June 1984

RADio COMmunication

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TRANSCEIVER FOR THE HF BANDS

from the design and description by

LORIN KNIGHT, G2DXK

commencing in this issue

Journal of the Radio Society of Great Britain

RSGB

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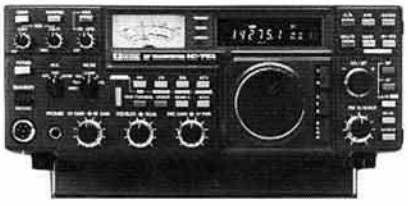

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A contribution will only be considered for publication on the understanding that the person submitting it is the original author and owner of the whole copyright, and that on acceptance for publication such copyright will become the property of the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

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

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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

London Lowe Electronics Ltd.
278 Pentonville Road, London N1 9NR
(Shop located lower sales floor, Hepworths)
Tel: 01-837 6702

Glasgow Lowe Electronics Ltd.
4/5 Queen Margarets Rd, off Queen Margarets Drive, Glasgow.
Tel: 041-945 2626

The North East Lowe Electronics Ltd.
56 North Road, Darlington, Durham.
Tel: 0325 486121

Birmingham Ward Electronics
Soho House, 362-364 Soho Road, Birmingham B21 9QL
Tel: 021-554 0708

Buckinghamshire Photo Acoustics Ltd.
58 High Street, Newport Pagnell, Bucks.
Tel: 0908 610625

East Scotland Jaycee Electronics
20 Woodside Way, Glenrothes, Fife KY7 5DE
Tel: 0592 756962

Essex Waters & Stanton Electronics
Warren House, 18-20 Main Road, Hockley, Essex
Tel: 0702 206835

Lancashire Stephens-James Ltd.
47 Warrington Road, Leigh
Tel: 0942 676790

North London Radio Shack Ltd.
188 Broadhurst Gardens, London NW6 3AY
Tel: 01-624 7174

West Midlands Dewsbury Electronics
176 Lower High Street, Stourbridge
Tel: 0384 390063

W. Sussex Bredhurst Electronics
High Street, Handcross, Haywards Heath, W. Sussex
Tel: 0444 400786

Northern Ireland George Moore Electronics
7 Cyprus Avenue, Belfast BT5
Tel: Belfast 658295

TS830S HF TRANSCEIVER

AMATEUR BANDS TRANSCEIVER £731.40 inc. VAT

The TRIO TS830S is for the operator who wants a dedicated amateur bands only transceiver, who is used to and wants a pair of rugged 6146B valves in the PA stage and who wants a compact rig which has its own in-built power supply. The TS830S is for the radio amateur who requires a rig capable of rising above today's crowded band conditions, a rig that has, as standard, the necessary features that will produce consistently good contacts where other lesser equipment would fail. The TRIO TS830S, a proven rig with an impeccable pedigree.

* The TS830S covers on USB, LSB and CW the full amateur bands from 160 through to 10 metres.
* Convenient to use, the transceiver has its own in-built power supply.
* VBT (variable bandwidth tuning) enables the operator to, at will, vary the IF filter passband width and establish optimum IF bandwidth relative to the interference being experienced.
* The IF shift control allows the IF passband to be moved up or down in frequency without having to retune the receiver. Hence, an unwanted signal, present in the IF passband, may be attenuated significantly by moving the passband in the appropriate direction.
* As the IF shift and VBT are independently adjustable they can, to advantage, be used together.
* The tunable notch filter in the TS830S is a high-Q active circuit in the 455 kHz second IF. Sharp, deep notch characteristics will eliminate a strong interfering carrier within the passband of the receiver section.
* The RF speech processor in the TS830S provides added audio punch and increases the average SSB output power whilst suppressing sideband splatter. Compression levels can be monitored and controlled from the front panel.
* To cope with pulse type (such as ignition) noise, the transceiver has an in-built noise blanker.
* For perfect listening, a tone control adjusts receiver audio frequency response to suit operating conditions.
* Both RIT and XIT, transmitter as well as receiver incremental tuning are included to aid operating, XIT being a distinct advantage when calling a station that is listening "off frequency."
* It is possible to monitor the transmitted audio in order to assess the effects of the speech processor: a most useful feature ensuring perfect reports.

Optional Accessories
AT230 antenna tuning unit.
VFO240 external matching VFO.
SP230 external speaker.
SM220 station monitor.
HS4, 5, 6 headphones.
MC50 desk microphone.
MC35S noise cancelling hand microphone.
YG455C 500 Hz CW filter for 455 kHz IF.
YG455CN 250 Hz CW filter for 455 kHz IF.
YK88C 500 Hz CW filter for 8.83 MHz IF.
YK88CN 270 Hz CW filter for 8.83 MHz IF.
DS2 DC to DC converter.

Please check for latest prices which may be subject to exchange rate fluctuation

TRIO

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

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

TR9130 TWO METRE ALL MODE TRANSCEIVER

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

TR9130 . . . **£442.52** inc VAT.

TS780 DUAL BAND BASE STATION TRANSCEIVER

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

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

TR7930 TWO METRE FM MOBILE TRANSCEIVER

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

TR7930 . . . **£312.11** inc VAT.

R2000 GENERAL COVERAGE RECEIVER

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

R2000 . . . **£421.36** inc VAT.

TS930S HF TRANSCEIVER WITH GENERAL COVERAGE RECEIVE FACILITIES

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

TS930S . . . **£1150.00** inc VAT.

TR2500/TR3500 HANDHELD TRANSCEIVERS

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

TR2500 . . . **£237.82** inc VAT.

TR3500 . . . **£256.45** inc VAT.

TS530SP HF AMATEUR BAND TRANSCEIVER

A logical progression from the reliable TS520 series the TS530S was the most popular HF rig in the range. I use the term "was" because TRIO decided to cease production and supplies were no more, however the demand from radio amateurs worldwide for the transceiver have continued and TRIO have reintroduced the rig. A standard HF valve transceiver without the frills but providing today's amateur with all necessary facilities for reliable world wide communication, the TRIO TS530SP now with notch filter.

TS530SP . . . **£638.00** inc VAT.

TW4000A DUAL BAND FM TRANSCEIVER

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

TW4000A . . . **£469.00** inc VAT.

just a part of the range

LOWE ELECTRONICS Ltd

CHESTERFIELD ROAD MATLOCK DE4 5LE TEL 0629 2430/2817

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

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

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

UNIQUE CONTROLLERS

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

PRESET CONTROLLER ROUND CONTROLLER

SAFE OPERATION

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

DEPENDABILITY

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

QUIET OPERATION

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

EASY MAST ALIGNMENT

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

SUMMARY

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

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

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

If I am absolutely honest,

I am not certain whether I own a NRD515 because of its unbelievable performance as a general coverage receiver or just for the sheer pleasure of having and constantly admiring probably the finest piece of equipment available today.

Perhaps it comes down to the same thing, certainly the other NRD owners I have spoken to have all expressed the same feelings, that the NRD515 is a receiver in a class of its own.

As a person not owning the receiver, you may ask what sets this particular one above all the others. This is difficult to define—the feel of the equipment when wandering over the crowded band, its signal handling capability and selectivity can only really be appreciated by use. Technically, the equipment is above reproach. JRC's manufacture and production control methods as applied to other items in the range are equally applied to their amateur products. The other items referred to, only a small part of the vast range, are marine radio equipment, Marisat mobile terminal, Omega navigators, Doppler sonar, echo sounder/fish finders, communication satellite earth stations and a complete range of avionic beacons, radar and associated products. Indeed, a wide range of application of electronic and radio technology for land, sea and air.

You may be forgiven for associating such advanced technology with complexity of operation, a piece of equipment that needs an operator with an electronics degree. However, this assumption is incorrect. The NRD515 is easy to use with the minimum of controls to ensure the operator really enjoys his listening time. Digital readouts, MHz, mode and filter bandwidth switches together with a VFO knob that will tune the band continuously without using any other control, from 100KHz to 30MHz or vice versa. To assist with difficult band conditions the NRD515 has pass band tuning and the medium wave broadcast section to 600KHz to 1·6MHz has a preselector control to cope with crowded conditions. To give real "armchair copy" JRC have introduced the NCM515 remote control keypad. As its name suggests, the NCM515 enables frequencies to be quickly keyed into the receiver. Four memories are provided, two rates of frequency stepping in increments of either 100Hz or 10MHz and finally the ability to add to or subtract from the operating frequency by any frequency step. Add the optional 600Hz CW filter and the 96 channel memory unit and, as the other NRD515 owners would say, "a joy to own".

NRD515	monitoring receiver	**£965.00** inc VAT
NDH515	96 channel memory unit	**£264.00** inc VAT
NCM515	remote frequency controller	**£125.00** inc VAT
NVA515	speaker	**£34.50** inc VAT
CFL260	500Hz cw filter	**£39.10** inc VAT
CFL230	300Hz cw filter	**£64.00** inc VAT

Please check for latest prices which may be subject to exchange rate fluctuation

EMPORIUM NEWS

Good Morning

Really, **a superb trip down to South Mimms** to see those amateurs from North London area and **such a pleasure** to hear John's Technical Lecture. I might add it really pleased John to know he had his audience with him throughout the talk. Anyway, an enjoyable afternoon was had by all. We from the company, David, Andy, Tony and myself, also learned a great deal—a most successful day. **The exam** after the event was also **a great success** with **85%** of the audience getting **above average marks.** My thanks go to all those who helped make the day.

The **new Belcom LS202E** is now in stock. As I think it will be a most popular rig I am devoting part of the column this month to giving you more details. You will be very pleased to learn that **the price** of the SSB/FM hand held transceiver is only **£225, inc VAT. . .**

Until now, dual mode 2 metre transceivers have been designed for shack, car or shoulder operation. Mobile they may have been but convenient hand portables they were not. That situation has now changed. You will remember that I told you about the new BELCOM LS202E SSB/FM 2 metre transceiver in a previous edition of RADCOM; at the time I said the price would be around £1000. You will, therefore, be extremely pleased to learn that the transceiver is available for £225.00 inc VAT. Now for a few details; (if you want a colour leaflet to appreciate the full beauty of the LS202E transceiver then ring Beryl here at Matlock, alternatively you could always visit a LOWE shop).

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

NP6	Rechargeable battery pack (7.2 volts)	£22.65
NP9	Rechargeable battery pack (10.8 volts	£31.40
CA910E	AC charger (for NP6)	£8.50
CA110E	AC charger (for NP9)	£8.50
CS912	Mobile charger (for NP6)	£6.90
CS112	Mobile charger (for NP9)	£6.90
SH1	Speaker/microphone	£14.95
SFT207	Soft case	£4.80
LA207	Mobile console with 25 watt linear	£118.00
AN2	1/4 wave BNC rod aerial	£8.50

At last the **new shop** in **Cambridge** is open. Manager, **Tony G4NBS** is in charge and looks forward to meeting you. **Dare I suggest** that if the family do not want to join you in the shop then **Cambridge** is a delightful town, shops in profusion and, of course, the beautiful buildings to enjoy. How about punting on the Cam? The river is only a short step from our door—how about arriving by punt!

Been listening on the NRD515 recently. I must admit that I have been tuned to the pirate station off the south east coast: Caroline on 963 KHz and a very strong signal. **My wife** is of the opinion that the NRD515 is a little expensive if that is all I am going to listen to but when the evening draws in I am to be found still in the shack listening on the 49 metre band.

Just a complaint about the World Radio & TV Handbook: my copy (the company owns it but it's on my desk) is incorrect. The book's compilers are of the opinion that Western Europe does not exist—no map of England, Ireland, Scotland, Wales, France, etc. only two identical ones of Central Europe—**most disappointing.** When I read the book for the first time I quickly tuned to BBC World Service to check but, **thank goodness,** the station was still there. Perhaps the Publishers would send me the map that is missing. Never mind, I'll use last year's copy—correct, both maps were in that volume.

I am pleased to see more people **widening their horizons** with the short waves. So many things to hear and, dare I say it, almost as interesting as listening to the HF amateur bands. **Music,** political opinion and information on a country's way of life. **Fascinating!** The **Trio R600** and **Trio R2000, £263** and **£421** inc. VAT, admirable receivers and not only do they perform well, they look attractive and are easy to drive. Indeed, **I caught my wife** last week **upstairs,** hoovering I might add, and she was tuned in, full volume to the Archers, an every day story of countryfolk and she thinks me listening to Caroline is sacrilege.

LS202E

Following Alan's price reduction (a free PSU) for the **Japan Radio Company's JST100,** £998 inc. VAT amateur band transceiver, many satisfied amateurs have now at their finger tips a **"Professional"** piece of equipment and are justifiably proud.

Daiwa rotators—back with us on the opposite page and if you are going to a lot of trouble with your aerials, etc and aerials are not the things that improve by hitting the ground at acceleration of 32 feet/sec/sec. **I appreciate that there are cheaper rotators** but please buy one in which you can place your confidence and for some situations don't forget to add a stay bearing. **KS065** priced at **£24.50,** inc. VAT, carriage £2.50. I have had one at the top of my tower for some years now and I know for certain that my aluminium scaffold pole is as strong as the day it was erected; that is, no steel edge has cut a groove in the tube wall and weakened it. **Most important when the wind blows.**

Some months ago I told you all about the second-hand list. Those visiting the shop often consult one as a matter of course. Don in the Darlington shop has one pinned to the shop noticeboard. However, you can get your own copy either by ringing Beryl (you all remember Beryl) or by sending a stamped addressed envelope or, better still, a series of envelopes, then we will send the list to you fortnightly as long as your envelopes last. Simple! Free and, would you believe, done by human hand and not by computer.

