating data-type signals between 145·50-145·55MHz, 145·62-145·63MHz and 145·80-145·82MHz; there was also some radiation outside the 144MHz band. British Telecom have indicated that the offending handset (which is Type 8520, gen 84/1, embodying Modifications 1 and 2) will be replaced.

The Society would be most interested to hear of other cases of this nature. The interfering signal sounds like a high-pitched tone with superimposed fast pulses.

Radio Amateurs Old Timers Association

The sad passing of "Uncle Vic", G2UV, in 1981, was a great loss to RAOTA, for he was working hard to strengthen the association, and had acquired for us the call G2OT. In the same year the cost of the agm reduced our funds to a very low level, and it has not since been possible to arrange a further meeting. The weekly net on 3,570kHz at 11am on Thursdays still runs regularly and efficiently in the hands of G3DSI. Uncle Vic had hoped to arrange a second net at a more convenient time, for those occupied during working hours. Any offers?

It is hoped to arrange a meeting somewhere in the Midlands next spring when plans to revitalize RAOTA may be considered, but in an association which works on a life subscription as the only source of income, it has always been necessary to rely on voluntary contributions, which puts the load on those who can attend a meeting. With some hundreds of members, a small amount from each one would put us back in business. We need this help if the projected meeting is to happen. The treasurer is Miss A M Gadsden, 19 Drummond House, 50 Fonthills, Long Lane, London N2 8LF.

Seasons greeting to all members.

G6CJ, vice-president

Sic transit gloria 405

After almost 50 years, we say farewell to the UK's 405-line television system this month. Some sources are suggesting that the next step in tv broadcasting is a 1,249-line system needing over 20MHz of video bandwidth.

Sidebands

On 7 October 1984, at the Great Lumley Radio Rally, a Trio TR9130 multimode transceiver was sold on the bring-and-buy stall at an obviously incorrect price. The Great Lumley AR&ES is attempting to locate the person who purchased the equipment, in order to restore it to its original owner. Any information regarding this equipment to G4OCQ, QTHR, please.

Solar News, a quarterly publication published by the London Solar Committee, contains detailed information on sunspots, magnetic and ionospheric storms, auroras etc, which could be useful to radio amateurs interested in propagation as a function of the sun's influence. It costs £2 per year, and details can be obtained from Bert Chapman, "Brindles", Mill Lane, Hooe, Nr Battle, E Sussex.

Special Event Stations

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

17-19 January, GB4SWN
Operated by Swansea ARS at Swansea Bay Micro Show, Swansea Leisure Centre. RTTY/ssb/fm on hf and vhf. Hours 10am-6pm, Thursday and Friday; 10am-4pm Saturday. Weather satellite Meteoset display demonstration. Details, GW4HSH, QTHR, tel 0792-404422.

1 March, GB2SDD
To celebrate St David's Day, BSC Port Talbot ARS will operate on all bands from midnight to midnight. Special QSL cards will be sent. SWL reports will be acknowledged; ircs appreciated. St David's Day Award available for contact with GB2SDD and (a) five other Welsh stations during February and March (for residents outside UK), and (b) 10 other Welsh amateurs during February and March (for UK residents). Copies of logged entries, plus cheque or postal order to value of six ircs payable to SDD Station; should be sent to Mr R R Jones, GW4HOQ. "Bryn-Ynys", Strawberry Place, Morriston, Swansea, W Glam SA6 7AG.

Mobile Rallies Calendar

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

10 February
Bury RS "Hamfeast", Mosses Centre, Cecil Street, Bury, Lancs. Only 30min from M66 junction 2. Talk-in on S22 (G3BRS/G6BRS). Doors open 11am. Details G1BWN, QTHR.
10 March
Northern ARS Association Exhibition & Mobile Rally. Central Hall, Belle Vue, Redgate Lane, Longsight, Manchester M12 4WH. Details G8NRF, QTHR.
10 March
Pontefract & DARS Components Fair. For the home-constructor and d-i-y enthusiast. Components, surplus equipment and antennas; no new black boxes. Open 11am-4.30pm, Carleton Community Centre, Pontefract, on A1 between Darrington and Pontefract. Details G4ISU or G4KMW, both QTHR, tel 0977 792784 or 792654.
24 March
White Rose Rally, University of Leeds. Details G4NDU, QTHR, or Box 73, Leeds LS1 5AR.
21 April
Lough Erne ARC Mobile Rally. Killyhevlin Hotel, Enniskillen. Details GI4CZW, tel 0365 24500.
28 April
Humberside Radio Rendezvous, Grange Farm Hobbies Centre, Franklin Crescent, Scunthorpe. Details later.
5 May
Swansea ARS Mobile Rally, Patti Pavilion; adjoining St Helen's CC Ground on Swansea-Mumbles road A4067. Open 1030am-5pm. Talk-in on S22, GB2SWR. Details GW4HSH, QTHR, tel 0792 404422.
6 May
Mid-Cheshire ARS Mobile Rally, Winsford Civic Hall, High Street, Winsford, Cheshire. On A5 eight miles from M6 junction 18. Details G4VOH, QTHR, tel 06065 4719.
12 May
Swindon Radio & Electronics Rally. Oakfield School, Marlowe Avenue, Swindon, Wilts. Open 1030am. Talk-in on 144MHz (S22) and 432MHz (SU8/GB3TD). Details G8SFM, QTHR, tel 066689 307.
19 May
Northern Mobile Rally. Great Yorkshire Showground, Wetherby Road, Harrogate. Open 11am. Caravan site at showground. Details H. Moore, 269 Leeds Road, Ilkley, West Yorks LS29 8LL.
26 May
East Suffolk Wireless Revival. Details later. Info G4IFF, QTHR, tel Ipswich (0473) 44047.
26 May
Maidstone YMCA ARS Biennial Mobile Rally. Y Sports Centre, Melrose Close, Cripple Street, Maidstone. Details later.
2 June
Spalding & DARS Mobile Rally. Talk-in from 10am. Details Betty Whitley, G4ZGT, 45 Exeter Drive, Spalding, Lincs.
9 June
Elvaston Castle Mobile Rally, Elvaston Castle Country Park, 5 miles SE of Derby on B5010. Organized by the Nunsfield House ARG. Open 10am. Talk-in GB2ECR on 144 and 432MHz. Details John Robson, G4PZY, QTHR, tel Derby (0332) 767994, or Ian Cage, G4CTZ, QTHR, tel Derby (0332) 799452. Trade enquiries G4HIJ, tel Ashbourne 43241.
16 June
Denby Dale Mobile Rally, Shelley High School, Nr Skelmanthorpe, Huddersfield. Talk-in on S22 and SU8. Open 11am. Details G3FQH, QTHR, tel 0484 862390.
30 June
Buxton Mobile Rally. Pavilion Gardens, Buxton. Details G6MIF, QTHR, tel 0298 6174.
30 June
28th Longleat Amateur Radio Rally, Longleat Park, Warminster. Details G4FRG, QTHR, tel 0272 848140.
21 July
McMichael Home Counties Mobile Rally, Bells Hill, Stoke Poges, Nr Slough. Talk-in on S22 and SU8. Open 11am. Details G8IHF, c/o McMichael Ltd, Wrexham Road, Slough, Berks.
21 July
Anglian Mobile Rally, Stanway School, Colchester, Essex. Talk-in on 144MHz. Open 10am-5pm. Details G6HQI, 26 Pondfield Road, Colchester, tel 0206 860403.
28 July
Scarborough ARS Rally. The Spa, Scarborough. Open 11am. Talk-in on 144MHz (S22), 432MHz (SU8), and RB0, GB3NY. Details G4YWR, QTHR, ex-G6CXK, tel 0723 360587.
25 August
18th Preston Annual Rally, Lancaster University. Details later.

Other Events

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

19 January
RSGB Presidential Installation, Post House Hotel, York.
3 March
Doncaster Amateur Radio Show, Doncaster Institute of Higher Education Annexe, Ellers Road, Bessacar. Opens 11am. Admission 30p. Talk-in on S22. Details G8XTU, tel Doncaster 531365.
23 March
RSGB National VHF Convention, Sandown Park Racecourse.
13-14 April
RSGB National Convention, National Exhibition Centre, Birmingham.
4-6 June
Scotelex '85, the 16th Annual Electronics Exhibition & Convention, organized by the Institution of Electronics. To be held in the Exhibition Hall, Royal Highland Society, Ingliston, Edinburgh EH28 8NF. Details from Exhibition Organizer, Institution of Electronics, 659 Oldham Road, Rochdale, Lancs OL16 4IE, tel 0706 43661.

COUNCIL PROCEEDINGS

A brief report of the Council meeting held on 29 October 1984

Present: Messrs R G Barrett (President in the chair), D E Baptiste, J T Barnes, Dr D S Evans, Messrs F D Hall, L N G Hawkyard, Mrs J Heathshaw. 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). D A Evans (secretary/general manager), A W Hutchinson (editor), H M Norman (minutes secretary).

This meeting of the Council was called by Messrs Holmden, Lundegard and Smith, under Article 64, and agenda items had been put forward by these members of Council in a letter from Mr Lundegard dated 8 October 1984. The items contained therein were included as part of a main agenda prepared by the President; however, he decided to deal with the items from Messrs Holmden, Lundegard and Smith first.

Apologies for absence were received from Mr P F D Cornish.

The President drew attention to the publication in several commercial amateur radio magazines of letters written by Mr Holmden as an ordinary member of the Society. Mr Barrett said that this action was totally wrong and he questioned the principle of Council members, who had access to specialized information, making an independent approach to the press.

A vote of censure on Mr Holmden was proposed by Mr Hawkyard and seconded by Mr Hall.

Mr Holmden explained that he was against the Radio Communication editorial concerning the election procedure, in particular the limitation imposed on candidates' statements of address. He added that there was nothing in the Society's Articles to prevent him from writing to other journals.

After some further debate, Mr Lundegard pointed out that this was new business and the matter was referred to the next meeting.

The calling of Council meetings
The President had obtained legal advice in the conflict between Articles 64 and 65. As a result, the President proposed that:- "If the secretary receives a direction from three Council members to convene a meeting of the Council under Article 64 it shall be considered to be in compliance with such direction to include the business referred to in such direction on the agenda for a meeting of the Council (whether an ordinary scheduled meeting or a special meeting) to take place within five weeks from the date of receipt by the secretary of the direction. The foregoing instruction does not limit the obligation of the secretary to comply with a direction from the President to convene a meeting of the Council at such time and date as he thinks fit: nor the discretion of the secretary to convene a special meeting of the Council in response to a direction from three Council members if he considers that the urgency or importance of the business proposed justifies the expense and inconvenience of doing so. The date and time of such special meeting shall be determined by the secretary".

Mr Baptiste felt that the purpose of Article 64 was solely to cover a situation whereby a President of the Society was unable to call a meeting, the necessity for which being agreed by a majority of Council. He added that Article 64 did not allow the right to direct that a meeting should be on a specified date and suggested a revision of the President's resolution.

Mr Smith said that this meeting had been called to deal with that business which had arisen which had not been dealt with at previous meetings.

The secretary explained that he had been directed by the President to suggest that the agenda items raised by Messrs Holmden, Lundegard and Smith be dealt with at the meeting already scheduled for 9 November 1984, but that this course of action had not been accepted. He added that, following legal advice, it was confirmed that the secretary had no discretion with regard to the calling of meetings, and that this had been interpreted to apply to the date of a meeting called under Article 64. The President wished Council to interpret the secretary's discretion in order to avoid unnecessary meetings.

Mr Lundegard said that he had received the President's agenda three days previously and had therefore not had an opportunity to seek legal advice. Dr Evans suggested that Council was forgetting its prime objective to further the cause of amateur radio and to conduct its work in the best possible way. Mr Smith repeated his earlier comments with regard to the calling of this meeting. Mr Baptiste felt that the question of meetings should have been raised at an earlier meeting of Council, and he referred to the manipulation of Council by unreasonable persons and suggested that further legal advice be taken with respect to Articles 64 an 65.

The President then proceeded with the agenda items set out in Mr Lundegard's letter.

Council minutes
Mr Lundegard said he was concerned as to the accuracy and presentation of Council minutes. In reply to the President, he said that he thought the minutes were slanted, with the remarks of certain members being either omitted or poorly recorded; he suggested a verbatim record from which minutes could be written. Mr Baptiste spoke of the problems of cost and administration of such a record.

In reply to a question from Dr Evans, who had asked if the criticisms referred to incompetence or deliberate mischief, Mr Lundegard replied that he did not know. Mr Smith said that the minutes were inaccurate by omission and did not reflect the mood. The secretary noted that company minutes need essentially only record motions and decisions, but that traditionally Council minutes had recorded relevant comments. He added that it would be impossible to describe the mood of a meeting in a way which would be acceptable to all present.

The President reminded Council that draft minutes were first checked by the secretary and President. Draft minutes could be altered by Council agreement.

Mrs Heathershaw, who had chaired the previous meeting, noted that she had only altered six words in the draft minutes before the draft had

been circulated to members of Council. She proposed a vote of confidence in the minutes secretary. This was seconded by Mr Hall and carried unanimously.

Election of the 1985 President
Before discussing this item, Mrs Heathershaw referred to a communication dated 18 October 1984 sent to clubs in Zone C by Mr Lundegard in which it was stated that incomplete information concerning Raynet Ltd had been given to Mr Smith by Mrs Heathershaw. She felt that this had implied that she was solely responsible for Mr Smith's decision to propose the expulsion from the Society of Mr Lundegard, and she circulated a document containing relevant extracts from various correspondence which she felt indicated the erroneous nature of such an inference.

In defending the accuracy of Mr Lundegard's statement, Mr Smith said that his original opinion of Mr Lundegard had been formed on the basis of comments made by Mrs Heathershaw. In reply, Mrs Heathershaw said that in January 1984, the time of the conversation referred to, she was speaking with information which was available to any member of Raynet and not with information which was only now available to Council.

After further discussion, Mr Smith refused to retract his statement, and Mr Baptiste proposed a vote of censure on Mr Smith on the grounds of ungentlemanly conduct. The censure motion on Mr Smith was carried following a secret ballot.

Mr Smith had written to the president on 8 September suggesting that there was a deliberate move at the July Council meeting not to proceed with the election of the 1985 President. Drawing attention to Article 68, the President stated that this matter had not been an agenda item for the July meeting, and that he had made it known that this was to be on the agenda for the August meeting. Mr Smith repeated his concern at the way in which the July meeting had been conducted, to which Mr Baptiste replied that he was equally concerned at the apparent act of conspiracy in attempting to raise the matter in the absence of interested parties. He moved closure of this item, which was seconded by Mr McClintock, and agreed by majority.

Committee chairmen
Mr Lundegard raised questions with regard to the chairmanship of the EMC and the VHF Committees, to which the President responded.

Mr Jessop referred to the office of chairman of the Finance & Staff Committee, and following much discussion the following resolutions were put to Council:
(i) That the executive vice-President be chairman of the F & S Committee.
(ii) That the executive vice-President be vice-chairman of the F & S Committee.
(iii) That the executive vice-President be vice-chairman of the F & S Committee, and chairman of the Membership & Representation Committee.
(iv) That the chairman of the F & S Committee be appointed from time to time on professional qualifications.

It was agreed to vote on these proposals at the next meeting. Mr Baptiste noted that the F & S Committee chairman had been appointed for three years from August 1983, and a two-thirds majority of Council was necessary if any change was made.

Mr Lundegard enquired about the Technical & Publications Committee, asking if it was planned to split the technical and publications aspects following HQ's recent involvement with the latter. In response, Mr Evans commented on book production staffing levels, and noted the present good links between staff and the Technical & Publications Committee. Recent progress had set a good precedent for future team work. Dr Evans spoke of the problems faced by the committee in order to adequately deal with *Radio Communication* and books, and considered it vital that the two functions were not separated. It appeared that the publications presently in the pipeline were on schedule. Other publication matters were discussed, and it was noted that regular reports would be available to Council on a three monthly basis.

Appointment of RSGB manager and RSGB secretary
Mr Lundegard felt there was a need for a second manager because of the increasing size of the Society. Mr Evans responded that the Society needed more staff throughout all its various departments, including additional senior staff to assist himself.

He spoke of the need to develop the management structure as a continuing process, and added that more staff were needed for *Radio Communication*, membership services, accounts, book production and elsewhere, and indicated staffing priorities.

Mr Lundegard said it was not his intention to have two people operating in parallel, but expressed concern for HQ decision-making in the general manager's absence. Mr Evans said that it was always his practice to appoint a senior staff member to be in charge of HQ when he was not in the office, and added that under these circumstances he was usually available by radio pager. Following further discussion, the appointment of a permanent number two was to be considered by the general manager, who would later report back to Council.

Copyright
Dr Evans outlined the current position with regard to copyright for both *Radio Communication* and books. The copyright transfer document would be circulated to Council for information. The Society's solicitors were still working on related draft paperwork.

"Green Book"
Mr Lundegard favoured the convening of a sub-group to make further progress on the "Green Book". Dr Evans pointed out that this matter had been cleared at the last Council meeting when it had been agreed to circulate draft copies of the existing text as a basis for future discussions and for information. He urged Council to stick to this decision and reprint the book in January, the delay being necessary to incorporate any changes to the Articles arising from the December egm. Mr Hall proposed this motion, which was seconded by Mr Pinchin and Mr Baptiste, and it was carried.

Society organization
Mr Lundegard asked for full details of committee and Council expenses, and went on to ask if the Society was aware of expenditure incurred in this area. Mr O'Brien said that the cost of the Society's committee structure was high, but he was drafting a letter to chairmen for their future guidance. The matter was also to be discussed at a future F & S Committee meeting. Mr Lundegard questioned the justification for the present number of committees.

After further discussion on the cost of the committee structure it was agreed that the F & S Committee should look closely at committee budgets, and advise a scheme whereby monies were limited on a strict basis, taking into account factors such as the location of committee members, the need for meetings, and the possibility of holding meetings locally, if appropriate.

Reduced/waived subscriptions
Mr Holmden felt that as the Articles of Association did not permit reduced subscriptions they should not continue to be processed; however, it was pointed out that Council had already agreed a solution which was to be put to the members at an egm on 8 December 1984. The same change to the Articles would also result in a revision of the rules applicable to the waiving of subscriptions.

At this point Dr Evans proposed that the waived subscriptions on the supplementary agenda should be granted. This proposal was seconded by Mr Baptiste and Mr O'Brien. Messrs Holmden, Lundegard and Smith dissented from the proposal, which was therefore not carried.

Further discussion was followed by a vote which revealed that only Mr Holmden remained against the proposed changes to the Articles; his criticism being that new members were allowed to join the Society as waivers, and that he felt that the age of 60 should apply to the reduced subscription to both male and female members. Several members complained at the time being spent on this matter, and the President moved next business.

Printing and publications
Mr Holmden had conducted a survey of commercial computer magazines and concluded that *Radio Communication* should be produced in A4 format. Mr Hutchinson explained that the use of the A4 size would cost more money, following which Mr Baptiste proposed that the editor's advice be accepted by Council. This was seconded by Mr McClintock and carried. Mr Lundegard drew attention to a graph produced by Mr Jessop from which it appeared that book profits were dropping.

OBITUARIES

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

Mr J Briggs, G6OEH
John Briggs died on 2 August, aged 53. He had been interested in amateur radio for five years, and was studying for his "A" licence. A member of the Bury Radio Society, his main interests were 144MHz ssb and 1·3GHz.

Mr W Broad, G8GTF
Wally Broad died on 28 October at the age of 69. He was chairman of the East Kent RS, editor of the club's newsletter *Carrier*, and editor of the Kent Repeater Group newsletter.

Mr R Cookham, RS37350
Mr Cookham died on 19 October. He was licensed before the second world war, and was a very keen listener who loved valve receivers.

Mr A G Johnson, G3THT
Joe Johnson died on 25 October. He was known to many amateurs throughout Cornwall, was a founder member of the Newquay & DARS, and was never happier than when helping at field days. He was at one time Raynet group controller for the Newquay area, and also served for many years as an electronics instructor with the Air Training Corps.

Mr J McCallum, GM4LJM
John McCallum died on 18 November. Although severly handicapped and confined to a wheelchair for the last 15 years, he never lost his sense of humour. He was a member of RAIBC.

Mr D Morgan, G3SM
Don Morgan died on 20 October at the age of 83. His interest in amateur radio started in the 'twenties, and he was first licensed in 1938. He was a founder member of the Radio Society of Harrow, and a member of the RSGB for 50 years. A keen and able home-constructor, in 1962 he designed, assembled and erected a 45ft Dexion tower to support a tribander beam antenna, and the tower still stands. He was dedicated to amateur radio, and was an active dxer up to the date of his death.

Mr F Pearson, G8IST
Fred Pearson died on 4 November, aged 51. He had been an active member of the Denby Dale ARS for many years. His main interest was the development of vhf/uhf antennas, some of which were used at many field events which he organized.

Mr P G Wood
Peter Wood died on 30 October, aged 63. He was first licensed in 1950, and was a member of RAFARS. Most of his activity was on VHF/UHF, and he was an exponent of home-built equipment.

Also:

Mr R J Batters, RS26293
Mr K Costa, RS51724, on 1 September;
Mr J R Donaldson, GM3GCL, in September;
Mr H Earnshaw, RS28038;
Mr K G Fuller, G1ECU, on 12 August;
Mr F Harrison, G3IEP, on 19 August;
Mr H W Merry, G3RRR, on 8 July;
Dr D S Montgomery, GM8PCG, on 6 October;
Mr N A O'Callaghan, G3LBN, on 13 May;
Mr H W Simpson, G8DI, on 4 September;
Mr J Wright, G8PV, in July.

Members' Mailbag

I GIVE UP!

Sir—I am in the process of giving up amateur radio as a hobby and I would like to take this opportunity to explain my reasons why. I have been tinkering with radios for over 20 years, and decided in 1981 to obtain my amateur licence—thinking it could be an interesting and life-long hobby. How wrong I was!

The examination is an absolute farce, the standards being non existent. Quite frankly, any Tom, Dick or Harry could pass it without difficulty.

This leads me to my second point—operating standards or the lack of them. I despair when I hear some late G6 and G1 stations, even some G4s (who should know better). I am behind G4DFV all the way.

My solution to this problem is, first, to raise the standard of the RAE, and, second, to raise the licence fee. I feel sure that genuine amateurs would accept this, in order not so much to preserve but to raise the standard of amateur radio.

It was the worst thing a British Government could have done to allow cb in this country. Look what it has done to what was a great hobby.

A D Smith, G6HPQ

I DON'T!

Sir—After reading G3ZAY's views in your October issue on an A-level GCE type exam, the RAE in his opinion being inadequate, I would like to remind him that there are probably thousands of us lesser-educated (yls and xyls included) who found the RAE rather daunting and, like myself at near 60 years of age, rather hard-going. Never the less, we slogged at it and passed.

We now find we get a great deal of pleasure chatting to a very pleasant bunch of hams in the "international conversation club", as G3ZAY names it. Maybe we cannot dive into our Yaesu or Icom and repair it, so what! There are a lot of people who cannot repair cars but still drive them! I get the impression from G3ZAY and other "multiple-choice RAE knockers" that ham radio should be exclusively for those of a certain educational standard.

If that is the thought behind it, may I suggest that you "examination passers" quietly get on with your exams, and leave us lesser mortals to enjoy and struggle along in our amateurish way. Regarding the possibility of ham radio losing its privileges, if the government can grant the cb fraternity a licence (incidentally without call signs or the keeping of a log book) I do not think ham radio has anything to worry about.

K R Davis, G6LNQ

USE THE BAND PLANS . . . PLEASE!

Sir—On and around Monday 15 October, vhf/uhf enthusiasts were treated to some good conditions, tropo on an N-S path for XR, ZR, down to ZE, AF squares. I was carefully monitoring the beacon band as usual during these openings, the beacon band being of more use during a lift than at any other time. Then why is it at these times that so many stations are S9+ in the beacon sub-bands? I do not notice this problem on 430MHz, but on 144MHz it can be most annoying, mostly from stations on fm.

The French beacon FX8VHF, about 800km from my station, uses about 5W of rf, and was just audible sometimes, at others about S6! (on 144·955MHz). Unfortunately, someone who either did not have a callsign (or would not give one), was S9+ on 144·950MHz fm, making the beacon inaudible of course. I politely asked this person, who was having a local crossband contact, to QSY, but he refused and started to make most derogatory comments about me.

He asked my callsign, which I gave. I asked his, but he did not! I explained to him that if we all used the band plan, it would be to every amateur's advantage. He said, "The band's full of S9 signals, where am I supposed to go?". I listened through the band; true, it was packed, but only on multiples of 25kHz. Why not use 10 or 12·5kHz steps, which are available in most rigs nowadays, to conduct fm contacts?—expecially in lifts. During this lift I also heard fm contacts on 144·100 and 144·350MHz.

Will this problem ever improve? I hope so, for the integrity of 144MHz is at stake. I refuse to argue on the air, but have heard several others become quite heated on this subject.

Please, if you have got 144MHz, stick to the band plan, we will all be happy then.

J L Palfrey, G4XEN

Lack of observance of band plans on the part of a minority has always been a problem. It appears to the Society that ignorance of the existence of a band plan at all is often the problem, coupled with a lack of awareness of the use of part of the 144MHz band for a comprehensive beacon system. A few amateurs appear to take the view "I can't hear anything so the frequency must be clear", ignoring the fact that someone with a better site and a better receiver may be listening for a distant beacon on that frequency so as to determine propagation characteristics. An even smaller minority are simply bloody-minded—we hope that they have at least read last month's editorial! The editorial in our January 1983 issue was also relevant to the matter of band plans.

As is customary in the January issue, a complete set of band plans can be found in our centre pages this month.

LIGHT-BULB RFI

Sir—It was interesting to see the letter from G6EPM in your November issue. The whole business of the "Barkhausen-Kurz" oscillator has always fascinated me, and I can offer some interesting snippets of information I have accumulated. A Barkhausen-Kurz oscillator is a triode operated with a high positive potential on its grid and zero or slightly negative on its anode. The valve becomes a negative resistance device at Uhf/shf, much like a Gunn diode, with the frequency controlled by the electrode geometry voltages and the external circuit.

In the vacuum light bulb, the oscillation appears to be of the Barkhausen type—the electrodes are swept over the mains voltage range each cycle, and at one voltage oscillation occurs. I have tried to make a triode B-K oscillator, but with no success. I think by the second world war the valve designs had anti-B-K features, such as oval anode cylinders rather than round.

Marconi produced a high-power B-K transmitter in 1931, working at 50cm. This used a push-pull circuit with special valves. Several of these transmitters could be used together with each element of a broadside antenna array. To obtain directivity they would need to be coherent, and one assumes they phase locked themselves.

Valves other than triodes can also oscillate in this way. Terman mentions oscillations from a vacuum diode which exhibits negative resistance at certain frequencies when forward-biased but with reduced filament voltage. *Wireless World* 10 August 1939 described electron-type oscillations in frequency-changer valves. These seem easy to obtain, simply by adjusting electrode potentials.

I would be very interested to hear of any actual experimental results obtained by amateurs with B-K or other electron oscillators. There may still be potential for these devices, which at one point held the world frequency record—something long since forgotten.

D J Summer, G3PVH

Sir—I read G4BKU's letter on Barkhausen oscillations with interest, more so as I mentioned these oscillations in a talk I gave to the Belfast RSGB group at the October meeting. I also mentioned the effects on tv. Barkhausen Kurz oscillations can only take place at a period when the anode of the valve is negative in respect of the grid. As a line output valve is handling almost a square wave for a short period of time, the anode is negative in respect of the grid, and should the transit time be favourable; ie, the time taken for electrons to travel between grid and anode, then oscillation will take place.

In the early days of tv, when I was area tv engineer for Dunbartonshire, for EMI, we were given information as to how this effect could be cured: first try changing the line output valve, then put a variable resistor in the screen supply. It was evident to me that it wasn't properly understood, and I informed the chief engineer of home maintenance that altering the screen potential slightly did not stop oscillation, but only moved it into a period when the screen was blacked out. When asked by him how we could stop oscillation, I said increase transit time. To demonstrate this I picked up an ion trap magnet, put it over a line output valve on a set on the bench that was showing the effect, and to my great satisfaction, by using the magnet I could reduce, and with careful adjustment stop, the oscillation—not moving the period of oscillation in time in any way but increasing transit time. Later, EMI sets had a magnet fitted over the line output valve.

G Troy, GI3YS

Several members wrote outlining the principles involved. At least one member of headquarters staff is much less mystified than he was previously!

AMATEUR OR HAM, IT'S OK BY ME

Sir—I feel that I must answer Ralph Barrett's letter in your November issue.

I am a radio amateur, and happy to be one; if I am called a ham, ok, I'm happy to be called that also. I can see no dreadful stigma attached to either title.

What I do connect with the title is the remarkable work done over the years, by those early radio hams. Surely radio amateur is a title to be carried with some pride, for it was the amateur who opened the airways of the world; pioneered radio as we know it today; gave us the use of ssb; introduced computers into the shack; took rtty out of its nappy; and who has now become involved with satellite communication, Amtor and packet radio.

Why on earth should I want to change my title! "Radio enthusiasts"?—what has a radio enthusiast ever done? I know well what radio amateurs have done in the past and still do. I for one would not wish to lose all that history, just because the word "amateur" irritates someone's ego.

J M Stevenson, G8ZRY

MARITIME MOBILE

Sir—I would like to add my support to Mr Paul Barry's letter in your October issue on the subject of the Maritime Mobile licence, and also to your forthcoming representations to the DTI.

Mr Barry covers the subject well; it is only because I am permanently attached to my vessel that the complex procedure of obtaining the licence was worth undertaking in the first place. Frustration does not end with the receipt of the licence either! The schedule limits one as follows: going hf from 28MHz, the next band is 144-146MHz, then 24,000MHz! Presumably this is to avoid the radar bands, which is understandable. The 144MHz allocation excludes most of the rest of the world's fm operation, and Oscar 10 is a bit tricky.

Personally I would be keen to operate 50MHz/MM, and feel it could be a genuinely useful part of the experiment. I have frequently worked 29MHz fm from mid-Atlantic, and surprised stations who thought the band was closed.

Seafaring radio officers are a responsible breed and will always have the interest of their ship and its safety in mind. Amendments of the kind proposed by the well-informed Mr Barry would be very welcome and might, in extreme cases, save lives.

P E Williams, G3YPG/MM,
technical r/o, RMS Queen Elizabeth 2

A CW FILTER for the RADIO AMATEUR NEWCOMER

E.E. WETHERHOLD, W3NQN*

Ed Wetherhold graduated from Tri-State University, Indiana, in 1956, when he received a BS in radio engineering. Before that he spent four years in the US Air Force as a radio mechanic. He obtained his amateur licence, W3NQN, in 1947.

Between 1956 to 1962 he worked for RCA and the Allen Organ Co. before moving to Annapolis, Maryland. Since 1962 he has been employed at Honeywell Inc where he is responsible for the testing of communications systems. Because the test procedures require passive LC filters for defining detection system bandwidths, he has become experienced in their design and construction.

In 1979 he was appointed technical advisor to the ARRL on passive LC filters. He has had numerous articles published on this topic.

Introduction

Many newcomers to amateur radio have a non-electronics background—this was indicated in a letter to the editor of *Radio Communication* [1]. Consequently circuit design for construction by newcomers should be easy to assemble, of minimum cost, but should not seriously compromise performance. A common problem encountered by newcomers to the hobby is finding suitable construction projects which give them the satisfaction of building useful station accessories that perform better and cost less than commercial equivalents. This article describes a low-cost cw filter that is easy to build and whose performance is equal or superior to commercial cw filters. If you are active on cw and are looking for a simple but useful construction project, this article is for you.

Passive vs active cw filters

The two cw filter types used by radio amateurs are known as "active" and "passive". Active filters use integrated circuits to provide the desired filtering response, and many articles have been published on this filter type [2–6]. Most active filter designs for amateur radio application have controls for varying the bandwidth and centre frequency, but these circuits are too complicated for construction by newcomers to the hobby. In a recently published active cw filter design [2] the variable bandwidth and centre frequency features were omitted to simplify the construction, but the resulting circuit still presented a formidable challenge to beginners.

Passive filters use inductors (L) and capacitors (C), and although this type is more bulky than the active filter, it is easier to build, and it does not need a power supply. It is not practical to build a passive filter with variable bandwidth and centre frequency, but this is not a serious disadvantage. After the desired centre frequency is selected (frequencies between 700 and 800Hz are commonly used), there is little reason to change it. The fixed bandwidth is also no problem if it is narrow enough to provide adequate selectivity while being broad enough to allow non-critical receiver tuning.

The passive LC filter has not received wide acceptance, perhaps because of the many previously published passive filter designs which used only one or two LC resonator circuits. These simple filter circuits could not provide sufficient skirt selectivity for effective cw filtering. Perhaps because of this all passive cw filters have received an undeserved poor reputation. I hope that the five-resonator cw filter described in this article will correct this misunderstanding.

Shape factor provides an indication of filter performance

For proper cw filtering a steep rise in attenuation outside the filter passband is needed. This important performance characteristic is known as "skirt selectivity", and it can be defined in terms of "shape factor". This factor, in combination with the 3dB bandwidth, provides a quick and accurate performance comparison of various filter types. The shape factor of a filter is always greater than one, and is calculated by taking the ratio of two bandwidths at different attenuation levels on the filter response curve. The most commonly used attenuation levels for calculating shape factor are the 30 and 3dB levels and the 60 and 6dB levels. The closer the shape factor is to one, the more selective is the filter. Of course the 3dB bandwidth has considerable bearing on the filter selectivity, and bandwidths of 150–500Hz are commonly used. Bandwidths of less than 150Hz are not recommended because of the increased tendency of the filter to ring—that is, the dits and dahs tend to become a continuous tone.

Commercial cw filter advertising and articles on amateur home-brew active filters seldom include shape factors. The absence of this information may indicate a deficiency in the filter performance that the manufacturer prefers to ignore, or in the case of amateur design articles the author may not have had the time or equipment to completely evaluate the attenuation performance of the filter.

Five-resonator passive lc filter has good performance at low cost

Since December 1980 there have been several articles published on low-cost, high-performance cw filters using surplus inductors available in the US [7–13]. With this information the amateur could construct a five resonator passive cw filter that had a 60/6dB shape factor of about 3·6, which is equivalent to or better than shape factors available in most commercial filters. Two stacks of 88mH inductors (five inductors per stack) and a single 44mH inductor were used to provide a design with a bandwidth of about 150Hz and a wide selection of bandwidths and centre frequencies. Photo 1 shows some typical inductor stacks and 44mH inductors used in the filter construction. The circuit configuration used in this five-resonator cw design was based on a five-element Chebyshev lowpass filter having shunt capacitor input and output. The two-stack design was ideal for insertion into an audio system having an impedance level between 1,000 and 1,300Ω. Since the audio output impedance of many home-built receivers, such as the Dobbs Superex receiver, is around 1,000Ω, the two-stack passive filter could be connected directly to the audio output stage as described in [12].

New cw filter configuration needs only one 88mH inductor stack

Because the original two-stack design was intended for the American amateur the shipping cost of the two inductor stacks was not a significant part of the filter expense. However, if the stacks must be sent overseas to allow British amateurs to construct this design, then import duty and shipping expenses become significant. In order to reduce these costs, an alternative five-resonator filter configuration was developed in which only one inductor stack and two 44mH inductors are needed. This alternative

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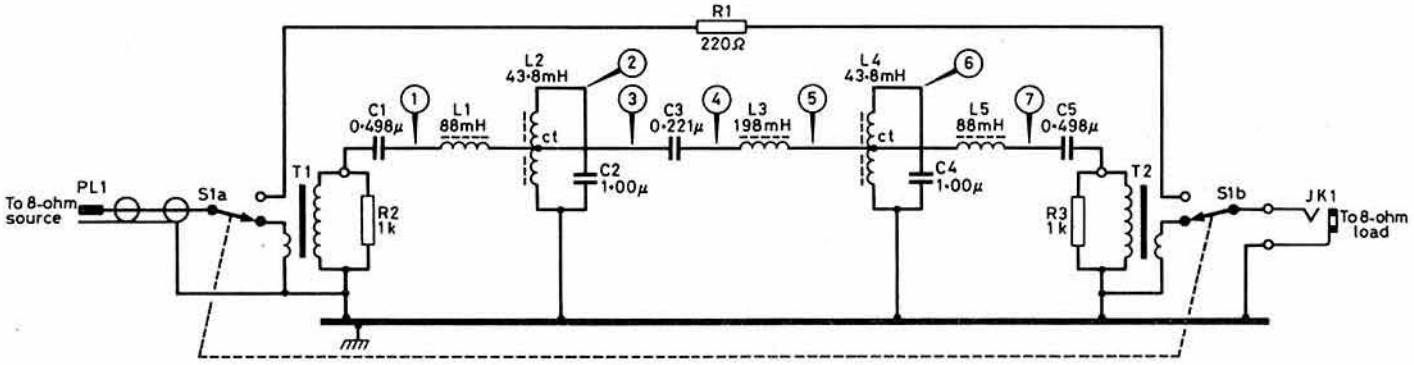
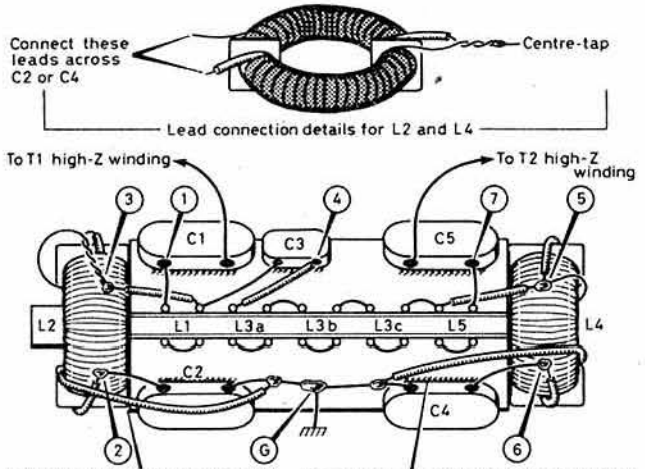
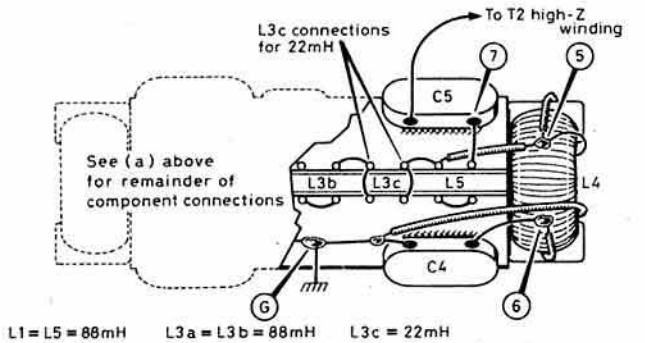


Fig 1. Schematic diagram of single-stack cw filter, design No 7





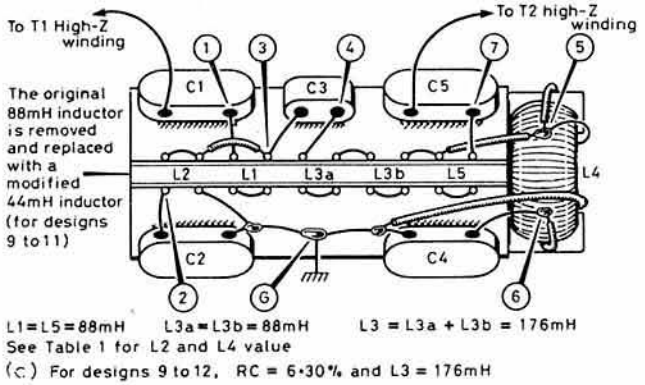


Fig 2. Diagrams showing the wiring interconnections of the inductor stacks for the cw filter designs in Table 1

configuration is based on a series inductive input and output five-element Chebyshev lowpass filter. This design is ideal for applications outside the continental USA because of the lower inductor stack import duty and shipping costs. Fig 1 shows the schematic diagram of the new single-stack filter and Fig 2 shows a pictorial diagram of the filter wiring. Table 1 lists 12 designs that were selected as most suitable for construction by newcomers to amateur radio.

The impedance levels of the one-stack designs were kept within seven per cent of 200Ω so that standard commercial output transformers could be used. British amateurs may use one-half of the high-impedance winding of a Tandy 8/1000Ω miniature audio output transformer, #273-1380 (about 70p each) to get an impedance of about 250Ω. (Note that the 1,000Ω impedance is quartered when the number of turns is halved.) A 1kΩ resistor is then connected across the secondary half being used to give a 200Ω termination for the filter. If desired the resistance of the high-impedance winding may be halved by rewiring the centre tap connections to connect the unused half-winding in parallel with the other.

Details of this modification procedure are explained in Appendix A. American amateurs may purchase a suitable transformer, 8/200Ω, 0·4W, part number 42TU200 (about $1.50 each) from Mouser Electronics, 11433 Woodside Avenue, Santee, CA 92071.

Because the filter construction is easy and the parts cost is low, this single-stack cw filter provides a most useful project for the beginner. Details regarding the filter construction and performance follow.

How to select a suitable design from Table 1

There are several important parameters in a filter design that must be considered by the amateur before a particular one is selected for construction. The most obvious parameters are centre frequency and 3dB bandwidth. These parameters have a direct bearing on the aural quality of the received signal and the selectivity of the filter. Older amateurs usually prefer a centre frequency below the commonly-used 750Hz, but if you have a transceiver with a sidetone of 750Hz then you must use a filter design having its centre frequency within 10 per cent of this value. Table 1 lists centre frequencies between 592 and 859Hz.

The 3dB bandwidth (see BW3 column) determines the filter selectivity. If you are hunting dx and require maximum selectivity then use designs 1-3. For general contacts the designs with wider bandwidths are satisfactory. The less important design parameters are the filter impedance level and the component values. As previously explained all filter impedance levels are within seven per cent of 200Ω (see RT column). You must therefore determine the audio output impedance of your receiver so that the proper matching transformer can be selected. See Appendix B for further details of this procedure.

Attempts have been made to simplify the filter construction by using standard-value inductors and capacitors. For example, L1 and L5 are both 88mH, and L3 is made up of multiples of 88mH inductors. L2 and L4 are, in most cases, slightly less than 44mH, and it is only necessary to remove a few turns from the standard 44mH inductor to obtain the required inductance. Details of this simple operation are given in Appendix C.

Wherever feasible, designs requiring standard-value capacitors have been used; however, C3 was left to fall where it might. By coincidence designs 3 and 5 have C3 values that are essentially standard values of 0·22 and 0·18μF. To obtain the expected attenuation response, Mylar capacitors of values within two per cent of the design values should be used. If necessary, capacitors may be paralleled to get the required capacitance.

The other eight columns to the right of the BW3 column in Table 1 give the calculated frequencies (based on perfect components) of the 3, 6, 30 and 60dB attenuation levels of the filter response. Using these data, one can calculate the theoretical shape factors of these designs. The actual shape

Table 1: Five resonator cw filter designs using one stack of 88mH inductors and two modified 44 or 88mH inductors

TABULATED VALUES BELOW ARE BASED ON L1 AND L5 = 88mH AND R-T = 200Ω (± 10%)

Design No	F-C (Hz)	C1,5 (UF)	C2,4 (UF)	L2,4 (mH)	C3 (UF)	L3 (mH)	RT Ω)	BW3 (Hz)	FL3 (Hz)	FH3 (Hz)	FL6 (Hz)	FH6 (Hz)	FL30 (Hz)	FH30 (Hz)	FL60 (Hz)	FH60 (Hz)	RC (%)
1	759	.500	1.52	29.0	.167	264	190	228	653	881	643	895	569	1012	438	1315	0.0441
2	717	.560	1.52	32.5	.187	264	190	228	612	840	602	854	529	972	402	1279	0.0441
3	651	.680	1.52	39.4	.227	264	190	228	547	774	537	789	466	909	346	1223	0.0441
4	751	.510	1.19	37.9	.170	264	215	257	633	891	622	907	541	1042	404	1397	0.0441
5	717	.560	1.19	41.6	.187	264	215	257	600	857	588	874	509	1010	376	1369	0.0441
6	751	.510	1.23	36.6	.227	198	185	298	617	915	607	929	533	1059	399	1415	2.765
7	760	.498	1.00	43.8	.221	198	205	330	613	943	602	959	523	1106	383	1509	2.765
8	859	.390	1.00	34.3	.173	198	205	330	710	1040	699	1056	616	1199	464	1590	2.765
9	751	.510	1.04	43.2	.255	176	185	345	598	943	589	959	514	1099	378	1494	6.300
10	783	.470	.996	41.5	.235	176	189	353	626	979	616	994	539	1137	398	1538	6.300
11	859	.390	.823	41.7	.195	176	208	388	687	1075	676	1092	591	1249	436	1691	6.300
12	592	.820	.823	87.7	.410	176	208	388	429	818	420	836	349	1007	236	1490	6.300

NOTES:

1. Fig 1 shows the schematic diagram of the above filter designs. Fig 2 shows the pictorial diagrams of the wiring interconnections.
2. L2,4 values less than 44mH are obtained by removing turns from a 44mH inductor as specified in Appendix C.
3. For optimum performance, the filter input and output should be terminated in an impedance within 10 per cent of the listed RT value. See Appendix B for details.
4. The calculated 3dB bandwidth is listed under the column heading "BW3".
5. The calculated lower and upper frequencies located on the filter response curve that are associated with the 3, 6, 30 and 60dB attenuation levels are listed under the column headings of FL-- and FH--.
6. The filter reflection coefficient percentage is listed under the "RC" heading.

factors will be slightly larger (poorer) than the calculated values because the measured 3dB bandwidth is smaller than the calculated value due to inductor losses. The inductor losses have little effect on the 30 and 60dB bandwidths, and these measured bandwidths are practically identical to the calculated values. Differences between the calculated and measured 3dB bandwidths up to 13 per cent should be expected for the narrowband designs, while differences of up to five per cent should be expected for the broadband designs.

The last column of Table 1 lists the reflection coefficients of the fifth-degree Chebyshev lowpass prototype upon which the bandpass designs are based. This parameter allows anyone familiar with modern filter design procedures to independently calculate each design and thereby verify the accuracy of the data. Because the reflection coefficients never exceed 6·3 per cent the designs are relatively insensitive to impedance termination variations, and impedances within 10 per cent of the listed value are acceptable. Of course gross mismatches, such as 50 per cent, will significantly distort the flatness of the bandpass response.

You now have enough information to make an intelligent choice of filter design. It is obvious that there is probably no single design that will have all the characteristics that you may desire, and some compromises will have to be accepted.

Filter assembly

Fig 1 shows the schematic diagram that is common to all the designs. The signal to be filtered enters at P1 and exits at J1. All five resonant circuits are tuned to the same centre frequency. Pictorial diagrams in Fig 2 show the component placement and wiring connections. Fig 2(a) is for designs 1 to 5, where L3 consists of three series-connected 88mH inductors. Fig 2(b) is for designs 6 to 8, where L3 consists of two series-connected 88mH inductors plus one 22mH inductor (total inductance is 198mH). Fig 2, (c) is for designs 9 to 12 where L3 consists of two series-connected 88mH inductors. Use the pictorial diagram that corresponds to the design number that you select.

The 88mH inductor consists of two 22mH windings connected in series-aiding to give 88mH, and the inductor is commonly known by this value. However, the windings *can also be connected in parallel-aiding*, and for this connection the inductance is 22mH. The inductance decreases from 88mH to 22mH, or to one quarter of its former value, because *inductance varies as the square of turns*. Because changing the series-aiding connection to the parallel-aiding connection reduces the effective turns by half, the inductance is reduced by the square of one half which is one quarter.

After L2 and L4 have been modified for the proper inductance in accordance with instructions in Appendix C, a 0·5in length of sleeving and inductor L2 are placed over the short brass tube on the left end of the stack. The sleeving and inductor fit tightly enough over the tube to hold the inductor securely in place. Strips of mounting tape (the author used Scotch 3M) provide additional fastening, if it proves necessary. On the right end of the stack two more strips of mounting tape are used to hold inductor L4 in place. The capacitors are then stuck on the sides of the stack with mounting tape, and the wires are interconnected as shown. If the inductor stack has a metal shell it can be used as the common ground. The remainder of the filter circuit is wired as shown in Fig 1.

Because designs 9 to 11 require only two 88mH inductors for L3 there will be an unused 88mH inductor in the stack. If desired the left end of the stack can be opened and the end 88mH inductor removed and replaced with a 44mH inductor. To do this unsolder the four inductor leads, remove the two top staples from the left end and prise open the sides of the cover to expose the end inductor. Carefully cut the adhesive tape holding the end inductor using a Stanley knife so that the end inductor can be lifted out of the container. Replace the inductor with inductor L2, and connect the leads in the same manner as the original 88mH inductor leads. In the case of design 12, L2 and L4 are both 88mH, and the end inductor inside the stack can be used for L2. Use Fig 2(c) for the connections, except that L2 and L4 are understood to be 88mH.

Wiring check-out

Before putting the filter in operation check the node-to-node resistances to see that all connections are correct. A check by ear is not sufficiently accurate by itself to establish if the filter has been correctly wired. Table 2 lists the node-to-node resistances of the three different designs. To perform the resistance checks set your ohmmeter on the lowest ohms range, place one probe on the "from" node and the other probe on the "to" node. The resistance indicated by your meter should be within 20 per cent of the value listed in Table 1. If a resistance reading is grossly in error check your wiring using the diagram corresponding to the design that you selected. If an open circuit is indicated check for broken inductor leads near the terminals or for cold solder joints.

Table 2. Node-to-node resistances of the single-stack cw filter

Nodes[1]		Inductors involved[1]	RESISTANCE (Ohms)[2]		
			Filter design numbers (from Table 1)		
From	To		1-5	6-8	9-12
1	GROUND	L1 + 1/2 (L2)	9.9[3]		
2	GROUND	L2	4.6[3]		
3	GROUND	1/2 (L2)	2.3[3]		
4	GROUND	L3 + 1/2 (L4)	27.4[3]	19.4[3]	17.5[3]
5	GROUND	1/2 (L4)	2.3[3]		
6	GROUND	L4	4.6[3]		
7	GROUND	L5 + 1/2 (L4)	9.9[3]		
1	3	L1	7.6		
4	5	L3	25.1	17.1	15.2
5	7	L5	7.6		

NOTES:

1. See Fig 1 and 2 for the node locations and the inductors involved.
2. Use these approximate resistance values as a check to see if you have wired the filter correctly. Gross differences between measured values and those in the table indicate a wiring error. For example, a measured short or open, or a measured value that differs by more than 50 per cent from the table value indicates that there is a wiring error.
3. This resistance depends on the L2 and L4 inductance. The listed resistance is based on L2 and L4 being 44mH. If L2 and L4 are 88mH (such as in design no 12, Table 1), then the node-to-node resistance will be greater than the listed value. For example, from nodes 2 and 6 to ground, the resistance will be about 7.6Ω, or the same as the resistance of L1 and L5. Also, for nodes 3 and 5 to ground, the resistance will be about 3·8Ω, or half the resistance of L1 and L5.

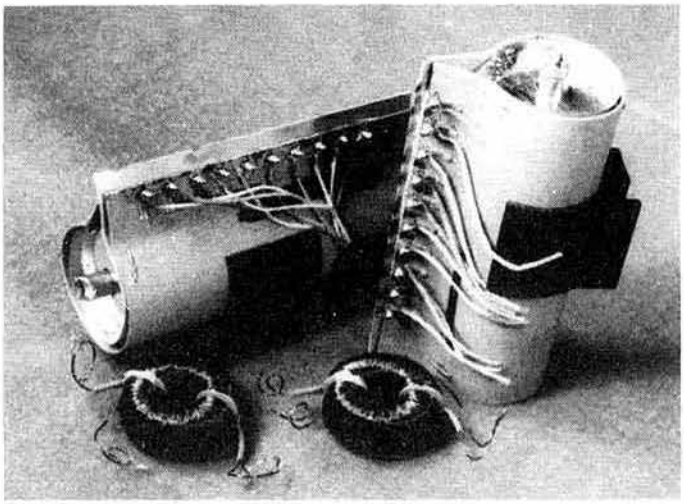


Photo 1. Typical surplus 88mH inductor stacks and 44mH inductors used in the single-stack cw filter construction. A single plastic component mounting clip securely grasps the stack for convenient mounting on a base

Filter mounting and containment

Because of its cylindrical shape, the filter stack is best mounted with a component clip designed for a diameter of 1·375in as shown in Photo 1. The clip can be secured to a base or container with two machine screws. Photos 2 and 3 show one example of how the assembled filter can be mounted in a commercial aluminium box that has enough room for the dpdt switch, transformers and phone jack to be included. If a cardboard box of about 2·5 by 2·5 by 7in is available it can be used instead of a metal box to reduce cost of the filter. Alternatively, the filter can be mounted on a flat sheet of aluminium or cardboard with the switch and phone jack fastened in a suitable manner. There is no compelling reason for the filter to be housed in a metal box, or any box at all, and your own ingenuity can be used to find some manner of containment that is inexpensive and easy to apply.

Filter performance

Fig 3 shows the measured relative attenuation response of design number 7. For comparison the calculated attenuation data from Table 1 are also included (indicated by the eight "Xs" on the graph). The close agreement between the measured and calculated attenuation data indicates that the filter component values were correct and the filter was correctly wired. This attenuation response was measured without transformers T1 and T2 so that they would not affect the attenuation measurements. With the transformers included (8/200Ω Mouser units), an additional loss of about 0·5dB for each transformer should be expected. The filter insertion loss was 2·0dB at 760Hz. The total 3dB loss of the filter and transformers is easily corrected by slightly increasing the audio gain of your transceiver. It is interesting to

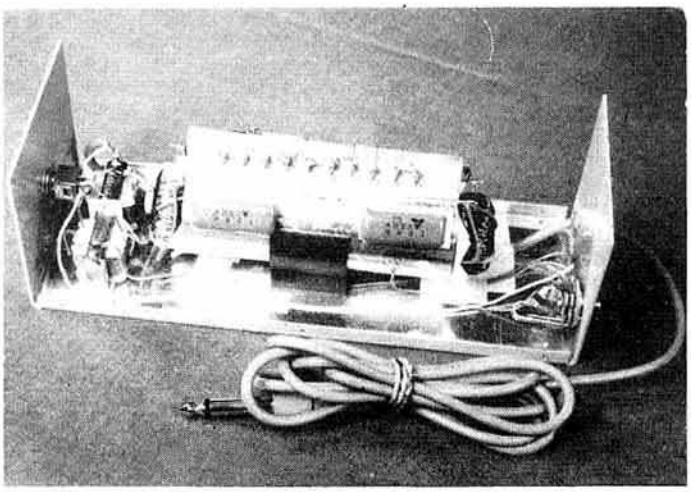


Photo 2. The assembled filter design No 7 installed in an aluminium box. The through-bypass switch and input/output transformers are at the left end of the box

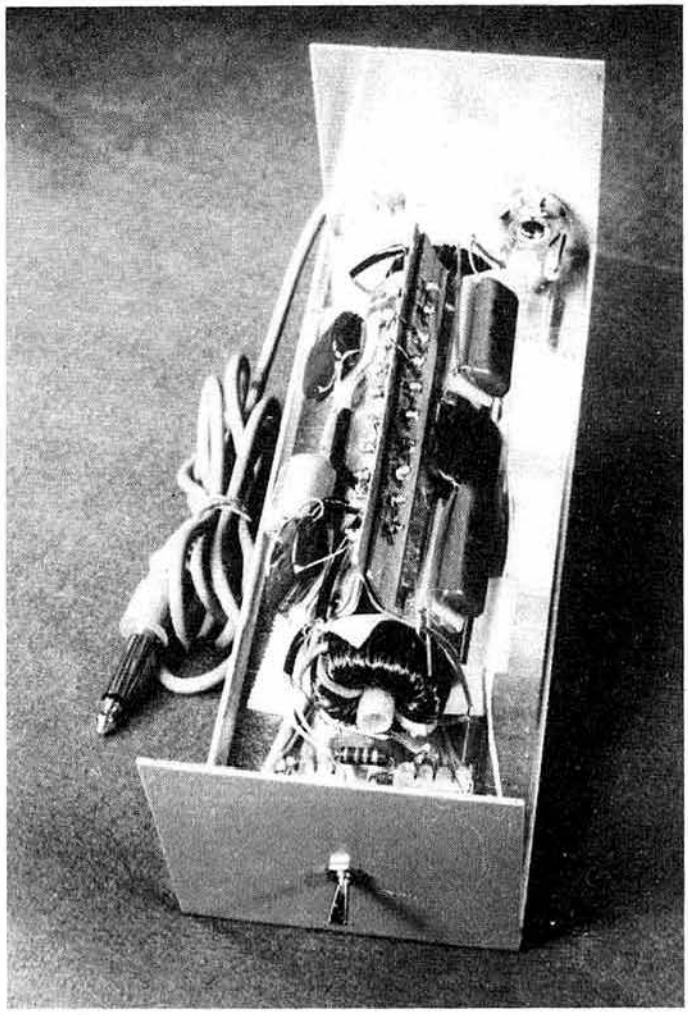


Photo 3. End view of the assembled filter showing how the capacitors are fastened to the sides of the inductor stack with mounting tape. L2 installs over the brass tube extending from one end of the stack after a short length of insulating sleeving is placed over the tube

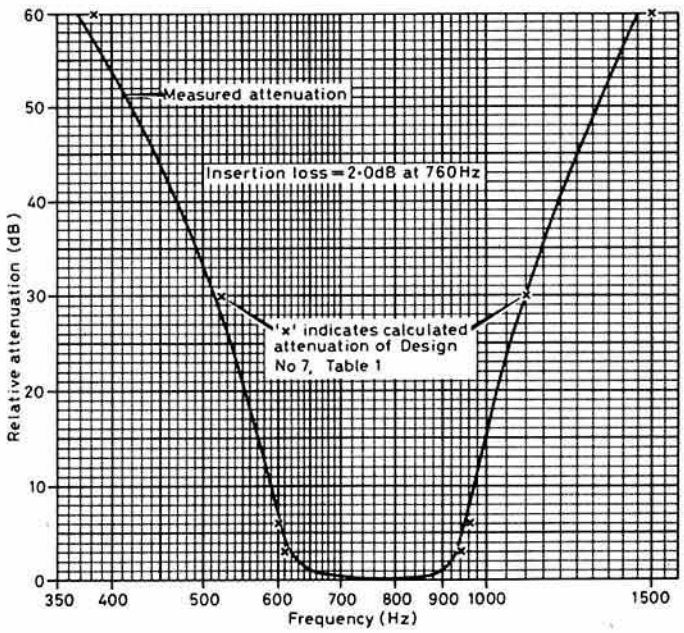


Fig 3. measured relative attenuation response of cw filter, design No 7 F—centre = 760Hz

note that the measured 1dB passband of the filter extends from 650 to 900Hz, for a bandwidth of 250Hz. This wide and flat passband characteristic ensures that the filter will not ring even at maximum cw speeds. Although the response curve gives a good indication of the expected performance the filter must be used under actual operating conditions before its aural performance can really be appreciated.

How to get the surplus 88 and 44mH inductors

These high-quality low-cost toroidal inductors are being made available to the radio amateur fraternity by Chesapeake & Potomac Telephone Company of Maryland, and more recently, through my purchase of inductors from a junkyard. Arrangements for distributing these inductors in the UK have been made with the co-operation of Rev. George Dobbs, G3RJV. Send a stamped self-addressed envelope to him at St Aidan's Vicarage, 498 Manchester Road, Rochdale, Lancs OL11 3HE, for further information on how to obtain these inductors. Make sure you state your amateur radio call sign, and describe the filter design you wish to construct. Requests will be considered only from those having bona-fide amateur radio applications.

Acknowledgements

The author gratefully acknowledges the assistance of Steven Gibbs, GU3MBS, and Rex Cox, for their review of the manuscript.

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[12] "A cw filter for the Dobbs Superex receiver", E. Wetherhold, W3NQN. *Short Wave Magazine* August 1983.
[13] "Build the COJAF", Rev George Dobbs, G3RJV. *Amateur Radio Magazine* September 1983.
[14] The following references give details regarding the toxic fumes associated with soldering wires with polyurethane film insulation: (1) p143, *Rad Com* February 1982; (2) p589, *Short Wave Magazine, January 1984.*

Appendix A

Modification of Tandy miniature audio transformer, #273-1380

Use the following procedure to modify a Tandy 8/1000Ω c-t transformer to a 8/250Ω transformer. The modification steps are illustrated in the schematic and pictorial diagrams of Fig 4.

1. With a Stanley knife carefully slice open the transformer wrapping to expose the secondary centre-tap termination (black insulated wire).

2. Carefully unsolder and pull away the secondary leads from the black insulated wire termination.

3. Pull out the black insulated wire from the wrapping, as it is no longer needed. Cut away more of the wrapping to fully expose the blue and green wire terminations.

4. With your ohmmeter determine the loose wire end that connects to the green insulated termination. Solder this wire to the blue insulated termination. Connect the other loose wire to the green insulated termination.

5. Close the wrapping and tie it in place with five or six loops of strong thread inside the core frame and around the winding.

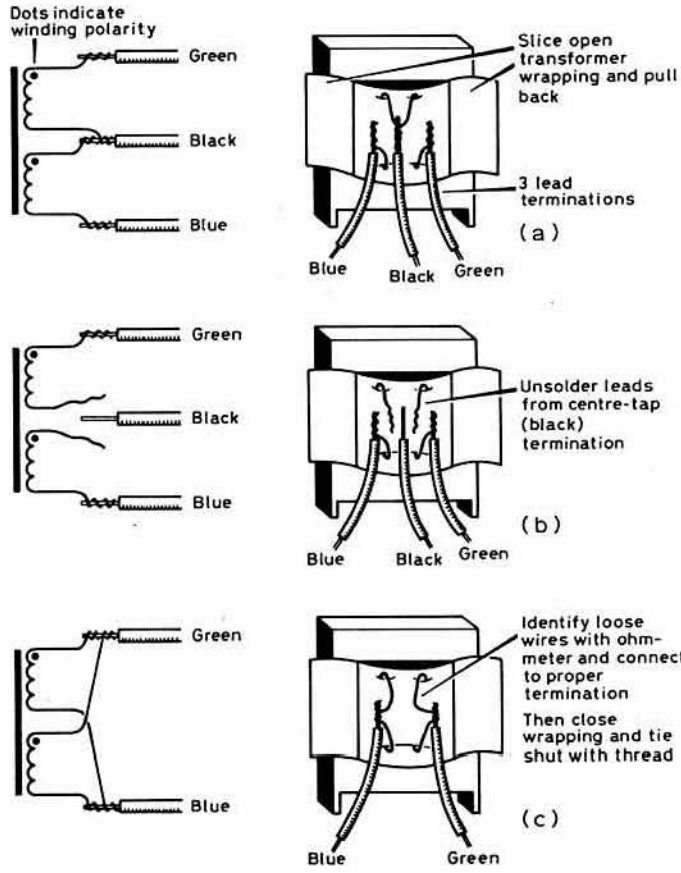

Fig 4. Diagrams showing transformer modification steps

6. Check the resistance of the re-wired high impedance winding. It should be about 16Ω, which is about one quarter of its original value.

The transformer-turns ratio is now about 5·65 to 1 and the impedance ratio is about 32 to 1. If an 8Ω source is connected to the low impedance winding it will be transformed to an impedance of about 250Ω. To make the 250Ω impedance look like a 200Ω termination (as required for the cw filter), connect a 1kΩ, 0·5W resistor across the high-impedance winding. This concludes the transformer modification.

Appendix B

How to properly terminate your 200Ω cw filter

The technical manuals of most commercial transceivers specify the audio load impedance that is to be used, and 4 or 8Ω are common. However, for your requirements this specification is not usable because you need to know the source impedance of the audio output amplifier. As there may be doubt concerning the actual source impedance of your audio output, it is advisable to measure it to confirm that, in combination with a suitable transformer, it will provide the required termination for your filter.

Assume that the audio output impedance of your receiver is 8Ω, and an 8/200Ω transformer will be used to provide the desired source impedance for the filter. It then remains to confirm that the filter will actually see something within 10 per cent of 200Ω at the transformer secondary. The impedance seen by the filter at the transformer secondary can be measured with an a-c analogue multimeter and a 0·5W five per cent resistor between 220 and 1,500Ω, using the following procedure:

1. Turn on your receiver, plug in your headset and tune in a station that gives a relatively constant amplitude audio output signal such as WWV. Disconnect the headset.

2. Connect the 8Ω winding of the 8/200Ω transformer to the audio output of your receiver. Connect the 200Ω winding to the a-c multimeter. (Before doing this use your ohmmeter to determine which are the 8 and 200Ω windings. The 8Ω winding will have a resistance of about 0·5Ω while the 200Ω winding will have a resistance of about 12Ω.)

3. Adjust the audio volume control for a meter indication of about 1V, or a level that is about 10dB above the noise level. Slightly vary the volume up and down to check that the meter indication moves in a corresponding manner. This is done to confirm that the audio output stage is not overloaded. Overload would be indicated by the meter pointer not

increasing upwards as the gain is increased. If an overload is indicated reduce the gain until the overload is eliminated. Record the meter reading in a-c volts as V1.

4. Without changing any control settings, connect the resistor you have selected across the 200Ω secondary of the transformer, and note that the voltage level drops. Record the new level and call it V2. From this data you can now calculate the impedance that will be seen by the filter after it is connected to the high impedance winding of the transformer.

5. Calculate the impedance looking into the high impedance transformer winding using the following equation:

$Zs = (V1 - V2)R/V2$ where R is the selected resistance in ohms and V1 and V2 are in a-c volts.

For example, for R = 1,500Ω, if V1 = 0·750V and V2 = 0·662V, then $Zs = (0·750-0·662)\ 1,500/0·662 = (0·088)\ 1,500/0·662 = 199Ω$. As this is within 10 per cent of 200Ω, your filter is properly terminated at its input.

As the impedance of your speaker or headset is less ambiguous than the source impedance of the receiver audio output it is sufficient to read the impedance level from the speaker or headset and use the proper transformer to match them to the filter. As the speaker or headset usually has an 8Ω impedance another 8/200Ω transformer can be used on the filter output.

If an 8/200Ω transformer is not conveniently available see the procedure in Appendix A for modifying a Tandy 8/1,000Ω transformer (available in the UK) to provide an 8/250Ω transformation. A 1kΩ resistor is then connected across the 250Ω winding to provide the desired 200Ω termination for the filter. Use the Appendix B measurement procedure to confirm that the Tandy transformer has been correctly modified, and in combination with the 1kΩ resistor, it provides the desired 200Ω filter termination impedance.

Appendix C

Inductance vs turns to remove from a surplus 44mH inductor to obtain a desired L2 value (with centre tap)

(Applicable for a 44mH inductor having windings on opposite halves of core.)

To use the graph, Fig 5, find the desired L2 inductance on the lower or upper horizontal scale. Read the corresponding turns to remove from each winding on the appropriate vertical scale. For example, to get 39·0mH, remove 15 turns from each of the two windings of the 44mH inductor. The number of total turns removed is 30. After the proper number of turns has been removed from each winding, connect the start lead (with sleeve) of one winding to the finish lead (no sleeve) of the other winding. The junction of these two leads is the inductor centre tap.

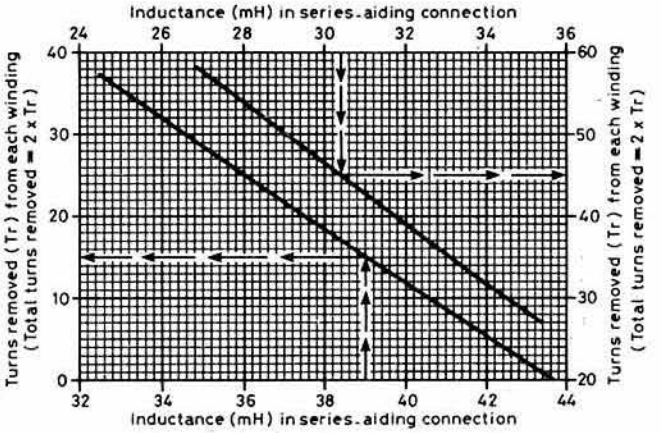

Fig 5. Graph to determine turns to be removed

Although the actual unmodified inductance at Tr = zero is only 43·7mH, this value can be used for those designs requiring 44mH because the difference is less than one per cent. If desired one turn can be added to each winding to obtain an inductance within 0·5 per cent of mH.

Note: The polyurethane film insulation is easily removed with some solder and a hot (750°F) iron. **Caution:** the fumes are toxic—do not breathe them (see [14] for further details).

Notes

1. See Figs 1 and 2 for the node locations and the inductors involved.

2. Use these approximate resistance values as a check to see if you have wired the filter correctly. Gross differences between measured values and those in the table indicate a wiring error. For example, a measured short or open, or a measured value that differs by more than 50 per cent from the table value indicates that there is a wiring error.

3. This resistance depends on the L2 and L4 inductance. The listed resistance is based on L2 and L4 being 44mH. If L2 and L4 are 88mH (such as in design no 12, Table 1), then the node-to-node resistance will be greater than the listed value. For example, from nodes 2 and 6 to ground, the resistance will be about 7·6Ω, or the same as the resistance of L1 and L5. Also, for nodes 3 and 5 to ground, the resistance will be about 3·8Ω, or half the resistance of L1 and L5. □

BOOK REVIEW

Computer Programs for Amateur Radio, by Wayne Overbeck, N6NB, and James A. Steffan, KC6A. 327pp. First ed 1984. 247 by 172mm, paperback. Published by Hayden Book Company. Available in the UK and Europe from Hayden Jenkins, Premier Book Marketing Ltd, 1 Gower St, London WC1E 6HA. Price £15.25 inc carriage.

This is a well-produced, impressive-looking book. It looks promising at first sight, but the good first impressions wear off when you start to dig into it.

The front cover blurb says "High-performance programs written in BASIC for your Apple, TRS-80, or Commodore 64. Plus Conversion Guides for the IBM PC". Inside the book there are indeed programs for all three machines. Unfortunately they tend to be the same program listed three times, with just minor changes between them. For example, the "General Contest Logger" takes some seven pages for the TRS-80, about the same again for the Apple, and once more for the Commodore. I suppose it's a good way to fill pages.

Surely most computer-owning radio amateurs are capable of doing the minor translation from one dialect of Basic to another? Even more so, given that the probability of typing in seven pages (about 450 lines) of closely-packed Basic, and getting it right first time are so small as to be negligible, meaning that the target reader is expected to be capable of de-bugging a program, and tracking down the typing errors.

The "high performance" claim is also dubious. A program to calculate "grid locators" (the same as the new locator system in Europe) from latitude and longitude is given. It takes 45 lines, and produces just the first four characters. A self-respecting program can happily get the full six-character job done in 20 lines or less. Interestingly, modifications which are claimed to get this program running on a ZX81 are given. Sadly, the result will produce the wrong answers—an unforgivable sin—as it assumed that the computer uses Ascii, which the ZX81 does not.

Removing all the duplicate information and the first 75 pages, which are mostly a simple guide to home computers, you are left with a slim volume containing 23 adequate, but over-long and not especially well written programs. Many of them assume that you have floppy discs.

The program titles roughly indicate their functions. Some, especially some of the contest scorers, are not really applicable outside North America. They are: *Mini-logger; Logbook; Awards data base; Setup program for awards data base; Gridlocator; Latitude-longitude data file; Beamheading chart; DX display; Sunrise chart; Grayline; Sunrises anywhere; DX checker; Dupechecker; Dupesheet printer; General purpose contest logger; Field day logger; Sweepstakes logger; Log printer; Antenna scaler; Vertical pattern plotter; Antenna matching evaluator; EME system calculator; Moontracker; Skylocator.*

In conclusion, this book is poor value for money, even as an ideas source book. It has little that is new or exciting, but does have a set of stolidly-written programs that may be of interest to some operators. If the redundant pages were removed, the programs tidied up a bit, and the price reduced by a factor of two or three, then it would be worth buying. *GM4ANB*

Guide to Utility Stations (3rd edn, incorporating *Guide to Radioteletype Stations*, 11th edn) compiled by Joerg Kliengenfuss and published by Joerg Kliengenfuss Publications (Panoramastrasse 81, D-7400 Tuebingen, Federal Republic of Germany, 427 pages (239 by 169mm) plus three fold-out maps, soft covers. DM60 (covers air mail postage), or equivalent in other currency.

This new edition (English text) has almost doubled in size since the second edition was reviewed in *Radio Communication* August 1984, p693, and now includes, without any increase in price, the detailed information on rtty press, meteorological transmissions etc previously published in a separate volume. The publisher claims, not without justification, that it now provides the most comprehensive and reliable manual of its type in existence. The *Guide* lists 14.746 callsigns in frequency order from 1,618kHz to 29.4MHz, an alphabetical list of 3,194 callsigns, plus an invaluable selection of abbreviations, codes, frequency allocations to the various services, and information and definitions from the ITU's Radio Regulations. Frequencies have been checked to within 100Hz. Some 6,967 changes have been made for this edition, and there is a listing of callsigns not in accordance with the ITU prefix list. No attempt is made to include broadcasting stations, ships or aircraft, although coast stations etc are covered. Transmission modes are listed. The usual warning must be given against "deliberate reception" of utility (commercial) stations by UK listeners—nevertheless this new edition is excellent value for those interested in the wide world of hf communications. *G3VA*

Technical Topics

by Pat Hawker, G3VA

THIS MONTH

SAFETY and the ac mains supply
Impedance of the human body
Effects of electric shock
Earth-Neutral leakage
Lack a centre-tapped heater transformer?
Audio agc/processor
Alternative power sources
The ageless W3EDP antenna
The flexible centre-fed dipole
Our shrinking lifestyle
Fitting PL259 and bnc plugs
Waterproofing and antenna accessories
ARQ rtty via satellite
Nicad charger

SAFETY is always an emotive subject which needs to be approached with a balanced and open mind. As a hobby, amateur radio has an extremely good safety record; but any activity that involves antennas, ladders and high places, connections to the 240V supply mains, high-voltage or high-current power supplies, high rf voltages, toxic chemicals etc, is bound to put an incautious operator at some risk, while even a normally prudent person can fall victim to a single rash act. Usually it is a matter of pain or injury or damage rather than a fatality. Constant vigilance and a healthy respect for electricity is the ideal; it can be argued that a little knowledge is a dangerous thing, since it can produce complacency and risk-taking. In electrical matters, there are few better pieces of advice than always to keep one hand in your pocket when fault-finding on a "live" piece of equipment, and so avoid the risk of a dangerous hand-to-hand shock with current passing near the heart.

So it is with some humility and with the help of some very experienced "professionals" that we open this month with a number of topics concerned with electric shock.

Safety and the ac mains supply

Recent items in *Members Mailbag* and *TT* on personal safety have sparked off a considerable flow of correspondence and comment on such questions as the value or otherwise of an rccb (residual current circuit breaker) and the safe limits and effect of current passing through the human body. In compiling the following notes I am drawing on information and comments from R. C. Taylor, GW2HCJ; Wing-Commander I. E. Hill, G6HL; J. Rickwood, G3JJR; Dr E. Leask, GM6UNQ, of the Scottish Health service; as well as material relating to the MK "Sentry" range and an article by Michael Neidle "Clean supply, new supply—and new rules" in *Electrical and Radio Trading*, (1 November, 1984).

It may also be worth emphasizing that the rccb has already been discussed a number of times in *TT*, most recently in May and August 1981, although the term rccb had not then come into general use. It was the 15th edition of the *IEE Regulations for electrical installations* published in 1981 that renamed what had usually been known as a "current-operated earth-leakage circuit breaker (elcb)". This edition also made the fitting of such devices mandatory for new installations when mains-supplies are used outside of what is termed the "equipotential zone", for example for an electric lawn mower, and presumably including a garden-hut shack when this has not been permanently wired for electricity.

The result of the 15th edition has been to encourage manufacturers to produce a range of rccb-type devices, including sockets with a built-in rccb having a 30mA earth leakage tripping current. As GW2HCJ points out, an rccb depends for its action on a transformer with two heavy-current windings which are equal within close limits and a third winding which usually has many turns of thin wire. The thin winding is connected to a solenoid which operates an isolating switch through a trigger mechanism, usually mechanical: Fig 1.

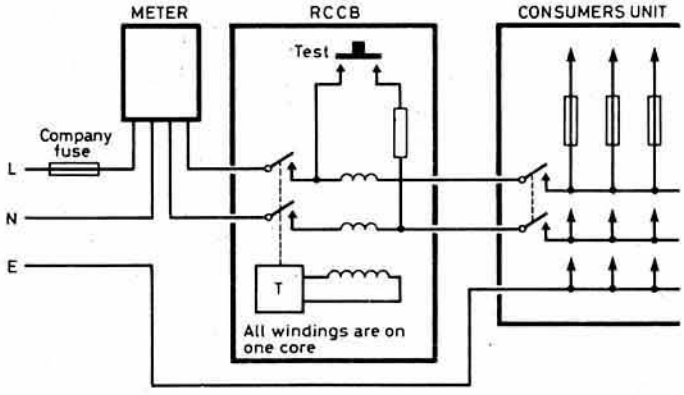

Fig 1. Showing an rccb installed to detect excessive earth leakage currents throughout a domestic installation. Such units may have a trip sensitivity of 100mA or more. Higher sensitivity 30mA units protect the output from a single power socket. Even higher sensitivity units (to about 10mA) are available but may prove susceptible to false tripping.

In normal operation the current flowing in the live ("phase") conductor is nearly equal to that in the neutral conductor. The magnetic fluxes produced in the transformer core nearly cancel. The device, however, will detect any resistive leakage to earth that unbalances the two currents, and will automatically switch off the supply when this exceeds the rated current (which may, for example, be 30mA, 100mA or 300mA etc). If the leakage is from live (phase) to earth, current flows through one "heavy" winding only, inducing a voltage in the third "thin" winding. Some recent devices, GW2HCJ points out, intended to protect a single portable device, are also actuated should the mains-supply fail. The majority of rccbs, however, are *not* affected by a temporary mains failure and do *not* act as "no-volt" relays in the manner suggested in *Members Mailbag*.

In *TT* May 1981, G3KWJ noted that some devices rated at 30mA could be wired to provide 15mA tripping, and 10mA rccbs are available. However, the problem is then likely to arise of false or "nuisance" trips: it is most inconvenient to have your equipment tripped off in the middle of a contact only to find it all a false alarm. On the other hand the tripping of a 30mA rccb usually indicates a fault-condition that needs rectifying, and gives good protection as noted below. GW2HCJ is firmly of the opinion that *all* domestic power points (but not lighting points) should be protected by 30mA trips; he believes a 30mA rccb to be a worthwhile safety precaution, prefereably with power circuits separate from the lighting installation.

Should this appear to suggest that an rccb is the ideal answer to safety problems, it should be emphasized, as Llyr D. Gruffyd, GW4CFC, did in *TT* August 1981, that such devices may prove counter-productive in giving a radio operator a false sense of security since it provides *no* protection against electric shock from the *secondary-side* of any double-wound mains transformer. This includes the ht supplies to high-power valve amplifiers which can often be 1, 2 or even 3kV. GW4CFC contended from experience in laboratories that introducing rccb protection where ht and eht supplies exist "can lead to a false feeling of immunity to shock, and is thus psychologically bad when most severe shocks experienced by amateurs originate from the secondary side of transformers". However, there are many all-solid-state rigs in which dc potentials (but not rf voltages) may be limited to 12–24V, and the main danger from a low-current heavy-duty psu comes from a short-circuit by, say, personal jewellery such as a ring. For such stations an rccb *would* reduce the risks of "live" metalwork etc

resulting from the primary of a mains transformer short-circuiting to a poorly earthed shield or a secondary winding etc (a by-no-means uncommon hazard).

It should be appreciated that the rccb is not only intended to provide protection against electric shock but also against fires caused by faulty wiring or appliances, and that even a 300mA rccb installed at the incoming supply offers significantly more protection than conventional fuses or miniature contact breakers (mcb).

My personal belief is that an amateur station should always have *one* heavy-duty double-pole switch (15A rating or better) that turns off *all* equipment rather than relying on the on-off switches in the individual units. As noted in *TT* several years ago, by no means all imported equipments are fitted with reliable double-pole on-off switches.

Impedance of the human body

Dr E. Leask, GM6UNQ, writes with the professional experience of representing the Scottish Health service on many BSI committees dealing with safety standards, as well as representing the UK on several IEC and ISO committees. He feels that the comments by G4CCM in the November *Members Mailbag* need to be corrected, particularly those concerning the measurement of hand-to-hand body impedance with a megger. GM6UNQ points out that these figures are wildly out, certainly for 240V 50Hz supplies. A megger turned at the correct speed produces 200Hz, but it is most unlikely that anybody would willingly stand the full output in order to make such a measurement. He writes:

"A megger is inappropriate for this purpose. To put the record straight, the following are quantitative figures for human body impedance, based upon official International Electrotechnical Commission (IEC) papers and experiments (including some on the writer) carried out in the course of drafting a new International Electrical Safety Standard which will be applicable to all measuring, test, process control, scientific laboratory, medical laboratory and educational equipment.

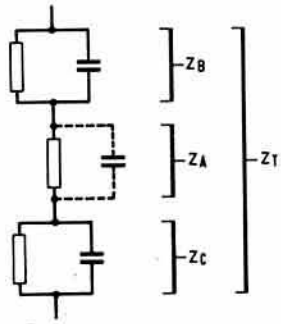

Fig 2. Body impedance can be thought of as the total of three impedances in series with the skin entry and exit points having a capacitive element that makes the total impedance depend to some degree upon the supply frequency. But note that there are very many variables. In practice, a rule-of-thumb approximation puts the total impedance between 1,000 and 2,000Ω.

"The impedance of the human body can be regarded as three impedances in series: Fig 2. ZT, the total body impedance, is made up of ZA the internal body impedance, which has a very small capacitive element, and ZB and ZC, the impedances of the skin entry and exit points. While ZA is largely resistive, the skin (acting as a semiconductor with conductive holes—the pores) has a large capacitive impedance up to skin breakdown.

"There are many variables in any situation: the contact area (the smaller the contact area the higher the apparent impedance); whether the contact areas are wet or dry; the type of current (ac, dc or pulse); the frequency; the touch voltage; the pressure of contact; and the ambient temperature.

"Up to about 50V the value of impedance varies widely with contact area, temperature and respiration; even for a single individual. I would postulate that G4CCM derived his figure with an idling megger and perhaps small electrodes.

"For large contact areas—50/100cm²—at 50Hz, and for touch voltages from 50 to 1000V, 95 per cent of the population lie somewhere between 1,500 and 4,300Ω. Safety standards in the past have assumed a theoretical body impedance of either 1,000 or 2,000Ω. The new standard assumes 2,000Ω up to 100Hz, and a more complex impedance—including capacitive elements—from 100Hz to 1MHz, which approximates to 1,750Ω.

"The question of electric shock and its effects, with the many permutations of conditions, involves the duration of the applied current and the phase of the cardiac cycle when the shock is experienced. On the question of rccbs, the trip time is obviously the most important parameter."

I seem to recall an old saying: "Its volts that jolts, but mils (mA) that kills." Perhaps in the light of GM6UNQ's comments one should now add: "Pray the relay don't delay."

Effects of electric shock

There is still some controversy over safe limits and the effects of electric shock on the human body. Much depends, of course, on whether the current passes through the region of the heart. The IEC document 479 includes a diagram (Fig 3) reproduced here from an MK "Sentry" catalogue. This attempts to relate duration of shock to current and indicates four of the five "zones" of effect.

Zone 1 (not shown) relates to currents less than 0·5mA deemed to have no effect.

Zone 2 is regarded as usually presenting no damage to health.

Zone 3 indicates "usually no fibrillation, possible non-permanent effect". This could mean muscular contraction and loss of breathing, but capable of being corrected by artificial respiration if the shock current is removed in time.

Zone 4 "probability of fibrillation less than 50 per cent".

Zone 5 "probability of fibrillation more than 50 per cent".

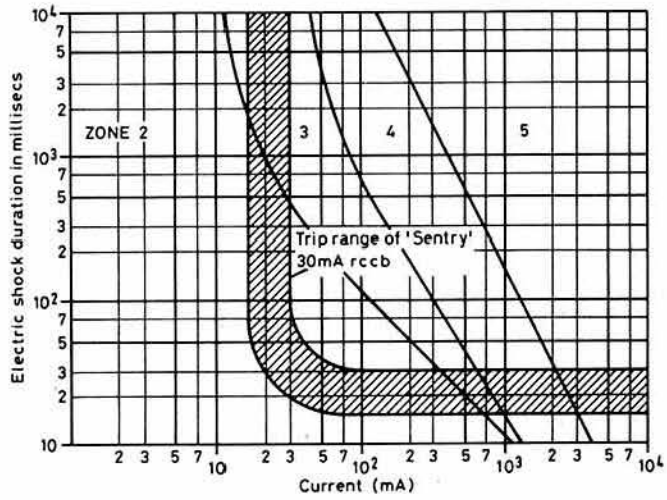

Fig 3. Showing how an MK "Sentry" 30mA rccb provides protection within the less dangerous Zone 2, as well as the much more dangerous Zones 3, 4 and 5. Zone 1 (not shown) involves currents of less than 0·5mA and usually has no effect. Zone 2 usually represents no damage to health. Zone 3 usually results in no fibrillation of the heart but possible non-permanent effects. Zone 4 represents a 50 per cent probability of fibrillation. Zone 5 more than 50 per cent probability of fibrillation. The zones are those defined in IEC document 479 and the diagram is as shown in MK information on their Sentry range. Trip range of other makes of rccb are therefore not necessarily the same.

Fibrillation is the highly dangerous condition where the current passing through the heart causes this to malfunction, reducing or stopping the circulation of the blood. Such a condition very quickly causes permanent brain damage, if not death. Removal of such a current does not cause the heart to return to its normal rhythm, and sophisticated medical attention may be required quickly.

From the above notes it will be seen that a protection device preferably needs to operate at a current and within a time period within Zone 2.

J. Rickwood, G3JJR, points out that, because of the risk of fibrillation, 30mA at 50Hz should be regarded as a limiting body current, but that the risk of muscles being paralysed—which in the case of a hand-to-hand electrical path would imply seizure of the chest muscles and eventual asphyxiation—10mA (at 50Hz) is taken as the limiting case. The effects of fibrillation are the more serious, however, because its effects are more rapid.

G3JJR disputes the 20,000Ω body resistance given by G4CCM; 1,000Ω is often taken as the rule of thumb figure (but see earlier). He is strongly of the view that total reliance should not be put on any protective device, rccb, mcb, fuse etc, even though an rccb will protect against earth faults. They are designed to operate on faults that cannot blow fuses and be quick enough to reduce the risk of human fatality if correctly chosen and installed.

The IEE Regulations emphasize the necessity that an rccb should be regularly tested, *not simply by pressing the trip button*. There are purpose-made instruments for use in making this test.

Earth-Neutral leakage

GW2HCJ emphasizes that an rccb protects against earth/neutral faults which often pass undetected and are a fire hazard. He writes: "As the current flowing in such a fault depends on the E-N voltage, which in turn depends on the supply cabling and the load being taken by other consumers, the trip in house A (which has an E-N fault) may operate only when the cooker in house B is turned on! This leads to confusion, and such faults may mistakenly be "cured" by removing the trip rather than the E-N fault. E-N faults tend to be caused by floor nails or missing sleeving on earth wires in fittings."

G6HL in the course of his service career encountered very varied standards of electrical installation. It should be noted that the British three-wire system is not used in most countries. In his present QTH an untidy fused distribution box was preceded by an old-style *voltage-operated* elcb ("Chilton") which proved erratic. Local electricity-supply staff pointed out that the voltage-operated devices are no longer fitted and advised a change to a current-operated device ("Wylex").

This resulted in a problem that he traced to his mains rf filter comprising two large single-layer rf chokes with 0·1μF feedthrough capacitors to earth from each end of the chokes. As has been pointed out on several occasions in *TT*, 0·005μF capacitance can represent the maximum safe leakage in this type of application, so that the action of several 0·1μF capacitors effectively in parallel caused the device to trip. When the 0·1μF capacitors were changed to 0·01μF mica the problem disappeared.

It should not be supposed from the length of these notes that large numbers of radio amateurs are being knocked out from shock or their homes burnt up. Nevertheless there can be few of us who over the years have not got ourselves across the mains or ht. I recall a 700V-plus "packet" that left me shaky and with extreme dislike of touching anything electrical for several hours! One should, of course, also watch out for charged high-voltage psu filter capacitors as a result of a "bleeder" resistor open-circuit. Protection that fails is a much greater hazard than no protection other than constant vigilance!

Lack a centre-tapped heater transformer?

Just as a problem exists these days in locating components suitable for high-voltage rf applications, so one finds increasing difficulty—or out-of-this-world costs, in providing the power for the valves still needed in linear amplifiers.

The 50W (10V at 5A) directly-heated filaments of the rugged and still-popular 813 tetrode have always been something of a problem, with their requirement for a hefty centre-tapped heater transformer, especially where several of these valves are used. W. M. Frost, G3OHE, has found a simple but effective solution to this problem that he has never seen suggested in print. His idea is shown in Fig 4. He writes: "D1 and D2 are 1A silicon power diodes, piv rating unimportant. In regard to anode current, the 813 filament(s) act as a centre-tapped resistor to equalise diode currents. Should a small amount of standing bias be required for the 813 over and above the 0·7V that always exists with this arrangement, several diodes can be used in series in each filament/earth connection, providing 0·7V times the number of diodes in each leg (which should of course be equal in number). Whether or not the mode of operation is precisely as outlined above may be open to question, but certainly the arrangement works well in practice."

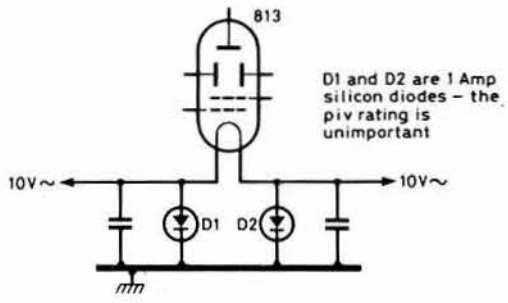

Fig 4. How a pair of 1A diodes can substitute for a centre-tapped transformer for the directly-heated 813 etc

Audio agc/processor

A high-performance agc system capable of converting an af signal with 50dB dynamic range input to near constant output, originally developed for broadcast applications, is described by Lee Barrett, K7NM, in *Ham Radio* September 1984, pp24-5: Fig 5. Heart of the device is a Motorola MC3340P ic which can provide 13dB gain or nearly 80dB attenuation, depending on the value of the resistance between pin 2 and earth. In practice a jfet

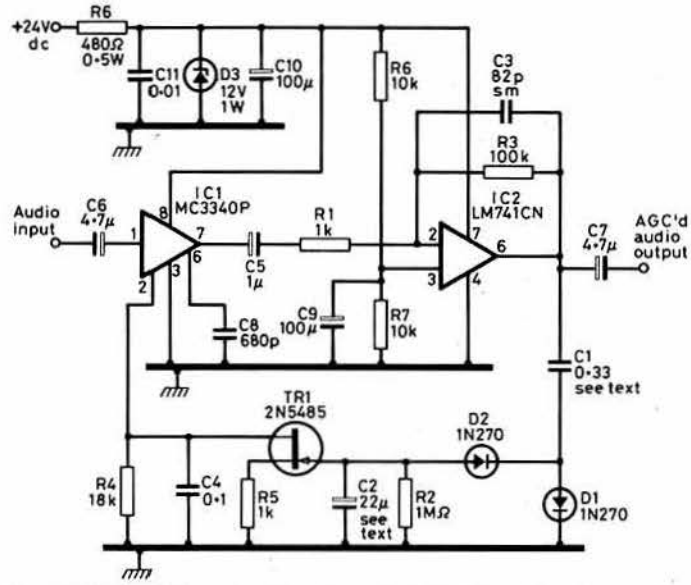

Fig 5. K7NM's audio automatic gain control circuit capable of converting 50dB input dynamic range to near constant output

(2N5485 n-channel fet) is used as a voltage-controlled resistor to control the ic.

Dynamic range is adjustable by selecting the value of R3 with the 100K shown resulting in a near—50dB range. To reduce the range (high for most amateur radio applications) increase C3, at the same time decreasing the value of C3 to maintain the time-constant represented by R3 × C3. R3 plus C3 form a low-pass filter to minimise the problem of overshoot (poppiness) caused by a very abrupt change from soft to loud input signal.

The attack time is governed by C1, with 0·33μF resulting in the fastest possible time; this value should not be exceeded or low-frequency oscillation may result. C2 controls the main recovery time, with 22μF recommended by K7NM for speech. A level control potentiometer may be added across the output.

One possible application for such a high-performance agc system mentioned by K7NM would be to provide constant modulation level in an fm repeater virtually regardless of the deviation of the incoming signal.

Alternative power sources

The operation of communications and electronic equipment completely independent of ac supply mains—even for battery recharging—continues to be a topic of more than passing interest not only to radio amateurs but also to sailing enthusiasts. Jack Tootill, G4IFF, who keeps an eye on the shipping and yachting periodicals, has sent along a wad of clippings that show the increasing number of small generating systems now being marketed for a variety of marine applications, although do-it-yourself electricity still does not come cheaply.

Two developing systems are evident: wind generators suitable for keeping batteries charged during periods when no engine is running; and the increasing use of solar cells to replace entirely mechanical generators.

Unfortunately for those with inland sites both wind and solar generators depend to a major degree on the weather, although it should be remembered that solar cells do deliver power during an overcast day. The contrasting weather dependence of wind and sun has encouraged broadcasters to experiment with a combination of both these forms of generation on the assumption that in coastal areas it is reasonably likely to be either sunny or windy, and without long periods of still fog. A note on and illustration of the IBA's wind and sun four-channel televison relay station at Bossiney, on the north Cornish coast appeared in *TT* January 1983, pp43-4.

It would seem that typical wind generators on the marine market include the Aerogen and Ampair ranges for 12V batteries, capable of delivering from about 25 to 75W at wind speeds of around 20 knots at prices that can go from roughly £140 as special offers up to about £200 for the 25W units. Typically they will begin to charge a battery at about 0·5A at wind speeds of around 10 knots. A voltage regulator is always necessary with a wind generator.

The UK is not the best region in the world for solar generators based on silicon photovoltaic cells, and although one often reads of how prices will soon come tumbling down this has not happened yet! Solarvent, who specialise in sun-powered ventilators, offer an M82 photovoltaic 20·6V module intended to charge 12V batteries, though the charging rate in typical

daylight is probably fairly low, and the price is around £125. There is also a Lucas Marine MB1206 solar battery charger claimed as suitable for keeping unattended batteries in a constant state of charge, and which appears to be intended as a topping-up facility in cases where the main charging is from a generator driven by the ship's engine.

Many of the solar heating systems intended for domestic applications work on a different principle, the heating by the sun's rays of liquid in roof-mounted thin pipes. Then there are the experimental large scale electricity generators using large numbers of parabolic reflectors computer-controlled to track the sun. A very large array of this type is located in the south of France and is expected to be made available to French amateurs for moonbounce experiments using the reflectors as antennas rather than heat concentrators.

For those interested in other novel forms of energy conservation, G4IFF has provided some details of the growing number of sail-assisted ships of up to 30,000 tonnes deadweight that have been built recently in Japan. The largest of these, the *Aqua City,* with two computer-controlled sails each 16m high and 11m across, achieved a $20,000 saving in fuel during a single voyage from Japan to Vancouver.

The ageless W3EDP antenna

In a recent "first steps in radio" article on "Radio antennas and how they operate" (*QST* September 1984, pp30-4), Doug DeMaw, W1FB, comments: "I've known a number of new hams (*sic)* who thought they could get on the air with a random length of wire at whatever height they could manage. Grave disappointment often follows . . . the amateurs received no responses to the CQs because they had ineffective antennas, and thereby were transmitting weak signals."

This discouraging and only partly valid observation can be justified only because W1FB makes it clear later in his useful article that the newcomers' problems were primarily because, in the absence of effective matching of the transmitter into a reactive impedance, very little power was being radiated. In other words, it was the *antenna system* and not necessarily the use of a random length of wire at uncertain height that made the antennas ineffective. In practice, as many amateurs have discovered, a random length of wire even a few feet off the ground *can* bring plenty of contacts, even though nobody should expect it to outperform a TH7DXX at 60ft.

The secret, if there is one, is simply to ensure that the whole antenna system is brought into a conjugate match with the aid of a very good earth, radials or, usually better still, a counterpoise insulated from ground, using an effective transmitter-antenna matching arrangement, and avoiding very heavy circulating currents.

About the mid-'thirties there appeared on the scene an antenna system designed by W3EDP that exploited this very effectively, though the length of the antenna wire (84ft) was not entirely random but chosen so that a simple parallel-tuned circuit inductively coupled to the transmitter tank coil, plus a short counterpoise of length suitable for the band in use, was all that was needed to bring the antenna system into resonance. Basically it is a simple "Marconi" antenna, and any other reasonable length of wire can be substituted for the 84ft length but may require a somewhat more flexible transmatch and different lengths of counterpoise. I recall using a W3EDP in 1939 for my 10W on 7 and 14MHz, and being reasonably happy with the results, which were roughly the same as with a 66ft end-fed wire that I also favoured.

Les Parnell, G8PP, still uses a W3EDP antenna on all pre-WARC bands from 3·5 to 28MHz, and reports receiving on ssb such comments as "this is a new one on me. If it is a new type of Yagi let me know how long the elements are, as my yard is very small and any rotatable thing with less than 12ft span would be more than welcome," and, again, "Is it omni-directional? You're coming in here 5 and 9 so I take it you've a reflector of some sort. If this is so, how do you radiate the other way? I'm using a three-element beam some 60ft high, and your W3EDP, as you call it, might have potential as you say it is only 21ft above ground."

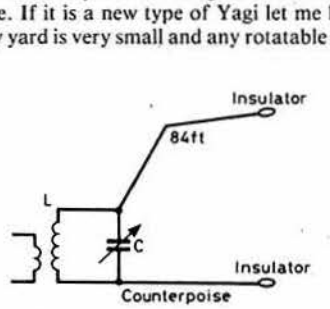

Fig 6. The traditional W3EDP 84ft end-fed antenna. L was often inductively coupled directly to the pa tank coil, but modern practice would be to use a low-impedance link winding on L. C is 250pF. L wound on 2in diameter former would be as follows:

3.5MHz 21 turns, 16swg spaced one diameter. 17ft counterpoise
7 MHz 7 turns, 16swg spaced one diameter. 17ft counterpoise
14MHz 5 turns 16swg spaced one diameter. 6·5ft counterpoise
28MHz 3 turns, 16swg 0·5in diameter. No counterpoise
Other bands will require some experimentation. G8PP uses a 3ft 4in counterpoise on 21MHz

G8PP comments: "These two quotes are not unusual responses to my saying that I'm using a W3EDP. So I explain that it is simply an end-fed wire some 84ft long with a short counterpoise that varies in length with the band in use: Fig 6. I first used this system in 1938-9, before we had access to 21MHz. I have since found that a counterpoise about 3ft 4in long gives the best results on that band."

It would be interesting to discover how well the basic W3EDP arrangement loads on 10, 18 and 24MHz (but remember, UK amateurs are not yet pemitted to radiate a vertical component on 18 and 24MHz) and the optimum counterpoise lengths for these bands. It could prove necessary to use series tuning on one or more of the non-harmonically related bands.

Although it is unusual these days to hear anyone claiming to be using a W3EDP, the basic design remains in the hf antennas chapter of the *Radio Communication Handbook*. It is described in the current edition as "an excellent solution for 'awkward locations' where an antenna of orthodox type cannot be made to fit in". Although most diagrams still show the W3EDP coil as inductively coupled to the pa tank coil, in 'thirties style, the current edition of the handbook makes it clear that there is no basic reason why it should not be link-coupled to the transmitter, directly or via a lowpass filter, swr meter etc. It is also pointed out that "there is scope for much experimental work with alternative lengths of antenna and counterpoise". It also stresses that, in general, it is much easier to achieve efficient radiation with systems of this type (ie not grounded, but with a counterpoise) than those relying on earth connections (ie Marconi-type end-fed antennas).

The flexible centre-fed dipole

In his "First steps in radio" article, Doug DeMaw, W1FB, pays tribute not only to the basic single-band half-wave resonant dipole with coaxial feeder, but also to the much more flexible centre-fed multiband dipole or doublet with open-wire or 300Ω resonant feeders.

Surprisingly, however, he does not mention one of the most important advantages of the multiband version: the top span does *not* necessarily have to be, as W1FB suggests, 468/f(MHz)ft, ie an electrical half-wave, "at the lowest operating frequency" with all the real-estate problems this involves for 1·8MHz (250ft), 3·5MHz (132ft) and even 7MHz (66ft) operation. Provided the whole system, top/feeders/atu can be brought into resonance, a "top" span of only about half this figure (λ/4), or even less at the lowest band, will radiate quite effectively. Remember that any antenna system radiates all the power that is fed into it, less that dissipated in losses. Although losses tend to rise with a short top span, even a 66ft span can prove quite effective on 3·5 and 1·8MHz.

Our shrinking lifestyle

Les Mitchell, G3BHK, raises the problem presented to both hf and vhf operators by the gradual shrinking of our *lebensraum*: "Modern housing decrees short gardens. Buildings are becoming ever closer together. Not only does the amateur have difficulty in finding space for an effective and aesthetically acceptable antenna, but even the number of potential rfi hazards is increased by proximity.

"Just consider", he continues, "the items which absorb rf such as metal and trees on an average-type housing estate, and you begin to realize the extent of the problem (but see my remarks below—*G3VA*). The average house has electrical wiring which passes up the wall but branches out at the 8 and 16ft levels (approx). The water pipes extend upwards to around 20ft with horizontal extensions under the floor at the same levels as the wiring. The tv and vhf/fm broadcast antennas are around the 32-3ft level. To this mass of rf screening one must add street lamp standards (even if made of concrete they still house electrical wiring), trees and overhead cables.

"As the majority of amateur antennas appear to be about 25 to 30ft high, one wonders how they radiate at all! If you then go on to consider this screening material as vertical antennas, many will tend to resonate on amateur bands and add to our rfi problems. For instance, I cause my very near neighbour very little interference on his fm radio, except when I operate on 7MHz running just a few watts to a vertical erected at ground level. Reference to Fig 7 suggests that his fm antenna array resonates as a half-wave on 7MHz, giving him full benefit of the available rf.

"One wonders what effect rows of High Street lights and those along motorways etc have; some must resonate and their spacing cause peculiar radiation patterns.

"The different combinations of screening and resonance in different locations may explain why two amateurs living in the same locality and

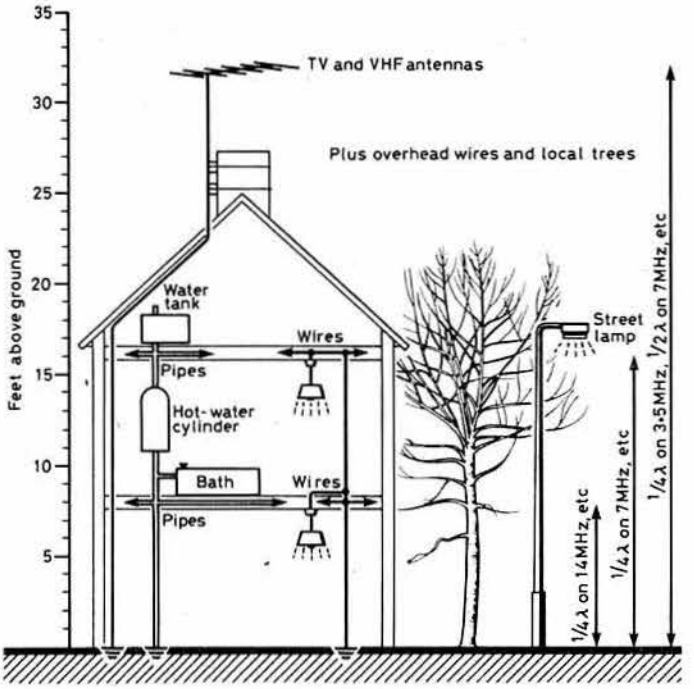

Fig 7. The possibility of unwanted resonances of metal conduits, pipes etc in a typical residential environment as suggested by G3BHK. The houses themselves can also have broadband resonances as noted in the text stemming from work by Canadian engineers

using exactly similar antennas often achieve very different results. Trees at least change resonant frequency with the passing years."

G3BHK's comments are generally valid but need some slight qualification. Objects surrounding antennas certainly affect their radiation pattern, but do not necessarily "absorb" as much transmitter power as G3BHK suggests. Many objects, particularly metal structures, do not absorb much rf but re-radiate most of it. This can, and often does, change the radiation pattern, tending to fill in nulls and to reduce the f:b ratio of directive arrays, introducing mixed polarization etc. In other words, they tend to act like poor mirrors rather than sponges. Quite distant electricity pylons have been shown to have significant effect on directional mf arrays.

A detailed paper by S. J. Kavanagh and K. G. Balmain of Toronto University (*IEEE Trans on Broadcasting*, Vol BC-30, No 1, March 1984) goes even further in showing how high-rise buildings re-radiate mf signals and can also cause detuning of nearby mf transmitting antennas. They have found that buildings can act like a thick, somewhat lossy monopole antenna, exhibiting a broad, quarter-wave resonance when a building having horizontal dimensions of about half its height has an overall height of about 0·18λ. Re-radiation from a building near resonance can be strong enough to distort significantly the pattern from an omnidirectional vertical antenna at distances of up to two or three wavelengths (ie up to about 1km at 1MHz). Moreover, for multi-element directional mf antennas, as widely used for radio broadcasting in North America and occasionally in the UK, serious null-filling can occur even when a "resonant" building is several kilometres away from the antenna site.

The paper describes successful "detuning" of a 12-storey building by the fitting of stubs, although the reduction of scattering (about 2dB with rooftop stubs, and 4·4 to 6·6dB for umbrella stubs) was not as large as could be obtained using simple models. The paper also observes that the predominant building construction material in which rf *losses* occur is concrete; the electrical properties of concrete are strongly dependent on its moisture content, which varies with age and environmental factors.

Building resonances resulting in re-radiation and rf losses can occur at hf without requiring the presence of high-rise buildings in the neighbourhood, though I am not sure how you could persuade your neighbour to let you fit an umbrella detuning stub on his house!

Fitting PL259 and bnc plugs

Brian Walters, GW3XHD, has sent along some useful notes on the fitting of PL259 and bnc plugs to coaxial cable based on his years of servicing mobile radiotelephones. He refers to his suggestions as "tips for newcomers", but I suspect that it is not only G0 and G1 amateurs who sometimes find it difficult to fit these plugs.

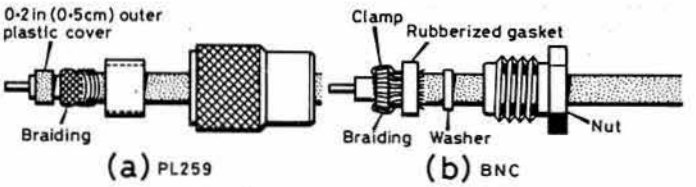

Fig 8. GW3XHD's recommended method of fitting PL259 and bnc coaxial cable plugs

GW3XHD believes that with the PL259 plug the problem when fitting is that afterwards it is found that a short-circuit exists across the insulation to the centre pin inside the plug. He avoids this problem, as shown in Fig 8(a), by placing a small piece of the outer covering of the cable to form an additional insulating washer as shown. When the reducer is screwed into the body of the plug, this washer is squeezed, insulating the centre of the plug and ensuring a snug fit of the cable to the plug.

With a bnc-type plug a similar problem can arise due to short-circuiting by stray strands of the braiding, and often the cable can later be all-too-easily pulled away from the plug. Fig 8(b) shows how both these problems can be overcome. The braiding is made long enough to go back over the clamp and then under the rubberized gasket, which can be eased over the cable. Then, when fitting to the body of the plug, the assembly will need to be eased in with the aid of a small screwdriver. Once a plug has been fitted in this manner, the cable is most unlikely ever to be accidentally pulled out; in practice, GW3XHD has found, the cable is more likely to snap before this happens.

Waterproofing and antenna accessories

P. G. Rollin, G4AFU (telephone (0768) 66131), draws attention to the uses to which a "Rubberlite" type 108 junction box can be put when erecting wire antennas; for example, when joining open-wire feeders to coaxial cable for a G5RV dipole or to provide a centrepiece for a dipole. The box is basically an eight-way connector block enclosed in a high-grade, watertight rubber enclosure with a removable transparent cover, and normally used for some vehicle electrics. There are two versions, one using synthetic rubber to provide greater resistance to oil. They are available from motor accessory dealers at under £5, although G4AFU offers to help out in case of difficulty. He has used one for a G5RV for several months with no trace of moisture ingress. He writes:

"After making the connections the window snaps back into place, providing a completely watertight enclosure. There are two blank inlet and outlet ports. These are opened by either cutting off sufficient of the rubber to make a suitable interference fit for coaxial cable, or by poking a small hole through for the open-wire feeder. A spot of silicone sealant at the point where the open-wire feeder enters the port then finishes the job. Coaxial cable does not need any other sealing provided the rubber has been cut for a push or interference fit."

It should be stressed that while it is possible to implement antenna systems without the use of watertight junction boxes, it is *essential* to ensure that the ends of coaxial cable are effectively sealed against moisture ingress. G3MCK (*TT* November 1981, pp1034–5) described a low-cost technique using a toothpaste-cap filled with Bostik or Evostick sealant.

For wrapping around other junction connectors etc, diy enthusiasts will probably be aware of the thick heavily-greased "Sylglas" tape intended for such purposes as temporary repairs to leaking water-pipes etc, though I would question the electrical characteristics of this very messy material. Mike Shepherd, G8YZW, draws attention to a "revolutionary" new waterproofing tape that would seem to be ideal for a number of outdoor and antenna applications. This is "Rubbaweld self-amalgamating marine tape" (C C Marine services Ltd, Eagle Road, Guildford, Surrey GU1 4HZ, telephone (0483) 35358).

It is a thin adhesive tape which, when bound around the dry surface of a pipe, cable, insulator etc, welds itself into a solid waterproof skin within about 1h, and is claimed to provide "complete protection against corrosion by seawater to electrical connections" and "high voltage insulation for rt connections". Two layers of overlapping tape are claimed to repair a leaking water hose.

G8YZW reports that a small roll of Rubbaweld marine tape (3m long, 25mm wide) costs about £1.30. He adds: "For outside joint sealing it is the best stuff I have come across next to well-applied Evostik, of which I make great use. It is not cheap but neither is the replacement of a length of watersoaked coaxial cable!"

For those who may believe that wire antennas have been displaced by "whips" for professional military and civil hf communications, attention is drawn to the fact that the British firm C & S Antennas Ltd has recently

Multi-purpose hf antenna kit with portable carrying case introduced by C & S Antennas Ltd for military and professional civil application

introduced a multi-purpose antenna kit for tactical communications or for civil exploration and survey applications. The kit enables any one of nine different hf antennas to be erected, including a base-fed "V" for short range use up to 8MHz, a sloping "V" for directional long-range skywave working, an inverted-L, various dipole delta and non-resonant "V" configurations, supported from trees, buildings or masts. The kit including wire, earth rods and accessories fits into a small canvas carrying bag.

For radio amateurs such a kit would be most useful, though experience suggests that products intended primarily for military purposes are seldom priced within amateur budgets, at least until they become available as "surplus".

In this connection, D. J. Harvey (ex-G8SSB) draws attention to a report last July in *The Daily Telegraph* headed "Equipment hoarded by MoD" and referring to a report of the Public Accounts Committee criticising MoD for its excessive level of stocks including: "obsolescent items, others which were almost out of date, and stocks awaiting potential overseas buyers." This explains why only a trickle of radio equipment has recently been released as "surplus". Those equipments that do reach the market still provide a happy hunting ground for home-constructors seeking the increasingly rare high-grade transmitting capacitors and coils etc, though the construction of military equipment has made it increasingly difficult to recover, for alternative use, the components.

ARQ rtty via satellite

Colin Richards, 9M2CR, in "Amtor spins a time-wrap around Oscar 10" (*Rad Com* July 1984, pp582-3, 589) described the problems that arise with ARQ (automatic repetition of errors) systems of rtty, such as Amtor, when the propagation delay increases. Admittedly, he showed that in certain circumstances it is possible to copy Amtor traffic through Oscar 10 provided that the error-rate is very low and there is no objection to losing the valuable advantages of error-correction offered by Amtor over all but the very longest terrestrial paths.

Belgian engineers have recently proposed a modified way of transmitting data blocks suitable for an ARQ system used on satellite circuits with their long propagation delay even under high error rate conditions (*Electronics Letters* 8 November 1984, pp986-7). If I understand their proposals correctly, the transmitter simply repeats the same data block until an acknowledgement is received. If this is the affirmative "ack", it immediately passes on to the next data block. If an error is signalled, "nak" or negative acknowledgement, the first data block continues to be transmitted until an "ack" is received: see Fig 9.

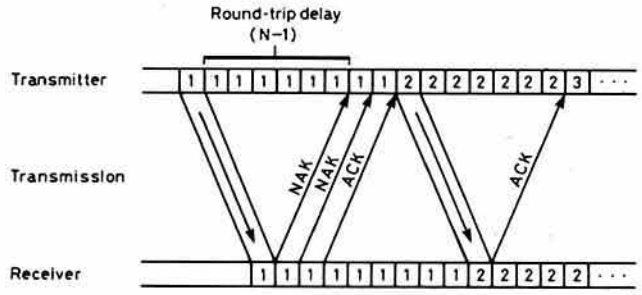

Fig 9. The proposed rtty ARQ system suitable for use over satellite circuits having long propagation delay. The minimum number of repetitions of each data block depends on the round-trip delay relative to block length. In practice, for Amtor, fewer repetitions would be required

The Belgian authors present mathematical and graphical analyses that indicate a significant improvement in overall efficiency under poor conditions when compared to two alternative systems proposed for satellite ARQ operation: "go-back-N" or the system proposed by A. R. K. Sastry in 1975 ("Improving automatic repeat-request (ARQ) performance on satellite channels under high error rate conditions" *IEEE Trans* 1975 COM-23, pp436-9). The new proposal would seem to be confined to the data block transmission protocol, and at first sight it would seem feasible to develop an Amtor terminal switchable between the conventional transmission mode and the Belgian scheme, though I leave it to rtty enthusiasts to show exactly how this could be done, and whether it would be permissible within the current UK licence.