Finally, regarding the **Air Scout Junior,** it was our **April spoof**—please no more letters or enquiries and, on a safety note, please don't build it. **The set is genuine,** those of you who attended the **NEC** saw it on our stand. It was imported around 1939 and has remained hidden until we came across it. Unbuilt it is and unbuilt it will stay. I hope to put it on show later here at Matlock together with some of the wonderful and humourous letters that it generated.

Anyway, that's about it for now. Got to start planning the **Open Day, 18th August this year** so keep the day free for a visit to Matlock.

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

David

What price

HF Equipment

IC–751	All band AM,FM,SSB,CW + Gen Cov Rx. 32 Memories.	1049.00
PS35	Internal switched mode power supply	149.00
SM6	Desk microphone	34.50
HM12	Hand microphone with up/down scanning	16.50
EX310	Voice synthesizer module	39.00
RC10	Frequency controller unit	29.95
CR64	High stability xtal unit	49.95
FL32	9MHz CW/RTTY filter – 500Hz	39.00
FL63	9MHz CW/RTTY narrow filter – 250Hz	39.00
FL33	9MHz AM filter – 6KHz	32.50
FL70	9MHz SSB wide filter – 2.8KHz	35.50
FL52a	455KHz CW/RTTY filter – 500Hz	79.00
FL53a	455KHz CW/RTTY narrow filter – 250Hz	79.00
IC–745	All band SSB,CW,AM(Rx only), Gen Cov Rx. 16 mems.	839.00
PS35	Internal switched mode power supply	149.00
SM6	Desk microphone	34.50
HM12	Hand microphone with up/down scanning	16.50
EX310	Voice synthesizer unit	39.00
EX242	FM unit Tx & Rx	32.50
EX241	Marker unit	15.95
EX243	Curtis keyer unit	39.00
FL45	9MHz CW filter – 500Hz	45.00
FL44a	455KHz SSB narrow filter – 2.4KHz	79.00
FL52a	455KHz CW/RTTY filter – 500Hz	79.00
FL53a	455KHz CW/RTTY narrow filter – 250Hz	79.00
FL54	9MHz CW/RTTY narrow filter – 270Hz	39.00
IC–740	No longer available. Accs still in stock.	
PS740	Internal switched mode power supply	149.00
SM5	Desk microphone	34.50
EX241	Marker unit	15.95
EX242	FM unit	32.50
EX243	Curtis keyer	39.00
FL44	455KHz SSB filter – 2.4KHz	79.00
FL45	9MHz filter – 500Hz	45.00
FL52	455KHz CW/RTTY filter – 500Hz	79.00
FL53	455KHz CW/RTTY narrow filter – 250Hz	79.00
FL54	9MHz CW/RTTY narrow filter – 270Hz	39.00
IC–730	10–80 Mtrs compact transceiver	659.00
PS15	External power supply – 20amps	119.00
PS20	External power supply with speaker – 20 amps	176.00
SM5	Desk microphone	34.50
HM7	Hand microphone with pre amp	14.95
EX202	LDA unit for use with AT100/500	13.50
EX203	CW audio filter	14.50
EX205	Transvertor unit	14.00
EX195	Marker unit	17.00
FL44	455KHz SSB filter – 2.4KHz	79.00
FL45	9MHz CW filter – 500Hz	45.00
FM04	FM unit Tx & Rx	49.00
IC–720A	No longer available. Accs still available.	
PS15	External power supply – 20 amps	119.00
PS20	External power supply with speaker 20 amp	176.00
CF1	Cooling fan for PS20	24.00
SM5	Desk microphone	34.50
FL32	CW narrow filter	39.00
FL34	AM xtal filter	34.00
BC10	Memory back up unit	5.95
FM03	FM unit Tx & Rx	89.00
IC–R70	General Coverage Receiver 0.1–30MHz	549.00
EX257	FM unit	32.50
FL63	CW narrow filter	39.00
FL44a	455KHz SSB filter	79.00
CK70	DC cable kit	5.75
7072	Interface unit to transceive with IC720A	97.50
IC–R71	All mode Gen Cov Rx, k'pad entry, 32 memories	649.00
RC11	Remote control unit for above	49.00
IC–2KL	1KW PEP Linear, auto band switching, complete with –	
2KLPS	Power supply to run 2KL linear	1303.33
IC–AT100	100Watt Automatic antenna tuner	269.00
IC–AT500	500Watt Automatic antenna tuner	369.00
IC–PS30	Systems power supply, 25 amps continuous	229.00
IC–AH1	Mobile antenna, 3.5MHz–30MHz	199.00

VHF Equipment

IC–271E	Multimode base station, 25w, 32 memories	629.00
IC–271H/E	High power version of above, 100w	789.00
PS25	Internal switched mode power supply	89.00
EX310	Speech synthesizer unit	39.00
AG20	Internal receive pre-amp	49.00
SM6	Desk microphone	34.50
IC–290D	25W Multimode mobile, 5 memories, scanning mic	469.00

IC-751, £1049.

The IC-751 now has an interesting and useful addition, a remote push-button frequency selector pad, so you can either twiddle knobs or press buttons.

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.

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.

For more detailed information on this excellent set, please get in touch with us.

IC-R71E, £649.

The best has just been made better! The ICOM IC-R70 receiver has had some important additions made to its specifications and this model is named the IC- R71E. Here are some details:–

100 KHz – 30 MHz all mode (with FM option). Quadruple conversion superhet. IF frequencies 70 MHz 9 MHz and 455 KHz with continuous bandpass tuning and notch filter. Virtually immune from adjacent channel interference with 100 db dynamic range. Adjustable AGC, noise blanker and switchable pre-amplifier. Direct entry keyboard into twin VFO's with 32 programmable memories. Auto squelch tape record function.

Options:– Synthesized voice readout, infra-red remote controller, 12V DC kit, mobile mounting bracket, two CW filters 500 and 250 Hz, FM unit, computer interface, headphones.

The IC-R70 will still be available at £549.00. Ask for a leaflet giving the full details of these two fine receivers.

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

perfection?

IC-27E	25W FM mobile, 9 memories, multi function display	**319.00**
UT16	Voice synthesizer unit	**25.00**
IC-25H	45W FM mobile, high power version of old IC25E	359.00
BU1	Memory back up unit for mobiles	24.50
	DC leads (flat pin or square 6 pin)	4.50
	DC Plugs (flat 4 pin)	.30
	DC Sockets (flat 4 pin)	.30
IC-2E	Synthesized hand portable, 1.5 watts	169.00
IC-O2E	Synthesized hand held, keypad entry, LCD display	229.00
ML1	10 watt booster unit for 2E	69.00
BP3	Standard battery pack	25.00
BP2	Low volts high capacity (long life)	38.00
VP4	Empty battery pack, takes 6 x AA size cells	7.95
BP5	High volts high capacity (high power)	48.00
BP7	High volts high capacity (for use with O2E ONLY	59.00
BP8	Low volts high capacity	49.00
DC1	12v regulator pack (2E ONLY)	12.50
CP1	12v charger lead for cigar lighter	4.95
FA2	Helical antenna	7.50
LC1	Leatherette case (BP5)	5.00
LC2	Leatherette case (BP4)	5.00
LC3	Leatherette case (BP3)	5.00
LC11	Case for O2E (BP3)	5.00
T/L1	Heavy duty leather case (all batt packs)	21.27
BC25E	240v wall charger for 2E	6.69
BC25U	110v wall charger for 2E (USA)	6.69
BC16E	240v wall charger for O2E (BP8/BP7)	9.95
BC30	Desk top drop in charger (fast and slow) old packs	56.35
BC35E	Desk charger all packs new & old (fast/slow)	56.35
HM9	Speaker microphone	16.50
IC-202S	SSB Portable, + CW, 3 watt output	199.00
BC15E	AC Charger 240v	41.80
BC20	DC Charger 13.8v	41.80
	DC lead	1.75
	Telescopic antenna	1.50
LC25	Leatherette carrying case	8.25
FA1	Helical screw in antenna	7.50
UHF Equipment		
IC-471E	Multimode base station, 25watts, 32 memories	699.00
IC-471H	High power version of above, 75watts,	879.00
PS25	Internal switched mode power supply	89.00
EX310	Voice synthesizer unit	39.00
SM6	Desk microphone	34.50
IC-490E	Multimode mobile, 10 watts, 5 memories	495.00
IC-45E	FM mobile, 10 watts, 5 memories	329.00
BU1	Memory back up unit for mobiles	24.50
	Spare DC leads (flat 4 pin or square 6 pin)	4.50
	DC plugs & sockets (flat 4 pin)	.30
AG1	Mast head pre-amp for 471/451/490	49.00
IC-4E	Synthesized hand portable, 1.5 watts	219.00
IC-O4E	Synthesized hand held, k'pad entry, LCD	T.B.A.
FA3	Flexi 1/4 wave antenna	7.50
	Accessories same as IC2E/O2E	
IC-402	SSB portable + CW, 3 watts output	257.00
BC15E	AC charger 240v	41.80
BC20	DC charger 13.8v	41.80
	DC lead	1.75
LC25	Carrying case	8.25
1.2 GHz Equipment		
IC-120	FM mobile, 1 watt output, 40MHz coverage mems	439.00
BT23E	Bit Zero 23e, 1296MHz linear, lw in – 7/8w out	179.00
50 MHz Equipment		
IC-551	Multimode base station, supplied SSB/CW only	379.00
EX106	FM unit	112.00
EX107	VOX unit	49.00
EX108	Pass band tune unit	97.50
IC-505	Multimode portable, 3/10watt, supplied SSB only	382.00
EX282	FM unit	28.50
BP10	Nicad pack	59.00
BC15	Charger unit	6.50
LC10	Carrying case	22.50
Mobile Mounting Brackets		
MMB5	Mount for 251E, 451E, 720A, 730	12.50
MMB6	Mount for 240,	12.50
MMB7	Mount for 245E	12.50
MMB8	Mount for 255E, 260E	12.50
MMB9	Mount for 290E, 490E	12.50
MMB10	Mount for 25E, 45E, 120	12.50
MMB11	Mount for 22U, 24G	12.50

IC-02E, £229.

ICOM introduces the new top-of-the-line IC-02E to complement its exisitng line of popular handheld transceivers and accessories. The new direct entry microprocessor controlled IC-02E is a 2 meter handheld jam packed with excellent features.

Some of these features include: scanning, 10 memories, duplex offset storage in memory & odd offsets also stored in memory. Internal Lithium battery backup and repeater tone are of course included. Keyboard entry is made through the 16 button pad allowing easy access to frequencies, duplex, memories, memory scan and priority. The IC-02E has an LCD readout indicating frequency, memory channel, signal strength, transmitter output and scanning functions. New HS-10 Headset, with earphone and boom microphone, which operates with either of the following:– HS10-SB Switch box with pre-amplifier giving biased toggle on, off and continuous transmit. HS10-SA Voice operated switch box, with pre-amplifier, mic gain, vox gain and delay.

IC-271E, £629.

The IC-271E,2 meter VHF and IC-471E,430-450 MHz are the 'terrific twins' in Base multimodes at the moment. The design is based upon a new CPU chip that is easy to operate and offers the maximum number of functions available. Power can be adjusted up to 25W on all modes, squelch works on all modes and a listen-input facility has been added for repeater work. RIT shift is shown on the multicolour fluorescent display. 10Hz tuning facilities are included on both machines. Options for the 271E and 471E include - switchable front-end pre-amp, SM6 desk microphone, speech synthesizer announcing displayed frequency, 22 channel memory extension with scan facilities and an internal chopper PSU.