Unlike the go-back-N schemes, which have the disadvantage of changing the order of the data blocks, the new proposals by M. Moeneclaey and H. Bruneel, provide a continuous ARQ protocol while preserving the order of the data blocks. At low error rates, go-back-N, Sastry and the Belgian proposals provide virtually the same throughput efficiency, which is defined as the number of bits delivered to the total number of bits transmitted, but as the probability of a transmission error increases the new scheme shows a dramatic improvement. It provides the normal degree of error protection though clearly reduces the wpm rate, compared to conventional ARQ over shorter paths, by an amount that is governed by the propagation delay.

Nicad charger

Brian Walters, GW3YSP, recommends the use of a 7805 three-terminal ic

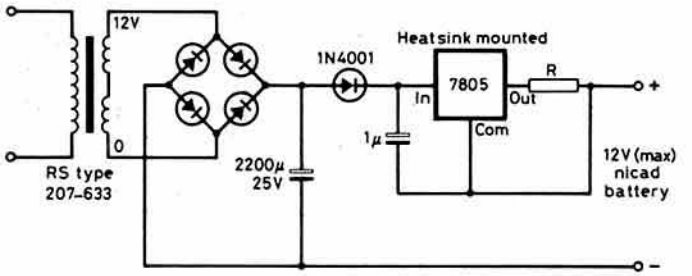

Fig 10. Constant current nicad charger using three-terminal ic regulator chip

regulator chip as a constant current source for charging nicad batteries. For the past five years he has been using this technique, which he took from RS data sheet No R/2854 issued August 1978, for batteries up to 5Ah capacity with a 12V maximum voltage.

The action of the 7805 results in the voltage-drop across R (Fig 10) remaining constant at 5V. Hence the voltage across the output and "common" terminals of the regulator chip is 5V, the regulated output voltage of a 7805. Table 1 lists the value of R for charging various cells, which may be single cells of 1·25V up to 10 cells in series providing approximately 12V. For other charging rates and cells, R is given by 5/(charge rate), remembering that the normal charge rate for long life of a nicad cell should be around 0·1C of its capacity, ie a 5Ah battery would charge at 500mA for 14h. Some nicad cells are suitable for fast-charge but with a simple charger without a timer or voltage sensing it is far safer to stick to the 0·1C rule.

Table 1

Nicad cell type	Charge current	Value of R Ohms	Watts
AA	66mA	75	0·5
C	250mA	22	2·5
D	500mA	10	2·5
PP3	9mA	560	0·5

GW3YSP suggests it may be possible to use the higher voltage 7812 (12V output) and a higher voltage mains transformer to charge 24V stacks using the same principle, although he has not tried this. He adds a timely reminder that nicad cells should generally be discharged to the 1V/cell level prior to recharging. Two or three complete charge/discharge cycles can often restore a battery which has developed a so-called "memory" to full normal working order. When discharging batteries the 0·1C rate is advised. □

4-2-70

*by Ken Willis, G8VR**

HERE WE ARE at the opening of another year, and for most of us the question will be "Where did the last one go?" Many of those urgent projects scheduled for completion in 1984 still lie half-completed on the bench at G8VR—and with the hobby developing so fast in so many ways, it is difficult to choose between micro-applications, that new elevated antenna for satellites, packet radio or just plain keeping in touch with things on the bands. I suspect many of us are faced with this predicament. Anyway, it is difficult to remain bored for very long with a hobby such as ours, and long may this state of affairs continue. Let me wish everyone a most happy and prosperous 1985, with dx that makes even that contact last year with UA3LAW seem pretty ordinary stuff!

50 and 70MHz

With the issue of a further 60 permits for operation on 50MHz, activity outside tv hours has increased greatly on the band. However dedicated to "six metres" the original permit holders may have been, it was becoming obvious that several of them had worked one another so many times that the advent of 60 new calls to listen for and work must have been a great morale booster. The next step would seem to be to see whether UK 50MHz operation would in any way embarrass Continental tv-watchers on Band I after our own transmitters in this part of the spectrum have closed down. The experiment so far has shown that this is unlikely if current "after tv-hours" operation is retained in the licence conditions. If a more liberal use of the band was permitted in the UK I doubt very much whether any significant problems would arise. Normal signal strengths of amateur transmissions would be well below typical local European tv levels, except possibly during major sporadic E propagation, which in any case affects all sorts of services for short periods during the summer and is accepted by viewers as inevitable.

The experiment has been, so far, very worth while, even though it had to be instituted after the solar cycle peak which might have given rise to super-dx via F2 layer propagation. The Atlantic has nevertheless been bridged, presumably by Es, (single, double or multi-hop since no-one can be sure what was actually going on "up there" at the time). The band has shown its capabilities for meteor scatter propagation, and for auroral contacts, so let us hope that UK amateurs, like their American cousins, will one day have a general allocation in this interesting part of the spectrum. One thing the experiment has ensured is that if this should come about, there will be plenty of operators ready and willing to commence operation on the band and there will be a lot of experience available for newcomers to these longer metre-waves. Hopefully several other countries within "normal" 50 MHz range of the UK will be encouraged to mount similar experiments as time goes by. Then, when the next sunspot cycle nears its peak, things should be really exciting since modern equipment is so much superior to what was available in the old days of "Five Metres".

Maurice Lee, G4BAL, was one of the applicants who was unfortunately unsuccessful in his attempt to obtain a 50MHz permit. He says, however, that his enthusiasm for the band remains unabated, and he will continue to operate crossband as he has done since April 1984. He can work 144/50MHz crossband from Sidcup in Kent with, at the moment, only a loft dipole, though a beam is in the making. He comments on long reflections received from GM3WOJ during an ms sked with G3IMW, and asks if they could have been reflections from an aircraft. It is possible, but as an ms addict myself, I suspect it was a "proper" ms burst, even though an indoor antenna was being used, since Chris puts in a terrific signal at times by this mode from his northerly QTH.

GW4HBK has sent in a copy of his log covering the period 31 May to 16 November 1984, and it is clear that he is very active on 50 and 70MHz most days, plus the usual crossband frequencies.

Further evidence that 50MHz is becoming rather more occupied is that during the aurora on the night of 15 November, when a second phase conveniently continued into the "after tv hours" period, GM3DOD of Greenock worked six stations via this mode between 2339 and 2358gmt, all on a beam heading of 15°. The stations contacted were G3LTF, GW3MHW, G3COJ, GW3LDH, G4BAO and G3OHH. Reports started at about 56A but gradually dropped to 52A. GM3DOD uses 20W to a four-element Yagi.

Derrick, GM4CXM (Borders) was successful in obtaining a 50MHz permit, and he would welcome skeds, either two-way or crossband. The preferred times are 2330 to 0030gmt most evenings. Crossband work can be to 144MHz (and shortly 28MHz). Equipment is an FT101B into an MM transverter plus a five-element Tonna at 25ft. Reports on his transmissions and requests for skeds would be appreciated, QTHR, or by telephone (0835 22795).

Graham Badger, G3OHC, of Sutton Coldfield, already a "Supreme" vhf award holder, set out to collect the very difficult 35 squares/10 countries award on 70MHz. It took him four years, but he has now received only the second of such awards to be made. The first, claimed by Gordon, G4BPY, had sat alone in G5UM's ledger since 1981. Congratulations to Graham whose tally included 70MHz contacts with Cyprus and Gibraltar as well as some quite rare (for 70MHz) squares.

The news that Norway is planning to issue 25 special permits for 50MHz operation (see "Amateur Radio News") is very welcome.

The distance between LA and the UK favours meteor-scatter contacts, while the country is ideally situated for auroral contacts, quite apart from being within the distance for "lifts", this opens things up considerably for the present holders and, hopefully, for us all in the future. The enterprise and lead shown by the UK in authorizing the initial permits has obviously borne fruit here, and it is to be hoped that other countries will eventually follow suit.

Repeater news

Writing from the Isle of Man, John Williams, GD6OXG, has provided some interesting information relating to the Isle of Man Repeater Group. The group has applied for a licence to operate a repeater on 144MHz from Snaefell, some 2,036ft asl, and they hope to get it on the air early this year. The group expresses its indebtedness to the Anglo-Scottish Repeater Group who, at no small inconvenience to its members, agreed to a Repeater Management Group request to relinquish channel R1 used by GB3AS and instead to operate on R0. This eased the integration of the IoM repeater into the existing 144MHz network, as indeed did the agreement of the Leicester Repeater Group to give up the call GB3GD so that the IoM installation could, most appropriately, have it assigned to their "machine". Thanks are due to all concerned, and these actions indicate the great bonhomie which exists between repeater "folk", and belies the reputation that a small number of repeaters have unfortunately gained through abuse and misuse by mindless people who remain blissfully unaware of the work behind the conception and implementation of these facilities.

John says that a magnificent response has been forthcoming from GD amateurs since the project was first mooted. In particular, GW4XWB (John Wills Browne) started off the establishment of a fund to finance it by a single donation of £1,000 which enabled a very prompt start to be made, and he is now treasurer of the group. At the site which is in QTH locator (old system!) XO58d, a model F494 transceiver is to be supplied by Pye Telecoms, with an older Pye unit being used as a back-up unit. A WACOM WP 641 Bp Br duplexer with attenuation of the order 90dB will be employed, feeding into a Jaybeam 7074 glassfibre 3dB colinear. As for the location, winds of more than 130 mph are not uncommon there, while the general topography of the IoM does not lend itself to good overall vhf coverage, especially when operating /M. The station control logic will be based on a modified version of the GB3US Mk2 system, but software development is not yet completed for a full description of operating sequences to be given at this stage.

The group does not envisage having to improve the receiver front-end, since the height and general location of the repeater are such that any attempt to improve its sensitivity would possibly turn it into a primary dx machine rather than one serving the needs of local and visiting amateurs. Nevertheless some of the "weak-signal" operators will no doubt monitor

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Three photographs taken at the Midlands VHF Convention last October

Left: G8VR with his trusty FT-225RD

Right: Malcolm Appleby, G3ZNU, chairman of the RSGB VHF Committee, who opened the lecture session

Photos by Derek Cook, G8DJC

R1 when GB3GD is operational, since its presence will add to the "beacon" signals available on 144MHz unless a local repeater continually blocks it at a distant point. John Williams asks anyone interested in learning more about this project, especially those who would like to support it, to contact him QTHR or by telephone (0624 822753).

It seems only yesterday that the Sudbury (Suffolk) Repeater Group was awaiting authorization to switch on GB3SU. Time flies, for on 25 November this repeater celebrated its first birthday. In a recent group newsletter, David Howard, G4IZA, reported that the repeater was doing "just great", with full-time operation throughout the year apart from three visits to the site for minor adjustments or maintenance. He says also that the service area is up to expectations, though possibly not as good as some of the users would like. Discussions are afoot to increase the coverage by filling in one or two "holes", though nothing is expected to be finalized for 12 months or more. "SU" is sometimes received better on horizontally-polarized antennas, although the transmitting antenna is vertical, and G4IZA feels that this may be due to effects of a metal antenna mast in close proximity to what are quite small antennas. GB3SU operates co-channel with GB3WI (Wisbech), and although no reports of interference have been received from the Sudbury area, operators to the west (eg Newmarket) can sometimes hear and open up both systems simultaneously.

Amateur television

The comments last month on amateur sstv activities by certain amateurs tended to suggest that this mode is the domain of just a few. Nothing could be further from the truth, since the British Amateur Television Club is a flourishing one which enjoys a large membership covering all aspects of amateur tv, and which publishes a superb quarterly journal full of technical information, things to build, software and items of general interest. To join the club and receive copies of *CQ-TV* at a modest annual membership fee, write to the membership secretary, Dave Lawton, G8ANO QTHR, or phone him on 0494 28899. The BATC is affiliated to the RSGB.

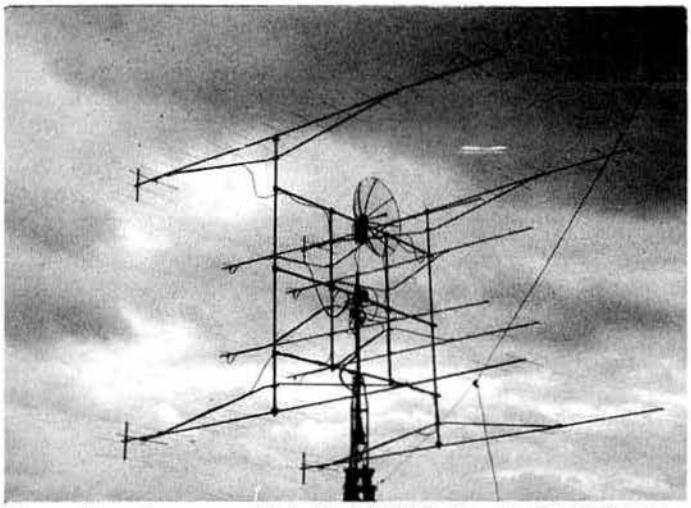
On the general subject of television, those amateurs who use small vhf 625-line tv receivers to monitor for sporadic-E conditions always seem to be in the forefront of the activity when openings occur, since often they can tell from the strength and variety of pictures they receive from Europe and elsewhere when an opening is likely to extend up as far as the 144MHz band. The small black and white miniature portable tv receivers capable of receiving European and Russian programmes under favourable conditions have become rather scarce recently due to the emphasis on colour sets. While colour sets built to the appropriate standards are perfectly satisfactory, they tend to cost rather a lot of money for what is usually only a monitor used on an occasional basis. I carried out a long search for a supplier of a suitable b/w set and eventually, with help from Jim, G8LFB, who is a devotee of this form of monitoring, ran to earth David Martin of South West Aerial Systems (phone 0202 738232) who proved to be a mine of information on the subject and who is usually able to find and supply such receivers. He currently has some which cover 47–69MHz and 174–230MHz on vhf, plus 470–860MHz in the uhf band. The screen is 6in, and the receivers incorporate continuous varicap tuning on both vhf and uhf bands. It is by no means too early to think of getting set-up for the coming Es "season", and during the winter months good pictures from afar can often be received when tropo is good or when a meteor shower is in progress, even if no more than an indoor dipole is employed. If you contact David, ask him for his catalogue of other "goodies" to gladden the eye of the vhf/uhf addict.

Not all vhf dx addicts spend their time entirely on the air. Here is G4DGU (lt) playing a cool violin, with G3SEK on the squeeze-box, at the evening session of the convention. The refreshment close by is purely for medicinal purposes

Beacon notes

The 430MHz beacon GB3SUT located at Sutton Coldfield is now off the air due to damage caused by water seepage into the transmitter unit. After many years of valuable service, the antenna system was also found to be in a very dilapidated condition when inspected recently. A new BBC tv mast is planned at the Sutton Coldfield site, and all of these problems make it very uncertain whether GB3SUT will continue in service unless a new site for it can be found. Readers' suggestions as to a suitable site for this beacon, including comments on which areas it should serve, would be welcomed by G3COJ or G3UUT, both QTHR. The hardware can probably be refurbished or replaced if installation elsewhere becomes possible.

GB3WHA, the 70MHz beacon which was near Crowborough until the



The very fine antenna array of John Neal, G4NQC, of London SE. The four long Yagis on both 144 and 432MHz, plus the dish for 1,296MHz, are equipped with elevation control, and John hears much "off the moon" with this system. Since he has only an average backyard in a very built-up area, he must indeed be fortunate in his choice of neighbours!

site was claimed back by the "owners" will now probably recommence operation from a site near Rochester, Kent, with a change of callsign to GB3REB (the site being a Royal Engineers Barracks). If this comes about, the original frequency of 70·04MHz will continue to be used by this beacon service.

The "other" GB3WHA on 432MHz, which also needs a new site, may have found one at a Water Board location in Sussex, but the matter is still being negotiated.

The VHF Committee is working on the provision of a 50MHz beacon somewhere to the north (of Watford!) to give auroral warnings. This will become more important when the Band I tv transmitters close down, since many operators listen to these transmissions for indications that an aurora is developing. It is rumoured that a senior engineer at the Meldrum transmitter was amazed to learn that amateurs relied on his carrier (rather than the picture content) to tell them when an aurora was in progress.

9H1AQ, who was a Maltese delegate at the Cefalu IARU conference last summer, said that a 50MHz beacon in that country was a possibility. It is also understood that the Maltese licence is so similar in its terms to the UK licence that it will be interesting to note whether 9H1 amateurs are eventually given any operating privileges on the 50MHz band.

The VHF Committee is in touch with a representative group of Polish amateurs who are anxious to establish a number of beacons in their country to serve the vhf/uhf bands. Several Polish beacons were lost when the SP amateurs had to close down when martial law was proclaimed. More news if this situation develops.

VHF Convention 1985

Although it is still two or three months away, it is not too soon to make a note in your diary that the 1985 VHF Convention is to be held at Sandown on Saturday 23 March. The usual trade show will be staged at the convention, plus specialist stands representing the RSGB, VHF Committee, Microwave Committee, RMG, Contests etc. A particularly interesting lecture session is planned, in three separate streams as in previous years. Among the lectures will be one on high-power amplifiers by Geoff Brown, GJ4ICD; one on vhf front-end design by G3SEK; a description of data and packet radio by Ian Wade, G3NRW; atv repeaters and their future by Graham Shirville, G3VZV; hints on getting a repeater going by Chris Young, G4CCC, and Andrew Barrett, G8DOR; microwave test gear and alignment by Mike Walters, G3JVL; and other lectures dealing with radio astronomy, satellite tv and similar topics of vhf/uhf interest in what promises to be a very full programme. The only problem is that one cannot be in three places at the same time to hear all the lectures. The convention organizer is Geoff Stone, G3FZL, and further publicity will be found in future issues of *Radio Communication*.

Aurora

In *4-2-70*, November, it was reported that some Russian stations found that on several occasions tropospheric propagation was good when auroral conditions existed. John, GM4IHJ (Fife), who studies auroras in scientific fashion from his northerly location, does not entirely accept these findings and comments that the "awful word tropo" is much misused (in this case, possibly, through translations from the Russian) to explain away contacts which do not appear to fit any other category. There is a tendency to talk about FAI propagation in much the same way. John wonders if our Russian friends have discovered *auroral-E* propagation, which has been mentioned before in this column; that is, contacts without the familar buzz-saw note made by E-layer reflection (or at least reflection occurring at typical E-layer heights) which are sometimes possible when an aurora is about.

Charlie Newton, G2FKZ, the IARU auroral co-ordinator says that he has not noticed any tropo conditions during auroras, though he admits that he has not especially looked for them. He makes a point that in a very big aurora with a spread of 1,000km or more, somewhere along the line there may well be good tropo simply because of large differences in weather patterns across the continent. He also commented on an article by GM4FZH dealing with auroras (*Rad Com* November 1984) which Charlie believes to be based on inadequate data. He says that there were at least 120 auroras during 1982 alone, with 7,875 contacts through this mode actually being reported to him and covering an area from the Arctic to the Mediterranean and from the Atlantic seaboard to deep inside the USSR; it would be difficult for any operator to have been active during all such events. Incidentally Charlie has prepared some tape-slide lectures on the subject of auroras, available from the RSGB for club use.

John Dunlop, GM6LNM, has sent his regular report on aurora observations from his location in Port Glasgow (XP07e). He says that auroras were noted there on 3, 7, 10, 12, 18, 19, 20, 21, 23, 24 and 25 October; not all of them big enough to penetrate far to the south. On 18 October the event lasted from 1400 to 2039gmt, peaking at around 1600. This was a large event which did get to the south, since Mark Watson G4WNZ of Lake, Isle of Wight, worked GM3WOJ (XR) and heard many other GM, SM and LA callsigns on the 144MHz band. With him the peak came at about 1700gmt, while the beam heading for his contacts was about 45°. On 25 October GM6LNM worked GM1BVD (ZU) in Shetland on a beam heading of 15°, the heading changing to 35° in a contact lasting 8min.

More recently, an aurora on 15 November was reported by both BRS31976 (Rayleigh, Essex), who unforunately did not give his name, and by Vaughan, G4MVR. This was a two-phase affair starting in the afternoon and continuing until quite late at night, and USSR stations were heard and worked in the south. Using an MM preamplifier and a nine-element Tonna into a FR101DD, BRS31976 heard SM, LA and UR stations in addition to several GMs, mostly on a beam heading of 0° though some peaked at 20°. It is good to have information from swls, though *4-2-70* readers should also note Bob Treacher's *SWL News* each month, since his contributors often provide information which supplements that received for this feature.

Apropos of what was said above about tropo accompanying auroral conditions, it is probably purely a coincidence that sandwiched between auroras on 12 and 18 October there was a major tropo opening during which G4WNZ worked OK1MS (HK) and HG1AV/P (IH) plus several German stations. In the same event, GM6LNM heard FX0THF stronger than GB3VHF, which he assumes to indicate a high-level duct formation.

Just as the British Astronomical Association is interested in the meteor-scatter activities of radio amateurs, so is there an interest by the same body in auroras. Ron Livesey, writing to GM4IPK in his capacity as a BAA member, noted that there was a magnetic storm on 4/5 September caused by a 30° long filament near the solar central meridian which occurred on 3 September and then disappeared. He said this would have resulted in a very disturbed ionosphere, and as we know (*4-2-70* November) a sizeable aurora also followed. This is mentioned for the benefit of those who like to do more than just have dx contacts via auroras or ms, since the linking of amateur activities in radio and astronomy can be a fascinating aspect of the hobbies for those who enjoy them.

From here and there

Jack Hum, G5UM, the vhf awards manager says that new-style forms for claiming awards have been prepared on the word-processor at RSGB HQ. Copies may be obtained by sending an sae to Jack, QTHR. G5UM again points out that awards cannot be approved for "mixed" contacts, so any contacts for /A, /P or /M will not count alongside contacts made from the home station, nor can they be mixed with one another. Equally, no contacts made through a repeater can be submitted for awards.

4-2-70 recently referred to front-end performance and mentioned a microcomputer program published in *Ham Radio Today* in an article on moonbounce written by G3WDG. It should be noted that a very similar program was published in the November 1983 issue of *Radio Communication* in an article entitled "Noise figure by computer" by C. J. Langley, G3XGK.

Don't forget that the Quadrantids meteor shower is due to peak on or around 4 January with a ZHR approaching 100; have fun!

SWL News

*by Bob Treacher, BRS 32525**

AS WE GREET another New Year, we find ourselves at the trough of the current sunspot cycle. Hopefully, the year in front of us will provide sufficient radio highlights to make 1985 bearable. At least conditions on the lower frequency bands should give some reward to those prepared to desert the hf bands—it could prove to be the best year for sometime, especially if more countries are allowed on to 1·8MHz. Will any listener get to the magic three figures on that band in 1985?—only time will tell. One important change this year is that the Society has given its name to an all-band swl contest similar to CQWW, subject to participation and the standard of log-keeping, it will become a regular part of the Society's HF Contest Calendar. The event will take place in July to coincide with the IARU Radiosport Championship. Full rules will be published in "Contest News" in due course.

QSL topics—again

Brendan, G4DYO, asks us to keep up pressure on listeners to produce a worthwhile report, and he monitors this page to ascertain what advice is being given. He confirms all reports received, but admits to paying little attention to content. However, one report continues to give G4DYO nightmares; a card from a UA0 swl in zone 19 for a QSO G4DYO had with a YB0 on 3·5MHz—he has still to work a UA0 in zone 19 on 3·5MHz! Such listener reports can be of immense interest and value. He also provided examples of "worst QSLs". One from W2-6838 was written on a small lined, index-type card simply giving the following basic information: 2310, 9.2.77, 14 ssb, 0559, wkd VP1. The card gave no report, no other data, did not include G4DYO's callsign on the front along with other basic information, and G4DYO's name was incorrectly spelt, needless to say, the "report" was not answered.

The second, and the worst case brought to life so far, concerns what is a blatant case of fraud. The report was for G4LJF/3B8 from a G listener in Lancashire who claimed to have heard signals from the 3B8 at R5S9 on 3·8MHz using a Vega receiver and a 30ft wire. What is fraudulent about that?—while in 3B8, G4LJF worked only two southern Europeans on 3·8MHz, both of whom exchanged R3S3 reports. How then can a G listener with a basic set-up have copied his signals at 59? I hope no other swl practises such fraudulent acts. There is no benefit or pleasure to be gained from it. This kind of behaviour brings the integrity of the listener movement into disrepute.

For New Year resolutions please, let us try to make reports accurate, informative, worthwhile, but—most of all—honest.

Overseas news

Tez Watson, ORS53635, provided a further up-date on happenings in West Germany. He had purchased the GW3RRI rtty/cw transceive software for his CBM64 and managed to get it operating after a few early troubles and much work on his AL990 receiver, which had no external loudspeaker socket. His table score for this year is therefore likely to include rtty. On ssb, he logged KG4DX, DF5DG/HB0, DU9RG and 9M2TW. His all-time score only stands at 298, and in view of his business and family commitments he is unlikely to reach the magic 750 for some time.

All the news

After last month's plentiful efforts, news came from just a few for this month. Brad Bradbury, BRS1066, found conditions poor, even on cw, during late October and early November. The 1·8MHz band produced C30BBE, 4U1ITU, UZ9AYA, W1, W2 and VE1ZZ; on 7MHz VQ9AC was a good signal, while 14MHz came up with 4E1AA. Has anyone any information on this "weirdy"? On the QSL scene, UF6DO/U6O, VP8ANT (10MHz), CY0SP1, 8J1HAM and ZF2FU were gratefully booked in.

My xyl, BRS62088, has been more active, monitoring 14MHz during the CQWW event. She also caught some interesting dx on 7MHz, but was most pleased to catch SZ2COT, operating from Thessaloniki for the Chess Olympics Tournament (QSL via SV2SV). On the QSL front, ZS3HL and YI1BGD boosted the countries confirmed total. However, I still cannot get a card from Baghdad!—the answer must lie in the 88s which are sent!

Cliff Adams, BRS10906, reported conditions extremely variable, but noted an undoubted phoney in the shape of ZA1ZA who informed hoards of amateurs to effectively waste ircs by QSLing to N7WO. Anyone else hearing this station should not claim it for the countries table. Another phoney seems to have been found by David Hunter, BRS84664, who logged a station signing YV0AQI. This may simply have been a YB0 not giving his callsign phonetically. Elsewhere, David fared quite well, logging many JAs, VKs, ZLs and G4CNY/VP9, XT2BR and 6Y5IC on 14MHz, while 3X4EX and 9K2BE were new on 3·5MHz.

Douglas Johnstone, BRS54163, also monitored the 14MHz band, gaining OY2A, VP8ASO, VQ9AC and 4S7VK. He still found his fan vertical to be working well with his newly-acquired 9R59DS receiver.

Philip Lancaster, BRS85124, has moved QTH to Ruislip since entering the 1984 lf band challenge. He now uses an Icom IC-R70 receiver with an 85ft longwire and atu. Also gracing the shack is an MBA morse/rtty reader, but Philip would appreciate a copy of the instruction manual. If anyone can oblige, his address is 55 Bideford Road, Ruislip HA4 0UE; postage and photocopying costs will be repaid. On the bands, 21MHz was Philip's most profitable, while the RS7 satellite was copied on 28MHz.

Robert Small, BRS8841, considered the latter part of October and early November to have been very mixed. The 3·5MHz and 7MHz bands were good to the Americas around midnight and early morning, while 14 and 21MHz showed up well to Africa around midday, before closing very early. A61AA was the pick of the dx on 21MHz, while 28MHz produced N4WW/3D6, 3B8FA, ZS4S and EA9IB.

On the QSL front BV0AA, CY9SP1, T31AT, V85TT, HH2WW, 8J1ITU and XT2BM all came good with wanted cards.

Dave Whitaker, BRS25429, received cards after his exploits on 432MHz; 32 counties and 11 countries were confirmed, along with 23 QTH locators. Best returns were F6ETI (YH24c), F1AJD (AF21d) and F6GNR (ZH63g), while GM3JFG (XR30b) provided another rare one on 432MHz. On hf, Dave concentrated on 1·8MHz in CQWW, gaining D44BC and VP2VCW for two new countries to take his all-time score to 91.

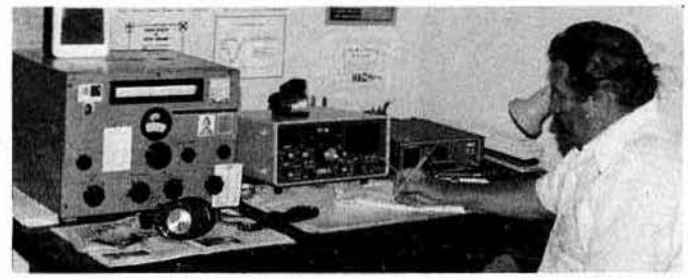
VK9MR's short stay on Mellish Reef seems to have been missed by all our reporters—let's hope there is another trip in the next few years when conditions are more favourable. For those who heard expeditions during CQWW, these QSL routes might help obtain cards: EX6F (UF6CR), HI0A (HI8LC), K4YT/DU9 (KE3A), P44A (K1AR), TI1C (K6VNX), V2ARS (K8BA), VP2VCW (N6CW), ZF2IM (WD8JIH), 4V2C (NQ4I) and 6Y3M (KT3M).

Finale

News, views and comments, together with final scores for the 1984 Countries Table, for March should reach me by 17 January, with late copy by 25 January. □

1984 HF COUNTRIES TABLE

Station	DXCC	28	21	14	7	3·5	1·8	Total
			G listings					
BRS8841	245	94	197	221	162	140	46	860
BRS48909	229	94	157	196	158	131	49	785
BRS25429	221	111	152	184	135	135	60	777
BRS52543	228	101	149	191	144	139	46	770
BRS44395	—	96	151	145	100	61	49	602
BRS10906	211	73	138	181	98	95	11	596
BRS31879	178	103	119	131	99	73	41	566
BRS1066	177	69	137	141	91	57	58	553
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
BRS85124	73	3	18	38	29	42	8	138
			DX listings					
ORS45992	231	119	149	206	104	70	5	653
ORS53635	106	—	32	74	27	46	2	181



The shack of Stan Porter, ORS45992, in Malawi, Central Africa. The gentleman in the photo is a local catholic priest who is interested in amateur radio and hopes to obtain a 7Q7 licence in due course

*79 Granby Road, Eltham, London SE9 1EH.

EPHEMERIS

Satellite news and views

*by R. O. Phillips, G4IQQ**

AFTER A RATHER disappointing start to 1984, the outlook for launch vehicle agencies took a significant turn for the better in October with highly-successful flights of both the US space transportation system (shuttle) and the European rocket, Ariane. In both cases two communications satellites were placed into appropriate orbits prior to transfer into the geostationary satellite orbit. Also, amidst a blaze of very welcome publicity, the crew of the shuttle carried out the first salvage exercise of satellites in orbit. (Earlier recoveries had been made, but these had been of satellites at the bottom of the ocean!) From the point of view of amateur satellites, this can only be good news; the higher the success rate of the commercial launchers the less likely it will be for the launch agencies to attempt to recover the real cost of placing amateur packages into orbit.

Circularly-polarized antennas

The benefits of using circular polarization are usually realized under marginal signal conditions, and can be particularly useful for stations using low power where every last 0·1dB counts. One of the popular suppliers of suitable antennas in the UK is Jaybeam Ltd who provide various models of crossed Yagi antennas for 144 and 435MHz. Around September/October last year a mistake in the assembly of certain models caused the antennas to be set up for left-hand, instead of right-hand circular polarization. The affected models were the 435MHz versions of the 8XY and 12XY. It is a simple matter to correct the problem, and only entails changing the connections in one of the folded-dipole feed assemblies. Anyone who purchased one of these antennas, and has reason to doubt that the antenna is performing as it might have been expected, should contact either the supplier, or Jaybeam directly. New assembly instructions have been produced which clearly show how to set-up the antennas for the desired sense of polization. No other models were affected.

Oscar 10

Weekend operation through the Mode B transponder is now becoming so popular that it would be easy to mistake the 145MHz downlink for 14MHz. A further revision to the operating schedule at the beginning of November increased the time for which the transponders were activated, and also provided for Mode L operation every day of the week. However, during January there are several factors that will require reductions in the operational periods of the satellite transponders. The occurrence of an increasingly bad sun angle coupled with eclipses at perigee give rise to a degraded power budget, and it is necessary to reduce the load on the power system to ensure the continued good health of the satellite. It was proposed to implement the first schedule change on 1 December as follows:

Mean anomaly	Status
15-51	Mode B
52-68	Mode L
69-220	Mode B
221-14	OFF

A further slight modification planned for 1 January will result in the transponder OFF period being extended to MA201-14.

Until recently the Mode L transponder has not been activated on Sundays, but due to the increase in activity it has been decided to provide operation during each orbit as indicated above.

One of the consequences of the activation of the Mode L transponder on Sundays is that the previously-planned schedule for the AMSAT-UK/GB2RS new bulletins will now have to be reviewed. In the past, these bulletins have been transmitted at times of optimum signal conditions which generally occurred around satellite apogee. Operation of the Mode L transponder itself has previously been timed to obtain similar benefits, so there is likely to be a conflict between the two requirements. When a new schedule has been developed it is hoped that the times of the transmissions might be indicated on the messages carried by the general beacon on 145·825MHz.

While most of the activity through the transponders is either ssb or cw, there has been a noticeable increase in the number of rtty/Amtor signals to be heard between 145·880 and 145·900MHz on the Mode B downlink. In addition, rtty messages are now carried by the general beacons at 145·810 and 435·040MHz. The signals from the latter have been very well received at this QTH, partly because of the much lower levels of ignition and electrical noise and to the lesser output of interference from the majority of home computers. The transmission standard used is 50 baud with fsk modulation and should be received in upper sideband mode.

RS satellites

The remaining three satellites in the series, RS5, RS7 and RS8, are still being kept alive by very cautious control of the demands on the power sub-systems. For some time the satellites have been operated on a schedule which requires each particular satellite to be on for only two days per week. A typical operating schedule has been as follows:

Monday	RS5
Tuesday	RS7
Wednesday	No operation
Thursday	RS8
Friday	RS5
Saturday	RS7
Sunday	RS8

During the off days each of the satellites transmits short periods of telemetry when in range of the control station in the USSR so as to ensure a continuous check on the status of the spacecraft. With continued care it should be possible to keep these satellites operating for some time, but they have now been in orbit for just over three years, and batteries have often proved to be the weak point in many other programmes.

Other news

There have been further rumours during recent months that new satellites from the USSR might be expected in the near future. Indeed, if one particular rumour turns out to be true there may already be two more satellites in orbit by the time this issue is produced. The most likely candidate for the transponder configuration seems to be 144MHz for the uplink and 21MHz for the downlink. □

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

RAYNET

*by Geoff Griffiths, G3STG**

Chairman, Raynet Committee

Frequencies

Raynet exists so that amateurs have an organization within which they can offer their special skills to the community in times of need. Without a properly structured and practised core of volunteers, additional communications capability is slow to mobilise, and has limited capability during those vital early hours of any major emergency situation.

One of the strengths of the trained team is the knowledge of availability of equipment at key locations, and the detailed understanding of communications paths within this area.

These considerations form part of the reasoning behind the identification of certain frequencies in the band plans published by the RSGB as being allocated to, or being used by, Raynet. This does not mean that these are, or could be, an exclusive allocation, or that they are not available for use by the amateur population at large. Such an expectation would be quite unrealistic, given the band occupancy taken for granted on 144MHz, for example. It would indeed bring forth a very short response from many users of the band—especially those who have scant regard for band planning or frequency allocation anyhow.

But Raynet members do expect that where exercise work or operations in support of a user service are underway, then the frequencies are left clear for the usually short period of such operation. That's a small concession to make in return for the contribution of time and expertise that members make for the common good.

The same consideration applies to Raynet members as well of course. If your group or club habitually monitors a Raynet channel, don't complain when another group can be heard on it from time to time. Your relaxed chatter may well be blocking their live traffic.

In return, Raynet groups should be prepared to hear other traffic on

11 The Grove, Asfordby, Melton Mowbray, Leics LE14 3UF.

"their" frequency from adjacent counties, for the capture effect on fm will usually permit sharing without problems—unless you want to work the dx as well, that is.

Likewise, if your favourite QSY channel happens to coincide with one of the Raynet frequencies, please think twice before continuing to use it. Please give a thought to the hand-portable station operator on a bleak hillside somewhere who is struggling to make himself heard, but who you can't hear when you ask if the frequency is clear.

Post mortem

The cepo and the county controller sank gratefully back into the warmth of the car, and shut out the wet cold Sunday morning wind. It had been a long morning. They had met at 6am, and travelled along the motorway to a neighbouring county to observe a large-scale exercise.

It had been very interesting, with many lessons learned, and the county controller observed with a wry smile that many of the problems seen were very similar to those of his own groups. But now they had a rare chance to relax for an hour in each other's company as they drove home, and the conversation soon turned to what they had seen—the callout performance was pretty good, but was the brief sufficiently clear, and were the real objectives of the exercise really thought through in the planning stage? Would noise excluding headphones have helped the operators' concentration? How unfortunate that the audio on that 430MHz handheld failed just at the cruical moment. How well the talk-through arrangements had worked, but why did the exercise scenario mean that they couldn't be used for that vital hour in the middle of the timetable?

The conversation turned to other things. What did the cepo really expect of the Raynet team in his own county? Did he really appreciate that what he had was a dedicated band of operators who could also erect antennas and feeders, get equipment up and running quickly at emergency locations, offer skilled advice on communications management, and train second and third shift operators quickly. But there were never enough bodies to do everything that was required. If he really wanted Raynet to provide signal clerks, messengers, telephone operators and communication centre managers as well, then there weren't many groups who were well-manned enough to do all these things effectively at short notice. And what about the levels of training of the groups—were they really good enough?

Then again, why did the cepo seem to want to take such a dominant role in running the detailed operation of the group? Surely all he would have time to worry about in a real incident would be handing on the traffic for transmission to the net operators. He wouldn't be free to think about the routing of the messages. He need only have confidence that they would be delivered accurately and rapidly.

Raynet Manual

All group controllers should have access to the *Raynet Manual* which forms an invaluable aid for group operation and training, with section devoted to signals procedures, planning and briefing, callout arrangements, equipment and emergency listening watch details, as well as the local and national organization. The latest supplement now carries details of recommended operating procedures for rtty which is becoming more widely used throughout the network. Copies of the *Manual* are available through your controller, or from RSGB Publications Sales.

Emergencies

Members of the Cleveland Raynet Group (01/CL/925) were called out by the police on 12 November, and 14 members responded to assist a search-and-rescue operation mounted over the North Yorkshire moors. Three 11-year-old boys had been lost since noon on the previous day, and were located by a helicopter crew at around 0930. They would probably have not survived prolonged exposure in the weather conditions prevailing. Congratulations to the groups who were active from 0545 till noon.

On the same day, members of the West Durham Group (01/DH/204) were among people evacuated after a chemical waste fire at Evenwood, near Bishop Auckland, and the group organizer, G6VTP, informed the fire brigade of the existence of the fairly new group. Shortly afterwards the group were called out by the police, and provided a valuable link with the county emergency planning officer. Well done, all concerned.

Supplies

Steadily increasing costs mean that the prices of Raynet tabards from the Norfolk groups have had to be increased by a small amount. Please note that it is always wise to check current costs on items before sending cash.

Members supplies continue to be available from Jane Balestrini at "Merrivale", Willow Walk, Culverstone, Gravesend, Kent, or from the Raynet stand at major rallies and exhibitions.

Please note that the circular windscreen stickers are inended to be restricted to members of Raynet only, and are therefore only normally available through your controller.

The Raynet Committee

Current membership of the Raynet Committee is: G3STG, Geoff Griffiths, chairman; G3XC, Bill Colclough, vice-chairman and technical information; G4CHH, Joan Heathershaw, zonal co-ordinator; G8CAC, Mike Barker, Group information officer; G4KAR, Dick Jeffries, rallies and shows; G3TJP, Dave Lankshear, membership; G4FLQ, Brett Rider, HQ; G3VPE, Henry Pinchin, Council Member.

In addition, the three spectrum managers, and, as corresponding members, all Raynet zonal representatives.

Wanted

One public relations specialist and professional writer. Working knowledge of Raynet essential. No pay and long hours. Volunteers to G3STG, QTHR, please. □

Microwaves

*by Mike Dixon, G3PFR**

Operating news

Jack, G5UM (microwave awards manager, QTHR) often receives inquiries about the "league leaders" in the Microwave Awards ledger, and he says that the current position is as follows: 1·3GHz, 60 squares, G4KIY; 2·3GHz, 30 squares, G4BYV; 3·4GHz, 10 squares, G4BYV; 10GHz, five squares, G8GKV/P (1978), G8HMV/P (August 1984) and G8SWZ/P (October 1984). On 10GHz there has only been one fixed-station claim, that of G8PMT in 1979, plus one listener award, to Dave Hall BRS40670. The best microwave distance award this year came from Petra, G4KGC, for 1,164km contact with SM7CFE on 1·3GHz.

Gordon, G8PNN, has recently made a number of claims as a result of successes on both 1·3 and 2·3GHz. His 1·3GHz Senior Award (number 10) showed many contacts deep into central Europe, including the believed "first" into East Germany. His distance award on 2·3GHz (beyond 500km) is number 13, and the 10 squares award on the same band is only the third such award made to date. Gordon took advantage of the lift conditions in October, working three new countries (F, GU and GJ) and five new squares on 1·3GHz, bringing his total to 50 squares and 15 countries. Further activities on 2·3GHz yielded contacts with G8TFI (IO81/YL) and G4LRT (IO92/ZM), pushing the squares worked up to 15.

While on the subject of squares, may I remind readers that they should now be using the Maidenhead System rather than the "old" QTH Locator, although the RSGB awards will continue to be available for either system, since it is quite easy to relate the new squares to the old. It will make my job a lot easier to report results if I don't have to do the conversion!

Geoff, GJ4ICD, reported working a further 19 squares on 1·3GHz during the "lifts" in October, thus bringing his score up to 41, including a most interesting contact with GM4DMA/P in IO87 (YR) square: the Scottish station was running a mere 1W to a 23-element Tonna, balanced on his knee!

Apropos the "Midlands 1·3GHz activity net" reported in *Microwaves* in July, regularly heard and worked in the midlands are the following stations: G3KFD, G6VKA, GI4CXH, GI8YDZ, G4LVB, G6FIO, GW8FKB, G8DIR, G3WOH, G6FK and G6LZZ, together with GW4IGF/P and GW8AAP/P. It really is encouraging to see so many of the newer callsigns active on this band, and a similar influx of newcomers has also been noted on 10GHz this year. Keep up the good work!

From another publication

Dubus issue 3/84 contains a number of technical items of interest. Three of the brief resumés deal, respectively, with 1·4GHz divide-by-four, 2·3GHz divide-by-two counter prescalers, and the principles of design of a frequency counter using a mixing technique to extend the range as high as 50GHz. Further articles deal with Gunn-oscillator locking using a circulator or hybrid-T (10GHz), a multiplier/filter from 432MHz to 10GHz (1W in, 6-8mW out), and transistorized linear amplifiers for 1·3GHz yielding 6, 16 or 30W output. The final item of interest is information on

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

the principles of design of twt power supplies based on the authors' practical experience with a 25W "X-band" twt.

The Sheffield workshop

This event, held on 17 November, was very successful, attracting some 30 operators and their equipments, which ranged from the immaculately-engineered to the "kitchen-table" variety. At the end of the day, regardless of the "quality", the vast majority of the equipment was on-frequency and working well: hopefully the owners will now go out and create activity on 10GHz! Facilities offered were comprehensive—everything the amateur could wish from a professional laboratory. Our thanks are due to Barry Chambers, G8AGN, and the Department of Electrical Engineering for "hosting" the event, which was enjoyed by all particpants. I took the opportunity to re-check the calibration of a professional-quality absorption wavemeter for 10GHz, and I will be pleased to assist operators in the Cheshire/Merseyside/Greater Manchester areas to get their 10GHz equipment "on-frequency" should they have missed the event.

Fundamentals (6)

I had hoped this month to give more details and layouts for the comprehensive 10GHz receiver/transmitter board mentioned in both October and December *Microwaves*. It has been decided that this column is not the right medium in which to publish the design, since space considerations will not allow adequate presentation, and it will therefore be published as a "stand-alone" article. Meanwhile, a number of prototypes are being built to prove the reliability and reproducability of the design, for there is nothing worse (as far as the constructor is concerned) than an unreliable or non-reproducible design.

Arising from the "fundamentals" so-far covered, I have received a number of queries which it may be sensible to answer here. First—"How can I get the *Microwave Newsletter*?" This is available via the membership services dept at RSGB HQ, and currently costs £5 per annum; there will normally be 10 issues per year, containing both technical and operating news.

Second—"How can I find out who, locally, is interested in microwaves?" The answer to this is manifold: on the air is one way, via your local or neighbouring clubs is another. A third is to read the *Microwave Newsletter* which contains an annual up-date of a microwave directory giving the whereabouts and interests of the more active stations. It should be stressed that this list is only as good as correspondents make it. If you are interested, please let the editors have details (G4KNZ, G3YGF, G4CNV or G3PHO, all QTHR).

Third—"Where do I get bits and pieces?" Again, the *Newsletter* publishes lists of suppliers of devices, materials and modules but, as before, the list is only as up-to-date as correspondence allows. The Microwave Committee Component Service functions well and is able to supply some of the more difficult components: "commoner" components are better obtained from other sources.

Fourth—(and specifically 10GHz)—"What type of Gunn/mixer assembly is best to use?" There is no definitive answer to this except to say again that, for the beginner, the easiest configuration is the "in-line" oscillator/mixer which has already been fairly comprehensively covered here. The use of the Solfan unit has been mentioned: this item now appears to be in very short supply, although an oscillator only is available and can be coupled to a home-made mixer of the type described in August *Microwaves*. The only change which needs to be made is to reduce the distance from the oscillator flange to the mixer diode—this should be 21mm, since the iris in the Solfan oscillator is recessed by 6mm. As previously mentioned, side-by-side or "piggyback" assemblies cannot be used, and their use is really restricted to being a signal source or a source of good devices. One word of warning: if the devices are removed for use in other gear, the usual mixer devices used are Schottky diodes and are susceptible to static damage when handled. It is a good idea to place the module on a sheet of aluminium cooking foil on the work bench and to "earth" both hands to this foil before removing the diode. When not in use, such devices are best preserved by wrapping them in a piece of the foil and keeping them in a metal box. Similar procedures can be followed when putting the diodes back into other equipment. If soldering is involved, then it is better to use either a low-voltage soldering iron or to disconnect a mains-voltage iron from its supply immediately before use. There are no special precautions needed when handling Gunn diodes, except to ensure that they are correctly orientated when put back into an oscillator.

Finally, the question "What polarization is used?" Universally, horizontal (E-plane). This is attained with the broad side of the waveguide *vertical* and it is most important that this is observed, otherwise the cross-polarization losses will be excessive and probably prevent effective contact. □

Sporadic-E observations in 1984

R. A. HAM, BRS15744*

THE AUTHOR began this series of annual sporadic-E reports in 1974, and in the 10-year period to 1983 the associated records show that the average season, falling between 1 May and 30 August, lasted 106 days with an average of 43 days when major events took place, Fig 1. The majority of these events disrupt the normal paths of radio and television signals between 40 and 80MHz, but there are a few disturbances each year when the range is extended to between 27 and 150MHz.

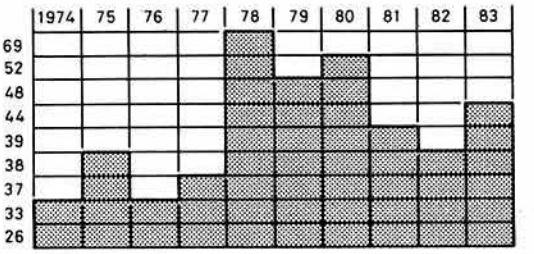


Fig 1. Ten years of sporadic-E

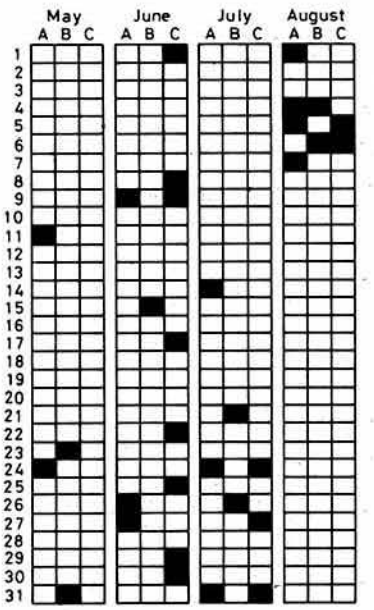


Fig 2. Monthly distribution of sporadic-E during the 1984 season

The meat of the 1984 season began on 11 May and ended 89 days later on 7 August—some 11 days less than the 1983 season. During this period sporadic-E occurred on only 26 days, well below the 10-year average, compared with 44 days in 1983 and 38 days in 1982. Most of the author's daily observations were made around 0830, 1330 and 1830bst, and the disturbances logged at each session are indicated by the dark squares in Fig 2, under A, B and C respectively.

Equipment

To cover the range 27 to 150MHz, the author used a Trio R2000 communications receiver with the frequencies of the 28MHz beacons in Germany (DF0AAB, DK0TEN and DL0IGI), Norway (LA5TEN) and Spain (EA6AU) at finger-tip control in the receiver's memory, and an SX200N scan receiver to monitor various sound and vision channels in Band 1, 40 to 68MHz. An ex-Army R216 vhf communications receiver was used to tune for broadcast dx between 66 and 73MHz, and JVC CX610GB and Plustron TVR5D television receivers located both colour and monochrome, PAL and SECAM, 625-line pictures in Band 1. Apart from a long wire antenna to feed the Trio, the signal collector used throughout was a combined Band 1/3 Yagi, horizontally mounted and connected to each receiver via an Antiference XS3 distribution amplifier.

Early warning

Signals from the 28MHz beacons, mentioned earlier, and the television synchronizing pulses, transmitted from stations as far as Scandinavia, Spain and the USSR on ChE2 48·25MHz and ChR1 49·75MHz, were used by the author for early warning of sporadic-E. As in previous years it was found that the pulses on 49·75MHz were among the first signals to appear and the last to fade away when sporadic-E was about. Although a typical disturbance lasts between 2 and 4h, these pulses on 49·75MHz, a frequency

(Continued on page 47)

*Faraday, Grayfriars, Storrington, Sussex.

The Month on The Air

*by John Allaway, G3FKM**

ANOTHER NEW YEAR sees propagation conditions on the hf bands nearing their worst for Cycle 21. Is it just my opinion, or have improved antennas and receivers meant that more lower frequency band dx is being worked at this stage of the cycle than last time round at the same stage?

More piracy—this time GM3VNW complains that "Bob" who claims to be near Gloucester, is causing him to receive G3VNW/M QSLs.

Take heart all those who are working for the Worked All Hawaii Award. G3AAE reports working the 100 KH6 stations required (since January 1982!) but that he has never heard a station in Molokai or Lanai. A letter from KH6UZ confirms that he has only ever once worked anyone on Lanai —and that was a visitor operating on 144MHz. However, KH6UZ visits Molokai and is attempting to keep schedules from mid-January. He has a TS120 and trap dipoles.

DX News

The recent VP2MW expedition by members of the G3RRS club made about 8,000 QSOs—6,000 of which were in the CQ WW SSB Contest on 27-28 October. The callsign in the October "QTH Corner" was given as VP2MF —this was the call originally expected to be used by the group, but finally VP2MW (the callsign of a silent-key) was re-issued to them. PY7CW is reported to be likely to visit Fernando de Noronha this month, CE0AE is now back on Easter Is and has resumed his daily schedules on 28,495kHz at 1900.

According to *DXpress* "Project Blizzard" left Austalia on 10 November bound for Antarctica via Macquarie Is. The callsigns in use are VK0PB and AX0PB, and the expedition will last until March. The same source says that the Japanese base station at Syowa, 8J1RL has been worked on 7MHz cw at around 2000. There are rumours of possible activity from South Sandwich Is in the next two months by G4GHP/VP8ASR, and also by a Soviet expedition which might visit Zavodovski, Leskov, or Visokoi Is and operate as 4K1I. VK0YL is on the air from Macquarie Is—a lady operator who learned about amateur radio when on Willis Is during the recent expedition. The next expedition to Clipperton is still scheduled to depart California on 27 March, and there is now a possibility that Revilla Gigedo, XF4, may be visited for one day on each leg of the journey.

JA1WXH operated from Bhutan very briefly in October. He reports that A51PN now lives in Phuntsholing and may have an FT757 transceiver soon. A51TY is now a fairly high ranking officer, and Seiji forecasts that regulations for amateur radio now under consideration may result in operation by visitors in two years or so.

BY5RA is now on all bands 1·8 to 30MHz, plus 50, 144 and 420MHz. The station includes TS-930s, TS-608, FT-280, FT780, and rtty and FAX terminals. The station is very active, and by early November had made 3,000 QSOs with 70 DXCC countries. In Taiwan, 60 candidates took an amateur radio examination during October—half were expected to pass, and the new amateurs will probably operate club stations initially.

G3LCS is now on the air from the UAR as A61AA, and will be there for two years. At the time of writing he was to be found regularly on 21,240kHz on Wednesdays and Sundays.

The Egyptian ARS has now been formed, with SU1AL as president and SU1ER as secretary. New licensees include SU1RR, SU1SR, SU1HK, SU1IA and SU3AM. SU1ER says that all /SU operations are unauthorized. The *DX Bulletin* reports that there will be an amateur in the relief crew due to arrive in Marion Is early this year. TR8DR operates daily at 2000 on 21,335kHz and then moves to 14,240kHz. TR8IG has been on 7,050kHz at 0200. From Algeria 7X2LS and 7X5AB often operate on 3,800kHz from 0200. Also on around this time are 3B8CF near 3,778kHz, and 3B8s CD and CF near 7,005kHz. FH4AA alternates between cw and ssb using 21,030kHz and other frequencies above 21,200kHz from 1500. FH8CB has been found on 21,215kHz at 1600—he will QSY to 18MHz on request.

HV2VO reports that his callsign is being pirated—mostly on cw—(which he rarely uses) on 7 and 14MHz. Edmund says that when he has a guest operating on cw he will announce the fact on ssb. ARRL is now reconsidering the position of 4U1VIC for DXCC status. RZ1OWA is the new callsign of UK1PGO on Franz Josef Land, and the station is often on 14,210kHz from 1400. OX5AC is now SV0AC/SV9 on Crete, and should be looked for on cw, rtty or ssb near 14,030, 14,085, 14,190 or 14,227kHz.

The first-ever Brazilian Antarctic Expedition with an amateur station was due to appear on the bands on 13 December 1984. This is ZX0ECF, and it is being fully supported by the Brazilian society, LABRE, as well as the Brazilian Government.

N6KT reminds that QSLs for his contest activities from PJ2FR (and for a few days before each) during the 1983 CQ WPX and CQ WW DX (phone) contests and the 1984 CQ WW DX (phone) event should be sent to the address in "QTH Corner".

Overseas news

Andy Matheson, 5B4DN, who has been sending in 28MHz countries worked scores, reports that a group of ZC4s from Episkopi and 5B4s from Limassol meet most evenings on 28,500kHz at 1800 in what is now called the Aphrodite Net. Regulars at the time he wrote included ZC4s AB and HA, and 5B4s BS, CC, DN and JE. Andy is happy to arrange Cyprus skeds on 28MHz, and can be reached at BEMRS, BFPO 53.

Dave, G4GED, has sent along a report on the visit of Alan Taylor, T30AT (G3OSB), to Kanton Is last June. He had the use of a 13-element log-periodic antenna at over 60ft which had been left on the island by the Americans, but he had to cycle three miles to get to the T31AT station every time he wanted to operate. He made about 3,300 QSOs while using 100l of petrol in the generator. Total population of Kanton Is is 17, consisting of a policeman, postman, some maintenance engineers and fishermen. A return visit is being planned for 1985. QSLs should all have been sent out by G4GED by the end of November.

Visit to RSF HQ

A group of German amateurs paid a visit to Moscow last October and had the great pleasure of visiting the Central Radio Club. Part of the report of the visit reads "High flying hopes were fulfilled when the President of the CRC, Vassilij Bondarenko, UV3BW, announced that a group was now allocated to work from UK3F. Early in the morning (at 0800 9 October) European stations were probably astonished to hear DLs on the air using their own callsigns following UK3F/ and reporting on the first trip ever made by an amateur group to Moscow. Several months of negotiations had cleared the way for a visit to the CRC and the QSL bureau. Vice-president of the RSF, Nikolaj Kazanskij, UA3AF, welcomed the 35 pioneers warmly at 0900msk, and a whole day devoted to amateur radio in the USSR followed. Among other officers were deputy editor-in-chief of *Radio*, Boris Stepanov, UW3AX, and the specialist on satellites and polar expeditions, Leonid Labutin, UA3CR, who were present to answer questions and hold

Rod Hodgson, G3DUW, of Knaresborough, N Yorks (l) enjoying a crossband QSO on 14MHz with Ken Miller K6IR on 144MHz while on holiday with his son, Richard Hodgson G4KBH/W6, in California

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talks. The local Moscow radio club, UK3AAA/UZ3AWA, technical museums, and sightseeing tours to places of tourist interest, ballet and circus were also on the agenda of the five-day visit. A further group was due to visit Moscow in November—and one from the UK is being organized from 19 to 26 May. The cost will be £397, and more details can be obtained from the organizer Rolf Foth, DF5LP, c/o GeBeCo Travel, Eckernforder Str 93, PO Box 22 09, 2300 Kiel, FR Germany.