MMB12	Mount for R70, 740, 271E, 471E	12.50
MMB16	Mount for 2E, 4E, O2E, O4E	6.95
MMB18	Mount for 751	T.B.A.
SS1	Shoulder strap for handhelds	7.50
Microphones		
HM3	4 Pin hand microphone (IC240)	12.50
HM5	4 Pin hand microphone noise cancelling	20.00
HM7	8 Pin hand microphone (IC–24G, 730, 720A)	14.95
HM9	Speaker microphone for hand helds	16.50
HM10	8 Pin microphone with up/down scanning	29.00
HM11E	8 Pin microphone with up/down scanning + tone call	22.50
HM12	Up/down scanning mic for new sets (271/471/751/745)	16.50
SM2	4 Pin base microphone	34.50
SM5	8 Pin base microphone	34.50
SM6	Base microphone for new sets (271/471/751/745)	34.50
Ext Speaker/Headphones/Headsets		
SP3	Matching speaker for ICOM sets	45.00
SP4	Mobile speaker with magnetic mount	19.55
HP1	Good quality headphones	28.50
HS10	Headset and boom mic for ICOM hand helds	18.40
HS10SB	PTT switch box for HS10	18.40
HS10SA	VOX unit for HS10	20.70
ICOM Global digital clock		
Attractive gold colour, gives time in cities all over the world. Pulsating red LED's, LCD readout with alarm. 195mm		59.00

TONO CW/RTTY/ASCII Terminals		
9000E	Communications computer, RTTY, CW, ASCII, TX/RX	669.00
550	CW/RTTY decoder, inc CW practice, and CW transmit	299.00
5000E	Comunications terminal & k'board, inc AMTOR, VDU.	799.00
9100E	As 9000E with amtor	699.00
CRT1200G	High quality video monitor with green display	136.00
TONO Linears		
MR250W	144–146MHz, 10–15W drive, 180–200W out, RX pre-amp	325.00
MR150W	144–146MHz, 10–15W drive, 120–140W out, RX pre-amp	169.00
MR100W	144–146MHz, 10–15W drive, 80–90W out, RX pre-amp	99.00
2M50W	144–146MHz, 1–3W drive, 30–45W out, no pre-amp	59.00
NEW "G" Series		
2M40G	144–146MHz, 1–3W drive, 20–35W out, RX pre-amp	79.00
2M90G	144–146MHz, 10–15W drive, 70–90W out, RX pre-amp	115.00
2M130G	144–146MHz, 10–15W drive, 110–130W out, RX pre-amp	160.00
4M60G	430MHZ, 3–15W drive, 40–60W out, RX pre-amp	159.00
TONO Pre-amps		
RX144	2 metre mast head pre-amp & control box	65.00
RX430	70 cm mast head pre-amp & control box	70.00
TELEREADER Equipment		
CWR685E	CW/RTTY/ASCII terminal & k'board, with VDU, TX/RX	730.99
CWR675E	RX only version of 685E, with inbuilt printer/VDU	599.00
CWR670E	CW/RTTY/ASCII RX only, use with TV or VDU	349.00
	12 pin plug for 670/675/685	6.00
CWR610	CW/RTTY decoder, slow morse practice	159.00
CWR610E	As 610 with adjs baud rate from front panel (45–600)	175.00
	13 pin plug for 610/610E	4.75
CM40PS	40 character dot matrix printer, 11.5cm paper roll	199.00
ZENITH Monitors		
123E	12 inch with green display, good quality	109.25
122E	12 inch with amber display, good quality	125.00
TAL, ASP Series System 6 antennas		
ASP2016	138–512MHz 1/4 wave whip with threaded adaptor	2.56
ASP3976	66–138MHz 1/4 wave whip with threaded adaptor	5.21
ASP3936	130–174MHz 1/2 wave whip with barrel/spring, 3dB	18.63
Mounts for above		
K57	Fits 1/2 wave, 3/8 inch hole, snap-in type	3.10
K440	Fits 1/4 wave, 3/8 inch hole, snap-in type	1.55
K145	Fits 1/2 wave, 3/4 inch hole, snap-in with claw mount	5.43

IC-27E, £299.

This must be the smallest, 2M, FM mobile available today, measuring only 38mm H × 144mm W × 177mm D. IT has all the features that you probably require included in this microprocessor controlled unit. In addition, if you feel lonely and can't find anybody on the band, just press "speech" and the optional built in speech synthesizer will tell you the frequency you are tuned to. This is a boon to the blind operator or to those that tuck their rigs out of sight.

Brief features:– 25/1 Watt output, green LED readout, scanning (memories and programmable limit band scan), priority scan, programmable duplex splits, 25 and 5 Khz tuning steps, 10 memory channels with lithium back up cell, normal and reverse repeater switch, dual VFO, internal speaker and optional speech synthesizer. Just ask for a leaflet and we'll be glad to send you one. Price 299.00 and 39.00 for the optional speech synthesizer.

IC-745, £839.

Hearing is believing, the IC745, a new all band HF transceiver with SSB, AM (receive only), CW, RTTY, FM option, and a 100KHz-30MHz general coverage receiver.

The IC745 has a terrific combination of features found on no other transceiver, at such a low price. The IC745 is the only transceiver today that has so many standard features, options and accessories.

The IC745 is yet another superlative set in the ICOM range, see it in our retail shop at 95 Mortimer Street Herne Bay Kent, or contact our Reculver Road address for more information. Your own local ICOM dealer will be able to help you too.

K65	Fits 1/4 wave, 3/4 inch hole, deep claw with 17ft cable	9.31
K47	Fits 1/2 wave, 3/4 inch hole, wing mount	7.17
KR47	Fits 1/2 wave, 3/4 inch hole, narrow wing mount	12.42
K220	Fits 1/2 wave, magnetic mount with 17ft cable	12.10
K220A	Fits 1/4 wave, magnetic mount with 17ft cable	12.10
M161	Fits 1/2 wave, boot lip mount, needs K57	3.88
M161	Fits 1/4 wave, boot lip mount, needs K440	3.88
KR193	Fits 1/2 wave, swivel ball mount	4.03
K67	Ground plane kit for all whips	16.30
3000 Series System 6 antennas		
TAP3006	60–110MHz, 1/4 wave whip with threaded hinge	7.76
TAP3016	110–512MHz, 1/4 wave whip with threaded hinge	7.76
TAP3026	144–174MHz, VHF 1/2 wave, 3dB gain, threaded hinge	10.86
TAP3676	144–174MHz, VHF 1/2 wave, 3dB gain, with spring	12.42
TAP3456	420–440MHz, UHF 3dB gain, with threaded adaptor	14.74
TAP3466	450–470MHz, UHF 3dB gain, with threaded adaptor	14.74
TAP3696	420–440MHz, UHF 5dB gain, with shock spring	18.63
TAP3666	450–470MHz, UHF 5dB gain, with shock spring	18.63
Mounts for above		
K68	Snap in adaptor for 3/8 inch hole	2.32
K145	Snap in adaptor with claw fits 3/4 inch hole	5.43
K72	Wing mount with 17ft of cable, fits 3/4 inch hole	11.64
K66	Claw mount with 17ft of cable, fits 3/4 inch hole	7.76
K65	1/2 inch deep claw mount with 17ft cable, 3/4" hole	9.31
K220	Magnetic mount with 17ft of cable	12.10
ASPR332E	Gutter clip with 10ft of cable	11.79
M161	Boot lip mount needs K68	3.88
KR223	Duraflex noiseless spring	10.86
K67	Ground plane kit	16.30
Base station antennas		
ASP655	130–174MHz economy base, 1/2 wave with g-plane	27.94
TAP4009	156–174MHz Colinear, 3dB gain	50.45
ASPD682	160–166MHz Colinear, 4.5dB gain	194.00
ASPE682UK	164–172MHz Colinear, 4.5dB gain	194.00
ASPD700	450–460MHz Colinear, 7dB gain	163.00
ASP2006	156.174MHz Unity gain	47.44
Low profile/Heavy-duty antennas		
ASP2001	66–88MHz dome shape, –12db	55.89
ASP2000	105–108MHz TX – 138–141MHz RX dome shape, –4.5dB	73.74
ASP2002	162–174MHz dome shape, –3.5dB	55.89
ASP2021	162–173MHz fin shape, –1dB	55.89
ASP4005	450–470MHz dome shape, –0.5dB	31.05
Marine antennas 156–162MHz		
ASM37E	1/2 wave unity gain, deck mount, with 20ft cable	26.90
ASM38E	Colinear 3dB gain, deck mount, with 20ft cable	39.32
ASM77E	1/2 wave unity gain, mast mount, with 3ft cable	19.67
ASM88E	As above with 60ft of cable	27.83
ASM98E	Dipole, with deck/bulkhead mount & 20ft of cable	24.21
TAM1001	1/2 wave unity gain, lightweight whip style	24.84
TAM1003	Emergency antenna, (CH16) c/w special bracket	23.28
Mounts/Accessories for above:		
ASM42	Heavy duty rachet mount all angles	25.88
ASM91	Vertical deck mount, fold over	10.35
K509	Stand off bracket (13cm) for 1001, 1005, 1006, 88E	5.74
TAM108	Antenna extension rod (1.5m)	31.05
ASM93	Antenna support bracket	5.16
CS100	Good quality extension speaker	11.37
Antenna matching units		
AMU100	1.5–99MHz 200 watts pep	99.00
AMU400	1.5–60MHz 400 watts pep	116.43

Prices include VAT at 15%

We reserve the right to change prices without giving prior notice. As well as ICOM equipment, we also stock the following:– TONO & TELEREADER, CUE DEE, DATONG, MICROWAVE MODULES, MUTEK, LAR, WELTZ, YAESU, JAYBEAM, TAL, G-WHIP, DRAE, B.N.O.S., BEARCAT, TRIO and many accessories. Items listed are subject to availability.

Tono 5000E, £799.

From the famous TONO stable comes the new THETA – 5000E now ready to send and receive AMTOR as well as CW, RTTY, and ASCII.

Features include:– 5" high resolution monitor displaying 400chr. × 16 lines × 2 pages, ARQ/FEC, time clock, Selcal (Selective calling), high speed RTTY demodulator – up to 300 bauds (600 baud using TTL level); 3 shifts (170, 425 and 850 Hz) and two tones (2125 and 1275 Hz); manual or automatic Tx/Rx; Battery back-up memory (72 chars × 7 channels and 24 chars × 5 channels); type ahead correctable buffer memory; Morse code 5 – 100 wpm (variable weights) + autotrack on receive; CW practice feature with random generator; Automatic CR/LF with wrap around display; Automatic letters code insertion; Printer interface; Bargraph LED meter for tuning; TOR A, B and L – the list goes on and on . . . Power requirements by the way are AC mains or 13.8v DC.

Tono 9100E, £699.

The famous TONO THETA 9000E has had AMTOR modes A, B and L added to its functions providing transmit and receive facilities with selective calling on AMTOR, RTTY (with 3 selective shifts and 2 tone pairs), CW with built in practice function and random generator, and ASCII with full Duplex facility. The 9000E requires an external VDU. The battery backed memory covers 256 characters × 7 channels with Channel 6 which is divided into 16 subsections of 16 characters each and Channel 7 into 8 subsections of 32 characters. Any of the subsections may be used individually and messages can be repeated 1 – 9 times from a keyboard command.

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

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

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Great News from YAESU!

Thanks to the massive upsurge in 70cm activity in Japan, YAESU have now increased production on these popular and well proven models with the result that we can now offer the following most attractive prices. Now is your opportunity to get on this superb band at less outlay than for 2 metres operation.

FT-730R
10W/1W
FM mobile
Now only
£229
Dual VFO's | 10 memories

FT-708R
1W/200mw
FM portable
10 memories
Keyboard entry
A must at only
£179

FT-790R 1W/200mw multimode
All the features of the FT-290R on 70cms
Incredible value at
£249

NOW IN STOCK!

The world famous SHURE 444D dual impedance magnetic desk microphone. Features tailored frequency response for optimum speech intelligibility. This is the mike with the pedigree.

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ICOM IC271E
2m base station for the eighties, 25w O/P, 32 memories, scanning, 10/100Hz auto shift tuning rates + (as options) voice frequency synthesiser, internal 12V psu, GaAS FET preamp.

£629 WITH ICSM6 ELECTRET BASE STATION MIC OR AG20 INTERNAL GaAS FET ICOM PREAMP

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YAESU FT790R
Portable microprocessor controlled UHF 70cm multimode. Fast becoming as popular as its 2m brother the FT290R–the FT790R has the same major features. Power output is 1 watt, but includes a speech processor.

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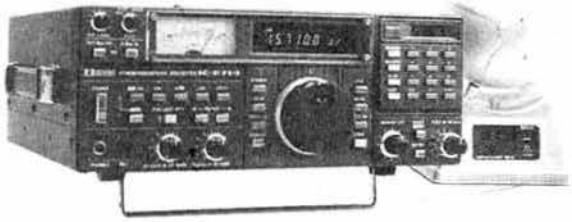

ICOM ICR71
The latest superior grade receiver, with keyboard entry, 32 tunable memories, three rates of tuning + (as options) infra red remote, F.M., voice frequency synthesiser, additional filters.

£649 WITH AT 1000 AERIAL TUNING KIT

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Multiband base station transceiver. Just compare the following features:

£739 INCL MUTEK PRE-AMP

FEATURES	FT 726R	TS780
Choice of bands	yes	no
450 MHz capability	yes	no
IF Shift	yes	yes
IF Width	yes	no
CW Filter	option	no
X-band Full Duplex	option	no
Squelch	all modes	FM only
Memory Channels	11	10

FEATURES	FT 726R	TS780
Limited Band Scan	yes	yes
Mode Memory	yes	no
Memory Backup	lithium	AA cell
RX Tone Control	yes	no
RF PWR Control	continuous	Hi/Low
Speech Processor	AF	none
VOX	no	yes
CW Semi break-in	yes	yes

EXTRA-SPECIAL OFFER
FT726R WITH 70cm CARD FITTED £989–WITH DUPLEXER/SATELLITE MODULE WORTH £95!!

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WORLD BEATER

YAESU FT290R
The design team on this one at YAESU definitely deserve full marks– probably the best selling 2m multimode in the world.

£269 WITH MUTEK BOARD (LIST PRICE £296)

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YAESU FT708R
Compact synthesised 70cm, hand held, minimum 1 Watt O/P, scanning/memories, full 10MHz coverage.

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BRENDA G4VXL and BERNIE G4AOG

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ICOM IC745
H.F. transceiver/gen. coverage receiver. The IC740 was, and still is, popular–the introduction of the IC745 with its additional features makes it our recommendation for the serious H.F. operator.

£839 WITH FREE ICSM6 BASE STATION MIC AND ICEX242 FM MODULE– WORTH £67!!

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Compact–dual VFO's–general coverage–100W O/P. What more can we say, except... If you haven't already heard or seen one, then you also probably think that Bobby Charlton still plays football for England!

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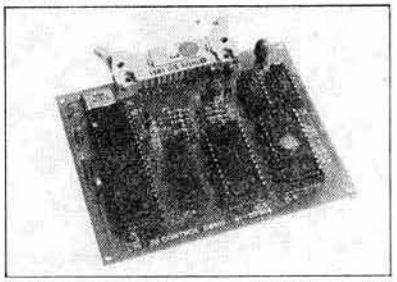
RC6

Computer Products

A complete range from Connectors to Board Level product



C12 Computer Cassette	21-00012	0.55
BBC to Centronics Printer	03-10019	7.25
BBC to 25 way D Male	03-10021	4.50
25 way D Socket	10-25200	1.90
25 way D Plug	10-25100	1.30
Cover for 25 way D	10-25322	0.93
20 up Eprom Eraser	40-82100	31.25
Z80 A Industrial Controller	40-82000	49.95
6802 Industrial Controller	40-68020	49.95
6502 Industrial Controller	40-65020	49.95
Z8 Basic/Debug Controller	41-00904	50.00

Nicad Batteries & Chargers

Minimum life 600 (300 PP3 size) full charge/discharge cycles. Batteries must be charged from a constant current source only. All batteries are supplied only with a residual charge and should be charged before used.

				1-9	10-49
AA	1.2V	500mAH	01-12004	0.80	0.74
'C'	1.2V	2.2AH	01-12024	2.35	1.99
'D'	1.2V	4.0AH	01-12044	3.05	2.85
PP3	8.4V	110mAH	01-84054	3.70	3.50
CH1/22 PP3 Charger 11mA for 16 hours			01-00159		4.30
CH8/RX Multi-purpose Charger			01-02204		9.40

Will recharge AA, C, D and PP3 size cells with automatic voltage selection. Will recharge following combination: 6×D, 6×AA, 6×C, 2×PP3, 2×D+2×C, 2×D+2×AA, 2×D+1×PP3, 2×C+2×AA, 2×C+1×PP3, 2×AA+1×PP3.

Battery Adaptor	01-12001	0.96

Sold in pairs: one to convert AA size to C size and one to convert C to D size. Both may be used together to convert an AA to D size.

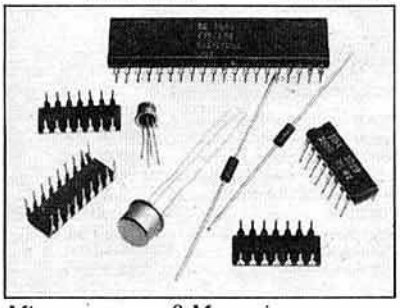
Semiconductors

Linear IC's

LM301AN	DIL version	61-03011	0.44
LM308CN	DIL version	61-03081	0.65
LM311CN	Popular comparator	61-00311	0.46
LM324	Low power quad op amp	61-03240	0.67
LM339N	Low power quad comparator	61-03390	0.68
LM346	Programmable quad op amp	61-00346	3.72
LF347	Quad Bi-FET op amp	61-00347	1.82
LM348	Quad 741 type op amp	61-03480	1.26
LF351	Bi-FET op amp	61-03510	0.49
LF353	Dual version of LF351	61-03530	0.76
LM380N	1W AF power amp	61-00380	1.00
NE555N	Multi-purpose low cost timer	61-05550	0.45

for a better service.

NE556N	Dual version of the 555	61-05560	0.50
uA741CN	DIL low cost op amp	61-07411	0.22
uA747CN	Dual 741 op amp	61-07470	0.70
uA748CN	741 with external frequency comp	61-04780	0.40
HA1388	18W PA from 14V	61-01388	2.75
TDA2002	8W into 2 ohms power amp	61-02002	1.25
ULN2283	1W max. 3-12V power amp	61-02283	1.00
MC3357	Low power NBFM IF system and detector	61-03357	2.85
ULN3859	Low current dual conversion NBFM IF and detector	61-03859	2.95
LM3900	Quad norton amp	61-39000	0.60
LM3909N	8-pin DIL LED flasher	61-39090	0.68
KB4445	Radio control 4 channel encoder and RF	61-04445	1.29
KB4446	Radio control 4 channel receiver and decoder	61-04446	2.75
ICM7555	Low power CMOS version of timer	61-75550	0.98
ICL8038CC	Versatile AF signal generator with sine/square/triangle OPs	61-08038	4.50
TK10170	5 channel version of KB4445	61-10170	1.87
HA12002	Protection monitor system for amps, PSUx, TXs etc	61-12002	1.22
HA12017	83dB S/N phono preamp 0.001% THD	61-12017	0.80
MC14412	300 baud MODEM controller (Eduro/US specs)	61-14412	6.85



Microprocessor & Memories

Z80A	Popular and powerful 8-bit CPU	26-18400	3.40
Z80AP10	2 port parallel input/output	26-18420	2.95
Z80A CTC	4 channel counter/timer	26-18430	2.90
Z8671	Z8 Micro comp. and Basic	26-08671	17.50
6116-3	16K (2kx8) CMOS RAM 200nS	26-36116	6.68
Z6132-6	32K (4kx8) quasi RAM 350nS	26-06132	15.00
4116-2	16K (16kx1) 150nS	26-24116	1.59
2764	64K (8kx8) 450nS	26-02764	9.50
2732	32K (4kx8) 450nS	26-02732	5.70

Voltage Regulators

7805	5V 1A positive	27-78052	0.40
7812	12V 1A positive	27-78122	0.40
7815	15V 1A positive	27-78152	0.40
7905	5V 1A negative	27-79052	0.49
7912	12V 1A negative	27-79122	0.49
7915	15V 1A negative	27-79152	0.49

Transitors

BC182	General purpose	58-00182	0.10
BC212	General purpose	58-00212	0.10
BC237	Plastic BC107	58-00237	0.08
BC238	Plastic BC108	58-00238	0.08
BC239	Plastic BC109	58-00239	0.08
BC307	Complement to BC237	58-00307	0.08
BC308	Complement to BC238	58-00308	0.08
BC309	Complement to BC239	58-00309	0.08
BC327	Driver/power stage	58-00327	0.13
BC337	Driver/power stage	58-00337	0.13
MPSA13	NPN Darlington	58-04013	0.30
MPSA63	PNP Complement to MPSA13	58-04063	0.30
J310	JFET for HF-VHF	59-02310	0.69
J176	JFET analogue switch	59-02176	0.65
3SK51	Dual gate MOSFET-VHF amp	60-04051	0.60
3SK88	Dual gate MOSFET-Ultra lo noise	60-04088	0.99
TIP31A	Output stage	58-15031	0.35
TIP32A	Complement to TIP31A	58-15032	0.35
VN66AF	VMOS Power FET	60-02066	0.95
ZTX3866	E-line version 2N3866	58-03866	0.45
IN4001	Rectifier diode	12-40016	0.06
IN4002	Rectifier diode	12-40026	0.07
IN4148	General purpose silicon	12-41486	0.05

Silicon Controlled Rectifiers

BRY55-100	100V .8A	52-55100	0.50
C106DI	400V 4.0A	52-00106	0.70
C122DI	400V 8.0A	52-00122	1.45

3mm Diameter LEDs

V178P	Red	15-01780	0.15
V179P	Green	15-01790	0.16
V180P	Yellow	15-01800	0.18

5mm Diameter LEDs

CQY40L	Red	15-10400	0.12
CQY72L	Green	15-10720	0.15
CQY74L	Yellow	15-10740	0.15

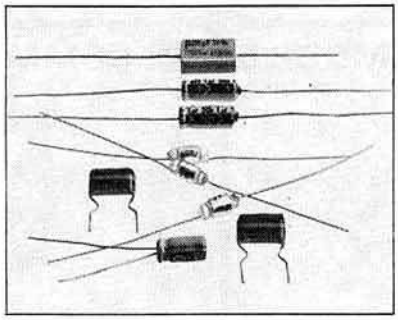
Infra-Red LEDs

CQY99	Emitter	15-10990	0.56
BPW41	Detector	15-30410	1.51

Tri Colour LED

V518	Orange-Green-Yellow	15-05180	0.60

Capacitors



Aluminium Electrolytics Radial PCB Mounting

			Pack of 4
10u	16V	05-10606	0.24
47u	16V	05-47606	0.28
47u	25V	05-47607	0.28
470u	6.3V	05-47705	0.36
470u	16V	05-47706	0.48

Tantalum Beads

			Each
1uf	35V	05-10501	0.18
10uf	16V	05-10601	0.28
47uf	6.3V	05-47601	0.45
47uf	16V	05-47602	0.92

Monolithic Capacitors

		Pack of 3
1n	04-10204	0.39
10n	04-10304	0.42
100n	04-10404	0.45

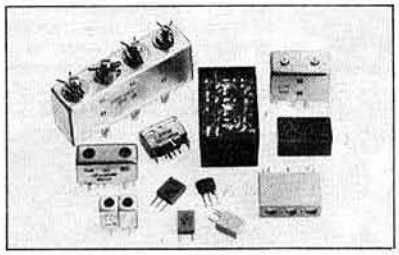
Low Voltage Disc Cermaic

		Pack of 5
1n	04-10203	0.20
10n	04-10303	0.20

Polyester (C280)

		Pack of 3
10n	04-10305	0.18
47n	04-47305	0.24
100n	04-10405	0.24
470n	04-47405	0.51
1uF	04-10505	0.66

R F Components



Filters

CFU/LFB CFW/LFH SERIES

Miniature 455kHz filters. I/P and O/P impedance 2K.

		−6dBW	−40dBW		
LFB6/CFU455H		6kHz	18kHz	16-45512	1.95
LFB12/CFU455F		12kHz	26kHz	16-45515	1.95
LFH6S/ CFW455HT		6kHz	14kHz	16-45525	2.45
LFG12S/ CFW455FT		12kHz	22kHz	16-45528	2.45
CFM2455A Mechanical IF Filters for 455kHz				19-45530	0.77

Crystal Filters 2 Pole Types

10M15A	10.7 Centre Freq.	20-10152	2.10
10MO8AA	10.695 Centre Freq.	20-11152	3.49

Inductors

We offer the complete Toko range of fixed and variable inductors. Over 500 coils from audio to V.H.F. See catalogue for details.

Soldering Irons (Antex)

CS240	Iron 240VAC 17 Watts	54-22300	5.20
XS-240	Iron 25W 240V High heat capacity	54-22500	5.40
SK6	Presentation pack of one XS-240 with ST4 stand	54-22510	7.20
MLXS	Handy 12V 15W soldering iron complete with crocodile clips and solder	54-20004	5.60

Please add 15% VAT to all advertised prices and 60p post and packing. Minimum order value £2 please. We reserve the right to vary prices in accordance with market fluctuation.

Communications Ltd.

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'SMC' YOUR ULTIMATE CHOICE FOR SERVICE

FT980

FT980	Transceiver with general coverage Rx.	£1265.00 inc.
SP980	External L/S with audio filter	£58.65 inc.
SP980P	External L/S with phone patch	£74.85 inc.
FIF80	Computer interface for NEC PC8001	£99.65 inc.
FIF65	Computer interface for Apple II	£51.35 inc.
FIF232C	Computer interface (RS232)	£54.80 inc.

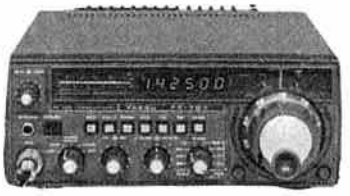
FT77

FT77	8 Band Rx/Tx 100W output	£459.00 inc.
FT77S	8 Band Rx/Tx 10W output	£425.00 inc.
FP700	Matching AC PSU	£135.00 inc.
FC700	Matching antenna tuner	£98.90 inc.
FV700DM	Digital VFO unit	£200.00 inc.
MKT77	Marker unit	£10.35 inc.
FMUT77	FM unit	£27.20 inc.

FT757GX THE 'NO OPTIONS' RADIO

FT757GX	All Modes and Filters Fitted	£685.00 inc.
FP757GX	Switched Mode PSU 50% Duty	£149.50 inc.
FP757HD	Heavy Duty PSU 100% Duty	£162.50 inc.
FC757AT	Automatic Antenna Tuner	£231.50 inc.

THE BUY OF THE YEAR
FT707 8 BAND HF TRANSCEIVER



~~£499.00~~
now only
£425 inc

FP707	Matching AC PSU	£125.00 inc.
FV707DM	Digital VFO	£149.00 inc.

FT102 ALL MODE TRANSCEIVER

FT102	Transceiver 9 band	£685.00 inc.
SP102	External speaker	£52.50 inc.
FC102	Antenna coupler	£179.00 inc.
AMFMUT102	AM/FM unit option	£46.75 inc.

FT ONE 'THE ULTIMATE'

FT ONE	Transceiver HF All Mode	£1495.00 inc.
KEYT901	Curtis Keyer	£28.75 inc.
DCT1	DC Power Cable	£10.35 inc.
RAMT1	Non volatile memory	£13.80 inc.
FMUT1	FM unit	£42.85 inc.

REMEMBER

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

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SMC Ltd
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Totton, Southampton.
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SMC (Humberside)
247A Freeman Street,
Grimsby, Lincolnshire
Grimsby (0472) 59388
9.30-5.30 Mon-Sat

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

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

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

BUCKLEY
SMC (T.M.P.)
Unit 27 Pinfold Workshops
Pinfold Lane, Buckley.
Buckley (0244) 549563
10-5 Tue-Fri 10-4 Sat

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

EDINBURGH
SMC (Scotcomm)
23 Morton Street
EH15 2HN
031-657 2430
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SCANNING RECEIVER

MS-8400

New 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" x 4" oval speaker
Size:	190(W) x 250(D) x 85(H) mm
Weight:	1.7kg

£249.00 inc.