RNARS morse proficiency tests

At 8pm on the first Tuesday of each month, the RNARS station at *HMS Mercury* (G3BZU or GB3RN) transmits a morse proficiency test on or near 3,520kHz. This is plain language without punctuation marks (these are spelled out) and consists of 3min passages of suitable text at speeds of 15, 20, 25, 30, 35 and 40wpm based on the "Paris" system of five characters to a word. A full explanation of the purpose and procedure of the tests is sent at about 13wpm before the test, and a short RNARS news bulletin is sent at the same speed after the test. A certificate is issued for 100 percent correct copy at 20wpm, and this can be added to up to 40wpm. An endorsement will only be issued if all the slower speeds have been copied correctly. The certificate costs £0.50 or three ircs (for overseas applicants) and an sae or one irc is required for an endorsement. There is also a certificate for 100 percent copy at 15wpm, but this is a 20wpm version endorsed "valid for 15wpm only". It is recognized that with mechanical aids to copying morse it would be easy to "earn" these certificates, but the sponsors feel that, hopefully, such action would give the applicant little satisfaction. Send applications to Peter Bowen, G3TZL, QRQ Manager, 34 Jubilee Road, Waterlooville, Portsmouth, PO7 7RD.

Recent developments

Amateurs in the USA have now been authorized to use the entire 10MHz band—including the previously forbidden area 10,109-10,115kHz. At the same time the FCC seems to have made it clear that 18 and 24MHz will most likely not be available until 1989. Amateurs in Sweden were given permission to use all three of the new bands from 1 December 1984—this is for 150W of A1A for all of them.

The new French callsign system came into effect on 1 January and according to *DX News Sheet* (which received information from F6AJA) it is as follows. There are now five licence classes: **(A)** for 144MHz only (for operators 13 years old minimum); **(B)** 144MHz plus a few segments on cw sections of 7, 14, 21 and 28MHz, and 28,400—29,000kHz on phone. Same age limit; **(C)** as B but no cw exam and only above 30MHz; **(D)** all band (with cw exam); and **(E)** issued to Class D holders after three years. Visitors will now use F/own callsign. The new callsigns will be (mainland France) first letter "F" followed by a second letter denoting licence class (from "A" to "E"), a number (from 0 to 9—exluding 7, which will be used for special event stations), and two or three suffix letters. In Corsica and the overseas departments and territories there will be two letters for the prefix, then a number between 1 and 5 (1 for Class A etc), and the two- or three-letter suffix. Corsica is TK, and the Antarctic Territories FT, otherwise the prefixes will remain unchanged. Old calls will change as follows: all F1s become FC1. F2, 3, 5, 8 and 9 become FE2, FE3 etc. F6HRA (approx) to F6IZZ become FD6. F6K onwards will be clubs. Overseas territories previously with a figure 1 become 3, with a 7 or 8 (and a licence of three years standing) become 5. Those who had a 7 or 8 but a licence for less than three years now use a 4.

Welcome . . . .

. . . . to the following who joined the RSGB during October: A92DT, C53FG, HB9BXR, IK5EXV, P29NFJ, PA3AAC, SM6BGG, VE1ZN, Z21BI, ZS1ESC, 5Z4XII and 9H1FBS. New overseas unlicensed members include L Lamb (A4), H Han (A7) A Penarroya (EA) and H Lau (VS6).

1984 28MHz table

Very few changes since December, so this is held over for the final listing next month.

CONTESTS

CQ WW 160M DX Contest
2200 25 January—1600 27 January (cw)
2200 22 February—1600 24 February (ssb)
Single- and multi-operator (with not more than five operators). Exchange RST; USA and Canadian stations will also send state/province. QSOs with own country count two points, with other countries in same continent five points, and with other continents 10 points. The multipliers are one for each state/province and DXCC country (W and VE do not count). Sample log and summary sheets can be obtained from *CQ* 160M Contest, 76 N Broadway, Hicksville, NY, 11801, USA, in exchange for a large sae and some ircs—they are *not* available from G3FKM. Logs should have 40 QSOs per page, and list time, station worked, numbers sent and received, if multiplier, and points claimed. Include a summary sheet showing scoring plus a declaration that all rules have been obeyed. Mail cw entries by 28 February and ssb by 31 March. Please mark the outside of the envelope "CW" or "SSB" and send to 160M Contest Director, N4IN, 3075 Florida Avenue, Melbourne Fla, 32901, USA. Certificates will be awarded to top scorers in each country in each class, and there is also a plaque for top European.

The only two UK entrants in the **1984 160M (Phone) Contest** were **G3SZA** who scored 77,252 points, and **GM4KHE** who scored 24,564.

VP2MW contest operation October-November 1984. L to r: (back) GM3YOR, G3UKS, G4BQH and G3SJK; (front) swl D John and G4JVG

In the **1984 Helvetia-26 Contest** UK scores were as follows: **GM4LGM** (15,345 points), **G3ESF** (14,742), G4UPS (9,165), G4IQM (8,658), G3HRY, (4,743), G3TXF (4,455), GM4MHG (2,907), GM4LKJ (1,824), and G8QZ (429). In the **1984 HADD SSB Contest** GM4ELV/QRP was second in the single-operator all-band class.

Hungarian DX Contest
2200 19 January to 2200 20 January
CW only in sections 3,500-3,590, 7,000-7,035, 14,000-14,090, 21,000-21,090, and 28,000-28,090kHz. Exchange RST and serial number (from 001)—HA stations will send a two-letter code denoting their county (BA,BE, BP, BN, BO, CS, FE, GY, HA, HE, KO, NO, PE, SA, SO, SZ, TO, VA, VE or ZA). Each QSO with HA counts six points, and any contact with another participant outside the participant's own continent three points. Europeans may only work HA stations within Europe. Each country counts as a multiplier on each band, and the total score is total QSO points multiplied by the total of multipliers from all bands added together. Logs should be made in the usual way with each band on a separate sheet, summary sheet and signed declaration. Mail within six weeks of contest to Hungarian Radioamateur Society Contest Bureau, H-1581 Budapest, PO Box 86, Hungary. Certificates will be sent to top stations in each country in each category (single-operator single- and multi-band, multi-operator multi-band).

YU DX Contest
2100 2 February to 2100 3 February
CW only. 3,520-3,590kHz and 7,010-7,040kHz only. Single- and multi-operator and listener sections. Exchange RST and serial number from 001, QSOs with YU on 3·5MHz count 10 points, with other Europeans three, and with dx five. On 7MHz scores are five, two and four respectively. The multiplier is the total of YU prefixes and DXCC countries worked on each band. Single-operator entrants must stay on a band for a minimum of 30 min, multi-ops at least 10 min. Logs should show date, time, station worked, numbers sent/received, band, if new multiplier, points claimed, and a separate log should be sent for each band. Include summary sheet showing multipliers and total score plus signed declaration. Post before 15 March to SRJ, YU DX C, Box 48, 11001 Beograd, Yugoslavia.

YL-OM Midwinter Contest
0700 to 1900 12 January (CW)
0700 to 1900 13 January (Phone)
Details from G3FKM (sase please).

Results of the **1983 CQ WW DX** Contest **(CW Section)** have appeared in *CQ Magazine*. UK scores are as follows:

Single-operator

Callsign	Band	Points	Callsign	Band	Points	Callsign	Band	Points
G4BUO	All	1,034,208	G4MVA	All	106,106	**G4CNY**	14MHz	279,756
G3UFY	All	552,636	G2AJB	All	69,596	**GM3RAO**	14MHz	12,210
G4/W6SZN	All	396,500	G4OKN	All	57,552	**G4VGK**	7MHz	21,392
G3ESF	All	280,765	G6QQ	All	17,658	**GW3MPB**	7MHz	19,720
GW3JI	All	194,098	G6NK	All	15,386	**G3SZA**	1·8MHz	40,887
G3JKY	All	116,092	**GM8SQ**	All	5,800	G3XWZ/A	1·8MHz	33,088
G4BKI	All	113,174	**G3UKS**	28MHz	44,233	G4FAM	21MHz	174,758
G3HRY	All	106,856	**G3HCT**	21MHz	208,620			

In the multi-operator single-transmitter section **GD4UFB** scored 2,587,130 points, **GJ3SXW** 2,004,702, and **GB2WCY** 408,775. In the multi-operator multi-

QTH CORNER

A61AA	G3LQP, A Brown, 32 Albert Rd, Sutton, Surrey SM1 4RX.
P46S	M Manafo, K3OUC, 2419 Willow St, Wesleyville, Pa, 16510, USA.
GJ0AAA	N Cawthorne, G3TXF, "Holt Cottage", Kingston Hill, Kingston-on-Thames, Surrey KT2 7JH.
FT8XA	F6FYD, V Delatouche, PB 8, Andresy, F-78570, France.
PJ2FR	R Smith, N6KT, 3281 Lorna Alta Dr Santa Clara, Cal, 95051, USA.
VK0CK	E C Jamieson, VK5LP, Forreston 5233, S Australia, Australia.
VK0GC	now via P29JS, PO Box 515, Konedobu, Papua New Guinea.
VK0PB	N Penfold, VK6NE, 2 Moss Ct, Kingsley 6026, W Australia.
VK0YL	VK3AH, Box 39, Mooroolbark 3138, Vic, Australia.
VP2MW	c/o Jean Mills, R20 Rutherford Appleton Laboratory ARC, Chilton, Didcot, Oxon.
VP2VA	VE3MJ, 305 Rosemary Rd, Toronto 349, Ont, M5P 3E4, Canada.
ZX0ECF	via LABRE.
3A2E	J P Guillon, F9RM, BP 680, 06012 Nice, France.
5N4FOC	N Cawthorne, G3TXF, "Holt Cottage", Kingston Hill, Kingston-on-Thames, Surrey KT2 7JH.

transmitter category **GB4ANT** scored 3,321,614 points. In the **QRP** section **G3VMY** scored 12,684 points on 21MHz, and G3CWL 8,742.

In the November *MOTA* in the **1984 ARRL DX Contest (CW)** scores GM8SP was listed—this was a misprint in *QST* and the callsign should have been **GM8SQ**.

AGCW-DL Happy New Year Contest—1 January
AGCW-DL QRP Winter Contest—19/20 January
AGCW-DL Straight Key Party—2 February and 6 October
Photocopies of rules from G3FKM (sase please).

YL-OM Midwinter Contest—12/13 January
As above.

Contest calendar
Visitors to the 1984 NEC exhibition may have seen a calendar of contests produced by G3TXF. An updated version of this will be available at the 1985 exhibition, but copies are also available from G3TXF on request (sae please).

Awards

Diplome de Geneve
A four-colour certificate issued by the Geneva section of USKA. Applicants need to provide log extracts showing contacts with six different stations operating in the canton of Geneva (abbreviated GE in the H-26 Contest) using any band/mode. Applicants outside Europe need only four QSOs. Listeners may also apply. Send log extract and seven ircs (or US $3) to HB9G, PO Box 917, CH-1211 Geneve 3, Switzerland.

Balearic Is Award
Details of this were given in August 1984 *MOTA*. It seems that the correct fee is 10 ircs, not five.

CW EA6 Award
For confirmed contact/confirmed reports of six EA6 stations using A1A.

Three Island Award
For confirmed contact/confirmed reports of five stations on Mallorca, one on Menorca, and one on Ibiza or Formatore. SSB, cw, or rtty classes. Fee for both CW EA6 and this award is 10 ircs. Apply to URE, Delegacion Regional, PO Box 34, Palma Mallorca, Balearic Is.

TD EA CW Diploma
For confirmed cw QSOs since January 1976 with each of the nine districts EA1 to EA9. There is a five-band version and a 1·8MHz certificate. The cost is 10 ircs, and applications should be sent to Delegacion Local de URE, La Mura 67, Villareal, Castellon, Spain.

IT9ZGY (via G3VOF) reports that the **IARU '84 Award** issued by the ARI Regional Committee for Sicily has been a great success—over 120,000 QSOs were made by IT84 stations during April 1984. By the end of July 900 awards had already been issued to amateurs in 70 different countries. European winner of the special trophy was YO4WU who made 402 points. Top Asian was UF6FE with 106, and African leader EA8YK with 67.

North Wakefield RC Award
UK stations must collect 50, and others 20 points by working club members after August 1984. QSOs with G4NOK, G6WRS and GB2NWR count 10, other UK members five, and with overseas members, VK4BRC, VK4VMB, A4XYQ etc 10 points. Send log extract plus £1 or five ircs to John Muzyka, G4RCG, QTHR.

Around the bands

The G8KG summary for the past month reads: "The hoped-for end to the trough in solar activity has been very slow in arriving. After the level but low mean activity in August and September, the 27-day average solar flux began a further decline, dropping slowly to a value of only 72 sfu centred on the first week of November. Daily flux values remained in the seventies from 10 September to 20 November, after which there were some signs of recovery—just in time for the CQ WW contest.

"Mean activity in recent months has been well below the average for a cycle in its ninth year, whereas Cycle 21 has for the most part been well above average. The next month or two should show whether this is a temporary situation or whether we are seeing signs of an early or prolonged minimum to the cycle."

In spite of the disappointing conditions the following sent in logs from which the next section has been compiled: G2HKU, G3s WP, YY, G5JL, G3s GVV, KSH, YRM, G4EHQ, GW4KGR, G4s LRS, OBK, SQZ, UOL, UYR and RS10906.

Stations using A1A are listed in italics:

1·8MHz. 0000 *N2AA, XN1ASJ* (=VE), *4X4NJ*. **0200** *EA, HB, IS, OH, OZ, Y*. **0400** *TF3KG*. **0500** *K1MEM, K1ZM, N4BNO, W4DR*. **0600** *W1,2,4, K5UR, K8CCV*. **0700** *FY0GA, WA9JBA*. **2000** *4X4NJ*. **2100** *T77C*. **2200** *AA1K, C30BBE*. **2300** *UA9CBO, UA9KAA*.

3·5MHz. 0000 *EA9KF, UP2NK/UF*, W1,4,0. **0100** *PZ1AP*. **0500** *CN8AD, HH8WDD, N7CW* (Ariz), *YV1AD*. **0700** *ZL1AMO*. **2100** ZB2HM. **2200** JAs, JA5FBZ, W2, 4U1VIC, 7X2LS. **2300** HP2ZR, C31SD, HZ1AB, SU3KY, *ZC4MR*.

7MHz. 0200 *VP2VA*. **0400** *CE7DLV, LU, OA, WD7APW* (Ariz). **0500** *KH6IJ*. **0600** *FM7WD, PY8ADG, YVs*. **0700** *JW5EI, PZ1DC, VKs, ZLs, 8P6AU*. **0800** *JAs, 1QJE, 3LDZ*. **0900** *OY6FRA*. **1500** *JA1, JA4*. **1600** *CN8ES*. **1700** *9K2DK*. **1900** OH0BH. **2000** *OX3AX*. **2200** FH4AA, *VK6RZ*, ZF2IB. **2300** *J28EF, OD5NZ*, 9G1MU (?), *9H4RK*.

10MHz. 0800 *EA5YM/EA8, T77C, VK3, VK4, VK5*. **0900** *VK2BKH, W5RPJ, ZL3s QJ, RK*. **1000** *PA0VG/EA5*. **1600** *4X4WF*. **1700** *VO2CP*. **2000** *N4SU*. **2100** *ZC4HA*.

(Continued overleaf)

SPORADIC-E OBSERVATIONS IN 1984

(Continued from page 44)

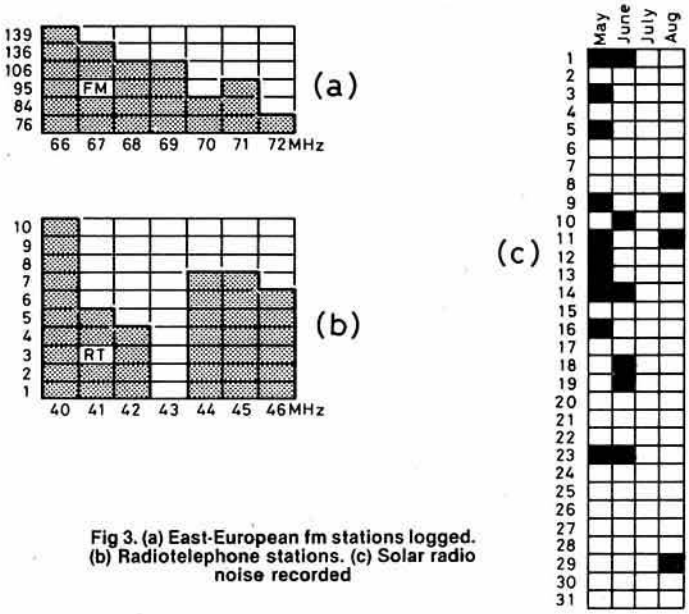

Fig 3. (a) East-European fm stations logged. (b) Radiotelephone stations. (c) Solar radio noise recorded

very sensitive to sporadic-E, can quickly alert an observer to the short-life, often less than 15min, events. Also very useful during the winter period when sporadic-E is sparse, the 28MHz beacons proved a valuable indicator when a disturbance was spreading toward the 27MHz band and to the possibility that a period of short-skip propagation was imminent.

Continental broadcasting stations

During the life of all the sporadic-E events listed in Fig 2, very strong fm signals were received in many parts of the UK from a variety of eastern-Europe broadcast stations which operate daily, with a limited range, between 66 and 73MHz. The frequency distribution and the number of times such stations were logged, between each megahertz, is illustrated in Fig 3(a). Although these signals had amazing strength for most of the disturbance, they were usually subject to deep and sharp fading early and late in the event.

European radiotelephone stations

While some of the disturbances, indicated in Fig 2, were in progress, a number of European radiotelephone type stations were audible at the lower end of Band 1 and their numbers varied with the intensity of the event. During the 1984 season the author counted 39 such stations between 40 and 46MHz, Fig 3(b), compared with 76 in 1983 and 60 in 1982.

Solar activity

Only 19 days of solar activity were recorded by the author at 143MHz, Fig 3(c), between May and August, compared with 25 days in 1982, and, as stated before, there is still no positive evidence to connect manifestations of sporadic-E to the "active" sun. □

14MHz. 0700 JAs (to 1000). **0800** JT1AO, KG6JJH, KJ9W/KH2, VKs ZLs (to 1200), 9L1SL. **0900** AL7FG, TT8CW, 5V7NG. **1000** J6LLO. **1100** A71BK, YB0BV. **1200** K7RMT, VI3WI. **1300** *VKs. 5N4FOC.* **1400** DX1A, T52JL, YI0BIF. **1600** TI1C, VP2EC, 5N24AMA. **1700** A22DK, S73MC, VP5GT, 3D6BQ. **1800** HI0A, KH0AC, VQ9YR, 9Q5MA. **1900** VP8QP, VP9AD, VQ9AC. **2000** ZD7BJ. **2100** 3X4EX. **2200** VP8AOD, ZD7AL.

18MHz. 0900 *DL, I.*

21MHz. 0900 *J28CI, VU2JDU, ZC4CW, ZSs.* **1000** A61AA, J28EF, RI0OAA, T52JL, VK6AJW. **1100** OD5BP, VQ9YR, *VU2BK.* **1200** A4XJQ, V2AS, VQ9ALQ. **1300** A24SC, A71BJ, D68WB, W1-4, W8, ZD9DB. **1500** C53FE, FH4AA, 5X5GK, 6W7FZ, 9Q5JE. **1600** HH2Y, TU1BS, TU2OK, ZD7CW, 3D6AL. **1700** J6LBR, ZD9CC, *K0GU/8R1.* **1800** PT7WZ/PY0F.

24MHz. No reports.

28MHz. 1200 FH4AA. **1300** PY1MAG, 9K2JF. **1400** EA9IB, TR8SA, ZS1,4,6. **1500** EA8AXN, LU, PY. **1700** EA9CE.

Thanks to the contributors this month, and to the authors of the following for items extracted: *DXNL* (DL3RK), the *Long Island DX Bulletin* (W2IYX), *DX News Sheet* (G3ZAY/G3XTT), the *Ex-G Radio Club Bulletin* (GI3OEN/W6). *Long Skip* (VE3XN), the *Lynx DX Group Bulletin* (EA2JG/EA3CBQ), *DX'press* (PA0GAM), and *CQ Magazine* (W1WY).

Please send everything for the **March** issue to reach G3FKM no later than **25 January.** Thank you! ☐

HF propagation predictions for January 1985

Using the table

The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band, ie $\genfrac{}{}{0pt}{}{0}{0}$ = 0000, $\genfrac{}{}{0pt}{}{0}{2}$ = 0200, $\genfrac{}{}{0pt}{}{0}{4}$ = 0400 etc.

The probability of signals being heard is given on a 0 (indicated by a dot) to 9 scale; the higher the number the greater the probability, with 1 meaning 10 to 19 per cent of days, and so on. Additionally 50MHz F-layer and 1·8MHz openings are indicated by a dagger (†) sign in the 28 and 3·5MHz columns respectively. The higher probability figures are printed in BLACK, lower probability in RED and lowest probability in GREEN type.

	28MHz				21MHz				14MHz			
GMT	000	001	111	122	000	001	111	122	000	001	111	122
	024	680	246	802	024	680	246	802	024	680	246	802
EUROPE												
Moscow	...	..2	2..	...	...	.37	75.	...	...	.88	886	...
Malta	...	..2	11.	...	...	.47	662	...	...	.88	888	2..
Gibraltar	...	...	...	...	...	..5	542	...	...	.78	888	3..
Iceland	...	...	...	...	...	...	331	...	...	..6	887	1..
ASIA												
Osaka	...	...	...	...	...	...	...	...	...	.62	...	...
Hong Kong	...	...	...	...	...	.43	...	...	...	.66	4..	...
Bangkok	...	.14	1..	...	...	.68	5..	...	...	146	653	...
Singapore	...	.24	3..	...	...	.68	75.	...	...	136	674	...
New Delhi	...	.23	1..	...	...	.67	61.	...	...	235	65.	...
Teheran	...	.34	31.	...	...	.78	86.	...	1..	554	675	...
Colombo	...	.34	31.	...	...	.67	86.	...	...	123	666	...
Bahrain	...	.34	31.	...	...	177	76.	...	1..	533	565	...
Cyprus	...	.45	43.	...	...	.88	883	...	22.	676	678	311
Aden	...	.44	32.	...	...	166	772	...	2..	422	467	211
OCEANIA												
Suva (S)	...	...	...	...	...	...	11.	...	...	..4	662	...
Suva (L)	...	.1.	...	...	...	.64	2..	1..	111	.86	553	631
Wellington (S)	...	...	...	...	...	..2	3..	...	...	.26	651	...
Wellington (L)	...	...	...	...	...	1..	...	...	.11	.75	211	431
Sydney (S)	...	..1	1..	...	...	.56	53.	...	...	176	672	...
Sydney (L)	...	...	...	...	...	..2	...	...	...	.36	421	33.
Perth	...	.34	31.	...	...	.78	76.	...	...	236	675	...
Honolulu	...	...	...	...	...	...	...	...	...	...	...	2..
AFRICA												
Seychelles	...	..1	32.	...	...	134	772	...	2..	211	467	211
Mauritius	...	.24	33.	...	...	.56	773	...	21.	222	368	311
Nairobi	...	.33	33.	...	...	.66	674	...	3..	422	258	421
Harare	...	..1	441	...	...	.45	676	...	33.	322	247	642
Capetown	...	..1	542	...	...	.34	677	1..	42.	132	236	753
Lagos	...	.25	543	...	...	.77	677	1..	45.	163	236	764
Ascension Is	...	..4	223	...	...	.57	557	2..	343	.73	223	664
Dakar	...	..5	543	...	...	.38	767	3..	233	.75	324	753
Las Palmas	...	..4	432	...	...	.38	887	2..	122	.87	667	842
S AMERICA												
South Shetland	...	...	.12	...	...	.24	555	2..	233	.76	533	332
Falkland Is	...	...	133	...	...	.14	566	2..	123	.66	422	232
Rio de Janeiro	...	..1	...	...	...	..5	434	2..	123	.36	322	332
Buenos Aires	...	...	..1	...	...	..3	435	2..	113	.56	421	221
Lima	...	...	332	...	...	...	776	2..	..1	...	632	21.
Bogota	...	...	232	...	...	...	776	2..	...	.11	642	22.
N AMERICA												
Barbados	...	...	332	...	...	..1	766	3..	..1	..6	632	32.
Jamaica	...	...	.32	...	...	...	476	2..	...	...	653	21.
Bermuda	...	...	.32	...	...	...	576	3..	...	..2	654	52.
New York	...	...	.21	...	...	...	176	2..	...	...	565	52.
Mexico	...	...	.11	...	...	...	.66	2..	...	...	164	21.
Montreal	...	...	.11	...	...	...	166	2..	...	...	566	52.
Denver	...	...	...	...	...	...	..5	1..	...	...	.56	41.
Los Angeles	...	...	...	...	...	...	..3	...	...	...	.16	4..
Vancouver	...	...	...	...	...	...	...	...	...	...	..4	4..
Fairbanks	...	...	...	...	...	...	...	...	...	...	...	1..

	10MHz				7MHz				3·5MHz			
GMT	000	001	111	122	000	001	111	122	000	001	111	122
	024	680	246	802	024	680	246	802	024	680	246	802
EUROPE												
Moscow	32.	476	668	312	885	643	346	878	††5	3..	..3	†††
Malta	452	575	568	853	998	743	336	898	†††	4..	..3	†††
Gibraltar	232	.86	667	841	888	664	335	898	†††	†3.	..2	5††
Iceland	...	.37	778	6..	563	.65	456	864	†††	†42	.23	5††
ASIA												
Osaka	...	.63	123	...	1..	.31	114	443	...	...	...	45.
Hong Kong	1..	.34	331	...	2..	..1	114	554	...	...	...	4†4
Bangkok	2..	.13	346	111	3..	..1	114	666	...	...	...	4†5
Singapore	2..	..3	346	113	2..	..1	114	666	...	...	...	4†4
New Delhi	41.	112	344	113	731	...	114	678	5..	...	...	4††
Teheran	642	321	346	324	973	1..	114	778	†5.	...	...	4††
Colombo	12.	...	346	324	52.	...	114	778	3..	...	...	4††
Bahrain	742	3..	246	545	973	...	.14	788	†5.	...	...	4††
Cyprus	885	643	457	877	997	311	125	788	††4	...	..2	5††
Aden	812	2..	146	766	963	...	.13	788	†4.	...	...	4†5
OCEANIA												
Suva (S)	...	.14	345	2..	...	.31	114	3..	...	...	...	...
Suva (L)	..1	263	335	52.	...	231	.13	2..	...	...	...	...
Wellington (S)	...	.54	344	...	...	.31	124	1..	...	...	...	...
Wellington (L)	..1	163	234	42.	...	131	.13	1..	...	...	...	...
Sydney (S)	...	144	346	...	...	.11	114	41.	...	...	...	3..
Sydney (L)	...	.44	334	641	...	.21	.13	51.	...	...	...	2..
Perth	2..	.13	346	323	...	..1	114	763	...	...	...	44.
Honolulu	...	...	212	4..	..2	.21	113	2..	...	5..	...	...
AFRICA												
Seychelles	8.1	...	146	766	931	...	.13	788	†2.	...	...	45†
Mauritius	851	...	146	777	83.	...	.13	788	5..	...	...	4††
Nairobi	842	2..	.36	887	973	...	..3	788	†5.	...	...	4††
Harare	883	2..	.15	888	973	...	..2	688	†5.	...	...	4††
Capetown	874	2..	..3	688	873	...	...	378	†5.	...	...	.5†
Lagos	894	53.	..3	799	888	4..	...	488	5††	...	...	.††
Ascension Is	898	341	...	389	888	51.	...	169	†††	3..	...	.3†
Dakar	888	252	..1	588	878	72.	...	269	†5†	5..	...	.3†
Las Palmas	788	475	435	798	989	852	112	589	†††	†2.	...	2††
S AMERICA												
South Shetland	456	253	21.	123	234	321	...	..1	...	...	...	...
Falkland Is	578	263	1..	.23	467	531	...	..1	.34	3..	...	...
Rio de Janeiro	788	253	...	.36	889	731	...	.15	†††	5..	...	..2
Buenos Aires	678	264	1..	.14	689	731	...	..2	3††	5..	...	...
Lima	347	122	3..	..2	589	641	1..	..1	2††	5..	...	...
Bogota	235	.43	31.	.12	688	541	1..	..2	4††	5..	...	...
N AMERICA												
Barbados	346	134	3..	.34	887	641	1..	.15	††5	5..	...	..2
Jamaica	224	.33	32.	.12	677	441	1..	..2	4†5	5..	...	...
Bermuda	224	.14	321	233	877	441	1..	.15	††5	5..	...	..2
New York	112	.12	332	232	778	331	11.	.14	†††	5..	...	...
Mexico	113	.12	341	..1	378	341	11.	...	.5†	5..	...	...
Montreal	112	..2	343	342	778	331	11.	124	†††	5..	...	..2
Denver	111	...	.43	22.	377	231	111	..1	.5†	5..	...	...
Los Angeles	.11	..2	.34	21.	257	131	.11	...	.3†	5..	...	...
Vancouver	.1.	..1	.16	42.	256	121	.13	111	.3†	5..	...	...
Fairbanks	11.	..2	124	61.	343	.21	113	532	.23	5..	...	2..

The provisional mean sunspot number for October 1984 issued by the Sunspot Index Data Centre, Brussels, was 12·6. The maximum daily sunspot number was 25 on 11, 18, 19 October, and the minimum was 0 on 5, 6, 7, 28 October. The predicted smoothed sunspot numbers for January, February, March and April are, respectively: (classical method) 35, 34, 33 and 31; (SIDC adjusted values) 28, 26, 24 and 22.

RSGB SLOW MORSE PRACTICE TRANSMISSIONS

Alterations and additions to this list should be sent to the organizer Mr M A C MacBrayne, G3KGU, 25 Purlieu Way, Theydon Bois, Essex

Time	Callsign	MHz	Mode	Town	Notes
Sundays					
0915	G3WNR	145·250	F2A/F3E	South Shields, T & W	[1]
1015	G3CGD	1·875	A1A/A3E	Cheltenham, Glos	
1100	G2FXA	1·910	A1A/A3E/J3E	Stockton-on-Tees	
1100	G3BLS	145·250	F2A	Osney, Oxford	[1]
1200	G3HVI	145·250	F2A/F3E	Stoke-on-Trent, Staffs.	[1]
1200	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[5]
1500	G4PYR	144·250	A1A/J3E	Solihull, W Midlands	[2]
1815	G3WNR	145·250	F2A/F3E	South Shields, T & W	[1]
1830	G4NZU	145·250	F2A/F3E	West Bridgford, Notts.	[1]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1900	G4OBK	1·875	A1A/J3E	Chorley, Lancs	
1900	G3LUC	145·250	F2A/F3E	Shildon, Co Durham	
1930	G4VBL	144·625	F2A/F3E	Fulham, SW London	[1]
1930	G3LDW	144·250	A1A/J3E	Halesowen, W Midlands	[1]
2000	G4TKM	145·425	F2A/F3E	Birmingham	[1]
2000	G4NHG	145·250	F2A/F3E	Stoke-on-Trent, Staffs.	
2005	G3OLU	145·375	F3E	Braintree, Essex	[1]
2030	G3ORP / G4UAQ	144·250	A1A/J3E	Maidstone, Kent	[6]
2100	G4EWK	144·850	F2A	Burton-on-Trent, Staffs	[7]
2100	G3HQH	145·250	F2A/F3E	Stockport, G Manchester	[1]
2130	G4TET	145·250	F2A/F3E	Great Barr, Birmingham	[1]
2130	GW4SYO	145·250	F2A/F3E	Tonypandy, Mid Glam.	[1]
2200	G4OJD	145·250	F2A/F3E	Brixham, Devon	[1]
Mondays					
1400	G4OOC	145·250	F2A/F3E	Leeds, W Yorks	[1]
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[5]
1830	G3LUC	145·250	F2A/F3E	Shildon, Co Durham	
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1900	G4FEX	145·250	F2A/F3E	Horsley Woodhouse, Dbys	[1]
1900	G3ULY / G4EXD	1·880	A1A	Culgaith, Cumbria	
1900	G3CMH/A	144·250	A1A/J3E	Yeovil, Somerset	[1]
1900	G8QR	145·250	F2A/F3E	Norwich, Norfolk	[1]
1900	G4ILD / G3ZQS	145·250	F2A/F3E	Riston, Lancs / Darwen, Lancs	[1]
1900	G4DLB	145·250	F2A/F3E	Banbury, Oxon	[1]
1900	G4UOL	145·250	F2A/F3E	Ilford, Essex	[1]
1915	GM4RSJ	145·250	A2A/F3E	Prestwick, Strathclyde	[1]
1930	G4VBL	144·625	F2A/F3E	Fulham, SW London	[1]
1930	G4LLU / G4JSQ	144·160	A1A/J3E	Wolverhampton, W Mids	[1]
1930	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
1930	G4SXU	145·250	F2A/F3E	Harrogate, N Yorks	[1]
2000	G2FXA	145·525	F2A/F3E	Stockton-on-Tees.	[1]
2000	G3GMS	145·250	F2A/F3E	Whitley Bay, T & W	[1]
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2000	GI4VSC	145·250	F2A/F3E	Belfast	
2000	G4OO	145·250	F2A/F3E	Spalding, Lincs	[1]
2030	G3ASR	1.875 / 144·175	A1A/J3E / A1A/J3E (lsb)	Harrow, Middx	[1] [8]
2030	G4NZA	145·250	A2A/F3E	Wellington, Somerset	[1] [9]
2030	G4ICC	3·535	A1A/J3E	New Duston, Northants	
2100	G4OTV / G4RPQ / G4RWT	145·250	F2A/F3E	Tunbridge Wells, Kent / Goudhurst, Kent / Paddock Wood, Kent	[1]
2100	G3AVJ	145·250	F2A/F3E	Huyton, Merseyside	[1]
2100	G3WOR	144·250	A1A/J3E	Lancing, Sussex	[4]
2130	GW4SYO	145·250	F2A/F3E	Tonypandy, Mid Glam.	[1]
Tuesdays					
0930	G4NHG	145·250	F2A/F3E	Stoke-on-Trent, Staffs.	
1100	G4IAV	145·275	F2A/F3E	Atherton, G Manchester	[1]
1200	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[5]
1830	G4ILD / G3ZQS	145·250	F2A/F3E	Rishton, Lancs / Darwen, Lancs	[1]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1900	G3WQK	144·775	F2A	Eastbourne, E Sussex.	[1]
1900	G4RS	3·565 / 145·250	A1A/J3E / F2A/F3E	Catterick, N Yorks	[1]
1915	GM4RSJ	145·250	A2A/F3E	Prestwick, Strathclyde	[1]
1930	G4BFJ	144·625	F2A/F3E	Banstead, Surrey	[1]
1930	G4DAL	145·250	F2A/F3E	Lancaster, Lancs	[1]
1930	G4TDO	144·160	A1A/J3E	Wolverhampton, W Mids	[1]
1930	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2030	G4PDP	144·250	A1A/J3E	Biggleswade, Beds	[1]
2030	G3KGU	1·910	A1A/A3E	Theydon Bois, Essex	
2100	G4EWK	144·850	F2A	Burton-on-Trent, Staffs	[7]
2100	G3AVJ	145·250	F2A/F3E	Huyton, Merseyside	[1]
2130	GW4SYO	145·250	F2A/F3E	Tonypandy, Mid Glam.	[1]
2200	G4RXR / G3AWL	144·250	A1A/J3E	Easington, Co Durham	[1]
2200	G4OJD	145·250	F2A/F3E	Brixham, Devon	[1]
2230	GI4NRE	145·250	F2A/F3E	Enniskillen, N Ireland	
Wednesdays					
0930	G4NHG	145·250	F2A/F3E	Stoke-on-Trent, Staffs.	
1100	G4IAV	145·275	F2A/F3E	Atherton, G Manchester	[1]
1400	G4OOC	145·250	F2A/F3E	Leeds, W Yorks	[1]
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[5]
1830	G4TYF	145·250	F2A/F3E	Bishop Auckland, Co Durham	[1]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1900	G4ILD / G3ZQS	145·250	F2A/F3E	Rishton, Lancs / Darwen, Lancs	[1]
1900	G2ABC	145·250	F2A/F3E	Truro, Cornwall	[1]
1900	G3ULY / G4EXD	3·583 / 145·475	A1A / F2A	Culgaith, Cumbria	[1]
1900	G3KWT	145·250	F2A/F3E	Leeds, W Yorks	
1900	G4UOL	145·250	F2A/F3E	Ilford, Essex	[1] [10]
1915	GM4RSJ	145·250	A2A/F3E	Prestwick, Strathclyde	[1]
1930	G4VRK	144·625	F2A/F3E	Guildford, Surrey	
1930	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
1930	G4SQV	145·250	F2A/F3E	Little Eaton, Derby	[7]
1930	G4VIT	144·250	A1A/J3E	Darlaston, W Midlands	[1]
1930	G4SXU	145·250	F2A/F3E	Harrogate, N Yorks	[1]
2000	GI4VSC	145·250	F2A/F3E	Belfast, N Ireland	
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2000	GJ4TVZ / GJ4TXB	145·250 / 144·250	F1B/F2B / A1A	St Helier, Jersey, CI / St Peter, Jersey, CI	[1] [1]
2000	G2FXA	144·250	A1A/J3E	Stockton-on-Tees.	[1]
2000	GW4KDP	145·550	F2A/F3E	Barmouth, Gwynedd	[1]
2000	G3SWP	144.250	A1A/J3E	Doncaster, S Yorks	[1]
2000	G4BP/A	145·475	F2A/F3E	Scarborough, N Yorks.	[3]
2000	G4OO	145·250	F2A/F3E	Spalding, Lincs	[1]
2100	G3HQH	145·250	F2A/F3E	Stockport, G Manchester	[1]
2130	GM4HYF	28·350 / 145·250	A1A / F2A	SE Glasgow	[1]
2130	GW4SYO	145·250	F2A/F3E	Tonypandy, Mid Glam.	[1]
2200	G4KZZ	145·250	F2A/F3E	Coventry, W Midlands.	[1]
Thursdays					
0930	G4NHG	145·250	F2A/F3E	Stoke-on-Trent, Staffs	
1400	G4OOC	145·250	F2A/F3E	Leeds, W Yorks	[1]
1830	G4ILD / G3ZQS	145·250	F2A/F3E	Rishton, Lancs / Darwen, Lancs	[1]
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[5]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1900	G4FEX	145·250	F2A/F3E	Horsley Woodhouse, Dbys	[1]
1900	G3BLS	145·250	F2A	Osney, Oxford	[1]
1900	G4RS	3·565 / 145·250	A1A/J3E / F2A/F3E	Catterick, N Yorks	[1]
1915	GM4RSJ	145·250	A2A/F3E	Prestwick, Strathclyde	[1]
1930	G3ASR	1·875 / 144·175	A1A/J3E / A1A/J3E (lsb)	Harrow, Middx	[1] [8] [11]
1930	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
1930	G4WVX	144·625	F2A/F3E	Slough, Berks	
2000	G2ACZ	1·819	A1A	Mablethorpe, Lincs	
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2000	G3GMS	145·250	F2A/F3E	Whitley Bay, T&W	[1]
2000	G4PYR	144·250	A1A/J3E	Solihull, W Midlands	[2]
2000	G4NHG	145·250	F2A/F3E	Stoke-on-Trent, Staffs	
2100	G3WOR	144·250	A1A/J3E	Lancing, Sussex	[4]
2100	G4EWK	144·850	F2A	Burton-on-Trent, Staffs	[7]
2100	G3AVJ	145·250	F2A/F3E	Huyton, Merseyside	[1]
2200	GM4HYF	28·350 / 145·250	A1A / F2A	SE Glasgow	[1]
2200	G4OJD	145·250	F2A/F3E	Brixham, Devon	[1]
Fridays					
1830	G4ILD / G3ZQS	145·250	F2A/F3E	Rishton, Lancs / Darwen, Lancs	[1] [1]
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[5]
1830	G4TYF	145·250	F2A/F3E	Bishop Auckland, Co Durham	[1]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1900	G4FIM	145·550	F2A/F3E	Leeds, W Yorks	
1900	G4PJZ	145·250	F2A/F3E	Mapperley, Notts	[1]
1930	G4WVX	144·625	F2A/F3E	Slough, Berks	
1930	G3HVI	145·250	F2A/F3E	Stoke-on-Trent, Staffs.	[1]
1930	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
2000	G3RR	145·550	F2A/F3E	Barnoldswick, Lancs	[1]
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2030	G3CAR	144·625	F2A/F3E	High Wycombe, Bucks	[1]
2100	G3AVJ	145·250	F2A/F3E	Huyton, Merseyside	[1]
2200	G4RXR / G3AWL	144·250	A1A/J3E	Easington, Co Durham	[1]
Saturdays					
1200	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[5]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1930	G4XOI	145·275	F2A/F3E	Stockport, G Manchester	[1]
1930	G4TDO	144·160	A1A/J3E	Wolverhampton, W Mids	[1]
2000	G4TKM	145·250	F2A/F3E	Birmingham	[1]
2130	GW4SYO	145·250	F2A/F3E	Tonypandy, Mid Glam.	[1]

Notes

All times are clock time
[1] Omnidirectional
[2] Vertical to NW
[3] Vertical to S
[4] Horizontal to E and W
[5] Reports to RAFARS Locking
[6] Tilted polarization to N and S
[7] To SW
[8] Horizontal
[9] To NE
[10] Starting speed 12wpm
[11] First and third Thursdays in each month

Contest News

Restricting hf contests

Roger Western, G3SXW,

(member, RSGB HF Contests Committee)

THE REPORT of the IARU Region 1 Conference, *Rad Com* September 1984, confirms that the IARU and the HF Working Group are adopting a policy of reducing the amount of contest traffic, on the hf bands, and a number of papers were submitted to the conference proposing ways of achieving this. While it was clear that few delegates were supportive of contesting, it may be questioned whether it is reasonable to expect delegates to be sufficiently informed on such wide-ranging topics as are debated at such a conference.

The question arises because of the way the field day issue was handled: the conference proposed to impose on the national societies who organize hf cw field days (mainly RSGB, DARC of West Germany, and USKA of Switzerland) a complete restructuring of these events such that hf cw, hf ssb and vhf be combined into a single field day. The report of the RSGB HF Contests Committee chairman, G6LX, *Rad Com* September 1984, proves conclusively that these proposals are not accepted in this country: voting on behalf of over 3,000 RSGB members confirms that such a move would be rejected. In addition, the proposal is itself contrary to other proposals that multi-band/multi-mode contests are to be discouraged.

Where to draw the line?

How can it happen that delegates from other countries get it so wrong? If there are such errors of judgement as to *how* to implement contest reductions, then should we not debate where the lines are to be drawn? The general trend at present in Europe (but not in North America or the Eastern bloc) seems to be towards a reduction in contest traffic volumes, which produces cheers from one quarter and groans from another, but where is the debating forum?

There are no referenda or market research data, so the RSGB relies on "culled views" from its members and develops policy accordingly. That policy has always been to support contesting, on behalf of its members, and the RSGB HF Contests Committee itself organizes many events. The RSGB has taken no action to reduce its own contesting volumes because it recognizes that complaints about band occupancy during contest weekends refer to non-RSGB events, particularly those which occupy all hf bands for 48h. Of the 17 events sponsored by the RSGB on hf, three are of 24h duration, one of 21h and the rest are of 12h or less; none are multi-mode, and only two encompass more than two bands.

So where should lines be drawn? Possibly at the point where non-participants can find no escape. Accordingly, contests that are all bands, both modes, 48h events could be amended to single mode. In addition, proposals for "contest preferred segments", whereby contestants operate only in a specified portion of each band, are being developed and are supported by the RSGB. Any restrictions beyond these must be considered in the light of the band occupancy debate, otherwise freedoms of contesters will be eroded—and here is the conundrum: whenever the bands are filled with contest traffic, the sheer volume of participants begs the question "Who is the minority?"

Both the contester and the non-contester should be permitted to follow his chosen interests, but it is recognized that contesters are not the fringe minority that some folk would have us believe. Literally thousands of them participate in some events: CQ Worldwide Contest attracts some 5,000 entries, not to mention the remaining thousands who operate in the contest but who do not post in their logs. The RSGB events attracted over 2,300 logs during the past year.

The hidden benefits

However, the debate goes far deeper than band occupancy: The operator who pounds away at 100 QSOs/h clearly derives enormous enjoyment from so doing, as he would not otherwise tolerate the deprivations of lost sleep and the cost in terms of time and effort. But what are the less visible benefits? On-air time is only a proportion of the activity; preparations in advance of the event can be lengthy to ensure maximum performance of equipment, antennas and paper-work systems. Advance preparations are of course at a peak for the really serious contester who mounts a special dxpedition. After the event further work is required to prepare and submit the entry and analyse the results. For the individual participant the benefits are many; besides the enjoyment, the challenge, the striving to perform better than last time, or to win, there is also great potential for learning and experience building, in particular about propagation. There is no better way to study propagation than a long, continuous period of operating, particularly on a single band, and the availability of signals throughout the contest period provides the equivalent of beacons. Testing of individual antennas, equipment, operating tactics, paper-work systems, stamina etc can all prove fascinating.

Less visible benefits are also enjoyed by non-contesters. Many are the keen dxers who never miss major contests in order to hunt out a rare DXCC country or to build credits towards awards. Contests much improve the potential for these rare contacts. The non-participant also can benefit from more easily and quickly assessing performance of equipment and antennas during a contest when many and brief contacts are available.

To the benefit of all radio amateurs the mere fact that contests provide band occupancy can be a plus, particularly where, for example, 28MHz might otherwise remain largely unoccupied, or the lower frequency bands during daylight hours. The general benefits in terms of spectrum protection, propagation study, generation of enthusiasm and activity, are considerable.

Live and let live

Therefore, in answer to our question, the line must be drawn at the point where all these important benefits are retained intact, but also where non-participants are not totally shut out. To aim to please most of the people most of the time calls for self-regulation, and a responsible approach on the part of all contest organizers is required; for example, by incorporation of contest preferred segments. In so doing, everyone can "live and let live". □

IARU Region 1 SSB Field Day 1984 results

There was an over-25 per cent increase in entries for this event, although conditions were generally worse than in previous years. This was evident in the relatively small margins between the leading stations in both sections.

Equipment used by the leading stations

G3RCV: FT101ZD, MLA 2500, HB33SP at 60ft 20m quad at 35ft, slopers and loops for 40 and 80m.
GW8GT: FT980, hb amplifier, TH6DXX and inverted-Vs.
G4AAX: TS820, SB200, TH3 at 60ft Mustang at 80ft, dipoles and delta loop for 40 and 80m.
GM3NEQ: TS830, 40m loop fed with 300Ω line.
G4SSD: TS530, G5RV antenna.
G3NJA: TS530, trapped dipole.

Contestants' comments

Appalling hf conditions, big problem with OZ portables with callsigns only differing by the digit—*Cray Valley RS.* Conditions very marginal, weather very wet, no wind this year but still a struggle. Let's make it more a dx contest; we struggled for HL, A22, 5X, KH6 etc for three points and get five points for working GM/P less than 30 miles away—*Northumbria ARC.*

A thoroughly disappointing performance from our point of view. We found 21MHz open to the south, and only two multipliers on 28MHz tells its own story—*Lichfield ARS.*

We have cracked the drought problem, let's have Field Day every weekend next summer. Then we are sure of high winds and lots of rain. Looking forward very much to next year's SSB Field Day whether IARU or not—*West of Scotland ALS.*

Weather kind this year, with operators walking to the beach between sessions, although we had a lightning strike only 100m away. Smoothest FD ever for setting up—*Guernsey ARC.*

Everything stopped when the operator thought he was being attacked by a snake that had crawled into the caravan—it turned out to be a highly venomous pair of headphones—*Cheltenham ARA.*

Murphy struck again this year—FT102 blown up, TH3 dropped from 48ft, generator problems and petrol shortage (garages close at 10pm on The Isle of Man)—*Liverpool & D.*

We wish the HF Contests Committee every success in blocking the idea to run both cw and ssb Field days together. It is suggested that if all else fails the keen contestants could go it alone—*Wirral ARS.*

One of our QSOs was with a W station mobile on a bicycle—three points didn't seem enough for this QSO—*Swansea ARS.*

One of our members made a serial number jump from 249 to 300—we are sending him back to school—*Ipswich RC.*

Suppose conditions were what could be expected at this time of the sunspot cycle—*Crawley ARC.*

Problems with voltage regulator on our generator—*Gloucester ARS.*

Some essential ingredient missing this year. Worse still, we don't know what it was; so, much head-scratching necessary before 1985—*West of Scotland* "B".

We would like to see a points system that encourages the use of 28MHz. Conditions abysmal. The tying in with the 144MHz. Trophy is ideal from an organization point of view, so please retain—*Hastings*

Don't recommend attempting to put 20ft of golf bag pole on top of a 20ft ladder—*Chepstow Wireless Club.*

Very poor show, only the operators to blame. Quad fell down, hence no open entry—*Southgate RS.*

Adjudicator's comments

The results table shows a big variation in the number QSOs made by the leading entrants. Once again it shows the importance of getting the ratio

RESTRICTED SECTION

Posn	Callsign	Group	NUMBER OF POINTS/MULTIPLIERS 3.5MHz	7MHz	14MHz	21MHz	28MHz	Total Pts/Mults	QSOs claimed	Score
1	GM3NEQ/P	Windy Yett Group	1,328/22	766/23	413/28	14/4	7/2	2,528/79	632	199,712
2	G4SSD/P	South Devon RC	1,053/15	815/18	526/30	—	—	2,394/63	559	150,822
3	G3NJA/P	Torbay ARS	807/14	733/23	395/27	72/9	2/1	2,009/74	493	148,666
4	GW4MHC/P	Malvern Hill Radio Amateurs	786/15	538/17	328/26	210/14	12/2	1,874/74	447	138,676
5	G4RUR/P	NADARS	811/14	639/17	375/24	148/12	26/2	1,999/69	468	137,931
6	G3PCG/P	Bats CG	1,400/23	346/14	226/17	41/6	—	2,013/60	513	120,780
7	G3WSC/P	Crawley ARC	1,216/17	396/10	245/22	119/9	5/1	1,981/59	476	116,879
8	GM3OZB/P	Kilmarnock & Loudown ARC	820/9	939/17	420/24	—	—	2,179/50	717	108,950
9	G4TMI/P	—	943/17	608/13	340/22	7/2	—	1,898/54	467	102,492
10	G3FVA/P	South Manchester RC	791/11	366/14	223/28	98/12	25/3	1,503/68	376	102,204
11	G4AYM/P	Gloucester ARS	780/13	591/13	236/21	71/9	10/2	1,688/58	412	97,904
12	GM8TT/P	West of Scotland ARS "B"	671/13	379/16	350/24	44/7	5/2	1,449/62	358	89,838
13	GM3BSQ/P	Aberdeen ARS	528/12	793/22	194/23	5/1	—	1,520/58	372	88,160
14	GW4ALG/P	Chepstow Wireless Club	1,093/18	246/14	164/16	37/4	7/2	1,547/54	390	83,538
15	G6HH/P	Hastings E & RC	773/15	263/12	245/25	60/6	5/1	1,346/59	316	79,414
16	G3TBK/P	Newark & District ARC	936/13	631/14	125/13	20/4	—	1,712/44	414	75,328
17	G3FJE/P	Shefford & District ARS	758/12	628/13	164/15	24/3	5/1	1,579/44	385	69,476
18	G601/P	Stourbridge & District ARS	1,060/13	389/7	227/18	17/3	—	1,693/41	378	69,413
19	G4BP/P	Hornsea & Scarborough	869/13	575/14	186/12	7/2	—	1,637/41	386	67,117
20	GM3STU/P	Unst Radio Club (Shetland)	395/11	345/12	598/22	7/3	—	1,345/48	341	64,560
21	G6UQ/P	Stockport RS	1,029/13	426/10	189/14	10/2	—	1,654/39	442	64,506
22	GW4EZW/P	Newport ARS	679/12	169/5	345/25	45/5	—	1,238/47	335	58,186
23	GM4SUF/P	—	477/15	279/12	303/20	17/4	2/1	1,078/52	270	56,056
24	G4ADM/P	Sutton & Cheam RS	517/10	294/8	238/23	62/7	—	1,111/48	284	53,328
25	GM4PRO/P	—	601/10	444/15	245/15	5/1	—	1,295/41	360	53,095
26	G4SKE/P	King Edward's School	666/14	79/5	403/22	49/3	—	1197/44	330	52,668
27	GW3EOP/P	BSC Port Talbot "B"	791/14	204/8	208/14	29/4	7/2	1,239/42	331	52,038
28	G3SFG/P	Southgate RS	764/12	159/8	89/18	104/7	5/1	1,121/46	291	51,566
29	GM4EAF/P	Perth & District ARS	671/11	507/14	125/12	10/2	—	1,313/39	309	51,207
30	G4GQR/P	Brighton & District ARS	1138/11	350/14	19/5	18/3	—	1,525/33	404	50,325
31	G4FOX/P	Melton Mowbray ARS	789/14	284/7	186/18	—	—	1,259/39	305	49,101
32	GM2TW/P	Falkirk ARC	388/10	468/13	203/21	5/1	—	1,064/45	254	47,880
33	G3MDG/P	Chesham & District ARS	444/9	315/8	183/19	99/6	32/2	1,073/44	243	47,212
34	G4MUR/P	—	581/13	150/8	217/16	42/8	—	990/45	238	44,550
35	G4VRS/P	Aylesbury Vale RS	714/12	352/12	105/12	—	—	1,171/36	335	42,156
36	G3CNX/P	Grimsby ARS	762/10	405/9	99/10	2/1	—	1,268/30	294	38,040
37	G3SRC/P	Surrey Radio Contact Club	382/10	224/11	247/12	68/6	10/1	931/40	222	37,240
38	G3KUE/P	Preston ARS	770/11	282/8	133/10	7/2	—	1,192/31	288	36,952
39	GW4UZL/P	—	493/10	166/9	186/22	8/2	—	853/43	202	36,679
40	G4UCR/P	—	45/4	265/10	209/21	52/12	19/2	590/49	153	28,910
41	G3HOX/P	Manchester & District ARS	442/11	328/7	114/13	—	—	884/31	228	27,404
42	G4FUR/P	Coulsdon ATS	667/10	—	133/14	80/5	—	880/29	209	25,520
43	G3NAT/P	SE London Raynet	307/8	15/3	53/9	—	—	375/20	91	7,500

OPEN SECTION

Posn	Callsign	Group	NUMBER OF POINTS/MULTIPLIERS 3.5MHz	7MHz	14MHz	21MHz	28MHz	Total Pts/Mults	QSOs claimed	Score
1	G3RCV/P	Cray Valley RS	1,078/30	1,203/35	1176/51	168/21	16/2	3,641/139	985	506,099
2	GW8GT/P	Red Dragon Contest Group	1,039/22	617/21	2,518/44	182/21	12/2	4,368/110	1,380	480,480
3	G4AAX/P	Northumbria ARC	1,156/20	735/21	1,972/56	112/19	19/2	3,994/118	1,125	471,292
4	G3WAS/P	Lichfield ARS	1,148/26	936/28	1,384/58	107/16	30/2	3,605/130	957	468,650
5	G4MBC/P	Mid-Beds Contest Assn	1,266/28	1,224/30	1,231/41	96/17	10/2	3,827/118	1,126	451,586
6	G3KWT/P	White Rose ARS "A"	1,265/28	967/27	1,176/34	141/19	21/2	3,570/110	976	392,700
7	GM4AGG/P	West of Scotland ARS "A"	1,391/25	1,444/30	847/38	44/8	7/2	3,733/103	997	384,499
8	GU3HFN/P	Guernsey ARS	555/13	1,029/27	2,493/40	12/4	—	4,089/84	1,232	343,476
9	G5BK/P	Cheltenham ARS	1,044/19	337/12	1,892/44	208/20	—	3,481/95	967	330,695
10	GD3AHD/P	Liverpool & D ARS	1,150/20	869/25	1,103/36	71/15	22/5	3,215/101	883	324,715
11	G4GCT/P	North Bristol ARC	1,215/19	761/15	1,016/34	77/10	51/4	3,120/82	832	255,840
12	G3FYQ/P	Pontefract & D ARS	658/19	682/23	1,324/43	23/6	—	2,687/91	735	244,517
13	G3VER/P	Verulam ARC	1,316/21	462/17	935/35	127/10	11/1	2,851/84	761	239,484
14	G4HRS/P	Horsham ARC	1,447/23	402/17	460/35	163/19	16/1	2,488/95	671	236,360
15	G3NWR/P	Wirral ARS	1,079/18	642/23	675/29	111/15	—	2,507/85	672	213,095
16	GW4NZ/P	BSC Port Talbot ARC	810/15	651/15	1,209/33	61/11	7/2	2,738/76	729	208,088
17	GW4CC/P	Swansea ARS	762/16	725/18	984/30	43/9	9/3	2,523/76	662	191,748
18	G3FEC/P	Swindon & D ARC	932/17	655/19	402/31	121/13	—	2,110/80	505	168,800
19	G6CW/P	ARC of Nottingham	1,151/12	617/18	451/35	14/5	—	2,233/70	562	156,310
20	G4IRC/P	Ipswich RC	1,339/20	434/14	368/23	48/6	7/2	2,196/65	593	142,740
21	G3BPK/P	Douglas Valley ARS	1,275/14	587/15	303/22	60/9	—	2,225/60	565	133,500
22	G4ANT/P	East Anglian C C	875/16	902/25	241/16	23/6	—	2,041/63	513	128,583
23	G3ASR/P	Edgware & D RS	921/13	880/18	385/24	5/1	—	2,191/56	519	122,696
24	G3WIM/P	Wimbledon & D ARS	1,307/18	487/11	139/16	72/7	—	2,005/52	544	104,260
25	G3VGG/P	Bromsgrove & D ARC	860/13	308/19	242/22	88/10	41/3	1,539/67	410	103,113
26	G3GHN/P	Clifton ARS	713/13	426/11	596/23	93/5	7/2	1,835/54	446	99,090
27	G4TVI/P	Mayland & D ARS	794/14	599/18	185/20	35/5	—	1,613/57	425	91,941
28	G5FZ/P	Lincoln Short Wave Club	1,169/16	783/14	78/15	—	—	2,030/45	557	91,350
29	G4MVN/P	Southdown ARS	844/13	472/13	191/15	54/6	61/4	1,622/51	387	82,722
30	G4ECT/P	Cheshunt & D ARC	496/12	815/14	243/20	9/3	—	1,563/49	370	76,587
31	G3XEP/P	White Rose ARS B	506/14	493/14	292/28	14/2	—	1,305/58	324	75,690
32	GM4HEL/P	Helensburgh ARC	535/11	378/14	410/26	31/3	5/1	1,359/55	331	74,745
33	GD4IOM/P	Isle of Man ARS	214/7	137/10	997/27	20/5	—	1,368/49	417	67,032
34	G4ARN/P	Norfolk ARC	1,004/13	549/9	135/16	—	—	1,688/38	483	64,144
35	G3GRS/P	Gravesend RS	693/14	504/11	163/14	47/3	21/2	1,428/44	314	62,832
36	GI3XRQ/P	Bangor & D ARS	388/13	412/14	244/16	—	—	1,044/43	250	44,892
37	G8JC/P	Worcester & D ARC	357/9	344/9	265/23	15/4	—	981/55	265	44,145
38	G4PVO/P	Droitwich ARC	666/12	476/7	94/8	10/2	16/2	1,262/31	284	39,122
39	G4PRS/P	Poole RAS	343/11	77/7	71/18	45/13	—	536/49	173	26,264

Check logs received from: BRS45205, REF41758, HB9R/P, OZ5EDR/P, VP2M/P, YU7ORQ, YU7SF/M.