Price includes free carriage

KDK KYOKUTO DENSHI CO. LTD.

FM2033

144 MHz, 12VDC Transceiver. 25W/5W Hi/Lo (both adjustable). Compact 2⅝ × 6⅜" × 7⅜". 12½ KHz steps (100 KHz fast QSY). Amber LCD 'Sunlight View', Side Lit. Display; 100's of Hz or channel number. Sensitivity <0.2μV for 12dB SINAD. Single knob frequency control "Dial". Endless or non-endless dial options. RIT; 1 KHz steps, V.F.O. + memory. Two 5 slot memories A, B, A+B, A×B. 11th memory instant "call" channel. Memories simplex or duplex channels. Band scanning, programmable limits. Scan halts squelch + centre zero. Pause on scan halt for 3 seconds. Scan/tune/RIT from microphone ±600 KHz split, plus cross memory. Repeater input listen by pressing "dial". Setable; steps, tone, splits, limits. Simple controls for safe mobile operation. C/W mobile mount, mic and handbook.

NEW **£239 inc** NEW

JAY BEAM

			p/p
4 METRES			
4Y/4M	Yagi 4 element	7dBd	£29.90 £2.65
PMH2/4M	Phasing harness 2 way		£16.10 £1.65
2 METRES			
H0/2M	Halo head only	0dBd	£5.98 £1.50
HM/2M	Halo with 24" mast	0dBd	£6.55 £1.65
C5/2M	Colinear omni vert	4·8dBd	£54.62 £2.65
LW5/2M	Yagi 5 element	7·8dBd	£14.37 £2.65
LW8/2M	Yagi 8 element	9·5dBd	£17.82 £2.65
LW10/2M	Yagi 10 element	10·5dBd	£24.15 £2.65
LW16/2M	Yagi 16 element	13·4dBd	£35.07 £3.65
14Y/2M	Yagi 14 element	12·8dBd	£36.23 £3.65
PBM10/2M	10 ele Parabeam	11·7dBd	£44.85 £3.65
PBM14/2M	14 ele Parabeam	13·7dBd	£55.77 £3.65
Q4/2M	Quad 4 element	9·4dBd	£29.32 £2.65
Q6/2M	Quad 6 element	10·9dBd	£39.10 £2.65
Q8/2M	Quad 8 element	11·9dBd	£44.85 £2.65
D5/2M	Yagi 5 over 5 slot	10dBd	£25.30 £2.65
D8/2M	Yagi 8 over 8 slot	11·1dBd	£34.50 £2.65
5XY/2M	Yagi 5 ele crossed	7·8dBd	£28.17 £2.65
8XY/2M	Yagi 8 ele crossed	9·5dBd	£35.65 £2.65
10XY/2M	Yagi 10 ele crossed	10·8dBd	£46.00 £2.65
PMH2/C	Harness cir polarisation		£9.77 £1.65
PMH2/2M	Harness 2 way 144MHz		£12.65 £1.65
PMH4/2M	Harness 4 way 144MHz		£28.75 £1.65
SEVENTY CM			
C8/70	Colinear Omni Vertical	6·1dBd	£62.10 £2.65
D8/70	Yagi 8 over 8 slot	12·3dBd	£25.87 £2.65
PBM18/70	18 ele Parabeam	13·5dBd	£32.30 £2.65
PBM24/70	24 ele Parabeam	15·1dBd	£42.55 £2.65
LW24/70	Yagi 24 element	14·8dBd	£27.02 £2.65
MBM28/70	28 ele Multibeam	11·5dBd	£21.27 £2.65
MBM48/70	48 ele Multibeam	14·0dBd	£35.65 £2.65
MBM88/70	88 ele Multibeam	16·3dBd	£48.87 £2.65
8XY/70	Yagi 8 ele crossed	10dBd	£42.55 £2.65
12XY/70	Yagi 12 ele crossed	12dBd	£52.90 £2.65
PMH2/70	Harness 2 way		£10.35 £1.85
PMH4/70	Harness 4 way		£22.42 £1.85
1296 MHz			
CR2/23CM	Corner reflector	13·5dBd	£40.25 £2.65
PMH2/23CM	Harness 2 way		£31.05 £1.65

NB: PRICES INCLUDE VAT AT 15%

Carriage extra, mainland rate shown

10M FM CORNER

Join the many others who have found that operating 10M FM can be a pleasant alternative to the overcrowded 2M band. The SMC Oscar 2 10M gives you 40 channels, channel 1 being 29.310 MHz and channel 40 29.7 MHz, a power o/p of approximately 4 watts and a receive sensitivity of better than 3μV for 12db sinad. Also for your enjoyment when the band opens up, we have incorporated a – 100kHz repeater shift (by using the original panel Hi/Low power switch), so from the car or at home you can enjoy 10M FM without having to pay £500 for an HP transceiver.

OSCAR 2 10M FM £49.00 inc

ACCESSORIES		INC	P/P
SMCGP27	¼ Wave vertical with radials	£24.15	£2.65
SMCVA27	¼ Wave vertical no radials	£20.70	£2.65
SMC11V11S	Glass fibre shortened ground plane	32.20	£2.65
SMC10SE	10M Mobile whip	£14.95	£2.00
RSL-28b	Yaesu 10M mobile whip	£10.65	£2.00
SMCGCCA	Gutter mount and cable	£10.35	£2.00
SMCSOCA	4M cable assembly for 10SE	£5.35	£1.50
FLEXI 10	G. Whip mobile 10-80M	£49.00	£2.35
MULTI-MOBILE	G. Whip mobile 10, 15, 20M	£32.20	£1.85
FLEXIWHIP	G. Whip 10M mobile	£19.21	£1.85
GW BASE	Base for all G. Whip antennas	£6.10	£1.00
SMCT3170L	Twin meter SWR bridge	£16.50	FOC
SMC100LP30	Low pass filter	£6.30	FOC
SMCRU12 04·06	4 Amp DC power unit	£14.95	£2.35
SP55	Extension L/S	£16.00	FOC

NB. PRICES INCLUDE VAT AT 15%

and carriage by post or Securicor

6 METRE EQUIPMENT

Are you one of the lucky few to obtain one of the 60 new 6M experimental licences or perhaps you would just like to listen and send reports.

Here at Totton we have been importing 6M equipment for the dedicated few since 1974 when the FT620 and the FTV650 were state of the art. Today's equipment is much more advanced; multimode, base stations, mobile and transportable equipment with multi memory facilities, scanning and channelized operation, to name a few of the facilities. Listed below is some of our current range of equipment and accessories for all your 6M requirements.

FT726R	Main frame unit less modules	£589.00 inc.
50/726	6M module for 726R	£185.00 inc.
FT680R	6M mobile 10W O/P	£349.00 inc.
FT690R	6M transportable 2.5W O/P (acc as FT290)	£249.00 inc.
FL6010	Matching 10W amplifier for 690R	£49.00 inc.
50TV	6M module for FTV transvertors	£85.45 inc.
MMC50/28	6M down to 10M convertor	£29.90 inc.
MMC50/28S	6M down to 10M convertor	£34.90 inc.
MMA50V	6M switched pre-amp	£34.90 inc.
SLNA50S	50 MHz switched pre-amp	£37.10 inc.
4Y6M	6M 4 ele Yagi	£41.40 inc.
2HB6	6M ZL antenna (HB9CV)	£19.95 inc.
LT606	13 ele Log Periodic 50-500 MHz	£115.00 inc.

Carriage on antennas £2.65 extra.

ROTATORS

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

KR600RC

9502B

FU200	through	3 Core	Light Duty	£49.95
KR250	Bell	6 Core	Lighter Duty	£54.91
9502B	Offset	3 Core	Lighter Duty	£57.50
AR40	Bell	5 Core	Medium Duty	£98.90
KR400	Bell	6 Core	Matches KR500	£99.95
KR500	Thro	6 Core	Elevation	£126.50
AR50	Bell	5 Core	5 Position Medium	£113.85
KR400RC	Bell	6 Core	Medium Duty	£118.45
CD45	Bell	8 Core	Heavy Duty	£149.50
KR600RC	Bell	8 Core	Heavy Duty	£167.90
HAM IV	Bell	8 Core	Heavier Duty	£264.50
KR2000RC	Bell	8 Core	Heavier Duty	£333.50
T2X	Bell	8 Core	Very Heavy Duty	£332.35
H300	Bell	8 Core	Digital Readout	£546.25

Control Cable

RC5W	5 Way 40p/mtr	Carriage £1.90
RC6W	6 Way 55p/mtr	Carriage £1.90
RC8W	8 Way 59p/mtr	Carriage £1.90
9523	Support Bearing £19.65 9502b F4200	Carriage £2.50
KC038	Lower Mast Clamp £12.65 KR400 600 etc	Carriage £2.50

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

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POWER METERS

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

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

FS-500H

				£
HANSEN				
FS710H	1.8-60 MHz	15/150/1500W	Pep	97.75
FS710V	50-150 MHz	15/150W	Pep	97.75
FS50HP	1.8-60 MHz	20/200/2000W	Pep	96.60
FS50VP	50-150 MHz	20/200W	Pep	96.60
FS500H	1.8-60 MHz	20/200/2000W	Pep	77.80
FS500V	50-150 MHz	20/200W	Pep	77.80
FS300H	1.8-60 MHz	20/200/1000W		50.60
FS300V	50-150 MHz	20/200W		50.60
FS200	1.8-150 MHz	20/200W	Pep	55.95
FS601M	1.8-30 MHz	20/200W	Pep	57.50
FS601MH	1.8-30 MHz	200/2000W	Pep	57.50
FS602M	50-150 MHz	20/200W	Pep	57.50
FS603M	430-440 MHz	5/20W	Pep	56.75
FS210	1.8-150 MHz	20/200W	Auto SWR	59.80
FS301M	2-30 MHz	20/200W		39.50
FS301MH	2-30 MHz	200/2000W		39.50
FS302M	50-150 MHz	20/200W		39.50
FS711H	2-30 MHz	20/200W	Head	41.00
FS711V	50-150 MHz	20/200W	Head	41.00
FS711U	430-440 MHz	5/20W	Head	41.00
HB1	FS711H Coupler			23.00
VB1	FS711V Coupler			23.00
UB1	FS711U Coupler			23.00
FS5E	3.5-150 MHz	20/200/1000W	(HF)	41.00
FS5S	1.8-150 MHz	20/200/1000W	(HF)	41.00
FS7	145 & (432)	5/20/200W	(144MHz)	44.85
SWR3E	3.5-150 MHz	20/200/1000W	(HF)	26.85
SWR3S	3.5-150 MHz	F/S Meter ant.		28.35
SWR50B	3.5-150 MHz	Twin Meter		26.85
FS20D	3-150 MHz	5/20W		39.85
FS-800	1.8-150 MHz	6/30/150W		115.00
JD				
JD110	1.5-150 MHz	10/100W		13.80
MIRAGE				
MP2	50-150 MHz	50/500/1500W	Pep	97.00
S.M.C.				
S3-30L	Mini			8.80
T3-170L	3.5-170 MHz	Relative		16.50

T3-170L

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

SMC-HS

HF, VHF, UHF ANTENNAS MOBILE VERTICALS

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

SMC 78F

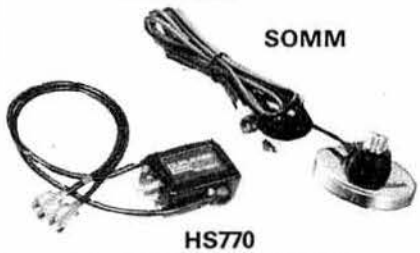
GCD

SMC258

GCD

SMC-HS MOBILE ANTENNAS		£	P&P
SMC6P2T/PL	Telescopic 2M PL259 fitting 0dB¦	5.75	0.85
SMCT144h	Telescopic 2M ¼ wave BNC	£9.20	0.85
SMC6P2T/BNC	Telescopic 2M BNC fitting 0dB¦	5.75	0.85
SMC2H/PL	Helical 2M PL259 fitting	5.75	0.85
SMC2H/BNC	Helical 2M BNC fitting	5.75	0.85
SMCHS430	70cm ¼ wave BNC fitting 2.5dB¦	7.30	0.65
SMC2QW	2M ¼ wave 0dB¦ 1.6'	2.53	1.85
SMC2NE	2M ½ wave fold 3.0dB¦ 4.3'	7.30	2.00
SMC2VF	2M ½ wave fold 3.0dB¦ 3.5'	12.65	2.00
SMC78F	2M ½ wave fold 4.5dB¦ 5.7'	14.95	2.50
SMC78B	2M ½ wave ball 4.5dB¦ 5.6'	14.95	2.59
SMC78SF	2M ½ wave short 4.7'	14.95	2.50
SMC88F	2M 8/8 wave 5.2dB¦ 6.5'	20.70	2.50
SMC118M	Colinear 2M 11/8 wave fold 7dB¦ 9.7'	33.35	2.65
SMC25B	70cm 2 × ½ fold 5.5dB¦ 3.1'	13.80	2.00
SMC358	70cm 3 × ½ 6.3dB¦ 4.7'	18.40	2.00
SMC70N2M	Dual band 2M 2.7dB¦ 70cm 5.1dB¦	18.40	2.00
SMCHS770	144/432 Duplexer 50W	16.50	1.85
SMC20SE	20M 1.72M 'fold over' 100W PEP	19.15	2.50
SMC15SE	15M 1.72M 'fold over' 130W PEP	15.70	2.50
SMC10SE	10M 1.72M 'fold over' 200W PEP	14.95	2.50
SMC17SE	17M 1.915M 'fold over' 200W PEP	17.25	2.50
SMC12SE	12M 1.915M 'fold over' 200W PEP	15.35	2.50
RSL-28b	Yaesu 10M mobile whip	10.65	2.00
SMCGCCA	Gutter clip 4 mtrs cable	10.35	2.00
SMCSOCA	Cable assembly 4M	5.35	1.50
SMCSOCAL	Cable assembly 6M	5.75	1.50
SMCTMCAS	Trunk mount c/w 6M cable	9.20	2.00
SMCSOMM	Magnetic base c/w 4M cable	10.75	2.00
SMCSOWM	Adjustable wing mount base	4.60	0.90
SMCGCD	Gutter clip deluxe	5.00	1.50
SMCBSD	Bumper strap deluxe	9.60	1.50
HS88BK	Bumper mounted extension for 144 MHz ant.	20.30	2.00

SOMM

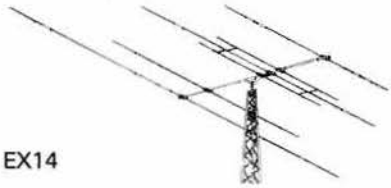


HS770

NB: PRICES INCLUDE VAT AT 15%

HF ANTENNAS

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



EX14

MULTIBAND BEAMS		Inc VAT	P&P
EX14	Explorer 10-20m	£325.00	£5.95
TH3JN	3 Ele 10-20m	£199.00	£3.50
TH5DXX	5 Ele 10-20m	£419.00	£6.70
TH7DXX	7 Ele 10-20m	£520.00	£8.75
TB3	3 Ele 10-20 Jaybeam	£189.75	£5.90
HQ1	Mini Quad 10-20	£169.00	£4.00
G4MH	Mini Beam 1-20	£88.50	£4.50
TA33JNR	3 Ele 10-20 Moseley	£177.10	£6.00
Mustang 2	2 Ele 10-20 Moseley	£177.10	£6.90
Mustang 3	3 Ele 10-20 Moseley	£220.80	£6.90
GQ2E	2 Ele 10-20 Quad	£270.25	£5.40
GQ3E	3 Ele 10-20 Quad	£435.00	£9.20
GQ4E	4 Ele 10-20 Quad	£599.00	£10.00
Hyquad	2 Ele 10-15M dipole 20M	£325.00	£6.00
LP1007	Log Periodic 13-20 MHz	£1707.75	DIST
3Y1015D20	3 Ele 10/15M Dipole 20M	£158.70	£5.95
DB10/15A	3 Ele 10-15m	£199.00	£4.80

TB3

MONO BAND BEAMS			
103BA	3 Ele Yagi 10m	£69.00	£3.50
105BA	5 Ele Yagi 10m	£155.00	£3.95
153BA	3 Eli Yagi 15m	£95.00	£3.50
155BA	5 Ele Yagi 15m	£239.00	£5.90
203BA	3 Ele Yagi 20m	£179.00	£4.90
204BA	4 Ele Yagi 20m	£289.00	£7.30
205BA	5 Ele Yagi 20m	£399.00	£9.40
402BA	2 Ele Yagi 40m	£249.00	£6.50
18TD	Dipole Tape 10-80m		

HF5V

HF5R

VERTICALS			
12AVQ	Vertical 10-20m	£52.90	£2.75
14AVQ	Vertical 10-40m	£66.70	£2.75
18AVT/WB	Vertical 10-80m	£113.85	£2.75
18V	Vertical 10-80m taped	£36.22	£2.75
C4	Vertical 10-20m	£59.00	£2.65
SMCHF5V	Vertical 10-80m	£59.00	£2.65
SMCHF5R	Radial Kit for above	£38.35	£2.65
TRAP DIPOLE			
SMCTD/HP	High Power 10-80m	£45.00	£2.65
SMC TD/P	Portable inc coax	£65.55	£2.65
MOBILE			
Tribander	10-20m Slide sw.	£27.37	£1.65
Multimobile	10-20m	£32.20	£1.85
Flexiwhip	10m only	£19.21	£1.85
Extra coils	For above to 160m	£6.90	£1.00
Flexiten	2, 10, 12, 17, 15, 20, 30, 40, 80M	£49.00	£2.35
Bases	For above	£6.10	£1.00

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

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ICS

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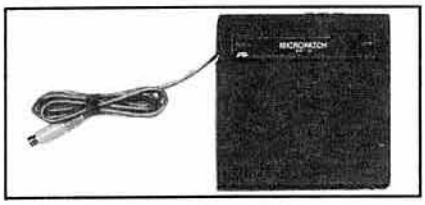
Good



MP64/MP20 "Micropatch" RTTY/CW/ASCII Terminal Unit

Software and hardware all in one module!
The simplest way ever to get on RTTY.
Just plug into a Commodore 64 or VIC-20 computer; connect up your rig (MIC, PTT, SPKR); plug in a 12 volt power unit and you're away!
Built-in tuning indicator. Wide and narrow shifts. Separate active 4-pole mark and space filters. NOT A PHASE LOOP DESIGN. European (IARU) AFSK tones. Programmable speeds (all commonly used speeds are available). FSK, AFSK and CW outputs.
Triple split screen software with on-screen status and time of day clock. Programmable memories. Can use disc, tape and printer. Excellent speed tracking morse facilities. Above all, the software is very user friendly. Even someone who has never used a computer before will be instantly at home with the "Micropatch".
Surely the cheapest and simplest way yet to get onto RTTY! The "Micropatch" can be used as the basis of upgrade to the CP-1 later.
USA made.

			P&P
MP-64	(for Commodore 64)	**£129.00**	£1.50
MP-20	(for VIC-20)	**£129.00**	£1.50
Also available:			
			P&P
MBA-RO	Self-contained Morse/ RTTY/ASCII Reader	**£179.00**	£2.00
MM-2	Morsematic de-luxe morse Keyer	**£149.00**	£1.50
CK-2	"Contester" Keyer	**£119.00**	£1.50

Better

CP-1 'Computer Patch" RTTY/ CW/ASCII Terminal Unit

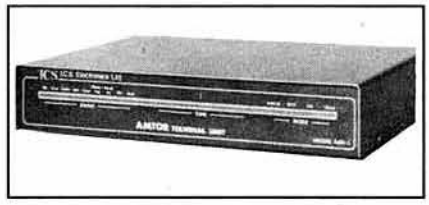
Picks signals out of the noise like no other terminal unit!
A professional quality CW/RTTY terminal unit which cuts no corners on selectivity, sensitivity or reliability.
A magic eye bargraph indicator makes tuning really easy and a multi-stage active filter with pre- and post-limiting and a floating comparator give 'state of art' reception of weak signals.
Switchable CW, RTTY (170Hz) and variable (100-1000Hz) shifts are provided on receive. A function generator gives a clean, stable sinewave AFSK output signal.
Inputs and outputs are TTL compatible, but RS232 drivers are optionally available. AFSK, FSK and tuning scope and keying outputs are provided as well as a morse key jack.
AFSK tones are European IARU compatible and the CP-1 comes complete with its own separate 240V. 50Hz power supply.
Our split screen software is up to the same standards of professionalism as the CP-1 and beats all comers in terms of ease of use. It comes on E-PROM or cartridge (to suit your particular computer) with a ready-made connection cable, keyboard overlay and manual.
USA made.

			P&P
CP-1	"Computer Patch"	**£179.00**	£2.50
CP-1/CBM-64	Commodore 64 software	**£39.00***	£1.00
CP-1/VIC-20	VIC-20 software	**£39.00***	£1.00
CP-1/BBC-B	BBC Model B software	**£39.00***	£1.00
MBA-TOR	Runs AMTOR/ RTTY/CW/ ASCII on the CBM-64 with the CP-1	**£69.00**	£1.00

(Note: This software will run with any TTL interface terminal unit)

* Price when purchased with a CP-1. (Price otherwise £55 plus £1.00 P&P.)

Best!



AMT-1 AMTOR/RTTY/CW Terminal Unit

A superlative terminal unit with its own built-in intelligence. The established world standard for AMTOR. RSGB and ARRL headquarters stations both use them).
Built-in 16 LED tuning indicator; four stage active filter and discriminator type demodulator. Crystal based sinewave function generator AFSK output. RS-232 serial interface to the computer or terminal. If your computer can communicate with a modem at 75 or 110 Bauds, then it will work with the AMT-1.
The AMT-1 has its own in-built microprocessor which takes care of all the code conversion. It then communicates with your computer in its own language: ASCII. With a microcomputer and one of ICS's powerful applications programs at your disposal, the power and intelligence of *two* microcomputers are at your fingertips to give the ultimate in data communication power and flexibility. All of our programs are professionally written, split screen and menu driven and offer a considerable degree of automatic operation. The user interface is simplicity itself.
AMTOR is now growing at a tremendous rate as its low error rate performance (when compared with RTTY) becomes appreciated. AMT-1s are now operating on all continents (including several in Japan).
If anyone still believes there is no one to work out there on AMTOR, we just got a QSL card from DJ1IL who worked 150 stations in 27 countries in 10 weeks with his AMT-1, using AMTOR.
Made in the UK.

			P&P
AMT-1	AMTOR/RTTY/ CW/ASCII Terminal Unit	**£269.00**	£2.50
	CW Receive option	**£25.00**	£1.00
AMT-1/CBM-64	Commodore 64 software, cable etc	**£55.00**	£1.00
AMT-1/VIC-20	VIC-20 software, cable etc	**£55.00**	£1.00
AMT-1/BBC-B	BBC Model B software, cable etc	**£55.00**	£1.00
AMT-1/IBM-PC	IBM-PC software, cable etc	**£55.00**	£1.00
AMT-1/TRS100	Tandy TRS100 software, cable etc	**£55.00**	£1.00

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RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY REPRESENTING ALL UK RADIO AMATEURS

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

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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

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ANNUAL SUBSCRIPTION RATES

UK corporate member: £14.50 **Associate member under 18: £5.80** **Family member: £5.80** **Overseas member: £14.50**
Students over 18 and under 25: £8.70 (Applications should give applicant's age at last renewal date and include evidence of student status)
Affiliated societies: £14.50 (including *Radio Communication*); **£8.70** (excluding *Radio Communication*)
(Subscriptions include VAT where applicable)

RSGB QSL BUREAU

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

A list of QSL Bureau sub-managers was published in 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 June 1983 issue.

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

UK LICENCE CHANGES

The Secretary of State for Trade & Industry intends to publish a notice in the *London, Edinburgh* and *Belfast Gazettes* varying the terms of the amateur radio licence as from 8 June 1984. The notice to be published is as follows:

To all holders of Amateur Radio Licence (A) and Amateur Radio Licence (B)

The Secretary of State hereby gives notice to all such holders that as from 8 June 1984 any Licences they may hold falling within the above two categories shall be varied by replacing Clause 1 (1) (c), and 1 (2) (c) of such Licences by the following.

Clause 1 (1) (c)
To use the station as part of the self-training of the Licensee in communication by wireless telegraphy during disaster relief operations conducted by the British Red Cross Society, the St John Ambulance Brigade, the County Emergency Planning Officer, or any police force in the United Kingdom ("The user services"), or during any exercise relating to such disaster relief operations, or any other operation conducted by the said user services (provided that such other operations shall not exceed 4 in any one calendar month and not more than 12 in any one calendar year) for the purpose of sending to other licensed amateur stations such messages as the Licensee may be requested by the user service concerned to send and of receiving from any other licensed amateur station such messages as the person licensed to use such other licensed amateur station may be requested by the user service concerned to send.

Clause 1(2)(c)
The station shall be operated only
i) by the Licensee personally, or
ii) in the presence of and under the direct supervision of the Licensee, by any other person who holds a current wireless telegraphy licence issued by the Secretary of State to use another amateur station, or who holds an Amateur Radio Certificate issued by the Secretary of State.
iii) exceptionally, during any disaster relief operation referred to in Clause 1(1)(c) and in the presence of and under the direct supervision of the Licensee, by a representative nominated by the user service conducting the said operation.

A. J. Nieduszynski
On behalf of the Secretary of State for Trade and Industry

The purpose of these licence changes is to formalise some of the improvements negotiated with the UK licensing authority which became operational on 1 January 1983. These changes largely relate to the operation of Raynet with the user services. After a year of successful operation, the above licence changes have been agreed with the Society.

Raynet, along with its counterparts in many other countries, is a vital part of amateur radio. In the UK, members of Raynet work alongside other volunteers and professionals in times of disaster relief operations, and as such provide a service to the community at large. Mercifully we do not suffer from too many natural disasters in the UK and thus there is a **real** need for Raynet members to exercise in order to practice and fine tune their procedures and operations. Any group of people intending to carry out some work as a team need to be trained and to practice their skills—Raynet is no exception.

Under Clause 1(1)(c) of the new licensing conditions, Raynet groups may, of course, provide assistance in association with a user service in any **genuine emergency**. For training purposes Raynet groups may now take part in an **unlimited** number of **user service exercises of the disaster relief type**. In addition, Raynet may now take part in **user service exercises of the non-disaster type,** such as charity walks, county shows, marathons etc. The only restriction on user service non-disaster relief exercises is that Raynet groups may participate in a maximum of four such exercises in any calendar month with an overriding maximum of 12 in any calendar year. The above represents a relaxation of the previous arrangements following discussions with the DTI.