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between points and multipliers just right. A table giving the number of multipliers worked on each band is given below.

OPEN SECTION

	3·5MHz			7·0MHz			14MHz	
1	G3RCV	30	1	G3RCV	35	1	G3WAS	58
2	G4MBE	28	2	G4MBE	30	2	G4AAX	56
	G3KWT	28		GM4AGG	30	3	G3RCV	51
4	G3WAS	26	4	G3WAS	28	4	GW8GT	44
5	GM4AGG	25	5	G3KWT	27		G5BK	44

	21MHz			28MHz			All bands	
1	G3RCV	21	1	GD3AHD	5	1	G3RCV	139
	GW8GT	21	2	G4GCT	4	2	G3WAS	130
3	G5BK	20		G4MVN	4	3	G4AAX	118
4	G3KWT	19	4	GW4CC	3		G4MBE	118
	G4HRS	19		G3VGG	3	5	GW8GT	110
							G3KWT	110

RESTRICTED SECTION

	3·5MHz		7MHz		14MHz	
1	G3PCG	23	GM3NEQ	23	G4SSD	30
2	GM3NEQ	22	G3NJA	23	GM3NEQ	28
3	GW4ALG	18	GM3BSQ	22	G3FVA	28
4	G3WSC	17	G4SSD	18	G3NJA	27
	G4TMI	17	GW4MHC	17	GW4MHC	26
			G4RUR	17		
			GM3OZB	17		

	21MHz		28MHz		Overall	
1	GW4MHC	14	G3FVA	3	GM3NEQ	79
	G4RUR	12	Plus many		G3NJA	74
2	G3FVA	12	with 2		GW4MHC	74
	G4UCR	12			G4RUR	69
	G3NJA	9			G3FVA	68
5	G3WSC	9				
	G4AYM	9				

The standard of log-keeping varied from excellent to unreadable, some entrants find it difficult to arrive at a correct score. The HF Contests Committee finds it hard to understand how a group of people can spend a weekend installing and operating a station and then disregard the rules concerning logs, etc. As a consequence the committee has decided to list the stations whose entries did not comply with the rules in the hope that in future entrants will carefully read the rules.

The following did not submit a check list of countries worked on each band: G5FZ, G4ECT, G3XRQ, G4PRS, GM3NEQ, G4SSD, G4RUR, GM3OZB, G4TMI, GW4ALG, GW4EZW, GM4SUF, GM4PRO, G3SFG, GM4EAF,G4VRS, G3KUE, G4GQR, G3SRC, G4FUR.

The following did not list operators' callsigns against each contact: G4GQR, G3BPK, GD4IOM, G4PRS.

The following stations did not state which section of the contest they were entering, or used wrong logs, or sent their entries to the wrong address: G4ANT, G3WIM, GM4HEL, GD4IOM, G4PVO, G4VRS and GW4UZL.

Finally, the committee thanks all entrants for their comments regarding field days and is pleased to note their overwhelming desire to keep these contests as they are.

G3KDB

70MHz Cumulative Contest rules

10am-noon, 27 January; 10, 24 February; 10, 24 March.

Only single-operator entries will be accepted for this contest. The following general rules, published in the "Operating Guide" supplement, January 1985, *Rad Com*, will apply: 1, 2, 3, 4a (see above), 5a, 6a, 7a, 9, 10a, 11b, 12a, 13-24.

All entries and check logs to: VHF Contests Committee, c/o C. J. Easton, G8TFI, Highlands, Townsend, Nympsfield, Glos.

February 144MHz CW Contest rules

0900-1500gmt, 3 February

The following general rules, published in the "Operating Guide" supplement January 1985, *Rad Com*, will apply: 1, 2, 3, 4a, 5a, 6b, 7a, 9, 10a, 11a, 12b, 13-24.

All entries and check logs to: VHF Contests Committee, c/o G. M. C. Stone, G3FZL, 11 Liphook Crescent, Forest Hill, London SE23 3BN.

February 432MHz Fixed Contest rules

0900-1500gmt, 17 February

The following general rules, published in the "Operating Guide" supplement January 1985, *Rad Com*, will apply: 1, 2, 3, 4b & 4d, 5a, 6a, 7a, 9, 10a, 11a, 12b, 13-24.

All entries and check logs to: VHF Contests Committee, c/o R. W. Marshall, G4ERP, 44 Malleson Road, Gotherington, Cheltenham, Glos; GL52 4ET.

September 70MHz Trophy & SWL Contest 1984 results

This year's contest was again well supported, although entries were down on last year, despite good weather and reasonable propagation conditions. Most stations commented on how much they had enjoyed the contest, especially the chance to get away from the 144MHz "rat-race". Several stations also remarked on the high quality of operating manners and the lack of poor signals. The prize for the most amusing comment goes to GM4CWH/P: "I think I went a bit over the top on the distance advantage—with the result that I could not hear many stations at all!" No criticisms of the rules were received, and the decision to include full location information for this contest was supported.

Congratulations to the Parallel Lines Contest Group GM4LIP/P who take the 70MHz Trophy, despite blowing up three preamps in the first half hour and having to survive without one for the rest of the contest! Congratulations also to the leaders and runners-up in the other sections.

G4KGC

SECTION O

Posn	Callsign	Pts	QSOs	QTH	Best dx	Km	Ant
1	GM4LIP/P	997	68	XP45	G4TAW/P	576	8el
2	G3SYA/P	771	87	YO78	G3YJX	422	4/4
3	GW4BVY/P	649	75	XL108	GM4CWH/P	621	7el
4	GW4MGR/P	637	88	YN75	GM4CWH/P	496	6el
5	G3TCU/P	584	78	YL68	GM4CWH/P	691	2x6el
6	G3ZAM/P	576	82	ZK058	GM4CWH/P	721	12el
7	GW4VIX/P	473	69	YL25	GM4CWH/P	643	5el
8	G3UAX/P	469	77	ZL53	GM4CWH/P	677	8el
9	G3YHM/P	354	60	ZK08	G3SYA/P	373	4el
10	G4ARN/A	324	39	AM27	GM4LIP/P	523	5el
11	GM4CWH/P	318	16	YR50	G3ZAM/P	721	5el
12	G3BPM/P	316	43	YK06	GM4LIP/P	519	4el
13	G4LVK/P	309	66	YM50	GM4LIP/P	393	10el
14	G5FZ/P	305	44	ZN78	GM4LIP/P	402	4el
15	G3PJX/P	306	56	ZL69	GM4LIP/P	570	8el
16	G4TAW/P	209	37	AL51	GM4LIP/P	576	5el

SECTION F

1	GW3NYY	495	61	XL40	GM4LIP/P	433	4el
2	G3UKV	435	69	YM28	GM4CWH/P	524	4el
3	G3TBK	402	63	ZN77	GM4CWH/P	493	6el
4	G3RQZ	402	64	AL51	GM4LIP/P	573	4el
5	G6CW	318	54	ZM05	GM4CWH/P	499	5el
6	G4YUZ	271	51	ZL20	GM4LIP/P	529	5el
7	G4CIZ	268	50	ZL55	GM4LIP/P	528	4el
8	G4MUT	153	31	ZL46	GM4LIP/P	527	4el
9	G4BAO	148	24	AM61	GM4LIP/P	499	4el
10	GW4BZI	136	20	YN66	GM4LIP/P	290	4el
11	G4AFJ	123	25	ZM34	GM4LIP/P	401	4el
12	G4CMZ	108	24	ZM03	GM4LIP/P	370	HB9CV
13	G4JED	75	21	ZL50	G3SYA/P	329	4el
14	G4OJS	56	14	YM60	G3SYA/P	187	4el

SECTION SWL

1	BRS52543	296	38	YN15	G3RQZ	347	5el
2	BRS28198	140	22	AK04	G3SYA/P	397	TA31JR

Checklogs received with thanks from G2DHV, G4HLX and G3VNQ.

October 1984 UHF Contest results

As in previous years, conditions were described as flat, average or poor. The weather was kinder in the south, but northerly entrants suffered high winds. The only equipment comment came from GM8TSI/P who: "Managed to destroy a K2RIW (didn't like the trip up the hill), two GaAsfet preamps (didn't like the rf), a 2 x 2C39A pa (valves flashed over and sent a resistor/choke all over the car), and a generator fuel tank (sort of fell to bits)".

In general, logkeeping was good, but several real-time logs or photocopies thereof (even worse!) were received. Their legibility left a lot to be desired; where ambiguity existed, the benefit of the doubt has not been given.

Differences between the rules and scoring of the RSGB and IARU events caused considerable confusion. In particular, the half-points rule will be reconsidered for next year's contest.

Despite the conditions, many entrants commented that they enjoyed the contest, and some reasonable distances were worked on the lower bands. Congratulations to the winners, particularly G4CQR, G4PUB/P and G4ALE/P who repeated their successes of last year.

G4ERP

RSGB 432MHz

OPEN SECTION

Posn	Callsign	Points	QSOs	QTH	Best dx	Km	Final tx	Pwr
1	G4PUB/P	99,815	359	AL47	DL2ML/P	812	8877	400
2	GW8FUO/P	77,223	311	YL25	DF9FD	843	2 x 4CX250BM	350
3	G4LOJ/P	50,878	192	AM06	DB2FB	628	2 x 4CX250B	400
4	G3NNG/P	42,439	244	ZL33	DL0SN/P	680	4CX250B	250
5	G4HRC/P	39,770	160	AL17	DL0KW/P	594	Transistor	100
6	GW4MGR/P	39,071	224	YN75	F6APE	658	2 x 4CX250B	400
7	G8OHM/P	30,154	223	ZM73	DK3KD/P	571	2 x 2C39A	100
8	G8ZHP	25,287	136	ZM29	F1EAN	677	4CX250B	300
9	G1EME/P	24,763	173	ZM71	DK8VR/A	675	3CX800A7	400
10	G4SSS/P	20,211	93	YL72	F1KSL	721	4CX250B	200
11	G6TW/P	18,159	147	YN70	F1EIT/P	697	Transistor	50
12	GM8TSI/P	14,792	57	YP44	G6LWT	552	Transistor	100
13	G4XVW/P	12,037	94	ZL52	PE1EWR	370	Transistor	120
14	GM6MGS/P	3,316	23	YQ08	G4LOJ/P	508	Transistor	10

SINGLE-OPERATOR SECTION

1	G4CQR	24,942	145	AL71	GM8TSI/P	544	Transistor	100
2	G1DOX	9,555	83	YM28	F6CTT/P	390	Transistor	30
3	G4FOH	7,151	35	ZM60	DK0BN/P	603	MRF646	5
4	G6YQJ	6,718	45	AM42	GM8TSI/P	410	4CX250B	70
5	G4RLF/P	3,689	22	YK10	G4LOJ/P	306	Transistor	8
6	G4VXE	3,664	34	YL10	G3ZNZ	262	Transistor	25
7	G1JHC	3,022	27	YM69	F1EIT/P	599	Transistor	10
8	G8VPE	2,166	11	AM29	GW8FUO/P	339	MRF646	30
9	G3JXN	1,791	9	ZL39	PA0VVH	428	4CX250B	150
10	G4LRT	857	4	ZM45	F1FTB/P	441	2 x 4CX250B	400

RSGB 1,296MHz

OPEN SECTION

Posn	Callsign	Points	QSOs	QTH	Best dx	Km	Final tx	Pwr
1	G4ALE/P	18,820	87	AL47	DL0SN/P	475	6 x 3CX100A5	350
2	GW4BVY/P	17,731	79	YL25	DK1VC	730	2 x 7289	130
3	G4ANT/P	12,875	58	AM06	DL0HC/P	502	2 x 2C39A	150
4	G4VIX/P	12,030	61	AL17	DC8UG	478	2 x 3CX100	60
5	GW4PKO/P	9,368	53	YN75	F1FLN/P	448	2 x 2C39	55
6	G4SIV	7,880	46	ZM29	DL0HC/P	596	2 x 2C39A	150
7	G4XUM/P	7,173	49	YN70	F6GRA/P	697	2C39A	60
8	G3PIA/P	6,730	52	ZL33	PA0EZ	466	3CX100A5	35
9	G4OHM/P	5,298	45	ZM73	PA0EZ	454	2 x 7289	25
10	G4WET/P	3,735	29	ZM71	F1FLN/P	329	2N5944	3
11	G4KPX/A	3,684	37	ZL38	DJ3ZU	476	3CX100A5	50
12	GM8MJV/P	1,863	9	YP44	G8ECI	312	Transistor	10
13	G4HGU/P	1,140	7	YL72	G4KBC	310	Transistor	5

SINGLE-OPERATOR SECTION

1	G4KIY	9,096	50	ZM40	DL0HC/P	580	2 x 2C39	50
2	G3JXN	6,877	47	ZL39	DJ5BV	518	2 x 2C39A	100
3	G4CBW	6,571	44	YN79	F1FLN/P	415	2C39BA	50
4	G4CQR	4,324	31	AL71	GW4PKO/P	315	2C39BA	50
5	G8ACE	4,010	26	ZL74	G4KCT	320	2C39A	50
6	G8CZZ	2,253	24	ZL38	GW4PKO/P	248	2 x 2C39A	80
7	G4LRT	1,214	12	ZM45	F1FLN/P	312	2C39A	35

RSGB 2,320MHz

OPEN SECTION

Posn	Callsign	Points	QSOs	QTH	Best dx	Km	Final tx	Pwr
1	G4GLN/P	6,340	32	AL47	DF1EQ	400	2C39BA	25
2	G3ZIG/P	3,362	15½	AM06	GW4NXO/P	319	2C39A	10
3	GW4NXO/P	3,118	15	YL25	G3ZIG/P	320	2C39	20
4	G3OHM/P	1,985	14	ZM73	PE0MAR/P	383	7289	25
5	G4HLX/P	885	9	ZL33	G4GLN/P	204	Transistor	0·8
6	G4NNA/A	622	9	ZL38	GW4NXO/P	185	3CX100A5	1
7	GM8MNG/P	0	0	YP44	—	—	2C39A	3

SINGLE-OPERATOR SECTION

1	G4FRE	2,008	13	AL07	GW4NXO/P	303	2 x 2C39A	100
2	G3JXN	1,162	13	ZL39	PE0MAR/P	307	2C39A	10
3	G8CZZ	387	6	ZL38	GW4NXO/P	180	2C39A	15
4	G4LRT	246	3	ZM45	GW4NXO/P	162	2C39A	10

RSGB 3,456MHz

OPEN SECTION

Posn	Callsign	Points	QSOs	QTH	Best dx	Km	Final tx	Pwr
1	G3OHM/P	132	2	ZM73	G3TQF/P	83	BXY28	0·2
2	G3TQF/P	100	2	ZM26	G3OHM/P	83	HP491Ctwt	1
3	G4PZZ/P	26	1	AM06	G4BYV	26	Varactor	0·1

SINGLE-OPERATOR SECTION

1	G4LRT	66	1·5	ZM45	G3OHM/P	49	BXY28	0·35
2	G4FRE	14	1	AL07	G8HPU	14	BXY28	1·5

RSGB 10GHz

OPEN SECTION

Posn	Callsign	Points	QSOs	QTH	Best dx	Km	Final tx	Pwr
1	GW4TXG/P	318	3·5	YL25	G4MBS	151	5mW WB	300μWNB
2	G4FHQ/P	239	4	ZM31	G6CWK/P	70	100mW WB	
3	G8DPB/P	104	2	AL17	G6NVC/P	52	—	

SINGLE-OPERATOR SECTION

1	G4MBS	127	1	ZL65	GW4TXG/P	148	twl	2W

Contests Calendar

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	YL-OM Midwinter *(Rules in January* MOTA *)*
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	Hungarian DX *(Rules in January* MOTA*)*
19-20 January	160m World SSB Championship *(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)*
25-27 January	CQ WW 160m DX CW *(Rules in January* MOTA*)*
26 January	15m World SSB Championship *(Rules from G3FKM)*
27 January	20m World SSB Championship *(Rules from G3FKM)*
27 January	70MHz Cumulative *(Rules in January issue)*
2, 3 February	7MHz Phone *(Rules in September issue)*
2-3 February	YU DX *(Rules in January* MOTA*)*
3 February	144MHz CW *(Rules in January issue)*
9, 10 February	1st 1.8MHz *(Rules in December issue)*
10 February	70MHz Cumulative
17 February	432MHz Fixed *(Rules in January issue)*
22-23 February	CQ WW 160m DX SSB *(Rules in January* MOTA*)*
23, 24 February	7MHz CW *(Rules in September issue)*
24 February	70MHz Cumulative
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

South Manchester Quad Night Event results

The third quad night df event again attracted 10 hardy competitors determined to brave the elements.

Out of the four stations, only one required an approximate bearing (due to a last-minute change of location). Competitors appeared to be evenly distributed between stations A, B and C, leaving D for later.

Station A, operated by Geoff and Peter, was hidden some three miles south of the start. The operators had placed themselves by a fence separating a car park and a wood. They watched with amusement as competitors ran past them and spent hours in the woods into which the antenna ran! First to arrive was Jerry Armitage at 2137.

Station B, located some six miles SSE of the start, on Lindow Common, was operated by Dave and Chris hidden in a most ferocious gorse bush which appeared to be on their side! It stabbed arrivals without mercy! First in was George Whenham at 2047.

Station C was hidden some six miles SE of the start, at Bramhall Park. The operators, Colin and Chris, were located in thick rhododendron bushes on the "wrong" side of a small lake and brook. Dave Holland was the first to arrive, after a long run round the site, at 2030.

The fourth transmitter, station D, was some 12 miles distant in an easterly direction, at Broadbottom Woods. The operators, John and Trevor, had a very quiet night until after 2300 when noises, curses and threats were heard some distance away. After a period, lights appeared through the woods and Dave Holland arrived at 2358, just before the end of the event.

After the contest, Mary Holland and Sandra Magher provided a supper complete with "Lancashire Hot Pot" and trimmings. The prizes were then awarded, the Quad Night Rose Bowl being presented to Dave Holland.

The organizers would like to thank all who took part, especially the operators, and Mary and Sandra for the much-appreciated refreshments.

See you next year!

			Time of arrival			
Posn	**Name**	**Club**	**Stn A**	**Stn B**	**Stn C**	**Stn D**
1	D C Holland	S Manchester	22·34	21·26	20·30	23·58
2	G Foster	Stratford	21·37	22·56	23·53	—
3	C D Merry	Dartford Heath	23·59	21·56	20·55	—
4	G Whenham	Coventry	—	20·47	22·49	23·59
5	D Yorke	S Manchester	—	20·56	22·07	—
6	J Armitage	S Manchester	21·37	22·55	—	—
7	W Pechey	Mid-Thames	23·53	—	22·23	—
8	D Newman	Slade	—	—	20·59	—
9	M Ellis	S Manchester	23·04	—	—	—

One competitor failed to locate any transmitter

BARTG Spring RTTY Contest rules

0200gmt 23 March-0200 March 25 1985

Rules for this contest may be obtained by sending an sae to Peter Adams, G6LZB, BARTG Contests Manager, 464 Whippendell Road, Watford, Herts WD1 7PT.

"WHAT'S WRONG WITH WOMEN?"

(or how to interest your female half in radio)

FIRST, let me say that this is written from a totally biased point of view! There may be some who would say that amateur radio is "the last bastion of male supremacy", but, like it or not, it is becoming more the custom for ladies to join in the hobby.

This article is designed to give you *more* time in the shack and less time doing the decorating/washing up etc; *together* with your lady.

The first thing you must do is to conquer her fear of anything electrical. After all, she learnt to use the microwave you gave her last Christmas pretty quickly, didn't she? So , next time she opens her knitting instructions (they look like formulas anyway), slip a copy of this article between the pages. Remember, careless talk saves "Ham" lives!

Don't sit in your shack *all* the time alone. Ask for her permission and get her to join you. She'll water the plants that just happened to QSY from the greenhouse, but now you have her (almost) captive attention. Don't use headphones, she may complain that you always talk to that "thing" (forgetting she talks to her plants), so at least let her hear something!

So at this point you may hear another lady on air. At this point turn up the volume and carefully remark "She passed the exam". It's no use getting too excited when you realize that your fellow (lady) amateur is in the WAB square you really need, as this will have a disastrous effect, and you may find your dinner in the oven for the next week.

Now why not try her typing talents? Show her your Creed 444 and get her working. She learnt to type at 60wpm at Pitman's. When she passes the RAE it will be very handy for working rtty contests!

So now she must learn the syllabus for the RAE. Try evening classes—"No, they clash with my keep-fit"—so teach her yourself, you may find the revision useful. Never put a potential lady amateur down, you'll find in the end she will get better marks than you did and she'll go on to do the morse code exam as well. (Something you have always wanted to do but never had the time.) Then when she's passed she will comment "Easy wasn't it!"—as if all the time *you thought* that she hated it.

In closing, it will be worth it, though you may have to learn to cook, wash, iron and clean when "Her Indoors" decides to do a contest over a weekend. Your bank balance will also see red when she tells you that next Christmas she wants a radio of her own.

Go on, give her a chance!

All writs to be sent to Stephanie, G6PFY

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 July 1985 issue.

RSGB affiliated organizations are requested to report all programmes and news items to their regional representatives regularly. Information for inclusion in the **March** issue should reach them by **15 January** and for the **April** issue by **19 February.**

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.

Accrington (NW Repeater Group)—17 January, 8pm. Globe Bowling Club, Willows Lane, Accrington. Sec Bob Tomlinson, G6IKK.

Ainsdale (ARRC)—Alternate Tuesdays. 15 January (AGM). Scout HQ 8.15pm. 29 January (normal meeting, Scout HQ, Marine Drive). 8, 22 January (Natter night at The Mount, Manchester Road), 13, 27 January (DF hunt, 10.30 start at Mere Brow OS squares. Sec D Morris, G4TUP, tel Southport 35947.

Barnoldswick (Rolls-Royce ARC)—First Wednesday in each month, 8pm. Rolls-Royce Sports and Social Club, Barnoldswick. Sec L. Logan, G4ILG, tel 0282 812288.

Blackburn (East Lancs ARC)—First Tuesday in each month, formal meeting; last Tuesday, social gathering. 7.30pm. Conservative Club, Rishton, Blackburn. Details Norman Jenkin, G4CGT.

Bolton (B&DARS)—Wednesdays, 8pm. Horwich Leisure Centre. Details Phil Ingham, G6HDD, tel Farnworth 791918.

Bury (BRS)—Every Tuesday, 8pm. Mosses Community Centre, Cecil Street, Bury. 8 January ("How to blow your rig up", Harry Leeming, G3LLL). 15, 22, 29 January; Sunday 10 February (Hamfeast mobile rally at Mosses Community Centre, Cecil Street, Bury. 3min from Junction 2 M66. Talk-in on S22. All the usual attractions, including a large bring and buy. Details M B Priestley, G1BWN). 12 February ("Building and launch of Oscar 10 video", followed by questions and answers on amateur satellites and AMSTAT-UK, David Cadman, G8UVE). Details Brian Tyldsley, G4TBT, tel Burnley 24254.

Chester (C&DRS)—Tuesdays, 8pm. Chester rugby Union Football Club, Hare Lane, Vicars Cross, Chester. 8 January (AGM), 15 January ("Weather satellites"), 22 and 29 January (To be announced). Morse classes for members begin 7.10pm, beginners at 7.30pm, by Adrian, G4MOU. Details Alan Warne, G4EZO, tel Chester 40055.

Crewe (South Cheshire ARS)—Second and fourth Mondays in each month, 8pm. Victoria Club, Gatefield Street, Crewe. Club net 8pm Sunday evenings 145·350MHz Channel S14. 11 February (Visit by Bert Donn, G3XSN, Region 1 representative). Sec Nick Gutten, G6IGW, tel Crewe 60062.

Fylde (FARS)—1 January (No meeting), 15 January (AGM), 5 February ("Secret Listeners" video). 19 February (Informal and morse class). Kite Club, Blackpool Airport. Sec G8GG, tel 7251717.

Isle of Man (IoMARS)—Mondays, 8pm. Keppel Hotel, Creg-ny-Baa. Sec Mrs Anthea Matthewman, GD4GWQ, tel 0624 22295.

Kendal (Westmorland RS)—Second Tuesday in each month. Strickland Arms on A6 near Kendal. Sec Gordon Chapman, G1IIE, tel 0539 28491.

Liverpool (L&DARS)—8 January (Bring and buy sale, anything goes), 15 January ("Reminisences", Arthur Looney, G3LIU), 22 January ("Maidenhead", Bob Curwen, G3PDC). 29 January ("Valve power amps for vhf", Harry Williams, GW8FHD). Sec Albert Webb, G6XBK.

Liverpool (Sefton ARC)—Alternate Wednesdays, Liverpool Prison Officers Social Club, Hornby Place, off Hornby Road, Walton, Liverpool. Sec Mike Webb, G6ICR.

Manchester (UMIST RS)—During term time. Informal meetings, most lunch-times and Wednesday afternoons in the shack, L-floor, Main Building. Also Thursdays, 8pm, in the Union Bar. Club contacts: Alister Bailey, G6HEH; Tom Green, G4NQN; or Robin Commander, G6HEG. Tel 061-236 3311, ext 2945 or c/o Radio Society, UMIST Union, Box 88, Sackville Street, Manchester M60 1QD.

Manchester (South Manchester RC)—Fridays (Formal), Mondays (Informal). 4 January ("Development in oscilloscopes design", Tom, G4AOK), 11 ("Radio analysis", Mike, G6EAO), 18 ("Microwaves" Mike, G3PFR), 25 ("RTTY", Roger, G4NTY, and Chris G4MYB). 1 February (Club quiz), 8 (Lecture to be announced), 15 ("Radio astronomy", Ian, G1GZS, of Jodrell Bank), 25 (Radio question time—ask the panel of experts!). 8pm. Sale Moor Community Centre, Norris Road, Sale. Sec David Holland, G3WFT, tel 051-973 1837.

Oldham (OARS)—Mondays 8.30pm. Wheatsheaf Hotel, Derker Street, Oldham. 11 February ("QRP operation", Rev Dobbs, G3RJV). Sec Fiona Butterworth, G4SPX, tel 061-652 8862.

Ormskirk (O&DARC)—First and third Thursdays in each nonth, 7.30pm. Ormskirk Community Centre. Sec Mrs A Day, G1AZI, tel 0704 894047.

Penrith (Eden Valley RS)—Third Thursday in each month, 7.30pm. Kings Arms, Temple Sowerby, Penrith. Sec Allison Ashcroft, G1FBO, tel 0768 88260.

Preston (PARS)—Meets at the Lonsdale Club, Fulwood Hall Lane, Fulwood, Preston. Sec George Earnshaw, G3ZXC, tel 0772 718175.

St Helens (StH&DARC)—Thursdays, 8pm. Conservative Rooms, Boundary Road, St Helens. Contact Alan Riley, G6MXT, tel 051-430 9227, or Alan Manchester, tel 56025.

Skelmersdale (S&DARC)—Thursdays, 8.30pm. Dunlop Sports & Social Club, Skelmersdale. Sec George Rogers, G6OMN.

Stockport (SRS)—Second and fourth Wednesday in each month, 8pm. Blossoms Hotel, Wellington Road South, Stockport. Sec Mel Betts, G4FFW, tel 061-224 7880.

Tarporley (Mid-Cheshire ARS)—Wednesdays, 8pm. Cotebrook Village Hall, Sadlers Lane, off the A49, Tarporley. 2 January (General natter night), 9 January (Club station on the air), 16 January (Forward planning for NFD), 23 January (To be advised), 6 May (Mobile rally at Winsford Civic Hall). Sec Rick Dodd, G8PNL, tel Winsford 57766.

Thornton Cleveleys (TCARS)—7 January ("Map projections", Gerry Valelly, G4YRS), 14 January (Advanced morse class, Alan Cobbe, G3ZRZ), 21 January ("Home pcb manufacture", Mick Green, G4EZM), 28 January (Components sale). 7.30pm. Norbreck 1st Scout Hut, Carr Road, Bispham. Chairman Jack Duddington, G4BFH, tel 0253 853554.

If your club does not appear in this month's "Club News" it is because I have not received any information from you. I have also included clubs I know to be active, but as yet I am waiting to hear from you. If your club wants publicity then let me have the information. Wishing all a happy and prosperous New Year. *RR1*

REGION 2—RR P N Butterfield, G4AAQ, 43 Lynwood Crescent, Pontefract, West Yorks. WF8 3QT. Tel 0977 791071.

Barnsley (B&DARC)—Mondays, 7.30pm. Venue and details K W Roberts, 2 Earning View, off Twibell Street, Barnsley, tel Barnsley 297365.

Barnsley (UK FM Group Northern)—First Sunday in each month, 7.30pm. Royal Hotel, Barnsley. Sec G4UNA.

Denby Dale (DD&DARS)—Second and fourth Wednesdays in each month, 7.30pm. Pie Hall, Denby Dale. Sec J Clegg, G3FQH, tel Huddersfield 862390.

Doncaster (DMI of HEARC)—Mondays, 8pm. Gertrude Bell Hall, Armthorpe, Doncaster. Sec G8GTG.

Goole (GR&ES)—Tuesdays, 7.30pm. Junior Chambers Building, Boothferry Road, Goole. Sec R Sugden, G8IOH, tel 0405 84462.

Halifax (H&DARS)—First and third Tuesdays in each month. 19 February (Surplus equipment sale). The Running Man, ph, Pellon Lane, Halifax. Sec D Moss, tel Halifax (0422) 202306.

Halifax (Northern Heights ARS)—First and third Wednesdays in each month. Bradshaw Tavern, Bradshaw, Halifax. Sec G6CJL.

Hornsea (HARS)—Wednesdays, 8pm. The Mill, Mill House, Atwick Road, Hornsea. Sec N Bedford, G4NJP, tel 0262 73635.

Hull (H&DARS)—Fridays, 8pm. West Park Recreational Centre, Anlaby Road, Hull. Sec D Coldbeck, G6ABG.

Hull (World Association of Christian Radio Amateurs and Listeners)—Details from L D Colley, G3AGX, 13 Ferry Road, Wawne, Nr Hull, tel Hull 822276.

Leconfield (ASMT/RCTARS)—Fridays, 7pm, and coffee at lunchtimes. Signals Division, Normandy Barracks, Leconfield. Sec G4NQI at above address.

Leeds (White Rose ARS)—9 January (Construction contest), 16 January (Natter night), 23 January ("Latest project" Dr D A Tong), 30 January (Natter night), 6 February (VK0JS Heard Island Expedition video). 8pm. Moortown Rugby Union Club, King Lane, Alwoodley, Leeds 17. Details G3KWT, tel Leeds 688821.

Leeds (L&DARS)—Mondays, 8pm. Old Hall Golf Club, Woodhall Lane, Calverley, Leeds.

Maltby (MARS)—Friday, 7pm. Old School Buildings, Church Lane, Maltby. 11 January (Computer night), 18 January (Video, G3ZHI), 25 January (The great debate, morse). Details from I Abel, G3ZHI, tel Rotherham 814911.

Marsden (Pennine & DARS)—Fortnightly, Wednesdays. Venue and details from J S Shaw, G4RAJ, tel Huddersfield 35955.

Mexborough (M&DARS)—Fridays, 7.30pm. Harrop Hall, Dolcliffe Road, Mexborough. Sec P Gething, G1JNM, 162 Hirstgate, Mexborough, S Yorks.

Otley (OARS)—Tuesdays, 8pm. ROAB Club, Otley. Details Joint secs G6SPU and G6OAC.

Pontefract (P&DARS)—3 January (AGM), 10 January (Informal), 17 January (Annual junk sale), 24 January (Informal), 31 January (Homebrew evening), 7 February (Informal), 7.30pm. CW classes on Mondays, Carleton Community Centre, Carleton, Pontefract. Sec Ron Tams, G4TCB.

Ripon (R&DARS)—Thursdays, 7pm. St John Ambulance Hall, Ripon. Sec G6CUG, tel 0845 24945.

Scarborough (SARS)—Mondays, 7pm. Scarborough Cricket Club, N Marine Road, Scarborough. Sec G6CXK.

Sheffield (SARS)—First and second Mondays in each month. Firth Park Pavilion. Third Monday is informal. Sheaf House Hotel, Brammal Lane, Sheffield. Sec G8VQS, tel 0246 31696.

Spen Valley (SVARS)—10 January ("Viewdata", G4OTL), 24 January ("Fast-scan tv", G8HUA). 8pm. Old Bank Working Men's Club, Mirfield. Sec T Clough, G4PHR, 37 Park Avenue, Mirfield WF14 9PB.

Todmorden (T&DARS)—A new club, only just in Region 2. Sec J Gamble, 283 Halifax Road, Todmorden, Lancs, tel Todmorden 2494.

Wakefield (NWRS)—10 January (On the air night), 17 January (Visit to Pontefract junk sale), 24 January (Equipment test lecture by G8UYZ), 31 January (Monthly meeting). 7.45pm. Carr Gate Working Men's Club, Wakefield. Sec S. Thompson, G4RCH, tel Leeds 536633.

Wakefield (W&DARS)—Alternate Tuesdays, 8pm. Ossett Community Centre, Prospect Road, Ossett. Sec Walter Parkin, G8PBE, tel Wakefield 378727.

York (YARS)—Fridays, 7.30pm. United Services Club Room, 61 Micklegate, York. Sec Keith Cass, G3WVO, tel York 36230.

Owing to extreme pressures of business, I have tendered my resignation as I am unable to dedicate sufficient time to visiting clubs. Thank you to all who have assisted during my short time as RR. Please refer all club news directly to the editor until further notice. *RR2*

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

Area representatives
N Read, G8CXL, Warwick
I. Hopwood, G6CWK, Stratford
M. Henley, G3OQO, Rugby
B. Jones, G8ASO, Worcester
L. Craven, G4EQI, S. Birmingham
J. K. Harvey, G4IVY, SW Birmingham
S. H. Jesson, G4CNY, Hereford

Will all clubs please keep me informed of their activities. Clubs are only included in the news column if we have news to report. It is therefore essential to keep me informed if you want publicity for your club.

Ariel Radio Group—Club for BBC personnel only. Contact G3DEF or G3PGG.
Atherstone (ARC)—Second and third Mondays in each month. Tudor Centre, Coleshill Road, Atherstone. Sec G6BEQ, tel (0455) 212051.
Birmingham (Aston RS)—No details received since 1982.
Birmingham (Slade RS)—First Friday in the month, 7.45pm. Community Centre, 75 Kingsbury Road, Erdington, Birmingham. Sec G4FGF, tel 021-770 3474.
Birmingham (South RS)—Wednesdays, 7.45pm. Hampstead House, Fairfax Road, West Heath, Birmingham. Sec Tim Scrimshaw, 10 Somerdale Road, Birmingham B31 2EG.
Birmingham (UoBARS)—Fridays, 7.30pm. Various activities for students and visitors. Tuesdays, 7.30pm. RAE classes. On second floor of Students union, side entrance near Midland Bank. Sec GW4YEG.
Bridgenorth (Severn RS)—No details available. Sec E. Churchyard, 11 Greenfields Drive, Bridgenorth.
Bromsgrove (BARS)—Second and fourth Tuesdays in each month, 8pm. British Legion Club, Birmingham Road, Bromsgrove. Sec G4OJS, tel 021-445 3207.
Burton-on-Trent (B-on-T&DARS)—Wednesdays, 8pm. Stapenhill Institute, Main St, Stapenhill. Sec G4HBY, tel 0283 62344.
Cannock Chase (CCARS)—Thursdays, 8pm. Bridgetown War Memorial Club, Union Street, Bridgetown, Near Cannock. Sec G8HZP, tel (0922) 416419.
Coventry (CARS)—Fridays. 4 January (Night on the air), 11 January (Bring a computer), 18 January (Annual dinner at Beechwood Hotel), 25 January (Night on the air), 8pm. Scout HQ, 121 St Nicholas Street, Radford, Coventry. Sec G4JDO, tel 73999.
Coventry (CTARS)—Mondays, 7pm. Room E17, Wynfray Buildings, Technical College, Coventry.
Droitwich (DARC)—Second and fourth Mondays in each month, 8pm. Scout HQ, Droitwich. Sec G4HFP, tel 02993 3818.
Dudley (DARC)—7 January (Committee and natter night). Mondays, 7.45pm. Allied Centre, Greenman Alley, Tower Street, Dudley. Sec G4NRA, tel 0386 6246.
Halesowen (MEB Sports and Social Club RC)—8pm. MEB Social Club, Mucklow Hill, Halesowen. Sec G4RWH, tel 021-747 8784.
Hereford (HARS)—4 January ("Bermuda" by G4CNY), 18 January (Informal meeting). 8pm. The Old Goal, Goal Street, Hereford. Sec G3WRQ, tel 0432 54064.
Keele University (KUARS)—No details available.
Kidderminster (K&DARC)—Tuesdays fortnightly, 8pm. Aggborough Community Centre. Hoo Road, Kidderminster. Sec G8WOX, tel 0562 751584.
Lichfield (Lichfield Chad RC)—Mondays, 8.30pm. Naval Club, Burton Old Road, Lichfield. Sec G4ESK, tel 23919.
Malvern Hills (MHARC)—Second Tuesday in each month, 8pm. Red Lion Inn, St Ann's Road, Malvern. Sec G4TXG, tel Malvern 65802.
Much Wenlock (Wenlock ARES)—Second and fourth Monday in each month, 8pm. 14 January (Natter night), 28 January (Bring your own slides). Raven Hotel, Much Wenlock. Sec G3ZSL, tel (07462) 861332.
Redditch (RRC)—8pm. WRVS Centre, Ludlow Road, Redditch. Sec G3EVT, tel (0789) 762041.
Rugby (RATS)—Wednesdays, 7.30pm. 9 January ("Are the voltages correct?"), 30 January (Amateur radio video show). Cricket Pavilion, "B" entrance, Rugby Radio Station.
Shrewsbury (Salop ARS)—Thursdays, 8pm. The Albert, Smithfield Way, Shrewsbury. Sec G6DQY, Perry Willows, Yeaton, Bashchurch, Shrewsbury SY4 2HY.
Solihull (SARS)—Third Tuesday in each month, 7.30pm. The Manor House, High Street, Solihull. Sec G6HSZ, tel 021-742 3378.
Solihull Contest Group—No details available. Sec G4PYR, 107 Swallows Meadow, Shirley, Solihull.
Stafford (S&DARS)—Tuesdays, 8pm. Coach and Horses Motel, Pasturefields, Staffs. Sec G4RSW, tel 0785 46306.
Stoke-on-Trent (S-on-TARS)—Mondays, 8pm. Harold Clowes Community Centre, Dawlish Road, Bentilee, Stoke-on-Trent. Sec G6MLI, tel 0782 332657.
Stourbridge (StARS)—First and third Mondays in each month, 8pm. Robin Woods Centre, School Street, Enville Street, Stourbridge. Sec G8JTL, tel Lye 4013.
Stafford-upon-Avon (S-upon-A&DARC)—Second and fourth Mondays in each month, 14 January ("The oscilloscope", G3MXH), 28 January ("Let's make a pcb", G6DCL). 7.30pm. The Control Tower, Bearley Radio Station, near Stratford-on-Avon. Sec G8OVC, tel S-on-A 750584.
Sutton Coldfield (SCARS)—Second and fourth Mondays in each month, 8pm. Public Library, Sainsbury Centre, Sutton Coldfield. Sec G6UFD, tel 021-358 6501.
Tamworth (TARS)—Mondays, 8pm. Rugby Club, Cotton Green, Tamworth. Sec G4BKA, tel 0827 283952.
Telford (T&DARS)—2 January (Natter night and committee meeting). 7.45pm. Community Centre, Dawley Bank, Telford. Sec G6XUF, tel 0952 770568.
Tenbury (TARS)—Thursdays, 7.45pm. The Barn, Pool House, Hanley Childe, Tenbury Wells. Sec G6PQX, tel 08854 274.
Walsall (WARS)—Wednesdays, 8pm. Forest Comprehensive School, Bloxwich. Sec G4FAJ, tel 05432 2169.
Warwick (Mid-Warwickshire ARS)—Second and fourth Tuesdays in each month, 8 January (AGM), 22 January ("Warwickshire repeaters", G6ARP). 8pm. 61 Emscote Road, Warwick. Sec G4TIL, tel Southam (09269) 4765.
Warwick University (WUARC)—No details since 1977. (Come back, all is forgiven!)
Wells Krautkamer (WKARC)—Private Club. Sec No details.
West Bromwich (WBARC)—Sundays, 8pm. "Hop and Barleycorn", Dartmouth Street, West Bromwich. Sec G6ZLW, tel 021 553 0531.
Willenhall (W&DARS)—Wednesdays, 8.30pm. Saracens Head, Bloxwich Road, Willenhall. Sec G4LWI, tel Wolverhampton 782036.
Wolverhampton (WARS)—8 January (Club night), 15 January ("Home security" Sgt John Vincent), 20 January (144MHz df hunt), 22 January (Surplus equipment sale), 29 January (committee meeting). 8pm. Electricity Sports Club, St Marks Road, Chapel Ash, Wolverhampton. Sec K. Jenkinson, tel 0902 24870.
Worcester (W&DARC)—7 January (Aerial circus video), 21 January (Informal meeting at the Old Pheasant). 8pm. Oddfellows Club, New Street, Worcester. Sec G4RBD, 14 Oakleigh Heath, Hallow, Worcester.
Worcester Moonbounce Society—No regular meetings. Sec P. Crosland, tel 0905 620041.
Wordsley (WRC)—8pm. Vine Inn, Camp Hill, Wordsley. Sec G4VJU.
Wythall (WARC)—8 January (RAE Enrolment. 7.30pm. Community Centre. Silver Street, Wythall. Sec G4SMA, tel 021-444 2427.

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

Bolsover (BARS)—Wednesdays, 7.30pm. The Angel Hotel, Bolsover. Sec Ian Mellors, G4WCX, tel Mansfield 811129.
Buxton (BARS)—8 & 22 January, at the new venue, where the club has now available a lecture room and project room/shack. 8pm. Haddon Hall Hotel, London Road, Buxton. Sec Dave Hooper, G6MIF, tel Buxton 6174.
Buxton (BD&RC)—Information from G6ZHS, tel Buxton 4992.
Derby (D&DARS)—Wednesdays, 16 January ("Archaeology", Donald Farnsworth), 23 January (Night on the Air, a chance to air the callsigns, G2DJ and G3ERD), 30 January ("Multimeters made Easy", G3SZJ), 6 February (Junk sale), 7.30pm. 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.
Derby (NHARG)—Fridays, 7.45pm. Nunsfield House, Boulton Lane, Alvaston, Derby. Sec John Robson, G4PZY, tel Derby 767994.
Eastwood (Notts & Derby Border ARC)—Tuesdays, 7.30pm. Hand in Hart Hotel, Cotmanhay. Sec Peter Fretwell, G4UFC, tel Ilkeston 302990.
Glossop (G&DARG)—Last Thursday in each month, 8.30pm. Nags Head Hotel, Charlestown, Glossop. Details from G4WOW.
Grantham (GRC)—Third Tuesday in each month, 8pm. Shirley Croft Hotel, Harrowby Road, Grantham. Sec John Kirton, G3WWJ, tel Grantham 65743.
Grimsby (GARS)—10 January (Safety in the shack), 24 January (Soldering on), 7.30pm. Cromwell Social Club, Cromwell Road, Grimsby. Sec George Smith, G4EBK, tel Grimsby 887720.
Heanor (SE Derbyshire ARS)—Tuesday during term, 7.30pm. South East Derbyshire College, Ilkeston Road, Heanor. Details G8RZM.
Hinckley (HARES)—Second Wednesday in each month, 7.30pm. John Cleveland, College, Butts Lane, Hinckley. Sec Norman Geary, G8STX, tel Hinckley 632778.
Leicester (LRS)—Sundays 10.30am and Mondays 7.30pm. Gilroes Cottage, off Groby Road, Leicester. Sec Frank Elliot, G4PDZ, tel Leicester 871086.
Lincoln (LSWC)—9 January ("Test equipment", G3PVU) 23 January (Activity night/night on the air), 8pm. City Engineers Club, Waterside South, Lincoln.Sec Pam Rose, G4STO, tel Gainsborough 788356.
Loughborough (L Falcon ARC)—4 January (C W night), 11 January (Social evening). 18 January (Visit TBA), 25 January ("QRP & an expedition to DL", Brian, G8BUB), 8pm. Tuesday 7pm. constructors group. Brush Sports & Social Club, Fennel Street, Loughborough. Details G4DZL c/o the club.
Mansfield (MARS)—First Friday and third Tuesday in each month, Victoria Social Club, Princes Street, Mansfield. Sec Keith Lawson, G4AAH.
Mansfield (Central Notts VHF G)—Sec Graham Ridgeway, G8UYD, tel Mansfield 652093.
Market Harborough (Welland Valley ARS)—Mondays, 7.15pm. Welland Park Community College, Market Harborough. Sec Dave Lunn, G3LSL, tel Market Harborough 880746.
Melton Mowbray (MMARS)—18 January ("Quiz evening" led by G3WKM), 7.30pm. St John Ambulance Hall, Ashfordby Hill, Melton Mowbray. Sec Richard Winters, G3NVK, tel Melton Mowbray 63162.
Newark (N&DARC)—First Thursday in each month, 7.30pm. Palace Theatre, Appletongate, Newark. Sec Roger Hiscock, G4MDV, tel East Stoke 539.
Nottingham (ARCON)—3 January (Forum), 10 January (Brains trust), 17 January ("Oscilloscopes", G3OZ), 24 January (Activity night), 31 January (TBA), 7.30pm. Woodthorpe House, Mansfield Road, Nottingham. Sec Jim Towle, G4PJZ, tel Nottingham 624764.
Nottingham (Arnold & Calton C of FEARS)—Details from Ron Wilson, G4NZU.
Ollerton (Dukeries ARS)—Sundays, 2pm. The Labour Hall, New Ollerton. Sec Gladys Jones, 104 Newark Road, New Ollerton, Nottingham.
Ollerton (Robin Hood ARS)—Fridays, 8pm. White Hart Hotel, Ollerton. Sec G6VGN.
Scunthorpe (S&DARC)—8 January ("Oscar 10", G4JRY and G4GZAO), 15 January (Open forum), 22 January (TBA), 29 January ("Parabolic Antenna Design", G3CCH), CW practice every Thursday, 8pm. Grange Farm Hobbies Centre, Franklin Crescent, Scunthorpe. Sec Ida Aizlewood, G4ZGJ, tel Scunthorpe 732268.
Skegness (S&DARS)—First Tuesday in each month, 7.30pm. White Swan, Burgh le Marsh, Skegness. Sec Clive Ironmonger, G6HYF.
Spalding (S&DARS)—11 January (AGM). The White Hart Hotel, Spalding. Sec Betty Whitely, G4ZGT, tel Spalding 2781.
Stamford (S&DARC)—Twice monthly, 7.30pm. The Anchor Hotel, Stamford. Sec David Bradberry, G4OSM, tel Stamford 54433.
Wigston (WRC)—Fridays, 7.30pm. United Reform Church, Wigston. Sec Roy Tabberer, G6HAJ, tel Leicester 403107.
Worksop (WARS)—Thursdays fortnightly, 8pm. Old Ship Inn, Market Place, Worksop. Sec Carole Gee, G4ZUN, tel Worksop 486614.

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

Bedford (BMSARC)—Correspondence to Mr N E Kinselley, G1BYT, Bedford Modern School of

ARC, Manton Lane, Bedford MK41 7NT. No meetings during holidays, otherwise meetings every lunch hour except Mondays during term time. Sec P A J Worden.

Bedford (B&DARC)—Last Wednesday in each month, 8pm. Club House, Ravensden. Sec L R Hewett, G4PBE. No programme for January received.

Cambridge (C&DARC; G2XV)—11 January, ("National broadcasting", G4HPE), 18 January, (Informal evening, morse classes, problem corner operating of club station), 25 January, ("Chip design", G6GIX). Visual Aids Room, Coleridge Community College, Radegund Road, Cambridge, weekly during term time. Sec D M Leary, G8JKV, The Farmhouse, Blackers Hill Farm, Lowndes Drove, Needingworth, Cambs PE17 4NE. Chairman Brian Davy, G4TRO.

Cambridge (CUWS)—Last known details: Informal meetings during term time, 9pm, in the Buttery Bar, St John's College. Sec Laurence Barber, G8NJJ, Selwyn College.

Dunstable Downs (DDRC)—Fridays, 8pm. 4 January ("Amtor, rtty and packet radio", G3NRM). Chews House, High Street South, Dunstable. Sec P A Morris, G6EES.

Luton (Kent Process Controls ARC)—First Wednesday in each month, 8pm. Club House, Tenby Drive, Luton, Bedfordshire. Sec J S Allen, G3DOT. The club is open to all employees of Brown Boveri et Cie and Brown Boveri Kent.

Leighton Linslade (LLRC) G4LLR and G6LRC—Vandyke Community College, Room A64, Vandyke Road, Leighton Buzzard, 7pm—10pm. No programme for January received, except that morse classes are being held by G3XJO, 8pm-10pm, Wednesdays. Just turn up if you are interested.

Milton Keynes (MK&DARS)—Second Monday in each month. Tongwell Room, Lovat Hall, Silver Street, Newport Pagnell. 14 January (Visit by G3DOT to discuss RSGB matters). Chairman Phil Stubbs, G6WYZ. Sec David White, G3ZPA.

Nene Valley (NVRC)—Wednesdays, 8pm. 2 January (No meeting), 9 January, (Discussion—"Any Good Christmas Presents"), 16 January (Talk—to be arranged), 23 January, (AGM) and election of officers), 30 January, (To be arranged). Dolben Arms ph, Finedon, Near Wellingborough, Northants. Sec Lionel Barker, G5LP, 128 Northampton Road, Wellingborough, Northants.

Northampton (NRC)—Thursdays, 8pm. Kingsthorpe Community Centre, Thorntons Park, Kingsthorpe, Northampton. No programme for January received. Sec G6XKT, 35 Knightscliffe Way, New Duston, Northampton NN5 6DF.

March (M&DARS)—Tuesdays, 7.30-9pm—unless centre is closed for holidays. Neale Wade Adult Educational Centre, Station Road, March. Sec V Cracknell, G4KPZ.

Peterborough (GPARC) G4EHW—Fourth Thursday in each month, 7.30pm. Southfields Junior School, Stanground, Peterborough, 24 January (AGM). Sec Frank Brisley, G4NRJ.

Peterborough (PR&ES)—Fortnightly. Peterborough College of Adult Education. No programme for January received. Sec D. Wilson, G4KSW.

Shefford (S&DARS) G3FJE—Thursdays, 8pm. Church Hall, Amptill Road, Shefford, Bedfordshire. 3 January (Club reopens after Christmas break). Please listen to the RSGB news for the remainder of January's programme. Sec Alan, G4PSO.

Wisbech (WR&EG)—Thursdays, fortnightly. Five Bells, Parsons Drive, Wisbech, Cambridgeshire. No club programme received for January. Sec K. Stockley, G4UQN.

During 1984 at least two clubs on the region have closed due to lack of support: St Neots & District and the Corby Amateur Radio Group. One new club has been formed and one more is going through the process of being affiliated to RSGB. A number of clubs have not bothered to reply to my request for information, and therefore the information I have put in may not be correct. Happy New Year and enjoy amateur radio.

G3DOT, RR5.

REGION 6—RR F S G Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HA3 7EA. Tel Penn (049481) 4240

Aylesbury (AVARC)—22 January, (AGM), 7.45pm for 8pm. Members please attend Haydon Hill Community Hall, Dickens Way, Aylesbury. Details Mrs Cathy Clark, G1GQJ, Kingston Blount, tel 0844 51461.

Slough (Burnham Beeches RC)—First and third Mondays in each month, 8pm. St John Ambulance HQ, Burlington Road, Slough. 7 January (Junk sale). Sec G6DVC.

Slough—24 January ("Communication satellites", J. Pink), 7.30pm. Exhibition Training Centre, Crane Packing Ltd, Slough. Talk-in on S22. Details G4MDN.

Vale of the White Horse (VoWHARS)—First and third Tuesdays in each month. 15 January, (Judging of construction competition and visit by a London dealer in rf components), 5 February, ("RTTY and amtor", G3NRW of BARTG), 5 March, (Talk by Chris Barton, G4DGU, of MUTEK Ltd). Sec Ian White, G3SEK, tel 0235 31559.

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

Addiscombe (AARC)—Tuesdays (Informal), 9pm. Lion Inn, Pawsons Road, Croydon. Sec Peter Hart, G3SJX, tel 01-656 9054.

Ashford (Echelford ARS)—Second Monday and last Thursday in each month. 14 January ("Aurora from a satellite"). 31 January ("First Aid"). The Hall, St Martin's Court, Kingston Crescent, Ashford, Middx. Sec Bob Crane, G4PHS, tel 01-977 4157.

Bexleyheath (North Kent RS)—First and third Tuesdays in each month at 8pm. The Pop-in-Parlour, Graham Road, Bexleyheath. Sec J R Frampton, G6CUE, tel 01-309 7214.

Biggin Hill (BHARC)—22 January, (AGM), 8.30pm. St Mark's Church Hall, Church Road, Biggin Hill. Sec Ian Mitchell, tel 09598 376.

Coulsdon (CATS)—Second Monday and last Thursday in each month. 14 January, (RSGB video), 31 January, (Morse tuition). 8pm. St Swithun's Church Hall, Grovelands Road, Purley, Surrey. Sec Alan Bartle, G6HC, tel 01-684 0610.

Cray Valley (CVRS)—First and third Thursday in each month. 3 January, ("Assorted panics", G3GJW), 17 January, (Natternight), 8pm. Christchurch Centre, Eltham High Street, Eltham SE9. Sec P Clark, G4FUG.

Croydon (Surrey RCC)—First and third Mondays in each month. 7 January (New Year party—venue TBA), 8pm. TS *Terra Nova* Mess Deck, 34 The Waldrons, South Croydon, Surrey. Sec John Simkins, G8IYS, tel 01-657 0454.

Crystal Palace (CP&DRC)—Third Saturday in each month. 19 January, ("Converting surplus", G3ZMF), 8pm. All Saints Parish Room, Upper Norwood SE19. Sec Geoff Stone, G3FZL, tel 01-699 6940.

Dorking (D&DRS)—Second and fourth Tuesdays in each month. 8 January, (Informal at Star & Garter Hotel), 22 January (AGM at Ashcombe School). Club net Sundays 0830gmt 3,780kHz. Sec John Greenwell, G3AEZ, tel 0306 77236.

Guildford (G&DRS)—Second and fourth Fridays in each month. 11 January, ("Old Guildford", G2BBX). 25 January ("Aerials", G6BZ), 8pm. Model Engineers HQ, Stoke Park, Guildford. Sec Lew Bright, G4BHQ, tel Guildford 576375.

Guildford (UHF Repeater Group)—First Thursday in each month, 8.45pm. Anchor & Horseshoe, Burpham, Guildford. Details Colin Durbridge, G4EML.