Clause 1(2)(c) has been varied to allow non-licensed persons to use amateur radio under the direct supervision of the licensee during genuine disaster relief operations. This facility is not available during exercise conditions. Obviously there are occasions when, for example, a doctor or police officer could use amateur radio to advantage.

Under an agreement with the UK licensing authority made earlier, individual amateurs **may still** use their amateur radio equipment to pass third-party messages during an emergency, such as a road traffic accident, provided that no other conventional means of communication is available.

Amateur Radio News

The Society's honorary treasurer

Members will have noted that Council confirmed the re-appointment of Mr P. F. D. Cornish, G3COR, as the Society's honorary treasurer. The appointment is normally for three years, but because of pressure of business and strict instructions from his medical advisers to limit his activities, David Cornish has indicated that it is unlikely that he will be able to continue in his role as treasurer into 1985.

The Society has every reason to be grateful for the exceptional efforts David has made, and continues to make, on behalf of the Society.

Council member resigns

Mr Ian J. Kyle, GI8AYZ, resigned as zonal member of Council for Zone F in March. At the next meeting of the Society's Council, therefore, consideration will be given to filling the casual vacancy which currrently exists.

Heard in the House

In the House of Lords on 20 March 1984, Lord Glenarthur moved Amendment 126A to the Telecommunications Bill: the effect of this would be to authorize the cost of the Radio Interference Service to be met from central funds. He stated that there had never been any statutory basis for the provision of the RIS's funding by the Secretary of State, and that the new amendment would confer such a power. After a debate the amendment was agreed, and one member said that he was delighted to see the RIS's funding being given statutory authority.

On 12 April 1984 the Minister of State for Industry & Information Technology, Mr Kenneth Baker, announced through a written answer that the functions at present performed on the Secretary of State's behalf by British Telecom's Radio Interference Service would be transferred to the Department of Trade & Industry with effect from the day on which the assets and liabilities of the corporation are transferred to the successor company. It was expected that at least some of the staff engaged on this work at the time of its transfer would wish to transfer to the DTI. Officials had begun discussions with British Telecom and with the trade unions concerned on the details of the transfer, and it was hoped that proposals could be put to the staff concerned and their representatives shortly. The Government would also review the functions of the Radio Interference Service in the course of the next 18 months to determine what resources it needs.

The Society welcomes this news. It means that the Radio Interference Service once more has a secure future, and that it is also in a more immediate environment with what the Society considers to be a more logical relationship to the licensing body. In conjunction with the passing of the Telecommunications Bill into law, the Society feels that there will now be much more chance of meaningful enforcement of the legislation relating to the use of radio.

Still in the House of Lords, on 22 March 1984 Lord Mulley asked the Government why it had taken no effective action to stop illegal broadcasts by pirate radio stations at the cost of, and to the detriment of, independent local radio companies who were subject to statutory and other regulations. The Chancellor of the Duchy of Lancaster, Lord Cockfield, said that at present the effectiveness of any action taken was limited by the lack of powers to seize a station's equipment pending prosecution. However, the Government hoped that the new powers being sought in the Telecommunications Bill (which was enacted on 12 April), which would enable the seizure of apparatus for legal proceedings, would prove an effective weapon. He also said that the Government intended to continue to give action against the pirate radio stations a high degree of priority.

Proof of unlicensed use not necessary

A law report in *The Times* of 28 March 1984 carried the above title: it related to the case of D (a minor) *v* Yates in the Divisional Court. Basically, the judgment was that ". . . . the offence of using apparatus for wireless telegraphy without a licence, contrary to section 1(1) of the Wireless Telegraphy Act 1949, was committed where the set was available for use at any time and it was unnecesary to prove that the set had been used or that the defendant intended to use it".

To quote further from the law report, ". . . . The Queen's Bench Divisional Court so held and dismissed the defendant's appeal from the dismissal by Manchester Crown Court . . . . of her appeal against conviction of an offence that between 13 November 1982 and 20 November 1982 the defendant did use a Superstar 360 CB transceiver without a licence, contrary to section 1(1). The Crown Court, having considered the evidence, was not sure that the defendant had operated the set between 13 and 20 November, but was sure that during that period she kept the set readily available for operation and intended to use it if the occasion arose. The sole issue was whether to establish an offence under the section of having used an apparatus it was necessary for the prosecution to establish that the set was switched on and transmitting and receiving during those dates".

"The Crown Court concluded that that was not the proper meaning of 'use' in that section, and that it would be virtually impossible to obtain a conviction if the operator had to be apprehended at the time the set was switched on".

"Even without reference to the defendant's state of mind, that is, her intention to use the set in the future, **the offence had been established by the fact that the set was available for immediate use at any time**".

Lord Justice Kerr further said that the word 'use' should be given a broad and sensible interpretation of being available for use. **It was going too far to require proof that the set was being used at the time.**

It is, of course, always possible that the Court of Appeal or the House of Lords could reverse the decision of the lower court—it is not yet known whether the defendant intends to take the matter further—but the Divisional Court decision in this case has some very far-reaching consequences insofar as illegal operation on amateur frequencies, and any others for that matter, is concerned. It appears that a prosecution for unlicensed use can succeed **without** it being necessary for the prosecution to show that the equipment in question was switched on and transmitting or receiving; in other words, that the offence was established by reason of the equipment being available for immediate use at any time.

This is very different from the opinion given to the Society at various times by the Home Office and the DTI, that it is not possible to bring a successful prosecution under the Wireless Telegraphy Act because proof of transmission was necessary.

Given that the Society is well aware of the very serious problems presented by the illegal use of radio transmitters, which continue to manifest themselves both in amateur bands and elsewhere, the consequences of this judgment give some grounds for hope that a solution may become available. It is a fact that the simple possession of a television receiver without the appropriate licence is an offence under the Act, and the Society has for many years been aware of the anomaly that the same simple logic has not been applied to the possession of an unlicensed transmitter.

The Society has written to the DTI to make some points with respect to this case, and there appears to be a case for cautious optimism that it may at last be possible to tackle the apparently insuperable problem of illicit operation from a more productive angle. Equally, there are obvious implications for the short-wave listener who is working towards becoming a licensed amateur and who has purchased a transceiver in anticipation of that.

There is another cause for optimism insofar as the Telecommunications Bill has now completed its passage through Parliament, receiving the Royal Assent on 12 April 1984, and has become law. The actual effects of this remain to be seen, but the Society hopes that it will now become possible for the authorities to take meaningful action against many of the abuses which have caused problems for radio amateurs in recent years.

Further information on these most important topics will be published as soon as it becomes available.

Amtor by satellite

The first Amtor contact in the automatic error-correction (arq) mode by satellite took place on 2 March 1984, at 0140gmt; the stations involved being 9M2CR and DC8AM. Oscar 10 was close to apogee on orbit 540, and the contact was fully successful.

This is, in fact, a major discovery. It was previously thought that arq contacts via satellite would not be possible because of the range limitation on Amtor due to finite propagation delay. However, a detailed analysis of the operation of Amtor Mode A demonstrates that the apogee transit time of the order of 500ms displaces the "handshake" control signals backwards by precisely one frame. Since the Amtor time-frame for the transmission of a three-character block is 450ms, and as long as the normal control signals alternate for successive blocks, the system accepts them even though they are one time-frame late.

This means that a second "window" exists for Amtor contacts when the propagation delay is between 450 and 620ms, and contacts now take place when the satellite is around apogee.

IRCs

There seems to be some uncertainty concerning the validity period for International Reply Coupons, which are often used in connection with the payment of postage for return QSL cards. IRCs normally have an indefinite period of validity, and all members of the Universal Postal Union (UPU) are obliged to exchange valid ircs irrespective of the date of issue. However, there is one instance when an administration belonging to the UPU may refuse to accept ircs: this is in the case of those issued before 1 January 1975. IRCs issued before that date are known as "old style" ircs and, in the absence of a bilateral agreement, administrations are unable to claim reimbursement for their exchange. The UK Post Office continues to exchange "old-style" ircs and, in a recent letter to the Society, could only assume that where their exchange has been refused this had been due to failure to recognize the very small number of them now being tendered for exchange. The UK Post Office believes that ". . . . there are probably a few administrations who are unwilling to claim reimbursement. Unfortunately (the Post Office) . . . . has no information as to which countries no longer accept such ircs".

Software by air—a copyright problem

Some publicity has recently been given in national newpapers and software magazines to the efforts of a Rochdale software company, A & F Software, to monitor radio amateurs who exchange copyright computer programs over the air. According to the *Daily Telegraph* of 6 April 1984, the Guild of Software Houses is extremely concerned about the growth in the transmission of programs by radio, and the Rochdale company has said that it estimates its net loss of business to be some £75,000.

The legal position is that the terms of the amateur radio licence permit the transmission of data, and that there is nothing which prohibits the exchange of non-copyright material—for example, programs written by individual amateurs which they may wish to transmit to another amateur by radio. However, the effect of the various Copyright Acts is to make illegal the transmission or reception of copyright material such as commercial programs; these include such programs as computer games, educational programs and small business packages.

It would appear that there are only a few amateurs in the north-west involved, and they are probably not aware that the exchange of commercial programs is illegal. Members are asked to bear in mind that the exchange of computer software on the air should be confined strictly to material of a non-copyright nature, and that any transmission or reception of commercial software is an infringement of copyright.

It is understood that at present, A & F Software is planning to take legal action against eight licensed radio amateurs.

Scottish trophies

Two trophies are awarded annually in Scotland: the Jack Wyllie Trophy to the Scottish RSGB member, society, club or group thought to have done most for amateur radio in Scotland in general terms, in the past year; and the Jock Kyle Trophy to the Scottish RSGB member, society, club, or group thought to have done the most in Scotland in the vhf field in the past year.

Nominations and citations for each of the trophies are required from at least five RSGB members resident in Scotland, who should send them to their respective regional representatives by 15 August 1984. To be eligible for the awards, the member, or group of members, shall have been resident in Scotland for the period for which the award is made.

In the event of no nominations being received, the trophies shall pass to the zonal manager for safe keeping until nominations are called for in 1985.

News from America

Syledis

In "Amateur Radio News" March 1984, there was an item headed "Syledis emigrates", which outlined some of the problems which amateurs in the USA were finding with trans-horizon radar and navigation systems in the 430MHz band. It now appears that eight Syledis units on 433 and 437MHz which were operating in southern California have been closed down after the FCC confirmed that their operation was causing interference to users of amateur fast-scan television. Similar action is apparently pending in the Gulf Coast area, where the manufacturers of Syledis, the French company Sercel, are attempting to arrange for what has been referred to as ". . . . peaceful coexistence". The UK's experience of Syledis would suggest that this will not easily be possible; the Society is aware of several instances of this device operating well outside its intended parameters and with unsuitable antennas. The Society remains of the opinion that the choice of 430MHz for trans-horizon measuring systems of this type is a poor one, and that the Syledis system itself is excessively spectrum-inefficient. Its early removal from the 430MHz band does not look particularly likely at the present time.

It is worth mentioning that Syledis was discussed in some detail at the recent IARU Region 1 Conference in Cefalu, Sicily.

New ARRL president

Following a recent ARRL board meeting, the new president is Larry Price, W4RA. Leonard Nathanson, W8RC, becomes first vice-president, while K0GA remains vice-president of the League, and Dick Baldwin, W1RU, as vice-president of international affairs, Jay Holladay, W6EJJ, also becomes vice-president: he is a frequent visitor to the UK, and is also known as G5DEL.

Olympic games

Communications for the traditional 'torch relay" for the 1984 Olympic Games in Los Angeles will largely be provided by amateur radio. As with every other aspect of the 1984 Olympics, the event is a sponsored one, and the sponsor in this case is the communications conglomerate AT&T: the amateur operators involved in the co-ordination will be employees of this corporation operating in their spare time. It appears that, after considerable uncertainty, there will also be "commemorative amateur radio stations" operating from the three Olympic village sites; considerations of security had led to some doubt as to whether these would be permitted.

QSL W5LFL?

Over 12,000 swl QSL cards from the W5LFL mission have now been sent—volunteers from several clubs assisted in the task. QSL cards for two-way contacts had not been sent out at the time we went to press.

Third-party agreement

A third-party traffic agreement is now in effect between the USA and Dominica.

Finally from the USA, it appears that a formal agreement between the ARRL and REACT (a cb organization concerned with the handling of emergency and natural disaster traffic), which would have had the effect of facilitating co-operation between the two groups, may not now be made. The agreement would have been with the REACT organization rather than with individual operators, and was originally proposed out of concern for the possible results of the delicensing of cb.

Repeater news

More repeaters in UHF Phase 7 have now been licensed. They are GB3CY in York on RB13, GB3KB at Biggin Hill on RB0 , GB3LA in Leeds on RB11, GB3SZ in Bournemouth on RB15, GB3AH at Swaffham on RB11, (please note that this is a different channel from that originally proposed), GB3DS at Worksop on RB13, and GB3YS in Yeovil on RB2. The only Phase 7 unit which has not yet been cleared is GB3GD, the rtty/data repeater at Leicester, which will be on RB12.

The DTI has also agreed changes to a number of existing repeaters. GB3ND now has a new site near Ilfracombe: it is hoped that this repeater, which has been licensed but not operational since 1979, will be on the air on RB14 shortly—further information is obtainable from G3VNM. The Lake District repeater GB3LD will move shortly to its new site and is expected to have much better coverage than was previously the case; it is on R3.