Kingston (K&DARS)—Third Wednesday in each month, 8pm. "Alfriston," 3 Berrylands Road, Surbiton. Sec Brian Smythe, G3ODH, tel Epsom 26005.

New Cross (Clifton ARS)—Fridays, 8pm. Above the New Cross Inn, Clifton Rise, London SE14. Details R Hinton, 42 Sutcliffe Road, Welling, Kent.

Redhill (RATS)—Third Tuesday in each month, 8pm. Constitutional & Conservative Club, Warwick Road, Redhill. Sec T I P Trew, G8JXU.

Surbiton (308ARC)—Last Tuesday in each month. 29 January (Constructional competition 8pm. Coach House, Church Hill Road, Surbiton. Details Ray Lancaster, G1EOO.

Sutton & Cheam (S&CRS)—Third Friday in each month. 19 January ("QRP", Chris Page, G4BUE), 8pm. Downs Lawn Tennis Club, Holland Avenue, Cheam, Surrey. Sec Alan Keech, G4BOX.

Thames Ditton (TVARTS)—First Tuesday in each month. 8 January—date change (Natternight), 8pm. Thames Ditton Library, Watts Road, Giggs Hill, Thames Ditton. Sec R Muir, G3LHN.

Wimbledon (W&DRS)—Second and last Fridays in each month. 11 January (Video of annual camp), 25 January (General evening) 8pm. St John Ambulance HQ, 124 Kingston Road, Wimbledon SW19. Sec George Cripps, G3DWW.

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

Brighton (B&DRS)—Alternate Wednesdays, 8pm. "Seven Furlong Bar", Brighton Race Course. Details Nigel, G8JFT, tel Brighton 697682.

Burgess Hill (Mid-Sussex ARS)—Thursdays, Marle Place Adult Education Centre, Leylands Road, Burgess Hill. Details Bob Hodge, G4MMI, tel 0446 41830.

Canterbury (East Kent ARS)—First and third Thursdays in each month, 7.30 for 8pm. The Cabin Youth Centre, Kings Road, Herne Bay. Details Stuart, G4ZIC, tel Canterbury 68913.

Canterbury (UoKARS)—Tuesdays, 7.30pm. Radio Shack (behind maintenance building), off Giles Lane. Talk-in on S15. Details Christine, G6RQY.

Chichester (CARC)—1 January ("Bring along a computer evening" in the Long Room), 17 January, (Satellite communications systems, Graham Swann). Fernleigh Centre, 40 North Street, Chichester, on the first Tuesday and third Thursday in the month at 7.30pm. Details Chris Bryan, G4EHG, tel Chichester 789587.

Crawley (CARC)—Fourth Wednesday in each month (Formal), second Wednesday in each month (Informal) at a member's QTH. Trinity United Reform Church Hall, Ifield, Crawley. Details David, G4IQM, tel Crawley 882641.

Dartford (DDFC)—8 January, (Pre-hunt meeting, Horse & Groom), 13 January, (Club hunt). Pre-hunt Tuesday meetings held at the Horse & Groom ph, Leyton Cross, Dartford Heath, Dartford, Kent, after 9pm. Details Pete, G8DYF, tel Greenhithe 844467.

Dover (SEKYMCARC)—Wednesdays, 7.45pm for club nights, Mondays for RAE classes, Tuesdays for morse tuition. Dover YMCA, Godwynehurst, Leyburne Road, Dover. Details Alan Moore, G3VSU, tel 0304 822738.

Eastbourne Electronics & ARC—Club wishes all other clubs and amateur radio operators a Happy New Year. Sundays, 8.30pm. Archery Youth Centre, Seaside, Eastbourne, for RAE classes, morse classes, construction & chat night. Details Peter Struve, G1EJB.

Eastbourne (Southdown ARS)—7 January (AGM). Club meets first Monday in each month, 7.30 for 8pm. Chaseley Home, South Cliff, Eastbourne. Details Peter, G8IQO, tel Eastbourne 763123.

Edenbridge (EARS)—Second Wednesday in each month, Scout Hut, High Street, Edenbridge. Details John, G8VCH, tel East Grinstead 24748.

Gravesend (GRS)—Mondays, 8pm. Windmill Tavern, Shrubbery Road. Details G4BNQ.

Hastings (HERC)—16 January (Compact disc demo (Sony) loudspeakers (KEF)). Wednesdays 8pm. First of the month, committee meetings at Ashdown Farm CC, third of the month, main meeting at West Hill CC, Croft Road, Hastings. Other days: last Monday, Raynet Group; Fridays, chat night; last Friday, film show, all at Ashdown Farm CC. Details Dave Shirley, G4NVQ, tel 420608.

Horsham (HARC)—First Thursday in each month, 8pm. Guide HQ, Denne Road, Horsham. Details Pete, G4LKW, tel Horsham 64580.

Kent Repeater Group—The group, by annual subscription supports two vhf and three uhf repeaters in Kent: GB3KN, GB3KS, GB3NK, GB3EK and GB3CK. Details Martin Stoneham, G4RVV, tel Herne Bay 69828. The group can also supply speakers for other clubs in the area.

Lewes (L&DRAC)—First and third Tuesdays in each month. Bridge View Community Centre, Lewes. Details Frank Day, G4PZU, tel Lewes 3239.

Maidstone (MYMCAARC)—Fridays, 8pm. YMCA Sports Centre, Melrose Close, Cripple Street, Maidstone. Details Graham, G4AXD, tel Maidstone 29462.

Margate (Radio Club of Thanet)—Tuesdays, 7.30 for 8pm. Grosvenor Club, Grosvenor Place, Margate. Details Ian Gane, G4NEF, tel Thanet 594154.

Medway (MARTS)—4 January (Natter night), 11 January ("How can I work meteor scatter?", Ken Willis, G8VR), 18 January (Natter night), 25 January (Video—"Japan's visit to China"). 7.30pm. St Luke's Church Hall, King William Road, Chatham. Details Andy Wallis, G4TQS, tel 0634 363960.

Sussex Repeater Group—This group is responsible for GB3BP, GB3BR, GB3CP, GB3HO, GB3NX, GB3SR and GB3WX. The SRG "Roadshow" is available to give presentations to local clubs. Details Andy Clark, G8TJQ.

Swale (SARC)—Mondays, 7.30 for 8pm. The Ivy Leaf Club, 52 Dover Street, Sittingbourne. Details Brian Hancock, G4NPM, tel Minster 873147.

Tunbridge Wells (West Kent ARS)—11 January ("Clandestine Radio" Pat Hawker, G3VA), 25 January ("Touchdown", Dave Thorpe and Brian French). Informal meetings on the 4 and 18 January, 8pm. Adult Education Centre, Annexe, Quarry Road, Tunbridge Wells. Details Brian, G4MXL, tel after 7pm 0892 32877.
Worthing (W&DARC)—Wednesdays, 7.30pm. Lancing Parish Hall, South Street, Lancing. Details Eric Sandaver, G4KIT, tel 0903 766318.

The information given above is the latest, and, in some cases, the only information received for 12 months or more. Please advise me if any updating is necessary. *73 de Mike, RR8*

REGION 10—RR E J Case, GW4HWR, 2 Abbey Close, Tyrhiw, Taffswell, Mid-Glam CF4 7RS. Tel 0222 810368.

Abergavenny & Nevill Hall (A&NHARC) GW4FL—Thursdays, 7.30pm. Pen-y-fal Hospital, above Male Ward 2, Abergavenny. Sec D F Jones, GW3SSY, tel 0873 78674.
Aberystwyth (A&DARS)—Second Tuesday in each month. Bay Hotel (on sea front, opposite the bandstand). Sec J Mike Pryse, GW4JXB, tel 0970 828446.
Barry (BCoFERS) GW3VKL, GW4BRS, GW6BRC—Thursdays, 7.45pm. Barry College of Further Education Annexe, Weycock Cross, Barry. Sec Margaret Beynon, GW4GSH.
Blackwood (BARS) GW6GW—Fridays, 7pm. Oakdale Comprehensive School, Oakdale, Blackwood, Gwent. Does not meet during school holidays. Sec Wynn Wright, GW8UAM.
Bridgend (B&DARS) GW4LNP—First and third Fridays in each month, 7.30pm. YMCA, Angel Street (near recreation centre), Bridgend. New chairman Don Sedgebeer, GW3RVG, sec Trevor Morgan, GW4SML.
Bristol Channel Repeater Group, GB3BC—Sec Roy Selleck, GW6MBU, 12 Norseman Close, Rhoose, tel Barry 11146.
Cardiff (CRSGBG) GW5BI—Second Monday in each month, 7.30pm. Panmawr Hotel, Tyla Teg, Pantmawr Estate, Whitchurch, Cardiff. 14 January, ("Principles of using the Spectrum computer for rtty, cw and sstv", Bill Andrews, GW2DHM). Sec Cyril Laws, GW6ZHP, tel Cowbridge 3212.
Cardiff, Highfields (HARS) GW4LFO—Thursdays, 7pm. Highfields Handicapped Centre, Allensbank Road, Cardiff. For further information contact Mr S Hudson at the centre, tel Cardiff 750315.
Cardiff, Llandaff (SGIHEARC) GW3RNW, GW1AAA—For information contact Steve Williams, GW8CUR, 301 Newport Road, Cardiff.
Carmarthen (CARS)—Second and fourth Fridays in each month, 7.30pm. West Wales Hospital Social Club, The Quay, Carmarthen. 25 January ("The RSGB and amateur radio", John Case, GW4HWR). Sec Mrs M Meridith (husband's call GW4XLK), tel 0269 850803.
Chepstow (C&DARS) GW4LWZ—Tuesdays, 7.30pm. Chepstow Leisure Centre. Club net every Sunday at 8pm, 144MHz. Sec Alan Purnell, GW6NJY.
Cwncynon (CARS) GW3FFE—Sec R Allwood, GW4AUJ, 7 Daniel Street, Cwmbach, Aberdare.
Lougher (LAR&EC) GW4HVJ—Tuesdays fortnightly, 7.30 pm. Lougher Scouts Hall, Heol Cae Tynewydd, Gorseinon. Sec Tim Griffin-Thomas, GW8TYS, tel Gorseinon 893392.
Merthyr (HMARC) GW3RDB—C/o Engineering Dept MP9, Hoover Ltd, Pentrebach, Merthyr Tydfil.
Newport (NARS) GW4EZW—Mondays, 7pm. Brynglas House, Brynglas Road, Newport. Sec Robert Johns, GW4NXD, tel Pontypool 56348.
Pembroke (P&DRAC) GW2OP—last Friday in each month, 7.30pm. The Defensible Barracks, Pembroke Dock. Chairman Roger Baker, GW4RGI.
Pontypool (PARS) GW3RNH—Sec G A Smith, GW6JRB.
Port Talbot (BSCARS) GW3OEP—Thursdays, 7.30pm. BSC Sports & Social Club, Port Talbot. New sec Joe A Griffiths, GW4IGR, tel 0639 720416.
Powys (PARC) GW4HVN—Thursdays, 7.30pm. The Cricket Pavilion, Montgomery. Sec Mike Smith, GW4DWX, tel Welshpool 2068.
Radio Club GW4IYD—LCR Components, Woodfield Works, Tredgar, Gwent.
RAF St Athen ARC GW3CKB—Barry. No other information available.
Rhondda (RARS) GW2FOF—Thursdays, 7.30pm. National Union of Mineworkers' Club, Tonypandy. Sec John Howells, GW4BUZ, tel Tonypandy 432542.
Swansea (SARS) GW4CC—First and third Thursdays in each month, 7.30pm. Lecture Room N, Applied Sciences Building, Swansea University. Sec Roger Williams, GW4HSH, tel Swansea 404422. Swansea ARS will be operating special event station GB4SWN from 4 January. Swansea Bay Micro Show at the Swansea Leisure Centre on 17–19 January. A display system for the Meteosat weather satellite will also be demonstrated. Further details from Roger, tel Swansea 404422.
Swansea (SRACC)—Sec Mr Morgan, 1 Jersey Street, Hafod, Swansea.
Swansea (UCSRS)—Sec R B Hughes, Electrical Eng Dept, University College, Singleton Park, Swansea.
West Wales Repeater Group GB3WW—Contact 7 Crofton Drive, Baglan, Port Talbot.

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

Area representatives in Region 11
R H Tyson, GW6HUV, Conwy Valley
A R Evans, GW4HDR, Rhyl and District
P C W Allely, GW3KJW, Pwllheli.

Colwyn Bay (Conwy Valley ARC) GW6TM—10 January ("Satellite tv", Chris Gilliam, GW6NTS, 7.45pm. Green Lawns Hotel, Bay View Road, Colwyn Bay. Sec J N Wright, GW4KGI, 46 The Dale, Woodlands, Abergele, Clwyd LL28 7DS, tel 0745 823674, or assistant sec N Vickars-Harris, GW4VVW, "Mwanga", 35 Llanrwst Road, Conway, Gwynedd LL32 8HP, tel 0492 636376.
Hawarden (Alyn & Deeside ARS)—Thursdays 3 and 17 January, 8pm. Shotton Conservative Club, King George Street, Shotton, Deeside.
Dolgellau (Meirion ARS) GW4LZP—First Thursday in each month. Dolserau Hall Hotel, one mile east of Dolgellau. Information from pro, c/o Box 2 Barmouth, Gwynedd.
Porthmadog (Porthmadog & DARS)—17 January (AGM), 8pm. Harbour Cafe, Ffestiniog Railway, Porthmadog. Sec Mrs L Jones, GW4WKQ, Henllys Back, Llanbedrog, Pwllheli, Gwynedd LL53 7PG, tel 0758 740445.
Rhyl (R&DARC) GW4ARC—No information.
Upper Bangor (Dragon Radio Club) GW4TTA—First and third Mondays in each month, Bangor Rugby Club. 7 January (Film night). Sec Bill Williams, 31 Tybroes Estate, Llanfair PG, Anglesey, Gwynedd LL61 5JR, tel 713941.
Wrexham (WARS)—Wednesdays twice monthly, 7.30pm. Friends Meeting House, Holt Road, Wrexham. 9 and 23 January. Sec A B Allen, G4HRH, The Hollies, Sedgeford, Whitchurch, Salop SY13 1EX.
Menai Bridge (David Hughes School RC)—David Hughes School, Menai Bridge Gwynedd LL59 5SS. No further information.
Sealand (RAF Sealand ARC)—c/o Officer in Charge, Radio Wing, No 30 MU RAF Sealand, Deeside, Clwyd CH5 2LS. No further information.
Bangor (University College of North Wales ARS)—School of Electrical Engineering, Dean Street, Bangor, Gwynedd LL57 1UT. No further information.

May I wish all societies in Region 11 a prosperous 1985. *Bert, GW2FLZ*

REGION 12—RR M R Hobson, GM8KPH, 17 Well Brae, Pitlochry, Perthshire PH16 5HH.

Aberdeen (ARS)—Fridays, 7.30pm, 35 Thistle Lane, Aberdeen. Details from GM4XGD, tel 0467 6251.
Caithness (CARS)—second Wednesday in each month, 7.30pm. Loch Watten Hotel, Watten. Details from GM4MIM, tel 0995 3960.
Dundee (Kingsway TCARG)—8 January (TBA), 15 January (Junk sale), 7pm. Annex to Kingsway Tech, Graham Street, Dundee. Details from GM4WEQ, 42 Grey Street, Dundee, tel 0382 552362.
Elgin (Moray Firth ARS)—First Monday in each month, 7.30pm. Spey Bayn Hotel, Fochabers. Details from GM4IZN, tel 05427 384.
Forfar (F&DARC)—Mondays, 7.30pm. 91B West High Street, Forfar. Details from GM4MN, tel 0575 81222.
Fort William—First Thursday in each month, 7.30pm. West End Hotel. Further details from GM4JNB, S20 or PO Box 6, Fort William.
Invergordon (Easter Ross ARC)—Fridays, 7.30pm. Community Room, South Lodge School, Invergordon. Further details from GM4UMA, tel 06678 244.
Inverness (ARC)—Thursdays, 7.30pm. Planefield Road, Inverness. Sec GM4LNU, tel 0463 81511.
Orkney (Kirkwall)—First Wednesday in each month, 7.30pm. Lynnfield Hotel. Details from GM3IBU.
Perth (P&DARC)—Tuesdays, 7.30pm. Perth City Sports and Social Club, Leonard Street, Perth. Details from GM8UGO.
Shetland (Lerwick RC)—Thursdays, 7pm. Room 14, Islesburgh Community Centre, King Harold Street, Lerwick. Details from GM4LBE, tel 0595 4270.
Black Isle Repeater Group, GB3BI—Contact GM4UMA, tel 06678 244.
Grampian Repeater Group, GB3AB/GN/PD—Contact GM8HGD, tel 0779 2413.
Lerwick Repeater Group, GB3LU—Contact GM4LBE, tel 0595 4270.
Orkney/Caithness RG, GB3OC—Contact GM3IBU, tel 0856 3232.
Perth RG, GB3PR/PU—Contact GM8KPH, tel 0796 2140.
Speyside RG, GB3SS—Contact GM4ILS, tel 0343 45842.

The possibility of arranging a bus to attend the RSGB convention at the NEC is being investigated. Departure will be on Friday evening, travelling overnight, and returning overnight on Saturday. The approximate cost will be £18 return, depending on support etc. Will those interested please **write** before 31 January—*No letters, no bus.* *RR12.*

REGION 15—RR J T Barnes, C13USS, Whitegables, 95 Crawfordsburn Road, Bangor, Co Down BT19 1BJ.Tel 0247 3948.

Antrim (A&DARC) (GI4SI4)—Second Monday in each month, 8pm. Backroom Railway Bar, Railway Street, Antrim. Details GI4FUM, tel Antrim 64931.
Ballyclare (East Antrim ARC) (GI4KKK)—Second Tuesday in each month. 8 January ("FM & repeaters", John GI4BWM), 12 February (Film show). 8pm. Fairview Primary School, Hillmount Avenue, Ballyclare. Details GI4PRH, tel Ballyclare 41655.
Ballymena (BRC) (GI3FFF)—Tuesdays, 8pm. Morse tuition. Wednesdays, 8pm RAE tuition. Thursdays, 8pm, club night, Sundays, 4pm, club activity. All in club rooms, 70 Nursery Road, Gracehill, Ballymena. Details GI4HCN.
Banbridge (Mid-Ulster ARS) (GI3VFW)—Second Sunday in each month, 3pm. QTH of GI4BAC, Banbridge. Note GI4SJQ has resigned as sec due to business commitments. GI4BDL has taken over pro-tem.
Bangor (B&DARS) (GI3XRQ)—First Friday in each month, 8pm. Sands Hotel, Sea Cliffe Road, Bangor. 11 January (Talk on Amtor). Very successful surplus sale was held on 2 November with over 220 attending and over 180 items offered for auction. Sec/pro GI4OCK, tel 0247 45049.
Belfast (BRSGBG)—Third Wednesday in each month, 8pm. 90 Belmont Road, Belfast. All RSGB members and prospective members welcome. AR GI4RXS.
Belfast (GI6YM, GI6YMC)—Tuesdays, 7pm. Saturdays, 2.30pm. Club room, fourth floor, YMCA, Wellington Place, Belfast. Details GI6BJO.
Belfast (College of Technology ARS) (GI2BX, GI1CTB)—Almost certainly the oldest active GI callsign, and along with GI1CTB is used regularly from the Millfield complex of the college. Details GI1CET, tel 227224, ext 243.
Belfast (Queens UOB RC) (GI3LLQ)–Tuesdays 7,30pm. 37 Fitzwilliam Street, Belfast. Details in term time, GI6JHF.
Coleraine (NWARC) GI4DBB)—First Tuesday in month, 8pm. The Scout Hall, The Crescent, Coleraine. At agm in October the committee elected chairman, GI4HVI, treasurer, GI4KIG, secretary, GI8NBW, QSL manager, GI4JFP, contest manager, GI4AAD, and station manager GI3KVD. New AR appointed, GI3XZM.
Enniskillen (Lough Erne ARC)—Third Monday in each month, 8pm. Railway Hotel, Enniskillen. 21 January—("Propagation", GI4CZW). Details from GI4CZW, tel 0365 24500.
Garvagh (C & DARS) (GI4NRQ)—Meetings believed transferred to Garvagh. Details GI4LNJ.
Larne (L & DARS) (GI4PHA)—First and third Wednesdays in each month. New club premises 100 Glenarm Road, Larne. RAE tuition every

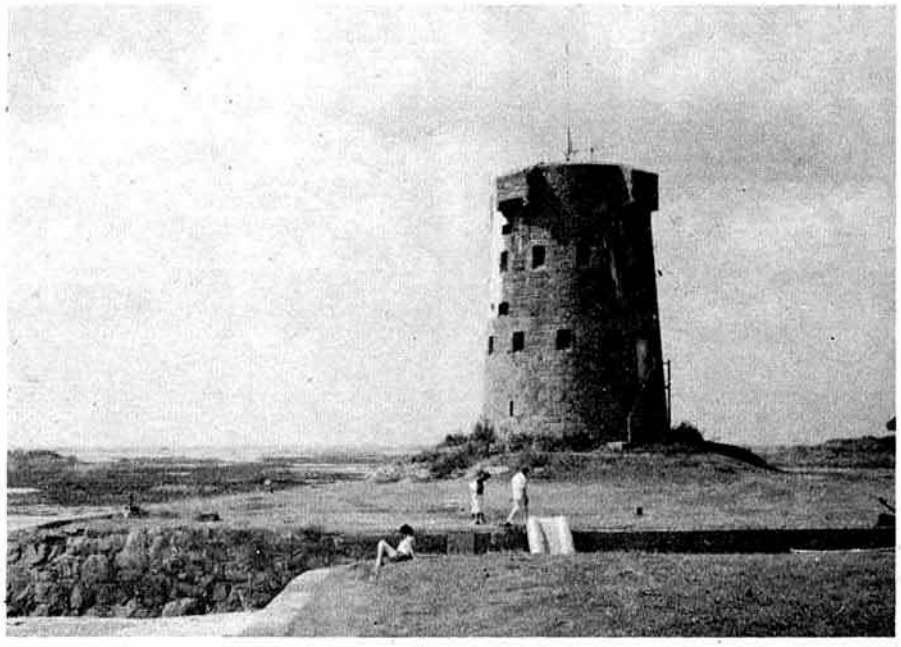
Wednesday, cw classes being arranged. HF station now operational at club premises. Details GI4CPP, tel 0574 75407.
Lisburn (ARS) (GI4GTY)—Second Monday in each month, 7.30pm. Rathvarna Teachers Centre, Pond Park Road, Lisburn. Details GI6UFU.
Londonderry (NW of IARS) (GI3CFH)—First Monday in each month. 7.30pm. Prehen Municipal Boat House, Victoria Road, Londonderry. At agm on 1 October 1984, officers elected: chairman GI4JIP; vice-chairman, GI4ONL (also AR); secretary, GI4OUN; treasurer GI6MYQ. Details GI4OUN, tel 504 84529.
Magherafelt (MARS) (GI4MFT)—No details of meeting place available. Details GI4LVC.
Moy (Armagh, Dungannon & DARC) (GI4VEN)—Second Tuesday in each month, 8pm. Pony Club, Killymann Street, Moy. 12 February (AGM). Details GI8RNX.
Omagh (West Ulster ARC) (GI4OMA)—Second Monday in each month, 8pm. McAleers, Campsie, Omagh. Details GI4OHW.

Note: I have not had details for some time from any clubs in Region 15. If the details above are not correct, persuade your secretary to send in the correct ones. In any case more details are needed regularly from all clubs. As a new RR will shortly be taking over, I should like to thank the small band of secretaries who regularly send in details, and believe me it is a very small number. Your new RR will not have a crystal ball either, so please send information. 73, GI3USS.

REGION 16—RR Alan Owen, G4HMF, 102 Constable Road, Ipswich, Suffolk.
Basildon (Marconi ARS)—First Monday in each month, 8pm. The Shack, GEC Avionics Social Club, Gardiners Way, Basildon. Sec Chris Mitchell, G8PKM, tel Chelmsford 323323.
Braintree (B&DARS)—2 January (Chat Night, 16 January "HF dx", John G3OLU), 6 February (RTTY, Amtor and packet, Barry Wade, G8NMP). 8pm. St Peter's Church Hall, St Peter's Close, Braintree. Sec Leslie Whitehead, G6XJC, 24 Gilchrist Way, Braintree, CM7 7SY, tel 0376 23813.
Bury St Edmunds (BStERS)—Third Tuesday in each month, 7.30pm. Guildhall, Guildhall Street, Bury St Edmunds. Sec John Munro, G3GBB, 29 Angel Hill, Bury St Edmunds.
Canvey Island (SEARS)—Every Wednesday, 7.30pm. The Paddocks, Long Road, Canvey Island. Morse class, followed by items of general or specific amateur radio interest. Junk sales are held regularly on the third Wednesday in each month. Details Albert Smith, G4FMK, tel 0268 68305.
Chelmsford (CARS)—First Tuesday in each month, 7.30pm. Marconi College, Arbour Lane, Chelmsford. Details Ian Messler, G4BYR. 1 January (Annual film show).
Colchester (CRA)—10 January ("Fire prevention", Essex Fire Service), 24 January ("Home construction of pcbs", Ron G4JIE, and Robin G8CKW), 7 February ("Radio controlled model aircraft", Neil G1DGQ), 7.30pm. Colchester Institute, Sheepen Road, Colchester. Sec Frank Howe, G3FIJ, tel 0206 851189.
Felixstowe (F&DARS)—Alternate Mondays, 8pm. Sec Ernie Long, G3MJS, 1 Ullswater Avenue, Felixstowe, tel 272426.
Dengie Hundred (DHARS)—Every second Tuesday, 7.30pm. Burnham Sailing Club, The Quay, Burnham-on-Crouch. Details Alan Officer, G6ZSJ, 7 Eastern Road, Burnham-on-Crouch CM0 8BS, tel Maldon 784225.
Great Yarmouth (GYRS)—Thursdays fortnightly, 7.30pm for 8pm. STC Sports & Social Club, Beevor Road, South Denes, Great Yarmouth. Details A D Besford, G3NHU 2a Halt Road, Caister NR30 5NZ, tel Great Yarmouth 721173. 3 January (social evening), 17 January ("Propagation", G3IOR—7.30pm start).
Harlow (H&DARS)—Tuesdays, 7.30pm. Mark Hall Barn. Details Cilla Mann, G4KVR, c/o Mark Hall Barn, 1st Avenue, Harlow.
Haverhill (H&DRS)—Fridays, 7.30pm. Copse Hill Farm, Bumpstead Road, Haverhill. Details Dave Hickford, G4MVK, tel Haverhill 61207.
Ipswich (IRC)—9 January (TBA). 30 January ("A history of radar, especially airborne", K A Woods, Electronics Engineers Assoc). 8pm. Rose and Crown, Norwich Road, Ipswich. Sec Jack Toothill, G4IFF, tel Ipswich 440747.
Leiston (LARC)—First Tuesday in each month, 7.30pm. Sizewell Sports & Social Club, St George's Avenue, Leiston. Sec Mrs I Westcott-Freeman, G6ORK, tel Leiston 831597.
Loughton (L&DARS)—Second and fourth Fridays in each month, 7.30pm. Loughton Hall, Rectory Lane, Loughton. Details C Knowles, G6FWT, 71 Kingsley Road, Loughton. IG10 3TU, tel 01-508 7190.
Lowestoft (LD&PyeARC)—Details Alan Seago, G4KDL.
Martlesham (MARS)—Occasional Wednesdays, 7.30pm. British Telecom Research Laboratories. Details G3ZNU.
Norwich (Norfolk ARC)—Wednesdays, 7.45pm. Valley Drive Community Centre, Plumpstead Road, Norwich. Details Peter Forster, G3VNQ. tel Norwich 37709.
Rochford (RDRC)—Second Monday in each month, 7.30pm. Civil Defence Building, Rochford. Details Denis Taylor, G3FGC, 265 Ferry Road, Hullbridge, SS5 6NA.
Saffron Walden (SW&DRAS)—Third Wednesdays in each month, 8pm. Details Garry Morton, G6KDW, tel Saffron Walden 22715.
Southend (S&DARS)—Fridays, 8pm. Civic Suite, Council Offices, Hockley Road, Rayleigh. Details G3YOA.
Stanford le Hope (SLH&DARC)—Mondays, 8pm. St Joseph's Parish Rooms, Scratton, Stanford le Hope. Details Jim Thompson, G4OVG, 61 The Sorrells, SS17 7ER, tel 642312.
Stowmarket (S&DARS)—7 January (Presidential address; "Weather, Part 2", Brian Greaves, G4BJO), 4 February (Junk sale). 7.30pm. Red Cross Hut, Station Yard, Stowmarket. Details Jim Lowe, G8SCB, tel Needham Market 721296.
Thurrock (TARC)—First and third Thursdays in each month, 8pm. Venue not known. Details believed available from G3KMD.
Vange (VARS)—Thursdays, 7.30pm. Venue not known, Details believed available from Mrs D Thompson, 10 Feering Road, Basildon. SS14 1TE.

I would like to be put in touch with the clubs in Romford, Mayland and Ilford. *RR16*

REGION 17—RR T Emery, Wilverley, Old Lyndhurst Road, Cadnam, Southampton SO4 2NL.
Andover (ARC)—First Tuesday and third Wednesday in each month, 8pm. The Wolvesdene Club.
Basingstoke (BARC)—8 January ("HF receivers," G4CGS). 7.30pm. The Village hall (opposite The Swan), Sherborne St John, Basingstoke, Chairman G4WIZ, tel Tadley 5185.
Basingstoke (GB3SN Repeater Holding Group)—Details from Mrs Jan Steele, tel Fleet 3311.
Blackmore Vale—8 January ("The RSGB", G3KWU). 7.30pm. The Bell and Crown, Zeals (on the A303). Sec M Bailey, tel 0963 70969.
Bournemouth (BRS)—4 January ("Hot sticks", G4SDY), 18 January (Natter Night). 7.30pm. Kinson Community Centre, Kinson, Bournemouth. Sec G4EKE, tel 0202 877945.
Chippenham (C&DARC)—Wednesdays, 7.30pm. Chippenham Sea Scouts HQ. Sec G4GFJ, tel Trowbridge 4190.
Eastleigh (Itchen Valley ARC)—4 January (Natter night), 18 January (The planning officer). 1 February ("Development of micros in the 'seventies") G3ABA). 7.30pm. The Scout Hut, Brickfield Lane, Chandlers Ford. Sec G6DIA, tel 0703 863039.
Fareham (F&DRS)—2 January (Natter night), 9 January ("Propagation predictions," G8VOI and G4XZL). 16 January (Natter night) 23 January (AGM), 30 January ("Basic construction," G8VOI and G4ITF). 7.30pm. Portchester Community Centre, Porchester. Sec G4ITF, tel Fareham 234904.
Farnborough (F&DRS)—9 January (G3AQC's aerial circus). 7.30pm. Second and fourth Wednesdays in each month. Railway Enthusiasts Club, Access Road, off Hawley Lane, Farnborough. Pro G4MBZ, tel 837581.
Gosport (Rowners&DARS)—Alternate Wednesdays 7.30pm. The Scout Hut, Rowners Estate. Sec G6OTY, tel Locks Heath 2541.
Guernsey (GARS)—Tuesdays and Fridays 8pm. The Lodge, La Corbinerie, Oberlands, St Martins. At the AGM on 30 October the following were elected; president Nigel Le Page, GU4NYT; sec, GU3MBS; treasurer, GU6JQF; committee members, GU1AFV; GU4WTN and GU8TPG. Sec GU4MBS, PO Box 100, Guernsey, tel 0481 57605.
Horndean (H&DARC)—7 January (talk by G6NZ), 8pm. Merchiston Hall, London Road. Sec G4BEQ.
Jersey (JARS)—Fridays 8pm. Sundays 10am. Visitors very welcome. Le Hocq Tower, St Clement. Sec GJ4TXB, tel 24328.



The Jersey ARS headquarters is situated in this tower, built nearly 200 years ago as part of the island's coastal defences against the French. Antennas for GJ3DVC, the club station, are mounted on its roof. The tower also appears on the obverse side of the Bailiwick of Jersey one penny coin, and the club claims to be the only radio club in the world to be featured on a coin. *Photo:* GU3MBS.

Jersey (JAEC)—Second Wednesday in each month, 8pm. The Communicare Centre, St Brelade. Sec GJ8KVV, tel 53333.
Liphook (Three Counties ARC)—9 January, ("Did Morse get it right", G3CCB), 23 January, ("Steam railways", G3ZRM). 8pm. The Railway Hotel, Liphook, Sec G3TBT, tel Passfield 368.
Portsdown Hill Repeater Group—Sec G8GNB, tel 03294 41456.
Portsmouth (Marconi EARS)—Last Tuesday in each month 8pm. Broad Oaks Canteen, Portsmouth Airport. Sec G3FWE.
Portsmouth (P&DARS)—Tuesdays, 7.30pm. Portsmouth Community Centre, Malins Road, Buckland. Sec G3JZV.
Poole (PARS)—30 January, (Open evening). 7.30pm. Poole College of Further Education, North Road, Poole. Sec G3XBZ, tel 0202 730012.
Salisbury (SARS)—Tuesdays, 7.30pm. Grosvenor House, Churchfield Road, Salisbury. Sec G2FIX, tel 0722 743837.
Southampton (SARS)—Wednesdays, 7.30pm. Hall of Aviation, R J Mitchell Museum, Albert Road, Southampton. Sec G6CPE, tel Romsey 514811.
Southampton (SUARS)—Tuesday evenings, and informal meetings every lunchtime, Clubroom, Old Union Building. Sec G6WEX.
Swindon (S&DARC)—Thursdays, 7.30pm. Oakfield School, Marlow Avenue, Swindon. PRO G4ZAZ tel 0793 37489.
Waterside (WSWC)—Second and fourth Tuesdays in each month, 7.30pm. Fawley & District Community Centre, Blackfield, Southampton. Sec G6DLJ, tel 0703 891975.
Weymouth (SDRS)—1 January (Film and slides evening). 7.30pm. Army Bridging Camp, Wyke Regis. Sec G6KHD.
Wimborne (FRARS)—Sundays, 7.30pm. Flight Refuelling Social Club, Merley, Wimborne. Sec G8MCP.
Winchester (WARC)—19 January (RSGB film show). 7.30pm. The Log Cabin, Stockbridge Road, Winchester. Sec G3SHQ, tel Twyford 713003.

REGION 19—RR R. J. C. Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ. Tel 01-989 6741.

Barking (B&DARS)—Mondays, RAE; Tuesdays, morse practice; Wednesdays, construction; Thursdays, general natter. Contact Alan Sammonds, tel 01-594 2471.
Cheshunt (C&DARC)—2 January (Natter night), 9 January ("The morse telegraph", G4FAI), 16 January (Natter night), 23 January ("The RSGB", T. I. Lundegard, G3GJW), 30 January (Natter night). 8.15pm. Church Room, Warmley, Nr Cheshunt, Herts. Details Roger Frisby, G4OAA, tel 09924 64795.
Chiswick (ABCARC)—15 January (AGM). 7.30pm. The Committee Room, Chiswick Town Hall, London W4. Sec W. G. Dyer, G3GEH, tel 01-992 3778.
Chingford (Silverthorn ARC)—7.30pm. Friday Hill House, Simmonds Lane, Chingford E4. Details G4AJA, tel 01-529 2282.
Ealing (E&DARC)—Tuesdays, 7.30pm. Hanwell Community Centre, 71a Northcroft Road, W13. Nets on S9 and SU49. Varied interests; Apple and Beeb users; rtty on site. Sec Anton, G4SCR, tel 01-997 1416.
Edgware (E&DRS)—Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. Sec J Cobley, tel Hatfield 64342.
Grafton (GARS)—11 January ("The account books", G3MCD), 25 January (AGM). 7.30pm. New venue, Finchley CCC Pavilion, East End Road, off N. Circular Road.
Harrow (RSH)—4 January (Junk sale). The Harrow Arts Centre, High Road, Harrow Weald. Talk-in on GB3HR (B14). Details Dave, G8XBZ, or G4RUF, tel Rickmansworth 779942 or 01-868 5002.
Hillingdon (HARC)—Tuesdays, 8pm. Treaty House, Uxbridge. Net Thursdays 8pm, 144·575MHz fm. Sec Howard, G6STI, tel 01-561 2917.
Havering (H&DARC)—2 January (AGM), 9 January (Informal), 16 January (tba), 23 January (Informal), 30 January, (tba). 8pm. Fairkytes Arts Centre, Billet Lane, Hornchurch, Essex. Info G4OQR, tel Upminster 26904.
London (CSARS)—9 January (Video and slide show; dxpedition to Heard Island. To be held at the cinema, Old Admiralty Building, Whitehall), 23 January ("Lightning protection", G3LYN). Lunchhour. Civil Service Centre, Monck Street, Millbank SW1. Details G. Gostin, daytime tel 01-632 6444. Nets Tuesdays: 7.30pm, 144·575MHz fm; 8pm, 3,720kHz.
London (Central POHARS)—Open to all BT and PTT employees. Net Wednesdays 8pm, 3,750kHz. Info J\ Clarke, G3TIS.
London (City University ARS)—Thursdays. Contact Robert Benyon, G4KSK, tel 01-253 4399.
London (New Scotland Yard ARS)—Not open to public. G4NSY and G8NSY active from time to time. Sec, Room 99, NSY Broadway SW1.
St Albans (Verulam ARC)—8 January (Informal), 22 January ("Microwaves", Glen Ross, G8MWR). 7.30 for 8pm. RAFA HQ, New Kent Road, St Albans. Sec Hilary, G4JKS, tel St Albans 59318.
Southgate (SARC)—8pm. St Thomas Church Hall, Prince George Avenue, London N14. Info R. Snary, G4OBE.
Stevenage (S&DARS)—15 January ("BBC outside broadcasting unit", G3OJI). 8pm. RAE classes every Thursday. All meetings now at Fairlands Hall, Archer Road, Stevenage. Sec C. Barber.
Watford (WRC)—First and third Wednesdays in each month, 8pm. Tudor Arms, Bushey Mill Lane, N. Watford. Details Gordon, G8XXV, tel 01-950 3611.
Wanstead (WRSGBG)—This group has now reformed and hopes to provide a liaison meeting place for all clubs in the area. Third Sunday in every other month, commencing January. Wanstead House, The Green, Wanstead E11. Sec Tony Martin, G4VIF, 01-594 0291.

Would ALL club secretaries/pros send their club's news well in advance of the deadline. New secretaries please send NOW your club calendar and YOUR name and telephone number for evening contacts for visitors to London who wish to go to a local club.

RR19 thanks the 15 members who attended his 6 November meeting of club secretaries in the region. All discussion points were raised at the RSGB RRs Conference on 10 November.

I am willing, *when invited*, to visit clubs in the region.

RR19

REGION 20—RR N F O'Brien, G3LP, 26 Southfield Road, Gloucester GL4 9UD. Tel 0452 34890

Bath (B&DARC)—Alternate Wednesdays, 8pm. 9 and 23 January Englishcombe Inn, Englishcombe Lane, Bath, Club station G4TMH regularly operating. Details Colin Ashley, G4UMN, tel Frome 63939.
Bath (Downside School ARS)—Details Physics Department, Downside School, Stratton-on-the-Fosse, Bath Avon.
Bridgwater (Sedgemoor ARC)—Third Monday in each month, 8pm. Bridgwater Arts Centre, Castle Street, Bridgwater. Details B Horsey, G3TTP, tel 0278 652058.
Bristol (BARC)—Tuesdays, 7.30pm. YMCA, Park Road, Kingswood, Bristol. Details Trevor Cockram, G8GFZ, or Alan Williams, G3ZKI, tel 0272 553020.
Bristol (BRSGBG)—28 January (AGM). 7.30pm. Small Lecture Theatre, Bristol University, Details Brian Goddard, G4FRG, tel 0272 848140, or Tony Capel, G4ROX, tel 0272 513573.
Bristol (First Crockern Scouts SWG)—Details Pete Knowles, 30 Church Path Road, Pill, Bristol BS20 0EE, tel Bristol 8814248.
Bristol (HTVRC)—Details Robin Thompson, G3TKF, tel Keynsham 3965.
Bristol (North Bristol ARC)—Fridays, 7.30pm. SHE, 7 Braemar Crescent, Northville, Bristol, Details Ted Bidmead, G4EUV.
Bristol (South Bristol ARC)—2 January ("What's Legal?", Mike G3OUK), 9 January (CW activity night, G4WUB/G4XPH), 16 January ("Films and slides from 1984", Paul, G8XIH), 23 January ("144MHz activity night", Alan, G4TSS), 30 January ("Construction workshop", G3XED/G8BDZ), 6 February ("Cables and connectors", Mark, G4KUQ. 7.30pm. Whitchurch Folk House, East Dundry Road, Whitchurch, Bristol BS14 0LN. Details Len Baker, G4RZY, tel 0272 834282.
Bristol (UoRARS)—Details Mark Posen, G6DYY, c/o Students Union, Bristol University, Queens Road, Clifton, Bristol BS8 1LN.
Bristol 432MHz Repeater Group (GB3BS)—Information Steve, G4MCQ.
Cheltenham (BYLARA)—No information available.
Cheltenham (CARA)—4 January ("Oscar 10", Tim, PZD, and Tim, VXE), 18 January ("Natter night"), 4 February ("Bermuda Contest and Bermuda", G4CNY). 7.30pm. Stanton Room, Charlton Kings Library, Cheltenham. Details Evan, G3CJ, or John G3GWW.
Cheltenham (Government Communications ARC)—Details sec, c/o Government Communications Headquarters, Benhall, Cheltenham.
Cheltenham (Smiths Industries RS)—10, 24 January, 7 February, Club House, Newlands Bishops Cleeve. Details Roger Hawkins, G8UJG, tel Bishops Cleeve 2175 or Bishops Cleeve 3333 ext 2511.
Gloucester (GARS)—9 January ("UHF and vhf aerial design", engineer from Alan Dick Ltd), 6 February ("Voice and Data transmissions from mobile installations", engineer from RSRE).

Eric, G3GC, holding the feeder after his lecture on "Aerial design for low power operation" at the Yeovil ARC QRP Convention on 14 October. L to r: Frank, BRS10663, founder member; Rob, G3MYM, lecturer; Tim, G4WMV, chairman; Frank, G3CFV, founder member; Eric, G3GC, secretary; Nobby, G3BEC, president, founder member; Don, G3NOF, founder member. *Photo:* G4PDG

7.30pm. St John Ambulance Headquarters, Heathville Road, Gloucester. Details Nick Negus, G6AWT.

Mendip Repeater Group—GB3WR, 144MHz repeater; GB3UB and GB3US, 432MHz repeaters; and GB3UT, 1·3GHz tv repeater. Details and applications for membership from Steve Gardner, G8GMZ, tel Midsomer Norton 413902.

Portishead (Gordano ARG)—23 January, ("Crime prevention"). 7.30pm. Ship Hotel, Down Road, Portishead, Details John Davies, G3LJD.

Shirehampton (SARC)—Fridays 7.30pm. Twyford House, High Street, Shirehampton, Bristol. Details Ron Ford, G4GTD.

Street (S&DARS)—First Tuesday in each month, 7.30pm. Strode College, Church Road, Street. Details Colin Webber, G4SCD.

Stroud (S&DARS)—8, 15, 22, 29 January (Natter nights). 7.30pm. Scout HQ, Parliament Street, Bisley Road, Stroud. Details Mike Mills, G3TEV.

Taunton (T&RDC)—Fridays 7.30pm. Basement, County Hall, The Crescent, Taunton (opposite the Crescent car park). Sec L. Forde, G4ZLF.

Thornbury (T&DARC)—First Wednesday in each month, 7.30pm. White Horse Inn, Groves End (A38). Details Alan Jones, G8AZT.

Wells (EMI Sports & Social Club RC)—Cedar House, Chamberlain Street, Wells, Somerset BA5 2PJ.

Weston-super-Mare (RAFARS)—Headquarters station of the RAFARS. Details Admin Secretary, RAFARS, RAF Locking, Weston-super-Mare, Bristol BS24 7AA.

Weston-super-Mare (WsMARS)—14 January. 7.30pm. Rugby Club (off Drove Road), Weston-super-Mare. Details Dave Restrick, G4/KA0NGP, tel W-s-M 28482.

Yeovil (Y&DARC)—3 January ("Using your RAE Knowledge", G3MYM), 10 January ("How to make an absorption wavemeter", G3MYM), 17 January ("Sunspot minimum", G3MYM), 24 January, ("An amateur radio discussion"), 31 January ("Natter night"). 7.30pm. Recreation Centre, Chilton Grove, Yeovil. Sec Eric H Godfrey, G3GC, tel 0935 75533.

Yeovil Repeater Group—Details S. J. Darch, G6AGL.

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. 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 **March 1985** issue is **Thursday 17 January.**

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS
Do not post to RSGB HQ or Advertising officer.

FOR SALE

Bush sw export model table radio, circa 1948, six bands covering 540kHz to 30MHz, ac/dc five-valve (inc rf) and rectifier, cabinet needs repolishing, £25. Cheque to British Diabetic Association. G6MPB, QTHR. Tel 06845 2353.

Collins 51J-4 rx gen cov, gd cond, £200 ono. Barlow Wadley XCR30, £50. Marconi CR100, £25. Prefer buyer inspects. G3UFI, QTHR. Tel Hastings (0424) 753949.

KW2000A, matching psu, manual, £125. Transistorized BC221 frequency meter, £20. G2AYY, QTHR. Tel Nelson 63374.

FT757GX, FC757AT, FP757HD, MD1 mic, complete line-up sold as new, 18 months warranty. Tel 01-300 5079.

Yaesu FT101ZD six-band a.m. fan filter desk mic, £450. Ele-key electronic keyer 240V, £35. FT708R and charger, £150. FC902 ATV, £95. Buyer collects or post Securicor. Tel 021-373 0060, evenings preferably.

Trio TS120V, £275. MML 28/100 linear, £90. MMC 28/6M converter, £25. FP12 12A psu, £50. IC720 PS15, £590. G3WBN, QTHR. Tel 01-654 2761.

Yaesu FRG7700 rx as new, digital clock and timer, handbook, £250. G3HRO QTHR. Tel 01-460 7660.

Super 3500 linear amplifier covers 80 40 20 15 10m, £200. Trio 520S, vfo 520, fitted cw filter, £350. Tribander TH33 antenna with balun, seen wkg, £100. Advance oscilloscope d/b OS250, £100. Avo sig gen, £35. 25A psu 13·8V, £60. 5A psu variable 0–20V, £30. Prefer collect or prepaid carr. G4HZO, QTHR. Tel 0283 217089.

Complete station. HW101 tx/rx SBA301-2 filter, spare valves, SB600 spkr, HP23B power pack, HDP21A mic, HN31 dummy antenna, homebrew swr meter and Z-match, manuals, phones, key, £340. Will consider sensible split. TD-3JR trap dipole 15m UR67, £20. W3DZZ trap dipole 16m UR67, £15. 17ft mast with brackets, £8. Various books, GC wall map, *Rad Com* 1972 onwards. CR300/2 rx requires 250V dc 12V ac power supply, manuals, £25. G3VDG, QTHR. Tel 091-253 3605.

Bulls and *Rad Com* substantially complete 1936 to 1984. Located near Egham Surrey. Best offer, contact G6CJ, QTHR.

New 813, £10. Three used 813s, £5 each. Two bases, £1 each. Heater tfmr 2 × 813, £5. 10μF 2,000V paper capacitor £5. All plus carriage, Heavy-duty mains tfmr 1,500V–2,000V fw, £10 ono. Buyer collects. G2FNS, QTHR. Tel 061-881 6674.

FT757GX tx/rx with FP757 heavy-duty psu and spkr, mic, boxes, manual, dealer warranty, mint, £750. Buyer collect. G4WXF, not QTHR. Tel How Caple 205.

Yaesu FT7B, mobile mount, mic, manual, boxed, vgc, never used mobile, £275 ono. Tel 051 260 6668.

FC707 atu immac cond, £70. Trio TR2300, case, nicads charger, £95. Sony fm/a.m. tuner ST70, £25. FC 902 atu and FTV901 in mint cond required. G3SZG, not QTHR. Tel Bendley 0299 400616.

Icom 720A hf gen cov tx/rx cw, a.m. filters, fm unit, ic PS15 psu, ICSM5 base mic, ICSP3 speaker, can be seen wkg, £750 ono. Phil, G4WFZ, QTHR under G1BNG. Tel 0202 301717.

Yaesu FT902DM. WARC, fm, fsk memory, speech processor, Iambic keyer, mains/battery psus, boxed as new, £650. G4KLN, QTHR. Tel Leeds (0532) 821020.

FT101ZD, mic, fan, fm, nine bands, £425. FC902 atu, £90. FTV901R, £120. *Wanted:* Any info on Zetagi BV1001 linear amp circuit etc please, will pay any costs involved, Also want FT102 and atu G4UYI, QTHR. Tel 0946 810205.

Yaesu FT107M int psu, mic, latest model, new bands, mint, boxed, £550. Yaesu FT480 2m multimode, £225. FDK750E 2m fm, ssb, cw, £190. Trio 401A 70cm fm, new, £260. Part-exch? Want IC45, G3ZVC board 9MHz filter, xtals. G4AFY, QTHR. Kidderminster (0562) 753358.

Tempo 2002 (similar 6N2) 2m, very high power linear, virtually new, £690. Offers? Pet 2001, large keyboard, 16k personal computer plus cassette, £150. Icom IC225 2m fm, 10W mobile 25kHz, synthesized, £85. MMT432/144R, £115. MM4000KB rtty tx/rx, £180. G8AYN. Tel 04555 57790.

Mains tfmr to 4·5V 5–10A, £4. Xtal calibrator, all-valve by GEC, old X63, etc i/p, o/p, phones, sockets, 100, 1,000, 5,000KHz, variable osc 30MHz, 40MHz, £5. Metal punch set, Roper Whitney USA, 3/32in, 5/32in, 3/16in, 1/4in, 9/32in, box instructions. £10. Mains tfmr 215-0-215 100mA, 11V 2·5A, 4V 2·75A, 2V 1A, ct 4V 6A twice, £5. Five AR88D rx knobs, £4. *Wanted.* Altimeter, barometric type, can exchange gd barometer. G3MBL, QTHR. Tel 01445 4321.

FDK700EX 2m fm 25W, £135. Realistic DX200 hf rx up to 30MHz cw a.m. usb lsb, £85. G6TPV. Tel Clacton (0255) 73550.

Heathkit HW101 psu plus top band transverter (worked 200 countries) including spare valve, £130. Codar AT5, mains psu and mobile psu, £25. MM 2m converter, 4–6MHz o/p, £7. G4JBR, QTHR. Tel South Molton 07695 2738.

Yaesu FT7 tx/rx and mic, mobile mounting bracket and regulated power supply o/p 13·8V AT8A model PP136, £250. Buyer collects. G4HMW. Tel 0246 36496.

Icom IC720 cw and a.m. filters with ICPS15 mains power supply. Factory service manual, exc cond, £675. GW4ACO, QTHR. Tel 0492 515240.

Icom IC211E 144MHz multimode tx little used, with mobile fitting kit, £360 ono. G3XKU, QTHR. Tel Felixstowe 277361.

Kenwood TR8400 70cm fm tx. Unopened, brand new, £185 ono. Ten fm rigs, DNT M40 fm modified 29,310 to 29,700kHz, brand new, complete £33 each. JWR M2 10fm rig, £26. G4SNO. Tel 0562 884824, evenings or weekends.

Valves. Amateur has hundreds of valves for disposal, cheap prices or swap for anything interesting. WHY? *Wanted.* Ex-military radio equipment, control boxes, leads test equipment, buy or swap. Service manuals wanted and available. G4XWD Jim. Tel Kidderminster 3674.

KW2000A psu, £130. Storno boot-mount 70cm and 2m rigs, control box, £35. Murphy l/b a.m. complete, £10. Creed 7B/RP, silence cover, psu, 6S6 tape reader, many spares, £25. G41QP not QTHR. Tel 01-393 1284.

FDK multi-700EX 144MHz fm tx with internal pre-amp, £140. Trio TR3200 432MHz fm tx with nicads charger etc, and xtals for 10 channels, £100. 432MHz/10W pa, suits above with rx pre-amp, £25. Yaesu FR50B rx 80m to 10m, much modified, narrow ssb filter, fm demodulator, digital display, vfo replaced, huff/puff stabilizer, £100. G4HLX, QTHR. Tel 036 77 503.

FT221R with variable power mod, SP120 spkr, £350. FDK multi-700EX mobile mount, £120. Trio TR8400 10W uhf, mobile mount, £180. IC22A, £75. Palm 2, £55. SMC358 70cm mobile colinear, £10. *Wanted.* 144/432 varactor tripler, 432/144 converter. G8GHU, QTHR. Tel 0305 789022.

Shimizu 105S, all options, £275. G4TZX, QTHR. Tel Dymchurch 872060.

VIC20 rtty programmes. GW3RRI fabulous rtty/cw tx/rx split-screen auto cw ident 26 memories no t/u required. Details of simple interface supplied, 8k expansion required, £12. Scarab rtty runs on unex Vic, £6. GM4PGV, QTHR. Tel Irvine 0294 72950.

Vidicons 1in or 0·5in, large pcb includes 8035 processor 7 × 2708 in sockets, £3. 12V dpdt relay 30A contacts, mains filters, psu 36V 12A dc, 70V 70,000μF faulty colour set, £4. Several mains motors 1/16-1/2hp, stabilized psu 0-250V dc, £5. Tel Tony 01-452 6724.

FT290R Mutek nicads case, £220. Daiwa hf/vhf swr power meter, £35. Jaybeam 6ele quad £15. Two 9ele Tonnas, £12 each. 8ele Quagi, £30. 1·5-30MHz 200W linear Skipmaster, £40. DRAE morse tutor, £35. All above perfect. Colin, G1JHC. Tel (0905) 54140.

Trio R600 rx, perfect, as new, boxed, with manual etc, £255 ono. Buyer collects. Tel D. Mathews, 01-876 7868.

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 Royston 41380.

Yaesu FTDX560 QRO hf tx/rx, £200. FV400S vfo, £30. G4RJC, QTHR. Tel 040 22 21523, evenings not Sundays.

BBC 32k morse tuition programs. Random: letters (in random groups); numbers (in 5s); words from dictionary of 500 in store, (or mixture, if desired); 100 plain language morse tests; 70 cw abbreviations/punctuations; send output to internal speaker, 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.

Icom IC4E 70cm handheld, incl DC1, spkr/mic, case, charger, semi-auto toneburst, as new cond, £160. G8EPQ, QTHR. Tel Milton Keynes (0908) 677221 after 7pm.

TS520S and VFO520, both vgc, incl 500Hz cw filter, £400. G4OGB, QTHR. Tel Haxey (0427) 752528.

FT757/757HD, mic, five months old, mint cond, orig packing, genuine reason for sale, £685, G4GJE. Tel 0922 37223, evenings.

Yaesu SP980 spkr, cost £60, has filters for different sound, buyer must collect, £23 ono. Tel D. Smith, 01-670 2188.

Compact, lightweight economical petrol generator, 240V, 400w, 12V 100w, unused, cost £286, bargain, £220. G6CUQ, QTHR. Tel 052-789 2282.

QTH: superb five-bedroom QTH in 0·5 acre rural setting. Ideal flat takeoff, mast planning permission available, good local dx interest, full ch, gardens, greenhouse, orchard, handy shops, schools, (pubs!), but very peaceful, a dream QTH! £49,950. G4EDZ, QTHR. Tel 074 381 332.

Ten-Tec Argonaut 509, mint cond, £235. Astatic D104 mic c/w UG8 stand, as new, £45. Servomex voltage stabilizer AC7 Mk2 195V ac to 265V ac at 35A, weight 140lbs, hence buyer collects, offers. G3ZZS, QTHR. Tel Plymouth 707550.

Due to changed personal circumstances all must go: Trios TM201A, 401A, microdot, digital flight scan, discone GDX2, 2m/70cm mobile antennas, 160m-marine-80m rx, fet dip oscillator, sig gen, meters, etc, complete shack clearout. Lockwood, G3XLL, QTHR. Tel Mellis 596.

Circuit board, 8035, six 2708 etc, £3. 24V relay 30A DPCO, £2. Selsyns, aircraft instruments, 36-50V psu, 12A, £15. 36,000μF 70V, £2. 0-500V stabilised 0·25A, £8. 75Ω 0·5in coaxial, colour tv faulty, £10. 0·5in and 1in vidicons. Tel 01-452 6724.

IC202S gc beacon band xtal, £100. MMT 144/1296MHz transverter, mint, used little, £110. Tandy Patrolman 50 30-50, 88-174, 450-512MHz, £20. Packer wavemeter 400 900MHz, £10. Reason for sale unemployed, need cash! G6GGE. Tel George, 01-747 1506.

Icom IC240 2m fm tx/rx covering all repeater and simplex channels, in mint cond, orig packing, instruction manual, etc, £130. GM4/TF3SI NOT QTHR. Tel Bishopton (Renfrewshire) 862151.

1,297MHz fm local communication is with us! Small number of Icom IC120 transceivers available. These sets feature simplex or repeater operation, scanning, six memories, microprocessor control programmed for UK. Selling at vastly reduced price of £300 each. G4VCO. Tel 0923 671951.

Barlow Wadley XCR30 gen cov rx 0·5-30MHz 87·5-108MHz vhf, as new, £80. G4MT, QTHR. Tel Rickmansworth 772500.

HF print. HF gen cov rx is Lafayette HA600, ideal for swl, £40 ono. Print is Kempston parallel Centronics printer interface for 16k or 48k Sinclair ZX Spectrum micro, very small, neat unit with lead, £30. G4EYR NOT QTHR. Tel 0734 584561.

TS430S comp line-up, boxed, used little, comprising rig PS430, SP430, £690. FC902 atu, boxed, as new, £100. Brand new unused Icom AT100 auto atu, £200. Save £100, for quick sale. G4MCK NOT QTHR. Tel Peter, 0438 317216, daytime.

Trio 2300 portable, 2m, case, strap, mic, charger, £90. Icom IC2E, 2m, handheld with helical whip charger, £95. Both boxed and in good cond. G4UFC. QTHR. Tel 0602 302990 (Derbyshire).

Brand new Marconi nicad battery, 15·2V, for rt equipment eg Dymar or Marconi hand portable, £15. Collect from Bishops Stortford or postage extra by arrangement. RS49315. Tel 0297 56017.

Global AT1000 antenna tuner, ideal for swl, good cond, £25 ono. G6NLY not QTHR. Tel 0472 884877.

Linear Daiwa LA2035 2·5 in, 25 out, £35. PSUs, 25A to 150A, films 16mm b/w sound with projector, Marconi sig gen type TF801A 10-300MHz, £15. *Wanted:* 28-144 100 W transverter. G4XOX. Tel 0621 828807.

Trio 9R59D, good cond, xtal calibrator 0·55-30MHz continuous am cw, ssb, bandspread, handbook, £45 collected. G3XPX NOT QTHR. Tel Tunbridge Wells 48575.

Lynx 48k micro, unwanted gift, £150 ono. 11-el Parabeam, £25 ono. G1CMI, QTHR. Tel Westbury-on-Severn 467.

FRDX400, FTDX400 cp, handbooks, spare valves, mic, £240 the pair, or £135 each. Carriage extra. G4MKS. Tel 0272 778333, ext 270 daytime, or 0272 664057 after 7pm, ask for Patrick Walsh.

Standard C78 portable comp 10W power booster manual charger, £220 or offer. Palm 4 handheld, portable charger, six channels, £80 or offer. FRG7 hf rx, incl frequency readout, £100. Tel South Benfleet 58364.

Heathkit HW12, 80m, and HW32 20m, ssb tx/rxs, psu, £120 ono. Xtals, £3.50 pair, £1.75 each for FDK U11 wd pocketphone RB2, RB4, RB14, SU8, SU20 rx, atv rx, 38·666MHz, 42MHz. Tel Nailsworth (Glos) (045 383) 3411.

Dataprinters ITT, Creed 2300/8, two, tape punch and reader, modem spare printer ribbons, 2yrs old, £49. GI4ZBJ. Tel David, Belfast (0232) 642942, ext 335, during working hours.

Yaesu FT708, with remote spkr/mic, perfect order, orig packaging, four months old, £160. G3KLF. Tel Fareham 236906, evenings or weekends only, please.

TS700G 2m all mode, immac, orig pkg, £295. G6UHH, QTHR. Tel Peter, Oakamoor 702208.

FT707 hf tx/rx, 100W, FP707 power supply, mic, manual, mint cond, £400. FDK multi 700E 25W, 2m fm tx/rx, mic, manual, mobile mount, used little, £130. G3XSZ. Tel Reigate (07372) 46051, after 7pm or weekends.

Heliax cable, 0·5in, 46m roll, £1.50 p/m. ⅜in, 35m roll, £1 p/m. All 50Ω. G4POP, QTHR. Tel Eversley 732384, after 6pm.

Trio TR9130, brand new, boxed, unused, £349. Memory b/u psu, £5. Bremi BRL40 10m linear, 70W, £28. K40 processor mic, £19. All new/boxed. Bremi BRL500 10m linear, 500W, £190. LCL 10m fm tx/rx, repeater shift, £39. G4BKM, QTHR. Tel Denham (0895) 834358.

Power supply 30A, 13·8V regulated, over voltage —current limit, £60. or swap, W.H.Y? FT902DM, matching atu, £650 ovno. *Wanted:* ICS MBA-TOR eprom for CBM64. Speaker for 101ZD. FT209 handheld. Top section for P40 to convert to P60. G4KDZ. Tel Tony, Grays (Essex) (0375) 78783.

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.

Radio Communication 1984, £5. Three-el Y, £3. Heathkit DX40U and vfo, £50. Cassette recorder, £8. Copper strip 7mm wide, 50p/m. Bakelite, £2/lot. Wire, £2/lot. 2m preamp, £3. Buyer collects. Tel 01-272 1702, (N19), 6-7pm.

Hygain TH2JNR, used one year only, £55. Kenwood TR9130, as new, £350. Daiwa DK210 keyer, £30. Himound MK704 paddle, £8. Large marble base, £6. Shinwa 1005 lpf 52Ω, 500W, £6. G3OPJ. Tel: Radnage (024026) 2718.

Belcom LS202E, fm/ssb, 2m, multimode handheld, soft case, nicads, spkr mic, less than six months old, orig packing, £185. G4UZG, QTHR. Tel Telford (0952) 582903.

Atlas 210X, 10, 15, 20, 40, 80 hf tx/rx psu console, use as mobile or base station, £300 ono. Video camera, modulator, £50. Antenna tuner, wide spaced capacitors, £10. G3XMA, QTHR. Tel 0203 410208.

Hallicrafters SX28, modified but good performance, 550kHz-42MHz, six bands, six selectivity positions, very heavy, buyer must collect, £35 ono. PW "Clubman" rx, good, but no case, £15. Tel 01-647 6157.

Said 'er indoors, "You hams are bores," so for me that means QRT. With your offers don't be mean as my gear is nice and clean. FT730, FT790, FT290, case ni-cad charger, ELH230G, 432/30L linears, spkr/mics, T435 SP15M meters, 2m/70cm wavemeters, mobile antennas, base colinears, two 15A psus, plus usual bits and pieces. Genuine offers to T. Smith, (G6HPQ NOT QTHR), 57 Ramuz Drive, Westcliff-on-Sea, Essex SS0 9JH.

FT200 and psu, recently overhauled and realigned, £150. G3TGV, QTHR.

Yaesu FT707, FC707, FTV707, Yaesu MD1B8 dynamic mic, YM35 dyamic mic, Yaesu earphones YH55, Yaesu extension spkr, Yaesu mobile mount G-whip, £650. Tel Basildon (0268) 284550, or Ingrebourne (04023) 45470.

FT208R 2m handheld, nicads, NC9C charger, PA3 car adaptor, orig box, £170. MM 28/144 transverter, set up for the TS830S, £65. G4UNM, QTHR. Tel 0983 402273.

Leeds north, imposing four-bedroomed detached house in one-third acre landscaped gardens, quiet cul de sac position nr shops, schools and buses; full gas ch, reception hall, cloakroom, guest toilet, dining room, lounge, breakfast room, newly fitted kitchen, bedrooms with fitted furniture, new bathroom suite, separate toilet, brick garage, workshop, toolshed, flagged drive and patio. Cushcraft four-el beam and 2m antennas fitted, great dx location, £55,000. G3AAS. Tel Murray, 0532 686036, daytime, or 0532 683107, evenings.

Standard C78 70cm portable/mobile fm synthesized tx/rx, five memories, scanning, reverse repeater, 10W amp, preamp, nicads, charger, case, mobile mount, £200. G3WWT, QTHR. Tel 01-898 2417.

Beam 2m Yagi nine-el Tonna, £10. 10m omnidirectional, £10. Various mics, stand-up and hand, offers. Grundig Satellit 1400, £100. 2m colinear, bottom needs attention, £10. Three secondhand 1·5in × 10ft masts, £5 each. Homebrew oscilloscope, poor, free. Tel Silver End (Essex) 84439.

Telonic sig gen, 25-75MHz, cw or variable frequency pulse mod, £10. Rotary alternator, 24V dc in, 115Vac 800Hz out, 1kVa, £10. Medieval class C hf wavemeter, needs attention, £5. TCS rx, £10. Collect please. G8LIU, QTHR. Tel Uxbridge (0895) 30006.

Widespace variable 500pF suit 2kW linear, £14. FRG7 rx, perspex cover, fitted ssb filter, orig box, manual, £130 ono. Burns SP1 speech processor, £8, HRO rx, all coils, £38. BC221 power unit, £5. Tel Thanet (0843) 69068.

Tower, 60ft, three sections Versatower, £275. Tel Basildon (0268) 284550, or Ingrebourne (04023) 45470.

Excellent transverting opportunity. FT707 comp with fm board, scanning mic, Yaesu mobile bracket, in exc cond throughout, £330. FT107R transverter comp with satellite, 2m and 70cm modules fitted, not used for tx since purchase, still under guarantee, comp with FRB707 relay box, just plug in to any Yaesu solidstate tx/rx and go, £400. MM144/28 transverter, exc cond, £50. New FRB707 relay box, as above, unused, £10. All items carriage extra, regret no offers. Would consider part exchange for multimode Trio 2m and 70cm separate tx/rxs that could double up as mobiles. G4WLD. Tel John, 01-857 8096.

Icom ICR70 rx, fm and 12V dc options, mint cond, orig packing, save £150 on new price, £450. Collect or Securicor carriage paid. 144/28 converter, £12. NR56 2m rx, £12. Tel 0733 69822, after 6pm.

Datong ASP automatic speech processor, £50. C. Knott, G3WMX, QTHR. Tel Sennen 405.

FT757 gx brand new, never used, surplus to requirements, £650. AT230, brand new, never

used, £125. Datong D70 morse tutor, brand new, never used, £45. Buyer collects. G1DCS. Tel 01-540 3959.

FT208R, Yaesu 2m hand portable, spare nicads, charger, spkr/mic, orig packing, £150. TM201A, Trio 25W, 2m, mini mobile, six months old, orig packing, £200. *Wanted:* 70cm 2m 6m transverters for Yaesu FT107. G2DPL, QTHR.

Wartime rx R206, collector's item, working, externally rough, £20. Homebrewed hf linear, HK257B pa, psu parts, ok rebuild/updating, £20. Pye T40FM vhf tx, 60W rf out on 2m, £15. Collect please. G8LIU, QTHR. Tel Uxbridge (0895) 30006.

MM transverter 2m to 70cm, repeater shift comp with 10W attenuator, £165 ono. GW8CVC, QTHR. Tel Albert, 03417 7709, anytime.

Lattice mast, one galvanized 20ft section, 5in sides, ideal for use with 20ft scaffold pole up through centre with guy ropes, (35ft), £20 ono. G4ETP, QTHR. Tel 0752 893377.

Yaesu FT757, few months old, comp with MH1 mic, £600. Would consider TS120S in part exchange. GM4UJZ, QTHR. Tel 031-331 2755.

Amateur television receive system: Fortop tvc 435/40 converter and Mutek TLNA 432U 70cm preamp, lots of gain, used six times, mint cond, makers guarantee, new £58, bargain at £39. Postage extra. No split. G4WBT, QTHR under G6MEF.

FT221R, Mutek board fitted, separate receive input switchable. Trio TR9500 all mode, 70cm, 10W. Offers for either. *Wanted:* FT101ZD, FT901DM, FT902DM, matching transverter spkr, etc, consider exchange. W.H.Y? G6JIM, QTHR. Tel 01-578 6986.

NEC PC8000 system, 32k dual 140k disks, high-res colour monitor, epson printer, cassette, word processing and games software, vgc, over £1,600 new, asking £850 ono. Accept 2m multimode, linear, rotator etc in part exchange. G1GPW. Tel Orpington (0689) 21615.

JVC model KD2B portable stereo cassette deck, super anrs, cw carry case and strap, used twice, ac/dc, mint cond, JVC HM200E binaural stereo mic/headphones cw dummy head stand, new £215, bargain at £85. G4WBT, QTHR under G6MEF.

Video Genie, new, list £199 at Lowes, £99. FT77, new, £399. FRG7, £159. Trio Kenwood R2000, £359. Icom 730, new, £575. R600, Trio, £199. G4GHE. Tel Bolton 592929.

Yaesu FT101Z, good cond, £380. Yaesu FT290R, leather case, nicads, charger, helical whip, £180. Trio TR7010 xtalled, 144·260 to 144·450 comp with mobile mount, £80. Phil Hassman, GW4REX, QTHR. Tel 0222 625702, after 6pm.

Rockwell AIM65 microcomputer, incl printer, 20 char Alphanumeric display, comprehensive i/o and exc comp software and hardware documentation, software included (in PROM) Assembler, Basic, Forth, PL65, well under half price at £250 ono. G8TDL. Tel Tony, Wokingham 788110, evenings.

Tonna 17-el, 2m, £25 ono. Reason for sale not required for present set-up, bought new in July. G6TCM, QTHR. Tel 0482 76994.

Drake TR7, PS7 psu, MS7 spkr, full workshop manual, superb rig, £850. Serious enquiries only please. Jackson, G4HYY, QTHR. Tel Todmorden (West Yorkshire) (070 681) 5342.

KD2025 fm 144MHz tx/rx, 25W rf, ten memory channels, scan facility, vgc, boxed, manual, £120. FDK multi U11, 432MHz, fm tx/rx, 10W, xtals, 12 channels, boxed, £110. Richard Perzyna, G8ITB. Tel 01-698 4403.

FT101, 80-10 mic, fan, manual, exc cond, £225. FT707, as new, fm fitted, £350. G4YAO. Tel Liskeard (0579) 20283.

Trio Kenwood R600 communications rx, a.m., usb, lsb, cw, digital readout, mint cond, £165. G6LJS, QTHR. Tel 01-868 6815.

Lattice tower, tilt-over, base and counterpoise weight, tower has 3 × 10ft sections galvanized, height approx 44ft incl stub, comp with Sky-King SU2000-3 rotator, control, three plastic coated steel wire guys, £175. No offers, buyer collects. G4PZX, QTHR. Tel Alex, 0206 28856.

Kenwood AT130 3·5/28MHz, £65. Kenwood TS520SE tx/rx, £350. KW2000B, ac, psu, £240. Zetagi C500 programmable frequency counter, £75. LCR bridge testset 373A, £30. Every item immac and may be seen working. Tel Harvey Jackson, 0229 85669 (Lowick, Cumbria).

Drake T4X, R4B, AC4, psu, new bands, will split, £475 ono. Ten-Tec Argonaut 509 cw filter, £250. 5W QRP. Drake 2C rx, 3-30MHz, Q-mult, £90. *Wanted:* Ten-Tec Corsair or Omni. Can deliver/collect South East. G3VTT, QTHR. Tel 0622 39936.

Clearance: G3ZVC tx/rx board, XF9B filter, working, £25. Transistors, ferrites etc, for PW Trent, 150W pa, £25. Info for both. Historic Short Wave mags 1950-54, free if collected. G3NYX, QTHR. Tel 0273 832910.

Dragon 32, as new cond, wordprocessor software telewriter. Used with Tandy DMP200 printer provided exc letter/report writing, £95. G4LTM, QTHR. Tel 061-351 1152.

FT101Z, six bands, mint cond, £280. FT227R, handbook, £80. HQ1 mini quad with balun, rotator, £80. G3ZGD. Tel 0329 286387, evenings or weekend.

FRG7700 rx. FRV7700K converter 140-170MHz. FRT7700 atu. All mint cond, boxed, £350 ono. G6NWN NOT QTHR. Tel Mansfield (0623) 512369.

IC240, 2m, fm, 80-ch adapter, mobile mounts, manual, £130 ono. An ideal rig for mobile or base station. G4MGL, QTHR. Tel Andy, Farnborough (0252) 546966, after 6pm.

BS5 pan adapter for SM220 scope, suitable for use with TS520S tx/rx, £25. DPEL770, 2m 70cm dual band mobile whip, matching Welz DF72C duplexer, £25. G4EIB, QTHR. Tel Sedgley 76131 (West Midlands).

Database for amateurs, QSO programme for BBC2, quick retrieval, compact, easy to use, updating entries and altering programme to personal needs is easily done. £5.96 incl post & packing. J.R.O. Delap, Little Armsworth, Alresford, Hants SO24 9RH.

Drake TR7, PS7, NB7, cw filter, fan, aux-7, £850. Drake SP75 speech processor, £75. Both items together, £900. BBC B rom board, Watford rom manager, £40. Datong speech processor, k/t tones, £25. D70 morse tutor, £35. FL2 audio filter, £50. SSB Products, 70cm gasfet preamp, £25. FT101B ext spkr, digital clock, £10. G2DYM balun, £5. LAR linear Omni-match, £10. Jaybeam 2m 14-el, £15. 2m 10-el P/beam, £10. 70cm 88-el, £10. Collect antennas, others postage extra. G3WHK, QTHR. Tel 01-330 5795, after 6pm.

Racal RA1217 solidstate rx, 30 1MHz bands, professional performance comp with manual, £300. G2ACZ, QTHR. Tel 0521 73233 (Lincolnshire).

MMT 144 transverter, £45. NEMS Clarks rev, mint, £75. APR4Y rx, £45. Valves 4CX1000A, £20. 2C39A, £5. Collins, new, vfo, £20. Manuals, Collins, AR88, HRO SP600, RA17+ etc. *Wanted:* Stoddart or Empire rx. Panadaptor, manual for R1283/GRC. Tel 0942 55948.

Command rxs BC453, Q5ER, £7. BC454 3-6MHz, £5. Standard radio hf tx, airborne, ST18C, contains two 4 × 100s and blower, £20. HD dc power supply (Mervyn Instruments), 285V regulated, ac mains, £10. Many mains transformers and autos, few watts to K watts, sae for list. Catronics frequency meter DFM5, £50. Frequency meter LM10 uncalibrated, £5. Kleinschmidt morse keyboard perforator, museum piece, offers? AC power unit for BC342, £4. IF transformers with xtal filter (CR100?), £3. Prefer collect, or carriage extra. G5XB, QTHR. Tel Reading 0743 722195.

Trio TS930S with MC42S mic, immac, £970. Dentron 1000B linear, £250. Swan PSU 5, suitable most rigs, £90. Val radio 12V dc/230 ac converter, £25. Mics, valves, meters etc, numerous radio manuals. Letters appreciated. G3MIN, QTHR, West Sussex.

UHF nine-ch Motorola mobile, type CD100, cradle manuals, fitted SU8, RB13, RB14, preamp toneburst, £100 or W.H.Y? G8QS, QTHR.

Personal stereo brand new, boxed unwanted gift, Guarantee till Nov '85, full auto-reverse, Dolby, metal, psu, v.v.low battery consumption, two-band stereo radio, full record, case, sockets for recording, mic, £80 ono. Tel 06632 2545.

Trio R1000 rx, £160. Would exchange for Racal RA17 with cabinet, or Collins 75A4, or SX111 or Hammarlund HQ170A. Must be in first class cond. Cash adjustment either side. Would consider buying any of above. Tel Swindon 693046.

Ten-Tec Century 21, cw only, tx/rx, five bands, 50W input, exc cond, £150. G3GIB. Tel Berkhamsted (04427) 2814.

Shack clearance: Trio TR9000, 2m multimode tx/rx, £250. Trio TR7850 synthesized 2m, fm rig, £160. Daiwa CN620A swr power meter, £25. Lowe FX1 absorption meter, £10. Daiwa CS201 coaxial switch, £5. Hanson DL20, 15W, dummy load, £2. All as new in exc cond, boxed in orig packaging, manuals. PSU, £5. Sanyo RP8880 short wave radio, £20. Global AT1000 sw antenna tuner, £5. G6PRX, QTHR. Tel Wakefield 279243.

Yaesu FC901 antenna tuner, as new, £65. G4IQL, QTHR. Tel 01-653 3456.

Tau systems atu, cased, fitted turns counter, list £370, as new, £250. Trio TS530SP, three months old, used little, perfect, £575. Uniden CR2021 gen cov rx, amazing performance, £100. Double the speed of your 1541 diskdrive "1541 express", £40. Tel Hornchurch 57722.

Trio 930, new. Trio 430, as new. Collins S line, the best, need room. Collins KWM2 exc cond. *Wanted:* heavy duty rotator. Alpha linear amp. Tel Derby 557705.

Yaesu FT290R, Microwave Modules 144·30LS, mobile mount MMB11, carrying case, scanning mic YM47, flexible whip, small 2m antenna, all boxed, £280 or swap with cash difference for 225RD, IC251, IC271, or similar. G1HMT NOT QTHR. Tel Market Deeping (0780) 343664.

MM4000 rtty tx/rx RCA keyboard ASCII auto cq ry etc, four message stores, standard speeds FSK Afsk microprocessor control, £150. GM6XW, QTHR. Tel Larbert (03245) 62604.

TR2400, ST1 base unit, spkr/mic, manuals, orig boxes, cannot separate, £165. MM144/28 transverter, £65. All in exc cond. Carriage included. G4JSZ, QTHR. Tel 029922 658, after 6pm.

Atlas 210X/215X deluxe ac console, £80. Atlas 206 digital vfo, £100. All as new. Mirage B108 80W, 2m, linear, new, £85. Gem Quad two-el, kit, new, £85. Jaybeam 14-el, 2m, beam, new, £25. G4ERU, QTHR. Tel Bournemouth (0202) 510400.

FT980, absolute mint cond, comp with all optional filters fitted, MH1B8 scanning mic, purchased April '83. Today's cost £1,435; first offer of £950 secures. G3LPA, QTHR. Tel Kettering 760336.

Redifon GR470 marine vhf fm tx/rx, transistorized, synthesized, 50ch (99ch capability), 156-163MHz, 15-20W, service manual, buyer collects, £60. G8HJS. Tel Stratford-upon-Avon (0789) 295257.

Heathkit GR78 gen cov rx, 200kHz-30MHz, £45. Labgear, Pye, top band tx, mains supply, 12V dc inverter, £45. Two 813s, one base and top cap, £5 each. Wilcox Gay vfo, contains two 37 turns roller coasters and turn counters, ideal for Transmatch atu, £25. Mains transformer 1250-0-1250, £10. G3EHG, QTHR. Tel Wolverhampton 700609, evenings or weekends.

Scanner SX200, £195. Trio 2300, £120. Rotel 28MHz tx/rx, as new, £25. Sound board for spectrum puts sound via tv, £5. *Wanted:* FT290. Will swap any of above, plus cash. G6FKK, QTHR. Tel 021-777 6268.

KW2000A new 6146B pas, 10MHz band, some spare valves incl 6CH6 mic, £150. G2ACZ, QTHR. Tel 0521 73233 (Lincolnshire).

600W dissipation tetrodes 250MHz, plus bases, air cooled, ideal 2m linear with data. Tel 061-723 2529, afternoons or evenings.

Grundig Satellit 3000, ssb, rx, £200. MM 70cm/30W linear/preamp, £80. MM rf switched 2m, preamp, £20, Mutek rf/hard switched 70cm preamp, £55. Mobile mic set, £25. Hansen FS700V swr/p.e.p. wattmeter, £30. Offers. G4WAK (QTHR as G6HUG) Tel 01-504 4830.

Video recorder, Philips N1700 working, but has tracking fault, heads believed ok, with one tape, £30. Labgear tv pattern generator video and rf output, £20. *Wanted:* dot matrix Centronics compatible printer, not thermal, G8PQG. Tel Dave, Oxford (0865) 67165.

Urgent disposal of following at giveaway prices: Microdot 2, Trios TM201A, TM401A, R2000. Pye 3210 cassette recorder. FRT7700 atu. 160m-marine-80m rx. AR22, 2m synthesized rx. ICF 1200 rx. FET dip oscillator. RF1 sig gen LPM885 swr/wattmeter 20/200/1000W. 2m amd 70cm mobile antennas. PF1 nicad charger. Discone GDX2 48-480MHz. W/mach motor Coaxial psus meters, components all types. Complete shack clearout needed. All vgc, manuals, nicads, chargers and accessories as appropriate. Lockwood, G3XLL, QTHR. Tel Mellis 596.

Lowe SRX30 hf rx, £100. Datong morse tutor D70, £33. G4VGV, QTHR. Tel 082347 4808.

432/28 transvert MM perfect order, offers please. *Wanted:* 43 Thru line power meter and elements. Tel 061-723 2529, afternoon or evenings.

Yaesu FT101Z nine band fm, c/w, fan, mic phones, YH55 manual, £400. Marconi TF1041C vacuum valve voltmeter, 12 RSGB *Bulletin* 1954-1966, 12 *Short Wave* 1952-1963, offers? G4PCA, QTHR. Tel 0376 41950.

Trio TS130S, exc cond, mic, swr/pwr meter, five band, G-whip antenna, £440 ono. Or exchange 2m handheld plus cash. G4RDU, QTHR. Tel Leigh (0942) 729516.

MBA-RO reads and displays morse, baudot Ascii, as new, £135 ono. HF5 five band vertical, £20. *Wanted:* Eimac 4CX250B valves and bases, G4NRG, QTHR.

Property of late G3RZW: HB speech processor, £5.50. Eagle transistor tester, £5.50. Solder sucker, £4.40. Cooling fan, 240V, £3. Test probes, £3.30. Mag mount, £5. Mic, £1.50. Nicad battery,

12V 10Ah, £10. Wave meter BC221, comp with phones and charts, £20. Yaesu FT202R handheld comp with nicads, six channels, MM 25W, linear, £75. Buyers to collect last three items. G4NND, QTHR. Tel Mansfield (0623) 823184.

DX100U a.m./cw tx new pair 6146 pa 160-10m, £65. Heavy 1kV psu, £15. 2m asp mag mount 5λ/8, £10. As new UM3 modulation transformer, £5. Send sae or tel for surplus bits list. G3XVL NOT QTHR. Tel Ipswich 215047.

ND1 HC1400 2m fm tx/rx, 30W out, three memories, mobile mount, scanning mic, spare mic, remote frequency readout, comp handbook and packing, £140 ono. G4FFW, QTHR. Tel 061-224 7880.

New 4CX250B vhf/uhf bases, ptfe silver plated Plessey mil-spec, £20. Navy cw key, slate base, £25. Valves ML7698 offers, 6AK6, 6AH6WA, 6CL6, 6J4WA, M8091, 6AU6A, 6BA6W, 6AQ5A, ECC91, CV2224, CV4068, OC3, all new £2 ea. G3XUH, QTHR. Tel 0772 36063.

RTTY Microwave Modules tx/rx, MM4000 with keyboard, vgc, £150. G4XNL. Tel Eastbourne (0323) 638653.

Yaesu FT200 tx/rx psu, handbook, ideal starter for new G4 good cond, best offer in range £200 to £225 secures. G4KGT. Tel John, 01-920 8142, business, Gt Missenden 4380, evenings. Can deliver 30 miles radius Gt Missenden (south Bucks).

Hilomast NK9 30ft, five section, wall brackets, £250. G3KEF. Tel 0279 413070.

Drake TR7 hf tx/rx, mint cond, ext vfo, £450 ono. G4OZL, QTHR. Tel 0264 88741.

KDK 2016E 2m fm mobile, 15W output, memory, scan, perfect wkg order, £110 ono. G4HBD. Tel 0202 767583.

Yaesu FT290R nicads, charger, carrying case, £190. Yaesu FRG7, £150. Home computer colour Genie (Lowe Computers) 32k, joystick controllers, £100. Reasonable offers considered. G6HZR, QTHR. Tel Crowthorne (0344) 771548.

4ft dish incl feed, £38. 23cm 22-el beam, £10. Pair Ultra hb portable tx/rx, £35. No hands needed telephone, £25. HRO all nine coils, £50. Past issues of *PW, PE,* etc, £5. 10m tx/rx ICB1050, £50. Other equipment. Tel Watford (0923) 662567.

Nascom 2 computer NAS-SYS three, 32k, ram 4k rom, naspen, toolkits, extension Basic, working on rtty split screen, buffer and memories, cw tx/rx etc, over 100 programs and games, manual and literature, £240 ono. G4GZA, QTHR. Tel Scunthorpe (0724) 763594.

Two GEC tx/rx Marconi mobile portables approx 5W single ch am/uhf airband, small fault on 1 convertible for 70cm, offers W.H.Y? Buyer collects. *Wanted:* Yaesu 208 PA31 12V dc/dc adaptor, 20/30A psu. G6XRL, QTHR. Tel 061-489 3770 work, or Poyton 876192, home.

FT77 tx/rx in exc cond, fm, going QRP homebrew, £390. G2DYM four band six trap dipole, works well, £35. GM4OSS, QTHR. Tel 0560 83800.

Datong FL3, audio filter with auto notch. Cut through the QRM every time, as new, only six months old, £85. G4UJW, QTHR. Tel 01-346 8597.

FT290R 144-148, nicads, charger, case, helical λ/4 wave flexi dummy load, swr, 16m UR67, SMC colinear, both brand new, never used, 0-19V, 25A psu, £319. Might split if enough offers, buyer collects, or pays carriage. Tel 0253 45431.

Trio TR7800, 2m 25W, fm, mobile/base station, 15 memories, mobile mount, mic, manual, orig packing, λ/4 wave, quick release gutter mount antenna, £160. Drae 12A psu, £50. G3ZZR, QTHR. Tel Witney (0993) 3792.

RTTY: complete set-up just plug in to rig and off you go. Microwave Modules MM4001 plus keyboard and all leads, 45·5 to 1200 bauds, as new cond, £220 ono. GU4YMV. Tel Chris, Guernsey (0481) 49301, after 6pm.

Bearcat 20/20FB vhf/uhf scanning rx, 40 channels a.m./fm, exc cond, £170. Discone antenna, £15. Buyer collects. G1GTJ. Tel Northwich (Cheshire) (0606) 74776.

Yaesu FTV107R cw 2m, £130. SP102 spkr, £30. 14 AVQ trapped vertical, 10-40m, £60. Fidelity 3000 base cb, £60. Power swr twin meters, 100W, 3·5-150MHz, £18. All above as new in orig packing, manuals, orig assessories. CP163X, 3·8-30MHz combined linear preamp solidstate, £70. Swop any of above for 70cm linear preamp or 30MHz scope. Cash adjustment either way. GM1IIB. Tel 04083 3197, after 6pm.

Pye air band mobile AM10B, 129·7, £40. AM10D glider band mobile, 130·1, 130·4, £50. GEC mains base station, 130·1, 130·4, small neat wooden cabinet with desk mic, £50. All above good order. GU3HKV, QTHR. Tel 0481 47278, 6/7pm only, please.

TR9000 2m, ssb, £200. FRG7000 gen cov rx, £100. TS120S tx/rx, £350. Sharp VHS, VCR, needs conversion to UK standard, £200 ono. G3YEL, QTHR. Tel 0626 60280.

FT290R, case, nicads, charger, mint cond, £220. Trio 3200 70cm 2W, fm, portable, all nine repeater channels, three simplex channels fitted, Mutek preamp fitted internally, £135. G6ICE, QTHR. Tel 0604 67406.

Yaesu FTV901R transverter, fitted 2m unit, mint cond, in box with leads, £180 ono. G4SOA, QTHR. Tel 0527 26567 (Redditch, Worcs).

New Brain computer with 800k twin disc drive controller, three megabite software, 800k single disc, runs cpm software ie Word Star, original cost £2000, would exchange part for TS780 or with appropriate cash adjustment. G6UDM, QTHR. Tel 0902 783338.

TV video camera CTC5000 b/w exc pictures, £80. EMI 1in vidicon type 9677, £20. Television lens cosmicar macro, 25mm 1:14, £50. RTTY terminal unit ST5, ttl o/p to drive a micro tx/rx switch, afsk o/p 170/450 shifts, £50. GM3WIL, QTHR. Tel 0292 79217.

25 rare vhf uhf valves, incl 1-QQVO 640, 2-QQVO 320A, 2-832s, 3-829B, 2-2C39A various disc sealed triodes, two magnetrons, the lot £25 ono. G3CGQ, QTHR. Tel 0582 25519.

Yaesu FT708R 70cm handheld, exc cond, nicad, brand new charger, Slim Jim, new Puma linear, comp, £150. Mirage B108 linear, 10W i/p, 80 out, pre-amp, £85. FC707 atu as new, boxed, £80. G6MNX. Tel Mike, York 53173.

FT707 fm, FC707, FP707, standard mic, HK706 key, swl user, orig boxes, exc cond, £490. Or swop for 12 bore o/u shotgun, same value, exc cond, Parker Hale, Winchester, Browning, etc. RS49218. Tel 0522 86523, after 3.30 pm.

Trio TR9000 2m multimode and mobile mount, £275, with PS10 power supply, £300. G6UKO, 161 St Marys Road, Kettering, Northants NN15 7BL. Tel 0536 521790.

Yaesu FT101ZD, mic, fan, dc, psu, £375. G3XKN, QTHR. Tel 05255 2207 (Bedfordshire).

FT102, fitted a.m./fm board, cw filter, used little, mint cond, £500. G3UQE, QTHR. Tel 03265 3279.

45ft lattice ali tower with h/duty base and winch, in full wkg order, £210. G4ODQ, QTHR. Tel 0509 843830, after 2pm.

SSTV Wrasse SC422A scan-converter, bw and colour, sends and receives eight sec and 16 sec, bw, and frame sequential and 24 sec line sequential colour, three picture memories. As new with manual, orig packing. Will pay Securicor delivery, £475. GD4HOX. Tel 0624 73264.

Trio TS830S 270Hz cw filter, VFO230, spare 6146B's and driver tube, exc cond, will consider splitting, £600. G3OZF, QTHR. Tel 0296 748354.

TS530S cw filters fitted, immac cond, £450. G3HCQ. Tel Duddington 0780-83 278.

Moving home, no room for HRO, gwo, pp, bandspread coils 160, 7MHz, also HRO, pp, coils, working, but needs attention, the lot, £30. Tel Ray, 01-977 8400. (Twickenham, Middx).

FDK multi 700E, £150. Icom IC202S SSB, £100. Both exc cond. Trio JR310 amateur bands RX, works well, £80. Microwave modules 2m converter 144-28MHz, £15. Class D wavemeter, mains supply, £10. Weller solder gun, £15. G8LGO. Tel Andover 51593, after 6pm.

Trio TS520SE, digital (lcd) frequency readout, perfect cond, used little, orig packing, Shure, mic, £370. Heath HW32A 20m ssb tx/rx, 180W h/brew psu, £75. Eddystone 750rx case, dial, tuning mechanism only, £10. G3CVK, QTHR. Tel Worcestor (0905) 356826.

Yaesu FT208R 2m fm, handheld, little used, vgc, £145 cash, no offers. Prefer buyer inspects, collects. G4PHC, QTHR. Tel Minehead 6936.

Gen cov rxs, both with manuals: Trio 9R59DS good cond, £20; Marconi CR100, wkg but needs attention, £10. G3BVF, QTHR. Tel Potters Bar 42887.

HRO complete with p/s, eight plug-in coils, instruction book. TS510, PS510, old but gwo. Homebrew atus, dummy loads, ex-G8MG now QRT. Offers to G4KTY. Tel Burnham (06286) 65536.

FT230R 25W fm tx/rx, boxed, as new, £195. G4MUJ (0903) 753102.

Jaybeam 2m colinear, £35. Mutek tvi filter, £2. Aerial balun 50Ω, £4. RSGB book, *World at their fingertips,* £4. Western DX33 tribander beam antenna, absolutely new, unused, original packing, full instructions etc, £150. 0376 84478 evngs pse.

Sony colour Prestel/Viewdata terminal, good cond, can be seen working, fantastic Trinitron display, half price, £350 or swap SX400 scanner. Tel 0304 373788. Adamson, Woodend Victoria Road, Kingsdown, Deal, Kent CT14 8DY.

FDK 700E, £110. Liner 2, Liner 430 matching hb/psu, £150. Burndept 5W uhf mobile tx/rx wkg rb0, £40. FDK 700E, £110. G8GON, NOT QTHR. Exmouth (0395) 264872.

Shack clearout. MMT144/28, £85. MML144/25, £32. MM144/28, £11. MMC70/28, £13. MMA144v, £20. Military-type 24V portable (backpack). All modes, hf synthesized tx/rx with all accessories, £250. Sony ICF2001 synthesized rx, £115. VIC20 tape unit, £95. All ono. G4AFF. Tel 0305 775456.

TS120S, YK88C cw, £340; MB100 mobile mount, £10; PS30, £65; VF120, £60; comp, £450, all boxed. Strumech Versatower ground post, £100. 21ft by 13in bottom section, incl winch/cable, £50. Western DX33, £120. CDE AR22R, £30. Met 144/19T, £35. Tel 0565 873205.

Valves from 5p each, hundreds to go. Taylor valve tester model 45D, £20. Moulding iambic keyer, £15. uhf-vhf terminating wattmeter, £20. Electrostatic voltmeters, 20kV, £4; 5kV, £4; 1·5kV, £3. Callers only, G4KDV. Tel 0943 463083.

FT101ZD official service manual, as new, £12. SWR power meter 0-5W 1-30MHz, new, boxed, £5. sae lists valves, old radios, books. Trowell, 'Hamlyn', Saxon Ave, Minister, Sheerness, Kent ME12 2RP. Tel (0795) 873100.

Pye PF8 uhf, hand-held, £40; Pye PF8 charger, £20; both for £55. Pye F450T uhf base station incl two rtc units, £40. G8XVV, QTHR. Tel Preston 0772 313886.

Yaesu FT980 little used, boxed, £400: below current price, consider 757 or similar in part exchange. MM28 to 144 transverter, £65 ono. *Wanted:* good all-band hf linear, 2100Z or similar, G4VI0, QTHR. Tel 0388 763501 after 5pm.

Akai VT110 portable bw vtr; monitor, camera, accessories, manual, offers or exchange hf gear. Storno Viscount 4m fm two channels, manual, £25. Ajax marine tx/rx 12V, would convert t. 80/160. *Wanted:* QQ0V 6-40a valve. G4VLR. Tel Norwich (0603) 51656.

Yaesu FT980 hf gen cov rx/tx, £950. GM4TNW, QTHR. Tel 0506 844791 daytime.

Matrix printer. Centronics model 730-4. Serial input, modern, small, hardly used, exc cond, £90. Tel 01-640 6020.

Converter MMC50/28, almost new, £20. Top band/80 cw/a.m. tx, no info, homebrew, £10. Quantity of Cannon connectors, wavemeter, no psu, £5. Three AM10B units for carriage at cost. G4SDZ, QTHR. Tel Newark 702076.

2m 9el Tonna, £10. 70cm masthead preamp, £10. 70cm GPV7 colinear, £20. 15m H100 coaxial terminated with N-plugs, £9. Tonna portable aluminium telescopic mast 4 × 2m, £15. Tonna 50Ω/75Ω impedence transformer, £10. Datong 2m converter, £20. Cushcraft 2m DX120, 14dBd gain, new unused, £40. 432MHz linear, unfinished project, 2X2C39 G8PQG design with seperate psu, offers. 2C39 valves, offers. High power coaxial relay, £10. *Wanted:* Tektronix 543 scope, manual. Tel Alan, Boxford 696, evngs.

IC-271E, £565; IC-471E + AG1, £675; IC-PS15, £90: or all for £1,250. Ideal sat set. FT708R, NC8 spkr/mic, £190. CBM4032 fitted "Flip Forty", new cond, £450; p/ex possible W.H.Y? *Wanted:* FTV107R (2/70) FT726 AT757. Tel after 3pm, Rayleigh (0268) 774089.

Audio generator 10Hz to 10kHz, battery powered, £25. Dummy load 50Ω 5·8in long by 1in diam, boxed, SO259 socket, £9, postage extra. G3RDG, QTHR. Tel 01-455 8831.

Midland 3001 10m fm tx/rx, £28. CW active filter with psu, £15. Type D morse key, £18. Codar AT5, homebrew copy in commercial cabinet with psu, £35. Heathkit HW8 tx/rx, £120. All items as new. G3KZU, QTHR. Tel 0865 63000.

T1154 mint cond in original wood transit case, offers. G3KMV, QTHR. Tel 0270 624298.

Collins KWM-2A 516F-2 psu, £425. 75S-1, 32S-1, 516-F2 psu, with handbooks, £450. David Hambleton, G4OPF. 133 Mornington Crescent, Cranford, Hounslow, Middx. TW5 9SU.

Dragon 32 morse tutor program 1-16wpm on cassette, £4. G. Jones, GW4KJW, 24 Underhill Cres, Abergavenny, Gwent NP7 6DF.

Mint FT290R freq spacing/range made switchable, no other mods, nicads and charger incl, £200. Tel Steve, G8KUX, 0449 741366 (Stowmarket).

Two Solatron bench scopes, 30MHz, single beam, all valve, both wkg fine, £70 each; or exchange both for elec keyer Katsumi Kempro 150, must employ Curtis chip. Heathkit swr 150W 3·5, 30MHz, £8. Homebrew swrs 3·5 30MHz, very accurate, £10 each. Leson DT251 desk mic processor, very sensitive, no handbook, £25. Buyer collects scopes, other items by post.

GM4ZLX, not QTHR yet. Tel 041 884 5850. *Wanted:* any working top-band valve tx/rx, homebrew ok with diag.

WANTED

FT290R in gwo, clean with accessories, or FT208R gd cond and Trio mobile, gd price paid etc. G3FUF, QTHR. Tel 03265 63648.

Pre-1940 domestic radios, service info on German domestic radio Siemens 14W, valves German types EF11, EM11, ECH11, EBF11, EL11, AZ11. Mid-'thirties valves AC/VP2, AC/VP1, AC/ME, AC/TH1, V914, AC/TP etc. Also radio knobs required. G4OOW, Tel Hinckley (0455) 612091, after 7pm.

Exchange/wanted. I have a TS130S but want a TS130V + TL120. My unit is three years old but I have worked for 2½ years in Saudi Arabia and was unlicensed. Also need a copy of HW8 circuit. Avery, G4MSB. Tel 0934 512698.

FTV901R three-band transverter, any modules fitted. Price, details to G4UXC. 16 Clevedon Green, Sth Littleton, Nr Evesham, Worcs WR11 5TY. Tel 0386 831508.

Txs required for cadet training, cw or cw-r/t, simple and safe, 40m band and possibly 80 and 160m. offers please. G4WMT. Tel 0245 469532.

Yaesu filter XF30B. A.m. filter for FR101. Any extra band xtals. FL101 tx wkg or non-wkg. 18in rack-mounting system. (Lots of room in new shack.) Tel Dursley 811454 after 6pm with details.

Drake R4C rx and T4XC tx. Please write stating cond, any extras fitted and price. All replies answered. Pete Milsom, 2 Fairview Place, The Street, Coaley, Glos. GL11 5EG.

Still required. ARRL *Radio Handbook* before 1934. Taylor T55 or smaller with ceramic base and unused 210 tube. G4IMT, QTHR. Tel Bath 891254.

Circuit diagram and information for Solartron Solarscope, scope CD514, can photocopy. G3XWL, QTHR. Tel 021 350 8632.

Tape reader for Creed type 7C teleprinter or complete unit with paper tape facility. Tel (0795) 875836 evenings.

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.

Mk 123 spy set in good wkg order. G4RJC, QTHR. Tel 04022 21523, evenings, not Sundays.

Collins KWM380, must be up to date, or a KWM2 tx/rx round label TH6-TH7 ant. Alpha linear. Drake linear. Henry linear. 60ft hd tower. Tel Derby 557705.

Multi U11 or Icom 24G, must be in good cond. G8CPH, QTHR. Tel Ipswich 831448.

Collins KWM380. Top price paid. Must be vgc. G4ZEK. Tel Colchester 851343.

PRM 4031 by Racal, or similar manpack equipment. G3KVT, QTHR. Tel 0603 860452.

For the Wireless Museum: very old radio books, magazines, catalogues, QSL cards, manuals, wartime and prewar *Radio Times*, car radios, people's rx, Meccano xtal, Phonogram cylinder. Details please hon curator, Douglas Byrne, G3KPO, Arreton Manor, IoW. Tel Ryde (0983) 67665.

Morse keyboard, preferably Datong model MK, but others considered. G3UUT, QTHR. Tel Cambridge (0223) 843546.

Pneumatic telescopic mast, colour video camera, video recorder. G6CUQ, QTHR. Tel 052 789 2282.

Still required: pair of 6L6 metal valves and ceramic based RU34 and 807 valves, must be of USA origin and close wartime period. RCA Guide to transmitting tubes. G4IMT, QTHR. Tel Bath 891254.

FT780, must by in good cond, fair price paid, and I will travel. G4SYD, QTHR. Tel Syd, Durham 720688.

Service manual and/or circuit of Dynamco dual-beam scope Model D7100. Will copy and return. G3RRA, QTHR. Tel 0276 25040.

Urgently wanted: the first issue of *"Acorn User"* July/August 1982. Your price paid. *For sale:* Microwave Modules 28-30MHz 2m converter and Bantex 5⅛/8 wave mobile whip, £5 each. Paul Martin, 3 Birch Close, Broadstairs, Thanet, Kent. Tel 0843 61448.

Recording barograph, must be in gwo and use readily available charts. Dave Sugden, G4CGS. Tel Bracknell (0344) 55898.

Capacitor reformer for MK123 spyset. AP4 spyset in any cond. G4RJC, QTHR. Tel 04022 21523, evenings, not Sundays.

Replacement motor for Sanyo reel-to-reel tape recorder model MR530. U/S recorder acceptable provided motor is ok. G3RGO, QTHR, Tel 0529 303247.

Power Supply No 5, 19 set power supply, 22 set comp, cables for 46 set. Also interested in any ex-WD equipment or books. G4MSF, QTHR. Tel Keith, 0632 693955.

Bird Thruline 43, accessories etc. Manual for Racal RA117 rx. Racal accessories. All components for hf, vhf linear amps, vacuum variable capacitors, transformers, W.H.Y.? Unfinished project? Pair 8875 valves. CDE rotator. Tel 03306 613, after 7.30pm.

Trio 120V tx/rx, with mic, or FT7 or FT7B, or similar. G4JFE. Tel Newbury 0635 41613.

Handbook/circuit and service info for curlew type 351L coastal rx, willing to pay or photocopy and return. G4UTV, QTHR.

70cm module for FTV107R transverter frame, might consider comp FTV107R transverter with 70cm fitted. Belcom LS10 28-30MHz multimode mobile rig. G4WZQ, 24 Seaview Road, Herne Bay, Kent CT6 6JA. Tel Herne Bay 4318, weekends only.

Information on modifications to Low SRX30 rx. I am interested in any mods but in particular incorporating fm, additional filters and improving the front end. G4MQH, 20 Queen Street, Brimington, Chesterfield, Derbyshire. Tel Rod Young, Chesterfield 203095.

FT290R, good cond, or other all mode tx/rx, 2m, £200 or less. Please write Mr John Gille, Asterstraat 3, 3660 Opglabbeek, Belgium, or Tel 010 32 11 859295, after 8pm.

Yaesu FT101ZD with WARC and fm. G3XKN, QTHR. Tel 05255 2207 (Bedfordshire).

Scanning for a scanner. Wanted vhf/uhf scanner. G3VSC, QTHR. Tel 0532 677002.

FRG7, must be mint and unmod, AR88 rh dial blank marked RCA AR88 freq, 540kHz-30MHz. Genuine AR88 S meter, please! Someone must have them. G3ESB, QTHR. Tel 0332 671536.

Early wireless sets, ham gear, old military equipment, early valves, books, magazines. Keen collector will pay cash and collect. TS930S to purchase or exchange FT757GX plus cash. G4ERU, QTHR. Tel Bournemouth (0202) 510400.

Transam Triton level 7·2 monitor and extended Basic, listing or eproms. I am also interested in rtty software for the Triton, Eimac SK620 or SK630 bases and chimney. G8APV, QTHR. Tel Clive, 01-732 8319.

FT241A, xtals chan 31, 32, 33, any quantity. Percy Greenwood, G2BUJ, QTHR.

Eddystone EA12 rx, good cond, with manual. G6DKE. Tel Sudbury (Suffolk) 73238.

Ten-Tec Corsair, Omni B or C with or without psu. Can collect Essex, Kent, Sussex, Surrey, London. *For Sale*: Drake T4X, R4B, 2C rx. G3VTT. Tel 0622 39936, evenings.

For the Wireless Museum: very old radio books, magazines, catalogues, QSL cards, manuals, *Radio Times, Listener, World Radio*, etc. Knobs! Details please to hon curator G3KPO at new QTH: 52 West Hill Road, Ryde, IoW PO33 1LN. Tel Ryde (0983) 67665.

Racal ssb adaptor type RA63. D version preferred. Good price for clean unit. G3GJF, QTHR. Tel 0742 462885.

Any suitcase type sets, instruction manuals, spares or damaged tx/rxs welcome. *For sale*: real quality leather carrying case for Yaesu FT101 or Sommerkamp FT277, £25. Taylor, G3UCT, 8 Government House Road, York YO3 6LU. Tel York (0904) 29777.

8877 valves required used, ex-equipment. GI4TAP, QTHR. Tel 0232 620728.

KW Supermatch atu, 107, 109, or E-Zee Match, must be in exc cond, no mods. G4JQI, QTHR. Tel 025482 3366.

D70 morse tutor for G8 keen to be promoted! G8ZYD NOT QTHR. Tel Alistair, Cambridge (0223) 323012.

Tower. Will consider any galvanized lattice tilt-over up to 60ft in good cond. HF beam or quad, anything considered. GW3XJQ, QTHR. Tel 09945 267, evenings & weekends.

FT101 hf tx/rx good cond, handbook, within 60 miles Shrewsbury as wish to view before purchase. Tel Leebotwood (06945) 441.

Early FT101 or FT101E. FC902 or other atu. SP901 spkr, 2m multimode. Portable and/or base, FRG7 must be exc, or FR101. Atlas 215X. Tel David, 04024 57722 or 025587 663, anytime.

Morse key, solid brass, type Marconi 365 or b/post office 610 large knob, Eddystone EC10, MK2 incl manual, gwo. G4HHN. Tel 0696 72547.

HRO mx or 5T gc coils. BC348 and mw command rx. GW3UTE, QTHR. Tel 0222 756093.

Yaesu YO601 digital display, price and cond to G3VBE, QTHR.

Isolating transformer, input 240V ac, output 240V ac 500VA (2·5A). CTV pattern generator, Pal-UK wobbulator and signal generator. RS54202. Tel 01-866 9500.

Microdot users: A microdot users' group to be formed, send any info or ideas plus sae or stamps to cover postage to John Brown, G3EUR, QTHR.

Versatower or similar, 40ft, or 60ft, not wall mounted. G4OAB, QTHR. Tel Runcorn 65804.

Digital Avometer type DA112 manual or photostat, also case or u/s meter for spares. *For sale*: Yaesu 2200GX, 12 channels xtalled, nicads, charger, case etc, mint cond, £60. Bert, G8ABZ, QTHR. Tel Rotherham 63774.

Radio compass receivers MN26C, MN26A, MN26X, MN26W, BC433, ARN7, DZ1, DZ2, Receivers BC314, BC344, BC969. Also any handbooks for any of these. Tel (South London) 01-318 5290.

Yaesu SP901P spkr to complement FT101ZD, also Yaesu FT230R fm mobile in mint cond. Will collect or pay carriage. G1JPY. Tel Reading (0734) 698261.

Electroniques ham-band front-end 1·6MHz i.f. out QP166, preferably transistor version. Please contact G3GRB, QTHR. (0902) 20322.

TH7 or similar beam and rotator. GM4VZI. Tel 0968 77073.

KW107 or 109 supermatch or similar. G4GJP Wirksworth (062-982) 3934.

Yaesu FRG7 FRG7000 or FRG7700 rx, also Datong PC1 gen cov converter. G3XFB, QTHR. Tel Brewood (near Stafford) 850033.

Two reflector coils for HQ-1 quad antenna. G3STT, QTHR. Tel 0704 29137 evenings.

Books: *The Complete DXer* (Bob Locher); *Active Filter Cookbook* (Don Lancaster); *Shortwave Propagation Handbook* (Cowan); *Secrets of Ham Radio DXing* (Tab); *HF Antennas for all Locations* (Moxon). Battery driven 24h world clock. Elaine Green, G0ATS. Tel Camelford (0840) 212262.

DC to dc inverter for FT101ZD, someone must have one. Contact Shaun, G4XDE. Tel 021-525 8329.

KW2000B and psu for club use. F. Butterworth, sec Oldham ARC. G4SPX, QTHR. Tel 061-652 8862 or PO Box 29, Oldham, Lancs.

Grundig Satellit 1400 in good cond, with circuit and instructions, up to £100. Would collect within 80 miles of Cheltenham or possibly in South Devon, also GE (US) valve data book, about 1960. G4OYB, QTHR. Tel Cheltenham (0242) 513561.

Linear amplifier hf, KW1000/2000 Drake L4B/L4PS or similar. GW4RYK Castell Forwyn, Abermule, Montgomery SY15 6JH. Tel 068 686 255.

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B2 tx for operative and sentimental reasons, my first tx 32yrs ago, with or without rx/tx. G3JIC, QTHR. Tel 0744 23916.

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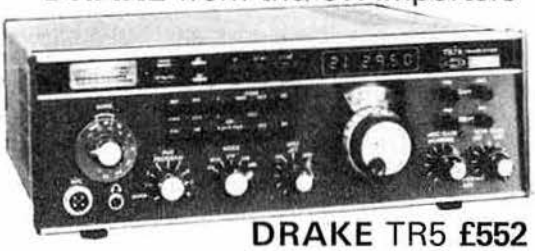

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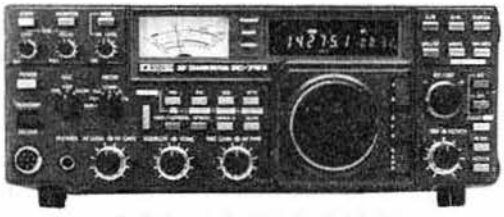

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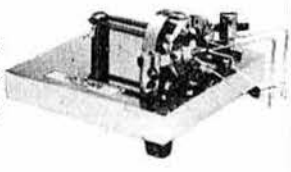

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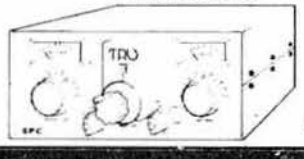

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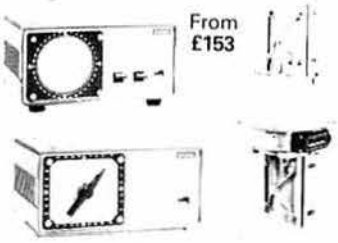

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FL3 SSB/CW/RTTY audio filter (as in FL2) plus **automatic** whistle remover. **£129.37**

FL2/A Fully assembled PCB module with hardware and instructions to convert FL2 to FL3. **£39.67**

RF SPEECH PROCESSORS

ASP The fully automatic **definitive RF Speech Processor** ("73" July 81) **£82.80**

D75 Manually controlled RF speech processor **£56.35**

D75/K Uncased version of D75 **£40.70**

MORSE EQUIPMENT

D70 The **"go-anywhere"** Morse Tutor. The PP3 battery supplied should last you until the exam! **£56.35**

MK Deluxe **Self contained** keyboard morse sender with memories. (SWM April 82, Amateur Radio April 83) **£137.42**

RADIO DIRECTION FINDER

This system turns any NBFM rig into a radio direction finder **which really works.** It is currently in use from HF to UHF by Government Departments, professionals of all kinds, and **amateur DFers** (Rad. Com. Jan. 84, Citizens Band Jan. 83).

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AD270 Indoor version of AD370 **£51.75**

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RFA 5 to 200MHz low noise preamplifier. **Why be bound to one band per preamp?** (Ham Radio Nov. 83) **£33.92**

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HF –
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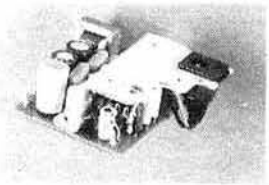

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73, W&D

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2. 500mW TV Transceive	(As 1 above plus TVUP2 + PSI433)	60.00
3. 10W TV Transmit	(As 1 above plus 70FM10 + BDX35)	65.00
4. 10W TV Transceive	(As 2 above plus 70FM10 + BDX35)	90.00
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10. 2M Synthesised 10W Transceive	(R5 + SY + SY2T + SSR + 144FM10A)	120.00
11. 2M Crystal Controlled 10W Transceiver	(R5 + T3 + BPF + 144FM10 + SSR)	85.00
12. 70cms Linear/Pre-amp	(70LIN10 + 70PA2/S)	45.00

70cms EQUIPMENT	**CODE**	**ASSEMBLED**	**KIT**
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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
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Synthesiser Modulator	MOD 1	8.95	5.50
Bandpass Filter	BPF 433	6.50	3.30
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Converter (2M or 10M i.f.)	70RX2/2	27.10	20.10
TV Products			
Receiver Converter (Ch 36 Output)	TVUP2	27.50	22.80
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TV Modulator (For Transmission)	TVM1	9.85	5.75
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6M EQUIPMENT			
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Transceiver Kits and Accessories			
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FM Receiver (with PIN RF Changeover)	144FM2R5	65.50	47.20
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Kaytone	PTK3	8.75	6.05
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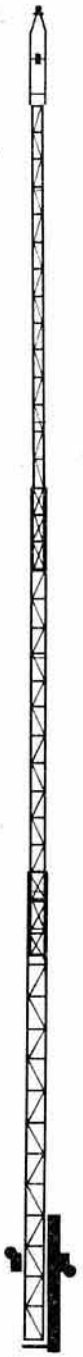

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Latest date for acceptance—7 weeks before 1st of issue month.
All classified and semi-display advertisements MUST be prepaid.

Copy and remittance to: **M. J. HAWKINS G3ZNI, RSGB Advertisements, PO Box 599, Cobham, Surrey KT11 2QE.**
(Cheques should be made payable to RSGB.)

Members' Ads must be sent to the editor at Chelmsford.

INCREASE IN CLASSIFIED RATE

With effect from the February 1985 issue, the rate for Classified advertisements will be increased to 30p a word (minimum advertisement value, £4.80). This has become necessary due to the number of increases in postage and printing costs that have occurred since the last increase in the Classified rate which was in August 1981. However, all orders with cheques received before Friday January 18th will be accepted at the old rate.

FOR SALE

QSL CARDS printed to your own specification on white or coloured gloss card. Send S.A.E. for sample pack to: The Caswell Press, 11 Barons Way, Woodhatch, Reigate, Surrey.

AMIDON TOROIDAL CORES, ferrite rings for TVI filters, ferrite beads. Send SAE for data and prices. SMC (TMP electronics), Unit 27, Pinfold Works, Pinfold Lane, Buckley, Clwyd.

QSL & LISTENER CARDS. Quality printing on coloured and white gloss card at competitive prices. SAE for samples. S. M. Tatham, "Woodside", Orchard Way, Fontwell, Arundel, West Sussex.

G5RV TYPE AERIALS. Half-size £13.00, full-size £14.95. New hard drawn copper aerial wire. 140ft 14swg, £7.90; 50 metres 16swg, £6.90. Soft enamelled copper wire 10 metres 12swg, £3.50. 50 metres 1.4mm, £5.75. Ceramic egg insulators. Large 50p; small 40p. Guy rope, 4mm polypropylene, 50 metres £3.95. 4mm nylon, 50 metres £6.90. All items post paid. S. M. Tatham, 1 Orchard Way, Fontwell, Arundel, West Sussex.

D.I.Y. QSLs/SWLs (state which!!). 100 mixed designs/colours, £2.50 (c.w.o.). Q/Cards, 87 Derwent Street, Blackhil, Consett DH8 8LT.

PERSONALISED QSL CARDS, 1000 £15.00, 5000 £50.00. Sae for samples. Q/Cards, 89 Derwent Street, Blackhill, Consett DH8 8LT.

50m (165ft) AERIAL WIRE. Strong PVC covered copper only, £4.40 inc postage. W. H. Westlake, Clawton, Holsworthy, Devon.

QSL CARDS. Gloss or tinted cards. SAE for samples to Twrog Press, Penybont, Gelildan, Blaenau Ffestiniog, Gwynedd.

CREED TELEPRINTERS 444(TP15) complete with perforator and reader. Tested working. Available to Raynet members only. £40. Details Mike Watson G8CPH, Ipswich (0473) 831448.

PAG, RTTY TERMINAL UNIT KIT. PLL, AFSK, auto start stop. Complete with PCB, power supplies, case components; £56. Details Mike Watson G8CPH, Ipswich (0473) 831448.

"RAYNET" YELLOW REFLECTIVE TABBARDS with RAYNET front and rear similar to Police and Ambulance, etc. Also "RAYNET CONTROLLER". 2 sizes. Prices from £6.90 inc p&p. Details Mike Watson G8CPH. Ipswich (0473) 831448.

QSL CARDS. Try me for quality and price, etc. SAE for samples. A. W. Bailey (G3YNI), Lower Wick Farm, Wick Lane, Lympsham, Somerset.

DX QSL CARDS. Display your best cards in our clear plastic hanging wallets, holds 20 cards. Pack of three, £2.20. Viola Plastics, Dept RC, 6 Croft Road, Hastings, Sussex.

QSL CARDS. White and tinted. Send SAE for samples. EPS Copycentre, 180 Portland Road, Hove, Sussex.

XYLs—AT LAST A PRESENT YOU CAN CHOOSE—Pure new wool sweaters with the callsign or logo of your choice from £14.99 (plus p&p). 'Phone (027 588) 7386 or send SAE to Mrs J. Mottart, 29 Ludlow Close, Willsbridge, Bristol for details.

ALL THE FAMOUS MOSLEY ANTENNAE TA-33Jr, Mustang, Atlas, V-3Jr, TD-3Jr Beams, Verticals etc., Also spares available only direct from us. Send £1 for our Handbook showing all Antennae. Mosley Electronics, 196 Norwich Road, New Costessey, Norwich NR5 0EX.

LOG BOOKS £2, CALLSIGN BADGES £1. Both inclusive carriage. Also wide range of accessories supplied. Morse keys, rigs for 10m, coax plugs and much more. GeeFor Enterprises (RC), 112 Leeds Road, Mirfield, West Yorks WF14 0JE.

G5RV TYPE ANTENNAS. Everything you need, hard drawn copper wire, heavy duty ribbed insulators, and quick fit spreaders to make low loss open wire feeder, complete kit with instructions £11.00, half size £10.00, ready made £15.00, half size £14.00 post paid. Viola Plastics, 36 Croft Road, Hastings, Sussex.

STANDARD C5800 MULTIMODE 2M rig. Unused, in original box, £290. Trio 2200TR with 9W homebrew burner and magmount, £55. Sensible offers please. Station going QRT. Telephone (0277) 822720 (Essex).

BUYING OR SELLING? Contact the used equipment centre for the best deal. 25 years of amateur radio experience, friendly advice, full no quibble guarantee on all equipment. Heard about our exchange plan, Buy and Try? Why not contact me, David Cole G3RCQ, Hornchurch 55733 evenings/weekends or send SAE for full details and current list of equipment. G3RCQ, 65 Cecil Avenue, Hornchurch, Essex. Urgent daytime enquiries, 01-594 3495.

PCB's MANUFACTURED. Prototypes, production runs, component identification, printed panels. UV and screen printing equipment supplied. Quotations. Orbit (G4GQL), 38 Torquay Gardens, Redbridge, Essex. 01-550 3610.

VHF/UHF/SHF HIGH POWER AMPLIFIERS, parts, 4CX250B, relays, PTFE sheet, standoffs, no VAT, metalwork, blowers. Also the new GJ4ICD C.A.D. book on amplifiers up to maximum UK, European and U.S. legal output power limits on 432MHz, circuits, pictures, step by step instructions by a computer C.A.D. system which cost thousands of pounds showing blowing methods and ideas for tube high power amps. Also contains parts prices. Only £2.50 post free. Geoff Brown GJ4ICD, Belmont Road, St Helier, Jersey, C.I.

HORSETRADER RADIO BUY AND SELL amateur radio equipment old and new. We are also local stockists of Tonna, BNOS, Mutek, etc. Call Derek G4XQU for cash offer on Bradford 663928, or call at Horsetrader Radio, 1424 Leeds Road, Thornbury, Bradford, W. Yorkshire, BD3 7AD.

BE DISTINCTIVE: SWEATSHIRTS printed with your callsign/name. Quality 50/50 polycotton. Colours: Grey, Fleck, Navy, Red. £6.50 + p&p. State size. Also teeshirts. Bulk discounts for clubs. Orbit, 38 Torquay Gardens, Redbridge, Essex. 01-550 3610.

KW M40 10 METRE FM transceiver. 5W, 12-14v. £46.72. AC base station, £66.10. Repeater offset add £9.00 either model. 25W Lin. Amp. £17.50. Prices incl. VAT & postage. KW Communications Ltd, Vanguard Works, Chatham, Kent ME4 5RT. Phone (0634) 815173.

200 DIY QSL's—mixed designs, colours £5.00 Hampshire Logbook £1.90. SAE lists. RWW, PO Box 11, Romsey, Hampshire, SO5 8XX.

PHONE-ATLAS GAZETTEER—with maps, giving approximate location of all U.K. telephone numbers, £5.75. RWW, PO Box 11, Romsey, Hampshire, SO5 8XX.

MANUALS. HUNDREDS AVAILABLE. AR88, 1155, SX28, CT436, etc. "The Moorings", 41 Halvarras Road, Truro TR3 6HD. (0872) 862575. SAE.

AMATEUR RADIO INSURANCE SCHEME

"ALL RISKS" INSURANCE for portable/mobile/base station amateur radio and ancillary equipment. A service for RSGB members only. Also public liability and equipment insurance for affiliated clubs and societies. Details and leaflets from Nick Gibson, Amateur Radio Insurance Services Ltd, 19 Quarry Street, Guildford, Surrey. Tel: 0483 33771.

HOLIDAY ACCOMMODATION

FAIRMOUNT HOUSE—THE HOTEL TO SUIT EVERYONE. Wonderful food, lovely bedrooms (most en suite), quiet sunny gardens and a welcoming atmosphere. Old-timer G6GR operates the Yaesu-equipped shack—visitors welcome. Special offers this year, including free accommodation for children. Dogs are welcome, too. Please ask for brochure and details from Mr and Mrs Tolkien, Fairmount House Hotel, Herbert Road, Chelston, Torquay TQ2 6RW. Tel. (0803) 605446.

SELF-CATERING CHALETS. Explore by day, DX by night. My aerials, your rig. £15-£120 per chalet per week. Green, G0ATS, 'Chylean' Tintagel, Cornwall PL34 0HH. Tel. (0840) 212262.

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PEMBROKESHIRE—SOLVA. Quality cottages on magnificent, unspoilt coast. Near sandy beaches and bays. All home comforts, warmth and privacy. Free use of HF and VHF gear in your own cottage. For colour brochure, phone M. Probert GW4HXO—(0437) 721491.

LANZAROTE—Canary Islands. Enjoy the sunshine this winter on the interesting and fascinating island of Lanzarote. Superb villas, elegantly furnished, peaceful location, just 300 yards from the beach. Only 15 minutes from airport. Resident management. Rental only or fully flight inclusive. M. Probert GW4HXO—(0437) 721491.

TORQUAY (0803) 607333. Self-contained holiday flats, 2/6 persons, open all year. SAE brochure, Linden House, Ruckamore Road, Torquay.

MISCELLANEOUS

COURSE FOR CITY & GUILDS, Radio Amateurs Examination. Pass this important examination and obtain your licence, with an RRC Home Study Course. For details of this and other courses (GCE, Career and professional examinations, etc) write or phone—THE RAPID RESULTS COLLEGE, Dept JT5, Tuition House, London SW19 4DS. Tel: 01-947 7272 (9am-5pm) or use our 24hr Recordacall service 01-946 1102 quoting JT5.

HEATHKIT. UK spares and service centre. Cedar Electronics, Unit 12, Station Drive, Bredon, Tewkesbury, Glos. Tel (0684) 73127.

GB NEWS 1985—packed with information for your Continental Holiday, 2 × 13p stamps. GB Car Club, FREEPOST 1, Romsey, Hants. SO5 8ZT.

COMPUTER SOFTWARE/HARDWARE

BBC MICRO RTTY PROGRAM. Now available on EPROM. Split screen, type ahead. Cassette and instructions, £7.50. Disk £9.50. Available soon—stand-alone AMTOR system. P. J. Harris G3WHO, 10 Appleby Close, Great Alne, Alcester, Warks. Tel (078 981) 377.

BBC AMTOR. Its here at last! Full feature stand-alone Amtor program for the BBC micro on Eprom. Uses ordinary T.U. Split screen, memories, clock, mailbox etc. Phone or SAE for full details and price. P. J. Harris (G3WHO), 10 Appleby Close, Great Alne, Alcester, Warks. B49 6HJ. Tel. (078 981) 377.

ORIC ATMOS. RTTY £9.50, Morse Tutor £6, QTH Locator handles Lat/Long, QRA, Worldwide locator £5, all three £18. Electron/BBC Ham package: Morse Tutor, QTH Locator, ATV Test Card, £14. For Sinclair QL £17. SAE details—Vomek Software, 11 The Dell, Stevenage, Herts.

COMPUTER SOFTWARE/HARDWARE (cont.)

PACKET RADIO boards assembled/tested, AX.25 protocol, built-in modem, use with any micro having RS-232 only £249. In cabinet £285. SAE details: Vomek Software, 11 The Dell, Stevenage, Hervs.

QTH LOCATOR SYSTEM (Maidenhead). QRA to QTH conversion. Dec deg conversion. Distance calculation. DX beam headings. QTH to d.m.s. calculation. Etc. CBM64, Apple. Cassette £6.50. Disc £8.50, inc. p&p. Moray Micro Computing, Enzie Slackhead, Buckie, Moray. AB5 2BR.

COMMODORE 64 RTTY PROGRAM. Split screen, type ahead facility, memories which can be saved. CW ident plus many more features. £7.95 including p&p. G4MQW, QTHR or telephone 021-745 4068 after 6.00pm.

COMMODORE 64 AND SINCLAIR SPECTRUM Programmers Wipe Clean Planning Sheets. Double sided, high quality, easy to use Graphic and Audio planning sheets. Helps with those Data Statements. Plan your character shapes screen graphics and colours, plus sprites and sound effects on the C64. Registers and addresses given in hex and decimal. Plastic laminated sheets, wipe clean after use. Commodore 3 sheets £5.95, Spectrum 2 sheets £4.95 p.p free (UK). Graphic Response, Box 197, PO Box 599, Cobham, Surrey KT11 2QE.

MORSE READER PROGRAMMES. Off air onto screen. Programmes for BBC-B, Spectrum, ZX81, Dragon, Amstrad 464, Commodore 64 and any Vic20. Sinclair computers need no interface, others use simple one transistor (BC107) device. Programmes self track 8/30 wpm. All connections to existing sockets. Cassette with full instructions and circuit £6.00. J. Price, 4 Housman Walk, Kidderminster.

BBC MICRO PROGRAMS. . . . Morse Tutor. HF Field Day Contest Checker (2500 Calls). Auto duplicate check. Direct print to Form HFC1. . .Get ready for the 1985 Contests. Send SAE for Program Specs. G. MacKenzie GM4NUN, 278 Ayr Road, Newton Mearns, Glasgow. G77 6AQ.

BBC MICRO SOFTWARE. RTTY transceive program in ROM which is entered simply by typing "*RTTY". Terminal unit pcbs, kits and built boards now available. Sophisticated morse teacher, slow morse broadcast software, morse beacon. Written by professional software designers. Send large SAE for detailed technical specifications. GOC Software Limited, "CQ Cottage", Longhill Lane, Audlem, Cheshire CW3 0HU.

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MORSE TUTOR CBM64, VIC20, BBC-B, Spectrum, ZX81-16k. Superb program, very easy to use. Absolute beginner to over 40 wpm. Learn in stages, random letters, figures, words, plain language. Any amount, any speed. Tape, instructions, comprehensive learning guide £6 inc p&p. GW3RRI, see ad above.

RAE MATHS CBM64, VIC20, BBC-B, Spectrum, ZX81-16k. Gives unlimited practice and testing in all RAE formulae to make you perfect in this vital part of the exam. Don't let maths make you fail. Pass with this program. Tape, instructions, complete reference sheet £8 inc p&p. VIC20 needs expansion. GW3RRI, see ad above.

LOCATOR CBM64, VIC20, BBC-B, Spectrum. QTH or Maidenhead locators or lat/long. Distance, beam and return headings, VHF contest points and totals, long path details, converts between locator and lat/long. Tape, instructions £6 inc p&p. GW3RRI, see ad above.

LOGBOOK CBM64, VIC20, BBC-B, Spectrum. Records date, band, mode, callsign and large space for remarks of all your contacts. Superfast M/C callsign search. Easy, fast updating of files. Output to screen or printer. Tape, instructions £6 inc p&p. GW3RRI, see ad above.

CONTEST LOG, CBM64, VIC20, BBC-B. All details for RSGB HF/VHF contests. Instant duplicate check. Calculates distance and points for VHF. Outputs in required page format. Tape, instructions £6 inc p&p. GW3RRI, see ad above.

SPEED UP CALLSIGN IDENTIFICATION by sending for our 48K Spectrum tape giving Country, Continent, CQ zones, ITU zones. All bearings from London. Price £6.50 per tape incl. p&p. Send to Comtom Programmes, 11 Apperley, West Denton, Newcastle-upon-Tyne NE5 2JS.

BBC MICRO SOFTWARE. RTTY/CW Transceive, Send/Receive Morse Tutor, Super Locator, Sun/Moon prediction, Multifile, Disc Menu/Catalogue, Utilities, TU info. Please send two SAE/IRC for details and updates. BLT Software, 1 Wavell Garth, Sandal Magna, Wakefield, WF2 6JP.

ACORN ELECTRON SOFTWARE. Comprehensive Morse Tutor, Super Locator, Sun/Moon prediction, Multifile, Utilities. Please send two SAE/IRC for details and updates. BLT Software (RE), 1 Wavell Garth, Sandal Magna, Wakefield, WF2 6JP.

TANDY COLOR (Extended) and Dragon 32/64. AMTOR, RTTY/ASCII and CW transceive programs. Superb specifications. Triple cartridge £69. Separate programs from £10.75. Dragon morse tutor £6.50. SAE for details. State callsign (if any). Grosvenor Software (G4BMK) QTHR (0323) 893378.

VIC20 RTTY split-screen, type-ahead, any Baud rate, scratchpad memories, printer support. Suitable for expanded or unexpanded VIC. Tape £10. G4BMK see above.

CBM64 RTTY split-screen, type-ahead, Baud rate detector, unattended mode etc. Tape £11, Disk £14. G4BMK see above.

ATOM RTTY split-screen, type-ahead, memories etc. Utility ROM accessed by typing RTTY, £16. G4BMK see above.

QSO ORGANISER. Ideal gift for disorganised shack. Dedicated database/word processor. Features include automatic file handling, rapid data entry, search, prints log and QSLs. SAE Details, samples. BBC Disc, £9.50. G4RAK. 21 West Wools, Portland, Dorset. Tel (0305) 822753.

SPECTRUM 48K "4/2/70" AWARD manager. Log calls/QRA, summaries, prefix directory inc. Maidenhead. £6.50. "Wire" scheduler construction aide 48K, £6.50. "Parts" order—48K, £6.50. SAE enquiries. G4INP Software, 3 Redhouse Lane, Leiston, Suffolk.

SITUATIONS VACANT

SUMMER JOBS IN AMERICA: American childrens' summer camps are seeking bright, enthusiastic young people (age 19½-35) to live and teach Amateur Radio skills to children from mid-June thru mid/end August. Return flight, special work visa, food and accommodation plus $250-$300 pocket money arranged. A worthwhile and challenging job for those who like outdoor living, don't mind hard work and have a genuine love for children. If you have some relevant experience and would like further details of this great opportunity for work and travel (up to six weeks after camp) in North America, Contact: Rod Carol, Bunacamp, 58-60 Berners Street, London W1P 3AE. Tel: 01-637 7686/7.

AERIAL MANUFACTURERS SEEK DESIGNER to assist in development, either consultancy or staff basis. London NW area. Box 198, PO Box 599, Cobham, Sy KT11 2QE.

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The following valves in matched pairs 6JS6/C, 6KD6, 6JB6/A, 6LQ6, 6HF5, 6146A, 6146B. **YES** the 6JS6/C is Japanese and works in the FT101. Most amateur radio valves including difficult to obtain types **EX STOCK**. Quotations without obligation. If we don't stock your type we may be able to import for you, PLEASE ENQUIRE. REMEMBER over 200 types **EX STOCK**. Sae for list. 'Phone for assistance re types suitable for your equipment. USA and Jap manufacture of popular types available.

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RSGB MAIL-ORDER PRICE LIST

RSGB books

	Non-members' price	Members' price
A Guide to Amateur Radio (19th edn)	£3.91	£3.52
Amateur Radio Awards (2nd edn)	£3.68	£3.31
Amateur Radio Operating Manual	*(Out of print)*	
HF Antennas for All Locations	£7.35	£6.62
How to Pass the Radio Amateurs' Examination	£3.42	£3.08
Microwave Newsletter Technical Collection	£6.83	£6.15
Morse Code for Radio Amateurs	£1.64	£1.48
RSGB Amateur Radio Call Book (1984 edn)	£7.14	£6.43
Radio Amateurs' Examination Manual (10th edn)	£3.84	£3.46
Radio Communication Handbook (5th edn) Vol 2	£8.46	£7.61
Radio Communication Handbook (Vols 1 and 2 combined, paperback)	£11.79	£10.61
Raynet Manual (1984 edn)	£2.78	£2.50
Teleprinter Handbook (2nd edn)	£12.72	£11.45
Television Interference Manual (2nd edn)	£2.31	£2.08
Test Equipment for the Radio Amateur	£6.41	£5.77
VHF/UHF Manual (4th edn)	£10.58	£9.52
World at Their Fingertips (paperback)	£7.75	£6.98

RSGB logbooks

Amateur Radio Logbook	£2.77	£2.49
Mobile Logbook	£1.23	£1.11
Receiving Station Logbook	£2.87	£2.58

RSGB maps, charts and lists

HF Awards List and Countries List	48p	43p
Great Circle DX Map (wall)	£2.43	£2.19
IARU Region 1 Beacon List	40p	36p
Locator Map of Europe (wall)	£1.95	£1.76
Locator Map of Europe (card for desk)	70p	63p
UK Beacon List	40p	36p
UK Repeater List and maps	50p	45p
World Prefix Map in full colour (wall)	£2.53	£2.28
Meteor Scatter Data	£3.51	£3.16

RSGB members' sundries (members only)

Radio Communication Easibinder	—	£6.14
RSGB badge car sticker	—	49p
RSGB belt (real leather)	—	£7.57
RSGB hf contest log sheets (100)	—	£2.10
RSGB vhf contest log sheets (100)	—	£2.10
RSGB tie (coffee, maroon, green or blue)	—	£3.18
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RSGB logo rubber stamp	—	£3.16
RSGB station callsign plaque*	—	£9.50
RSGB teeshirts (med, large, exl)	—	£4.90
Standard callsign lapel badge*	—	£1.96
De-luxe callsign lapel badge*	—	£2.80
Lapel badge (RSGB emblem, pin fitting)	—	59p
Mini lapel badge (RSGB emblem, pin fitting)	—	68p
Members' headed notepaper (50 sheets) quarto	—	£1.20
Members' headed notepaper (50 sheets) octavo	—	75p

**Delivery approximately five weeks*

Miscellaneous

"Amateur radio" (two colours) car sticker	73p	66p
DX Edge (HF propagation prediction aid)	£14.09	£12.68
"I'm on the air with amateur radio" (four colours) car sticker	84p	76p
"I'm monitoring -5 are you?" (two colours) car sticker	73p	66p
QSL card holders	£1.23	£1.11
Radio Communication back issues *(As available)*	£1.32	£1.19
Radio Communication bound volume, 1980 (Parts 1 and 2)	£14.93	£13.44
Radio Communication bound volume, 1981	£14.93	£13.44
Radio Communication bound volume, 1982	£15.93	£14.34
Radio Communication bound volume, 1983	£16.90	£15.21
Smith charts, pad of 25 (Chartwell D7510)	£2.23	£2.01

ORDERING INFORMATION

NON-MEMBERS. Use left-hand price columns. Note that members' sundries are only available to members of RSGB.

MEMBERS. Use right-hand price columns. It is essential that you quote your call sign or BRS number so that you can be recognised as a member.

PRICES. These include postage, packing and VAT where applicable. For airmail despatch, please ask for price before ordering. Goods are obtainable, less p & p, at RSGB headquarters between 10am and 4pm, Monday to Friday.

POSTAL TERMS. Cash with order. **Stamps and book tokens cannot be accepted.** Cheques and postal orders should be crossed and made payable to "Radio Society of Great Britain". Our Giro account number is 5335256. Please write your name and address clearly on the order, and allow up to 28 days for delivery.

Other publications

	Non-members' price	Members' price
Active-filter Cookbook (Sams)	£12.71	£11.44
All About Cubical Quad Antennas (RPI)	£5.83	£5.25
Amateur Single Sideband (Ham Radio)	£5.46	£4.91
Amateur Television Handbook (BATC)	£2.55	£2.30
Amateur Television Handbook Vol 2 (BATC)	£2.77	£2.49
AMSAT-UK Technical Manual (AMSAT-UK) (Includes all revises and updates, including Oscar 10 data)	£14.83	£13.35
Antenna Anthology (ARRL)	£6.00	£5.40
ARRL Antenna Book (ARRL) (New edn)	£8.78	£7.90
ARRL Electronics Data Book (ARRL)	£4.47	£4.02
Beam Antenna Handbook (RPI)	£6.83	£6.15
Better Short Wave Reception (RPI)	£6.83	£6.15
Care and Feeding of Power Grid Tubes (Varian)	£6.99	£6.29
CMOS Cookbook (Sams)	£13.07	£11.76
Complete DX'er (W9KNI)	£7.77	£6.99
Complete Shortwave Listener's Handbook (Tab)	£12.21	£10.99
Design of VMOS Circuits with experiments (Sams)	£8.50	£7.65
FET Principles, Experiments and Projects (Sams)	£8.04	£7.24
FM and Repeaters for the Radio Amateur (ARRL)	£4.30	£3.87
G-QRP Club Circuit Book	£4.52	£4.07
Guide to Oscar Operation (AMSAT)	£1.78	£1.60
Hints and Kinks for the Radio Amateur (ARRL)	£4.47	£4.02
How to Troubleshoot and Repair AR Equipment	£10.47	£9.42
IC Op-amp Cookbook (Sams)	£11.76	£10.58
International VHF FM Guide	£2.45	£2.21
Newcomer's Guide to Simplex and Repeaters on 2m (UK FM Group)	£1.24	£1.12
**Power Supply Handbook* (Tab)	£10.99	£9.89
Radio Amateurs Antenna Handbook (RPI)	£6.88	£6.19
Radio Amateurs Callbook (1985) (DX listings) (ARC1)	£16.63	£14.97
Radio Amateur Callbook (1985 USA listings) (ARCI)	£16.93	£15.24
Radio Amateurs Handbook (1984) (ARRL)	£6.66	£5.99
Radio Amatuers Handbook (1985) (ARRL)	£14.80	£13.32
RTTY Today (UEI) (A modern guide to rtty)	£7.19	£6.47
Radio Amateurs Handbook (1985) (ARRL)	£14.80	£13.32
Radio Frequency Interference (ARRL)	£4.18	£3.76
Satellite Experimenters Handbook (ARRL)	£10.11	£9.10
Satellite Tracking Software for the Radio Amateur (AMSAT-UK)	£4.47	£4.02
**Secrets of Ham Radio DXing* (Tab)	£7.92	£7.13
Semiconductor Data Book (Newnes)	£7.97	£7.17
**Shortwave Listeners' Antenna Handbook*	£10.10	£9.09
Shortwave Propagation Handbook (Cowan)	£7.79	£7.01
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**Towers International MOS Power & FET Selector*	£10.95	£9.86
**Towers Op-Amp Selector*	£9.50	£8.55
UHF-Compendium Parts 1 and 2	£14.93	£13.44
Understanding Amateur Radio (ARRL)	£4.73	£4.26
Understanding the Oscilloscope	£10.10	£9.09
VHF Propagation Handbook (Nampa)	£3.75	£3.38
Weekend Projects for the Radio Amateur (ARRL)	£4.95	£4.46
World Atlas (RACI)	£3.35	£3.02
World Radio TV Handbook 1984	£12.81	£11.53
**99 Test Equipment Projects You Can Build*	£8.00	£7.20

***Items marked with an asterisk may not be available immediately. Please telephone before ordering to confirm availability.**

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G3HSC rhythm method of morse tuition		
Complete course (Two 3-speed lp records and one ep, plus books)	£8.99	£8.09
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On all overseas orders for G3HSC course, including orders from Eire, add £1.12 for additional packing and postage from supplier

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QST (including ARRL membership). One year	£21.24	£19.12
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NEWSLETTER SUBSCRIPTIONS

Microwave Newsletter, VHF Newsletter, DX Newsletter. For details contact the membership services department at RSGB headquarters.

ORDER FROM: **RSGB Publications (Sales), Alma House, Cranborne Road, Potters Bar, Herts EN6 3JW**

(Raynet supplies should be obtained from Mrs J. Balestrini, Merrivale, Willow Walk, Culverstone, Gravesend, Kent)

RAD COM OPERATING GUIDE 1985

(Supplement to *Radio Communication* January 1985)

General rules for RSGB vhf/uhf/shf contests 1985

The rules governing all RSGB vhf/uhf/shf contests to be held in 1985 will be selected from the following general rules, which will be referred to by number. Please read the rules carefully before the event. Supplementary rules will be added for the more complex events, such as VHF NFD.

Cover and summary sheets and up to 10 log sheets are available from the contest adjudicator. If you are entering a contest for the first time write to the contest adjudicator enclosing a large sae and a recent *Radio Communication* address label as proof of membership. For subsequent supplies it is only necessary to tick the bottom of the cover sheet (Form 427) and enclose a large sae. All stationery is A4 size (30 by 21cm); envelopes which hold flat sheets will carry far more than those which require the sheets to be folded. Note that a 13p or 17p stamp is only sufficient for 8-10 sheets. Larger quantities of log sheets may be obtained from RSGB Publications (Sales) quoting reference LSVHF. Queries on vhf contests may be made to John Quarmby, G3XDY, 12 Chestnut Close, Rushmere St Andrew, Ipswich, IP5 7ED, telephone Ipswich 717830.

Please note that some rules have been amended since 1984, so please read them all carefully. In particular, please note that the new IARU locator system must be used in all vhf contests from January 1985.

1. Date and time: See individual contest rules.

2. Entries

(a) All entries must be sent to the contest adjudicator at the address shown in the rules, and must be postmarked not later than 15 days after the end of the contest or last cumulative activity period.

(b) All entries must be accompanied by a correctly-completed current RSGB vhf/uhf contest cover sheet (Form 427) for each band used. In multiband events entrants must also complete a multiband summary sheet (Form 4422).

3. Operators: All operators must be RSGB members.

4. Sections

(a) All classes of stations with no separate sections.
(b) Fixed stations only.
(c) Portable stations only.
(d) There will be two sections:
Section S—Single-operator
Section M—Multi-operator
(e) There will be two sections:
Section F—Fixed stations
Section O—All other stations
(f) Sections as per IARU rules.

In fixed station sections, the station must be located at the main address as shown on the licence.

Single-operator stations are those operated by one operator who received no assistance whatsoever with the operating or log-keeping during the contest.

5. Locations

In multiband events all stations forming one entry must operate from one site, defined as a circle of 1km radius.

All equipment for portable stations must be installed on site during the 24h preceding the contest or during the contest itself.

(a) Entrants may not change the location of their stations during the contest.

(b) Entrants may change the location of their stations once during the contest. In the event of a repeat contact with a station, the higher score should be claimed, and the other contact clearly marked as a duplicate.

6. Modes

(a) Contacts may be made on all permitted modes.

(b) Entrants may transmit only A1A (cw) or F1A (fsk) and contact only other stations transmitting these modes.

7. Scoring

No points will be lost if a non-competing station being contacted by an entrant is unable to supply a QTH, IARU locator, or serial number, but the receiving operator must obtain enough information to be able to calculate the claimed distance score. Contacts with stations whose callsigns appear on the cover sheet will not count for points.

(a) Contacts made between stations separated by the distances shown in the table will score as indicated. Distances falling on borders between scoring rings score low, eg 50km scores 1 point.

Km	Points	Km	Points
0-50	1	150-200	7
50-100	3	200-250	9
100-150	5	250-300	11

and pro rata

Note: All radial rings are 50km wide; all possible scores are odd numbers.

(b) Contacts will be scored at one point per kilometre.

8. Final tabulation of multiband contests

(a) All bands will be listed separately. There will be no overall table.

(b) The final tabulation showing the overall results will be formed by taking the sum of the points gained on each band, which will first be calculated by dividing each stations score by that of the band leader and multiplying by 1,000.

ie Points for each band: $\frac{\text{Score achieved from Rule 7}}{\text{Band leader's score from Rule 7}} \times 1{,}000$

(c) The final tabulation and multipliers will be in accordance with IARU rules.

9. Awards

There will be an award to the highest scoring station in each section. An award will also be made to the runner-up in each section in which there are 10 or more entries. In events tabulated under Rule 8(b) a certificate will be awarded to the highest scoring station on each band that has not qualified for either the overall winner or runner-up award.

10. Crossband contacts

(a) Crossband contacts do not count for points.

(b) Half points can be claimed by both stations for a crossband contact if two-way communication cannot be established on the same band.

11. Repeat contacts

(a) Only one scoring contact may be made with a given station on each band in use during the contest; ie any callsign regardless of suffix or prefix may only be worked for points once. Any non-scoring contacts must be clearly marked in the log. Unmarked duplicate contacts will be penalized at the rate of 10 times the claimed score for that contact.

(b) One contact may be made with a given station (as defined in 11a) during each activity period. Only the highest scoring three activity periods will count towards the final score. However, all available logs should be sent to the adjudicator for the purpose of checking. Serial numbers increment from 001 for each activity period.

12. Log keeping

The logs for contest entries must be made out on current RSGB vhf/uhf log sheets, or if computer listings are to be submitted, these must be cut to A4 size, RSGB log format, and be line spaced to contain 25 contacts per sheet.

Logs must be tabulated as follows:

(a) *i)* Date/time (gmt)
ii) Callsign of station worked
iii) My report on his/her signal and serial number
iv) His/her report on my signal and serial number
v) IARU locator received
vi) QTH received
vii) Points claimed

The contest exchange must consist of both callsigns, RS or RST report followed by serial number, both IARU locator and QTH. The QTH must be given as a point identifiable on an Ordnance Survey route planning map (scale 1:62,500) or as a distance and direction not greater than 25k from such a point. In multiband events the QTH must be given in a different form on each band.

(b) As 12(a) but less part *vi* (QTH received). The QTH need not be given as part of the contest exchange, but contestants should note Rule 14.

13. Serial numbers start from 001 and advance by one for each contact.

14. A station must operate within the terms of his/her normal licence. (This excludes high-power permits). Special event callsigns may not be used.

15. A station may not engage in more than one contact at the same time.

16. The equipment comprising the station may be used under one callsign only for contest purposes on each band. This does not apply to the use of shared equipment for talkback.

17. The use of auxillary transmit antennas producing beams not pointing in the direction of the main lobe of the main transmit/receive antenna is not permitted.

18. Stations using telephony in the recognized cw sub-bands 70·025-70·150MHz, 144·000-144·150MHz, 432·000-432·150MHz and 1,296·000-1,296·150MHz, or transmitting on beacon frequencies, are liable to disqualification. Entrants should observe the provisions of the IARU/RSGB band plans.

19. Stations which persistently radiate poor-quality signals, or otherwise contravene the code of practice for vhf/uhf contest operation (see below), are liable to disqualification or loss of points.

20. Contacts made via a repeater, man-made satellite, or moonbounce will not count for points.

21. Proof of contact may be required.

22. Entrants must permit inspection of their station by members of the VHF Contests Committee, or its representatives, and give site access information if requested to do so.

23. Failure to comply with the rules given for a particular contest or with the Code of Practice may result in loss of points or disqualification.

24. The ruling of the Council of the RSGB shall be final in all cases of dispute.

General rules for listeners vhf/uhf contests 1985

1. The following general rules for vhf/uhf contests published above will apply: 1, 2, 3, 4a, 5a, 7a, 9, 11a, 20, 21, 23, 24.

2. Listeners contests are open to all non-licenced members of the RSGB. Only the entrant may operate the receiving station.

3. Logs must show in columns: *(a)* date/time (gmt), *(b)* callsign of station heard, *(c)* my report on his/her signals, *(d)* report and serial number sent by station heard, *(e)* callsign of station being worked, *(f)* IARU locator given by station heard, *(g)* QTH given by station heard (if appropriate), *(h)* points claimed.

On 144MHz the callsign in column *(e)* may only occur once in every 10 contacts logged. CQ and test calls do not count for points and should not be logged. If both sides of a QSO can be heard, both can be claimed for points.

The Hansen Trophy will be awarded to the entrant with the highest aggregate score in all the swl contests between 2 March and 22 September 1985. The aggregate score will be calculated in accordance with general Rule 8b.

UK 144MHz band plan

144.000		
CW only	144.000 to 144.025	*Moonbounce*
	144.050	*CW calling frequency*
	144.100	*MS cw reference frequency*
144.150		
SSB and cw only	144.250	*Used for GB2RS (ssb) and slow morse transmissions*
	144.260 ±	*Used by Raynet*
	144.300	*SSB calling frequency*
	144.400	*MS ssb reference frequency*
144.500		
All modes non-channelized	144.500	*SSTV calling frequency*
	144.600	*RTTY calling frequency*
	144.600 ±	*RTTY working (fsk)*
	144.675	*Data transmission calling frequency*
	144.700	*FAX calling frequency*
	144.750	*ATV calling and talkback*
	144.775	*Raynet*
	144.800	*Raynet*
	144.825	*Raynet*
144.845		
Beacons	(144.850	*Raynet)* †
144.990		
FM repeater inputs	145.000 R0	
	145.025 R1	
	145.050 R2	
	145.075 R3	
	145.100 R4	
	145.125 R5	
	145.150 R6	
	145.175 R7	
145.200		
FM simplex channels	145.200 S8	*Raynet*
	145.225 S9	*Used by Raynet*
	145.250 S10	*Used for slow morse tone modulated transmissions*
	145.275 S11	
	145.300 S12	*RTTY-afsk*
	145.325 S13	
	145.350 S14	
	145.375 S15	
	145.400 S16	
	145.425 S17	
	145.450 S18	
	145.475 S19	
	145.500 S20	*FM calling channel*
	145.525 S21	*Used for GB2RS (fm) broadcast*
	145.550 S22	*Used for rally/ exhibition talk-in*
	145.575 S23	
145.600		
FM repeater outputs	145.600 R0	
	145.625 R1	
	145.650 R2	
	145.675 R3	
	145.700 R4	
	145.725 R5	
	145.750 R6	
	145.775 R7	
145.800		
Satellite service		
146.000		

UK 430-440MHz band plan

430.000		
	NB: 431–432MHz not available within 100km of Charing Cross, London.	
432.000		
CW only	432.000 to 432.025	*Moonbounce*
	432.050	*CW centre of activity*
432.150		
SSB and cw only	432.200	*SSB centre of activity*
	432.350	*Microwave talk-back*
432.500		
All modes non-channelized	432.600	*RTTY calling frequency*
	432.600 ±	*RTTY working (fsk)*
	432.675	*Data transmission calling frequency*
	432.700	*FAX calling frequency*
432.800		
Beacons		
433.000		
FM repeater outputs in UK only	433.000 RB0	
	433.025 RB1	
	433.050 RB2	
	433.075 RB3	
	433.100 RB4	
	433.125 RB5	
	433.150 RB6	
	433.175 RB7	
	433.200 RB8/SU8	*Used by Raynet*
	433.225 RB9	
	433.250 RB10	
	433.275 RB11	
	433.300 RB12/SU12	*RTTY repeater and rtty afsk working*
	433.325 RB13	
	433.350 RB14	
	433.375 RB15	
433.400		
FM simplex channels	433.400 SU16	
	433.425 SU17	
	433.450 SU18	
	433.475 SU19	
	433.500 SU20	*FM calling channel*
	433.600 SU24	*RTTY-afsk*
434.600		
FM repeater inputs in UK only	434.600 RB0	
	434.625 RB1	
	434.650 RB2	
	434.675 RB3	
	434.700 RB4	
	434.725 RB5	
	434.750 RB6	
	434.775 RB7	
	434.800 RB8	
	434.825 RB9	
	434.850 RB10	
	434.875 RB11	
	434.900 RB12	*RTTY repeater-afsk*
	434.925 RB13	
	434.950 RB14	
	434.975 RB15	
435.000		
	434–440	*ATV—frequencies chosen so as to avoid interference to other band users and, in particular, the amateur satellite service*
	435–438	*Amateur satellite service*
440.000		

Notes on UK 144MHz and 430MHz band plans

MS operation can take place up to 7.5kHz higher than the reference frequency (see RSGB *Amateur Radio Operating Manual* p80).

The beacon and satellite service must be kept free of normal communication transmissions to prevent interference with these services. († - 144.850MHz in use by Raynet until further notice, subject to 25W erp max and vertical polarization).

The use of the fm mode within the ssb/cw section and cw or ssb in the fm-only sector is not recommended.

Repeater stations are primarily intended as an aid for mobile working and they are not intended to be used for dx communication. FM stations wishing to work dx should use the all-mode section, taking care to avoid frequencies allocated for specific purposes.

IARU Region 1 HF Band Plan

Band (MHz)		Type of emission
3.50–3.60		cw (2)
3.60	+20kHz	rtty (1)
3.60–3.80		cw and phone (2, 3)
7.00–7.04		cw
7.04	+5kHz	rtty (1)
7.04–7.10		cw and phone
10.100–10.150		cw
10.145	+5kHz	rtty (1)
14.00–14.10		cw
14.09	+10kHz	rtty (1)
14.10–14.35		cw and phone
18.068–18.110		cw
18.105	+5kHz	rtty (1)
18.110–18.168		cw and phone
21.00–21.15		cw
21.10	+20kHz	rtty (1)
21.15–21.45		cw and phone
24.890–24.930		cw
24.925	+5kHz	rtty (1)
24.930–24.990		cw and phone
28.00–28.20		cw
28.10	+50kHz	rtty (1)
28.20–29.70		cw and phone

Notes

(1) For rtty, recommended section of operation shared with cw.

(2) 3,500-3,510 and 3,775-3,800kHz reserved for intercontinental working.

(3) 3,635-3,650kHz is used by USSR stations for intercontinental working.

(4) For sstv recommended operation frequencies are: 3,735, 7,040, 14,230, 21,340, 28,680kHz, all ± 5kHz.

(5) For beacons, 28.2-28.3MHz is recommended.

(6) For the downlink of amateur satellites, 29.3-29.55MHz is recommended

(7) The transmitter power on the 10MHz band should not exceed 250W mean output power. (NB: UK max carrier power is 20dBW).

(8) No contests should be organized on the 10MHz band.

(9) Credit for awards or diplomas should be accepted for contacts made on the 10MHz band.

(10) SSB may be used on the 10MHz band during emergencies involving the immediate safety of life and property, and only by stations actually involved in the handling of emergency traffic.

UK 70MHz band plan

70.025		
Beacons only		
70.075		
CW only		
70.150		
SSB and cw only	70.200	*SSB calling frequency*
70.260		
All modes	70.260	*National mobile and calling frequency*
	70.300	*RTTY calling frequency*
	70.350 to 70.400	*Raynet*
70.400		
FM simplex only	70.450	*FM calling frequency*
70.500		

Code of practice for vhf/uhf contest operation

1. Obtain permission from the landowner or agent before using the site, and check that this permission includes right of access. Portable stations should observe the Country Code.

2. Take all possible steps to ensure that a site is not going to be used by some other group or club. Check with the local club and last year's results table to see if any group used the site last year (QTH locator). If it is going to be used by another group, come to an amicable agreement before the event. Groups are advised to select possible alternative sites.

3. All transmitters generate unwanted signals; it is the level of these signals that matters. In operation from a good site, levels of spurious radiation which may be acceptable from a home station may well be found to be excessive by nearby stations (25 miles or more away).

4. Similarly, all receivers are prone to have spurious responses or to generate spurious signals in the presence of one or more strong signals, even if the incoming signals are of good quality. Such spurious responses may mislead an operator into believing that the incoming signal is at fault, when in fact the fault lies in his own receiver.

5. If at all possible, critically test both receiver and transmitter for these undesirable characteristics, preferably by air test with a near neighbour before the contest. In the case of transmitters, aim to keep all in-amateur band spurious radiations, including noise modulation, to a level of – 90dB relative to the wanted signal. Similarly, every effort should be made to ensure that the receiver has an adequate dynamic range.

6. Above all, be gentlemanly at all times. Be helpful and inform stations apparently radiating unwanted signals at troublesome levels—having first checked your own receiver! Try the effect of turning the antenna or inserting attenuators in the feedline; if the level of the spurious signal changes relative to the wanted signal then non-linear effects are occurring in the receiver. Some recent synthesized equipment has excessive local oscillator phase noise, which will manifest itself as apparent splatter on strong signals, even if there is no overloading of the receiver front end. Preamplifiers should always be switched out to avoid overload problems when checking transmissions. If you receive a complaint, perform tests to check for receiver overload, and try reducing drive levels and switching out linear amplifiers to determine a cure. Monitor your own signal "off air" if possible. Remember that many "linears" may not be linear at high power levels under field conditions with poorly regulated power supplies. The effects of overdriving will be more severe if speech processing is used, so pay particular attention to drive level adjustment.

If asked to close down by a Government official or the site owner, do so at once without objectionable behaviour.

General rules for RSGB hf contests 1985

The general rules for RSGB hf contests are given below and are to be read in conjunction with the specific rules for each particular contest. International contest rules will contain the relevant sections of the general rules for the benefit of overseas entrants.

1. Entrants must operate in accordance with the terms of their licences.

2. Only one contact on each band may be claimed with a specific station, whether fixed, portable, mobile or alternative address. Duplicate contacts must be logged and clearly marked as duplicates without claim for points. Proof of contact may be required.

3. Unless otherwise stated, only single-operator entries will be accepted. A single operator station is one manned by an individual operator who receives no assistance whatsoever during the contest period.

4. When multi-operator entries are specifically allowed, such entries will be accepted only if:
(a) The declaration is signed by one operator, who will be regarded as the entrant, and
(b) The operator's callsign is given for each contact.

5. Operators of stations located within the British Isles, ie within the call areas G, GD, GI, GJ, GM, GU and GW, must be fully paid-up members of the RSGB.

6. A contact consists of an exchange and an acknowledgement of an RS report on telephony or of an RST report on telegraphy, and a three-figure serial number commencing with 001 and increasing by one for each successive contact throughout the contest period, irrespective of the band or mode in use. In an accumulative type of contest, each session will recommence with 001. Serial numbers, when sent, must be recorded from non-competing stations. In order to preserve contest-free segments, contestants are recommended to operate only within the segments designated in the rules of each event.

7. 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. *Separate log sheets must be used for each band.* Logs must be kept and entries submitted in gmt. Computer derived logs will be accepted provided that they follow the same format as standard hf log sheets, with 40 entries on an A4 size page split into groups of 10 and having the same column spacings and headings as HFC1.

8. Each entry must include a cover/summary sheet (eg Form HFC2) incorporating a signed declaration.

9. Entries must be addressed to the adjudicator, whose address will appear in the specific rules for each contest, with the name of the contest marked in the top left hand corner. All entries must be postmarked not later than 15 days following the contest. If acknowledgement of receipt is required, British Isles entrants should include a stamped addressed postcard which will be returned to the sender. Overseas entries will not normally be acknowledged.

10. All entries become the property of the RSGB. In the event of any dispute, the ruling of the Council of the RSGB shall be final.

11. For scoring purposes, aeronautical mobile and maritime mobile stations will count only as the minimum score of the particular contest and not for any bonus or multiplier. Entries from GB stations, aeronautical mobile and maritime mobile stations will not be accepted.

12. Awards are made at the discretion of the Council of the RSGB and may consist of trophies, plaques or certificates.

13. Certificates of merit are normally sent to the three leading stations in each section of a contest.

14. Entrants may be disqualified for failure to observe the general rules or the specific rules.

15. Points are deducted for errors in the logs. Duplicate contacts must be recorded without claim for points. Any such unmarked contacts for which points have been claimed will be penalized by the deduction of 10 times the points claimed for that contact.

16. Small quantities of RSGB hf contest log sheets (Form HFC1) and cover/summary sheets (Form HFC2) may be obtained from RSGB HQ on receipt of a large stamped addressed envelope. Larger quantities may be purchased.

General rules for RSGB hf receiving contests 1985

1. To claim points, a station may be logged once only on each band whether fixed, portable, mobile, or alternative address.

2. A receiving station log must show in columns: date/time (gmt), callsign of station heard, report and serial number sent by station heard, callsign of station being worked, bonus points, total points. The band in use must be shown at the top of each log sheet.

3. A cover/summary sheet (eg Form HFC2) must be submitted with the logs. The signed declaration must include the words "I certify that I do not hold a Class A transmitting licence".

. The following rules from the transmitting general rules also apply to receiving contests: 3, 5, 7, 9, 10, 11, 12, 13, 14, 15 and 16.

Code letters for use in RSGB contests

County/Region	Letters
Alderney	ALD
Antrim	ATM
Armagh	ARM
Avon	AVN
Bedfordshire	BFD
Berkshire	BRK
Borders	BDS
Buckingshamshire	BKS
Cambridgeshire	CBE
Central	CTR
Cheshire	CHS
Cleveland	CVE
Clwyd	CWD
Cornwall	CNL
Cumbria	CBA
Derbyshire	DYS
Devon	DVN
Dorset	DOR
Down	DWN
Dumfries & Galloway	DGL

County/Region	Letters
Durham	DHM
Dyfed	DFD
Essex	ESX
Fermagh	FMH
Fife	FFE
Mid Glamorgan	GNM
South Glamorgan	GNS
West Glamorgan	GNW
Gloucestershire	GLR
Grampian	GRN
Guernsey	GUR
Gwent	GWT
Gwynedd	GDD
Hampshire	HPH
Hereford & Worcester	HWR
Hertfordshire	HFD
Highlands	HLD
Humberside	HBS
Isle of Man	IOM

County/Region	Letters
Isles of Scilly	IOS
Isle of Wight	IOW
Jersey	JER
Kent	KNT
Lancashire	LNH
Leicestershire	LEC
Lincolnshire	LCN
Greater London	LDN
Londonderry	LDR
Lothian	LTH
Greater Manchester	MCH
Merseyside	MSY
Norfolk	NOR
Northamptonshire	NHM
Northumberland	NLD
Nottinghamshire	NOT
Orkney	OKE
Oxfordshire	OFE
Powys	PWS

County/Region	Letters
Salop	SLP
Sark	SRK
Shetland	SLD
Somerset	SOM
Staffordshire	SFD
Strathclyde	SCD
Suffolk	SFK
Surrey	SRY
East Sussex	SXE
West Sussex	SXW
Tayside	TYS
Tyne & Wear	TWR
Tyrone	TYR
Warwickshire	WKS
Western Isles	WIL
West Midlands	WMD
Wiltshire	WLT
North Yorkshire	YSN
South Yorkshire	YSS
West Yorkshire	YSW

RADIO COMMUNICATION

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What a Nice Pair!

TVHF230c hf transverter
£334·90 + £5 p&p inc. VAT

TVVF50c 6m transverter
£189·90 + £5 p&p inc. VAT

Following hard on the heels of our revolutionary TVHF230c hf transverter (all 9 hf bands from 2m multimode!), comes the TVVF 50c 6m transverter. Designed to provide transceive operation on 6m from a 2m multimode, the TVVF 50c genuinely sets new standards in single-band transverter performance. A very clean 10W output from a pair of rugged PA transistors in push-pull is fully ALC controlled. The 2m input will accept anywhere between 1 and 10W drive to provide full transmit output *without overdriving*. On receive, our innovative mosfet balanced pair design contributes to 2.2dB typical noise figure, and in conjunction with our custom-designed diode ring double-balanced mixer provides a typical third-order input intercept point of +4dBm.
Remember that input intercept + gain = output intercept; some specs can be *very* misleading!!
Available shortly will be the TVVF 50a 10m to 6m transverter with much the same features and performance—if you're interested, then please ring for details. Meanwhile the TVVF 50c is available for £189.90 (plus £5.00 carriage) including VAT. For those of us without money under the floorboards, by the time you read this we hope to be licensed credit brokers, and have full credit facilities available, in addition of course to Access and Visa.
(In the UK, transmissions on 50MHz. require special authorisation)

GLNA 433e
Last month, I briefly mentioned our new GLNA 433e (not to be confused with the GLNA 432e!) 70cm masthead-mounting preamplifier—now in full production. With a genuine sub-dB noise figure from a 'professional' GaAsFet, excellent filtering and strong signal performance, fitting the GLNA433e to your system at masthead should be quite a revelation! Housed in a high-quality polycarbonate enclosure, the preamplifier uses type 'N' sockets for performance and reliability, and has been designed not to provide a ready home for mosses, lichens, fungi and other cellular cryptogams!!
The GLNA 433e will comfortably switch up to 50W throughpower, either through its rf switching function, or by hard-line ground-on-transmit control, and will automatically sit in the straight-through mode with dc power removed–failsafe!
Priced at **£79.90** (plus £2.50 p&p) including 15% VAT, the GLNA 433e should now be available from stock. For more details please ring or write. Thanks.

LBPF 144u
Have you ever wanted to own a good 2m bandpass filter with such low loss that it can be left in circuit all the time? Well, now you can! Our LBPF 144u low-loss bandpass filter has <0.3dB insertion loss, better than 1.2:1 vswr in the passband 144–148MHz, and will provide more than 45dB rejection of a 2m third harmonic, and 35dB rejection of troublesome Band II signals! Power handling is 120W into a good load. Housed in an epoxy-coated diecast box with type 'bnc' connectors, the LBPF 144u is available for **£19.95** Plus £1.50 p&p) including 15% VAT.

OTHER PRODUCTS:

SLNA 50s	50MHz low-noise switched preamplifier using BF981	**44.90**
SLNA 144s	144MHz low-noise switched preamplifier using BF981. 15dB typical gain, 0.9dB typical nf, 100W through-power	**39.90**
SLNA 144u	Unswitched version of the SLNA 144s	**22.40**
SLNA 144ub	Unboxed version of the SLNA 144u	**13.70**
SLNA 145sb	Transceiver optimised preamplifier for the FT290	**27.40**
SBLA 144e	Masthead-mounting 144MHz high performance low-noise high dynamic range preamplifier with balanced pair of BF981's 13dB typical gain, 1.1dB typical nf, 250W through-power	**89.90**
GFBA 144e	Ultra-high performance masthead-mounting GaAsfet 144MHz preamplifier using advanced negative feedback circuitry for superb dynamic performance. Supplied with ATCS 500 sequencer-controller. 13dB typical gain, 0.9dB typical nf, 1000W pep (ssb) through-power	**139.90**
GLNA 432e	Masthead-mounting 430-440MHz ultra-high performance GaAsfet preamplifier. Supplied with ATCS 500 sequencer-controller. 13dB typical gain, 0.9dB typical nf, 250W pep (ssb) through-power	**149.90**
TLNA 432u	Unswitched bipolar 430–440Mhz preamplifier. 12dB typical gain, 1.5dB typical nf	**29.00**
TLNA 432ub	Unboxed version of the TLNA 432u	**20.40**
BLNA 432ub	Sub-miniature 430–440MHz preamplifier. 14dB typical gain, 1.3dB typical nf. Requires external filtering	**13.70**
BBBA 500u	20-500MHz high dynamic range preamplifier. Ideal for scanners	**32.90**
RPCB 144ub	Complete replacement front-end for the FT221 and FT225	**74.90**
RPCB 251ub	Complete replacement front-end for the IC211 and IC251	**79.90**
RPCB 271ub	Complete replacement front-end for the IC271e	**89.90**
GDIF 107ub	Gunn diode WBFM 'back-end' processing board	**49.65**
XBPF 700ub	Microstripline bandpass tvi filter	**2.95**
CISA 001	UHF (f) to BNC(m) coaxial adaptor	**1.60**
ATCS 500	Sequencer-controller	**33.90**
VFAT 206	25W 6dB attenuator (suitable for use with the TVHF 230c and TWF 50c)	**19.65**
	Carriage/Postage Rates GFBA 144e, SBLA 144e, GLNA 432e, GLNA 433e	2.50
	TVHF 230c, TWF 50c	5.00
	All other products above	1.50

ALL PRICES INCLUDE 15% VAT

Happy Birthday Nigel! We'd all like to wish our production manager Nigel G8FXG a happy 40th birthday this month. Keep taking the tablets Nigel!

muTek limited — **the rf technology company**
Dept. RC, Bradworthy, Holsworthy, Devon EX22 7TU (0409 24) 543

Access BARCLAYCARD VISA

YAESU

HANDI TWINS

AUTHORISED YAESU

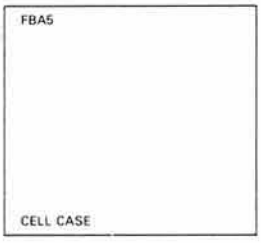
FT203R

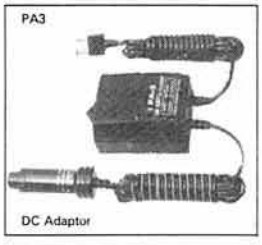
The FT203R is packaged in a lightweight, high-impact plastic case providing, comfort and convenience with high durability. The small size is made possible by using chip components installed on the double-sided circuit board by automatic assembly robots.
Three thumbwheel frequency selectors (with 5kHz up button) plus simplex, standard repeater shift. Volume and Squelch controls are located on the top panel along with jacks for the antenna (BNC), external microphone and earphone and HI/LO power switch.
When used with the optional external YH-2 Headset, the internal VOX system provides voice-actuated transmit/receive switching, allowing "hands free" operation when mobile or walking. (As FT209R)
Also included is an S/PO meter for monitoring of relative power output and relative signal strength. (As FT209R)
The FTE-2 1750 Hz Tone Burst Generator, which is included as standard, can be activated manually by a button on the side of the FT203R. (As FT209R)
A choice of slide-on Ni-Cd packs or case for AA-cells provides the optimum power source for your needs (As FT209R)
144-146 MHz – 10 KHz (+5 KHz)
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.
Battery life is greatly extended over standard squelched monitoring, with a programmable Power Saver 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 commands are one-touch operations.
Fat ½" LCD digits are complemented by ten memory and nine special function indicators showing 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), CASES, DIMENSIONS		
	FT203R	FT209R	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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