The two Sussex coast repeaters, GB3ES at Hastings and GB3SR at Worthing, are to exchange channels in order to reduce the incidence of interference between GB3ES and GB3NL. GB3ES will now be on R3 and GB3SR on R7.

Finally, three newly-operational repeaters are GB3BI at Inverness on R5, the UK's first television repeater to run fm video; GB3VR at Worthing on RMT2 (see "ARN" April 1984 for details of frequencies for these units) and GB3BW, a new 1·3GHz repeater at Bedford on RM6.

News from Italy

As of 1 March 1984, the following changes to the amateur bands and associated power limitations available in Italy were made:

1·83–1·85MHz, all modes, 300W p.e.p.

10MHz—to be advised

18,068–18,186kHz, cw and phone only, 300W p.e.p.

24,890–24,990kHz, cw and phone only, 300W p.e.p.

433·5–433·6MHz, all modes, 300W p.e.p.

"Special" licences may use 10W only: this class of licence equates roughly to the UK Class B licence.

1,296MHz, all modes, 50W p.e.p.

GB2RS in space

As part of the Society's commitment to expanding and improving its news services, the news broadcasts which have been transmitted over Oscar 10's special service channel on most Sundays by members of AMSAT-UK will shortly be originated from RSGB headquarters. They will be produced in conjunction with AMSAT-UK, and transmissions will be made each Sunday under the callsign GB2RS from the headquarters station. As we went to press, final arrangements had not been made but the intention is to commence the service as soon as possible.

Newsreader wanted

Peter Gill-Purdon, G3NRO, the GB2RS newsreader in the Hull area, has had to step down from the post after a good deal of valuable service. The Society thanks him very much for all his efforts. The reserve reader for the area, G4SEP, will continue, but another reader is sought for the area. Any offers, please, to the membership services department at RSGB headquarters.

"The G4BWE multimeter"

The author of this article, published in *Rad Com* March, apologises for the omission of a 10kΩ resistor in Fig 8. This provides a dc return path for the germanium diode, and should be connected between the anode of the diode and ground.

ELECTION OF RSGB REGIONAL REPRESENTATIVES

The following valid nominations for RSGB regional representatives to serve for the period July 1984–June 1987 have been received:

Region 1	B. Donn, G3XSN J. R. Fogg, G8UZZ
Region 2	(No nomination necessary as the current RR (P. N. Butterfield, G4AAQ), who has served for less than 12 months, has indicated his willingness to continue in office)
Region 3	(No nomination received)
Region 4	M. Shardlow G3SZJ
Region 5	J. S. Allen, G3DOT
Region 6	F. S. G. Rose, G2DRT
Region 7	R. Sykes, G3NFV
Region 8	(No nomination necessary as the current RR (M. J. Elliott, G4VEC), who has served for less than 12 months, has indicated his willingness to continue in office)
Region 9	A. H. Hammett, G3VWK R. W. Jones, G3YMK
Region 10	(No nomination necessary as the current RR (E. J. Case, GW4HWR), who has served for less than 12 months, has indicated his willingness to continue in office)
Region 11	B. H. Green, GW2FLZ
Region 12	M. R. Hobson, GM8KPH
Region 13	(No nomination received)
Region 14	(No nomination necessary as the current RR (T. G. Wylie, GM4FDM), who has served for less than 12 months, has indicated his willingness to continue in office)
Region 15	J. T. Barnes, GI3USS
Region 16	I. T. Coleman, G4GBT T. D. Howe, G3PLF M. J. Musgrave, G4NVT A. Owen, G4HMF L. V. G. Turner, G4CUT
Region 17	T. M. Emery, G3KWU
Region 18	P. Barker, G4HPS
Region 19	(No nomination received)
Region 20	B. L. Goddard, G4FRG N. F. O'Brien, G3LP

Ballots will therefore be necessary for **Regions 1, 9, 16 and 20,** and **corporate members** resident in those regions are invited to vote for one of the candidates in their respective region. Region 1 comprises Cheshire, Cumbria, Gtr Manchester, Isle of Man, Lancashire and Merseyside; Region 9 comprises Cornwall and Devon; Region 16 comprises Essex, Norfolk and Suffolk; and Region 20 comprises Avon, Gloucester and Somerset.

Votes should be recorded on the ballot form printed at the foot of the June *RSGB News Bulletin* enclosed with this issue of *Radio Communication.* This should be sent to: the RSGB Secretary, RSGB, Alma House, Cranborne Road, Potters Bar, Herts EN6 3JW, to arrive no later than Friday 6 July 1984. Mark the envelope "Regional Election".

In those regions for which no nomination has been received, RRs will be appointed by Council, which will be pleased to consider any recommendations from members in those regions, so that suitable appointments can be made. Any such recommendations should be sent to the RSGB Secretary, to arrive no later than Friday 6 July 1984.

ELECTION OF RSGB AREA REPRESENTATIVES

The following nominations for RSGB area representatives to serve for the period July 1984–June 1987 have been received. The list also includes area representatives who have held office for 12 months or less and who have indicated that they wish to continue in office for the above period.

Blackburn and Darwen	N. Jenkin, G4CGT
Wirral	J. K. Birch, G2FOS
South Cheshire	D. Fleet, G8MAI
Huddersfield	J. Clegg, G3FQH
Wakefield	R. C. Sterry, G4BLT
York	K. R. Cass, G3WVO
West Heath, Birmingham	L. W. Craven, G4EQI
Hereford	S. Jesson, G4CNY
Bromsgrove	J. K. Harvey, G4IVJ
Leicestershire East	A. W. Faint, G4TZY
Nottingham	M. C. Shaw, G4EKW
Lincoln	R. F. Gough, G3AWK
Harwell, Didcot and Wantage	C. Sharpe, G2HIF
Milton Keynes	N. A. Gunn, G8IFF
Cambridge	C. M. Goadby, G8HVV
Exeter	R. Tipper, G4KXR
South Devon	A. P. Rider, G6GLP
Conwy Valley	R. H. Tyson, GW6HUV
Rhyl and district	A. Evans, GW4HDR
Moray district	R. Adam, GM4ILS
Orkney	A. W. Wright, GM3IBU
Upper Teviotdale, Eskdale, Liddesdale and Ettrick, Scotland	W. J. Barbour, RS85803
Londonderry	V. Mitchell, GI4ONL
Mid-Ulster	D. F. Campbell, GI4NKD
East Antrim	W. P. McMichael, GI4LKA
Basildon area	R. W. Howe, G3PLB
Ipswich	J. Tootill, G4IFF
Guernsey	J. E. Martin, GU3YIZ
Basingstoke district	P. J. Sterry, G3CBU
Acton, Brentford and Chiswick	W. G. Dyer, G3GEH
Cheshunt, Wormley, Hoddesdon, Broxbourne and Ware	J. Sleight, G3OJI
Harrow	M. A. Kipp, G4FBK
S E Somerset	A. C. Dening, G4JBH
Gloucester	E. A. Perkins, G3MA
Weston-Super-Mare, Clevedon, Portishead and Nailsea	J. Thorn, G3PQE

No area having received more than one nomination, no election for area representatives will be necessary.

Crash, tinkle

It will be recalled that late in 1983 there were reports in the national media of illicit cb "burners" being used to obtain petrol from filling stations at reduced rates by taking advantage of the effects of rf fields on microprocessor-controlled petrol pumps. A recent item in the New Zealand national society's magazine *Break-In* drew attention to another aspect of the problem of filling stations and rf: in this, ". . . . an amateur was driving in and across the forecourt . . . . he happened to look in his rear-vision mirror only to see the proprietor running behind him with arms outstretched and covered in white powder. The amateur had dislodged a number of fluorescent tubes in the canopy over the petrol pumps with his hf antenna". (The item goes on to say, "he then decided he didn't really need petrol after all").

There is a serious side to the story. Quite apart from mobile hf verticals, many vhf and uhf colinear antennas are quite long, and there must be many mobile antennas which come to grief when the vehicle is driven into low multi-storey car parks etc. It is worth exercising caution in the vicinity of filling stations as well, since many in the UK have relatively low canopies over the pumps, and the Society has heard of at least one case where a long 144MHz colinear was broken by contact with one.

Pirate prosecuted

Mr Robert George Watson of Green Street, London E13, was fined a total of £690 for offences against the Wireless Telegraphy Act 1949 at Newham West Magistrates Court on 22 March 1984. Both cb and amateur radio equipment was involved, and the defendant was found guilty on six charges; the callsigns G3DCC and G8LBC had allegedly been used on 144MHz. Various items of equipment were confiscated under Section 43 of the Act.

Shuttle 2?

It appears that there is a good chance of another shuttle mission having an amateur radio operator on board. A meeting at the Johnson Space Center, at which officials of NASA and ARRL and two astronauts, Dr Owen Garriott, W5LFL, and Tony England, W0ORE, were present, took place on 9 March 1984 in order to evaluate the STS-9 operation and to ascertain the future of amateur radio in manned spaceflight. W0ORE indicated his intention to operate from space during flight 51F in March 1985 if NASA would grant permission; this would be the Spacelab 3 mission, which would use the *Challenger* to carry the European Space Agency payload.

If this operation was approved, the intention would be to use 28MHz as well as 144MHz fm, in order to give worldwide communication from any point in orbit. There are also some tentative plans for automatic operation of the 144MHz equipment when the astronaut was busy with other duties; these might include operation as a beacon transmitter. There is also a possibility of external antennas being used during the mission: apparently some unused coaxial "tie-lines" exist on the spacecraft, and only the proper permission would be needed in order to use them.

Amateur at professional workshop

Mr R. G. Flavell, G3LTP, chairman of the Society's Propagation Studies Committee, has submitted a paper to the Solar-Terrestial Predictions Workshop which will take place in Paris between 18 and 22 June 1984. Some of the work of the committee is described in this paper, with particular emphasis on the development of the concept of the solar rotation base map and some methods of treating the resulting data. The Society has for many years taken a leading part in propagation research, especially in the areas of anomalous tropospheric propagation and sporadic and auroral E.

Sidebands

The Isle of Man ARS is organizing an expedition to the Calf of Man from 15 to 17 June 1984. The Calf of Man is a bird sanctuary, and special permission was obtained for the society to operate a station there. Operation will be on hf and vhf, hopefully using GD4IOM. The WAB reference is SC16.

Derek Cole, the Society's draughtsman for many years, was married in May—we wish him every happiness.

Mobile Rallies Calendar

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

3 June—Spalding & DARS Mobile Rally. Springfields, Spalding. Talk-in on S22 and SU8. Trade stands, 25 acres of garden, bars, restaurants. Details from I. Buffham, G3TMA, tel Spalding 3845.

3 June—RAIBC Picnic, Broadlands, Romsey, Hants. Talk-in from 10.30am on S22. Details from G4COM, QTHR, tel Southampton (0703) 693017.

3 June—Welsh Mobile Rally, organized by Barry College of Further Education RS. New venue: Barry Leisure Centre, Holton Road, Barry, near Cardiff. Well signposted. Open 11am-5pm (disabled from 10am). Special event station GB0BDC will operate during the rally. Trade stands, bring & buy, refreshments, swimming pool in leisure centre, etc. Free car parking, 5min from the famous Barry Island Pleasure Park and beach. Enquiries to Reg Rowles, GW4FOM, tel 0222 565656, evenings.

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

10 June—Mid-Lanark ARS Open Day. Open 10.30am. Wrangholm Hall, Motherwell. Traders, books, meals, raffle etc. Details from Anne Hood, 4 Murray Road, Law ML8 5HR.

17 June—RNARS Mobile Rally. HMS *Mercury*, near Petersfield, Hants. Open 1000-1730. Talk-in on 144 and 432MHz. Hot and cold refreshments available all day. Many arena events for the family; steam train and engine rides; historic aircraft flypasts etc. Details from A. G. Walker, G4DIU, QTHR, tel 0705 667889.

17 June—Denby Dale Mobile Rally, Shelley High School, nr Skelmanthorpe, Huddersfield. Open 11am. Talk-in on S22 and SU8. Trade stands plus something of interest for the ladies and children. Refreshments, bar. Admission and parking free. Details from G3FQH, QTHR, tel 0484 862390.

24 June—27th Longleat Amateur Radio Mobile Rally. Longleat Park, Warminster. Open 10am-5pm. Trade stands in five 110 by 40ft marquees. Bring & buy extended to 110ft with separate arrangements for over £10 and under £10 items. RSGB bookstand and RSGB HQ staff will be in attendance. British Telecom has authorized the morse test to be taken during the rally, preference being given to handicapped amateurs. Enquiries about the test should be made to the Bristol Group secretary.

Attractions include the mast assembly contest for RSGB affiliated clubs, the Bristol Unicorns Marching Band, the Longleat raffle, and, weather permitting, a parachute descent to open the rally, plus all the usual Longleat Park attractions for the family. Entrance to the rally is free and parking is free, but there is a 50p charge for entrance to the park. Camping and caravanning facilities are available for Friday and Saturday night at a reasonable charge. Special event station GB4IMR will be operational before and during the rally, mainly on hf.

Details from B. L. Goddard, G4FRG, sec/ Longleat organizer, Bristol RSGB Group, 2 Greenfield Park, Portishead, Bristol BS20 8NQ, tel 0272 848140.

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

8 July—West Manchester RC Rally. Burtonwood Motorway Service Area, one mile west of junction with M6 on M62. Talk-in station GB2THF. Details from Alan Nixon, 14 Carlton Road, Lowton St Lukes, Warrington WA3 2EP, tel 0942 725931.

15 July—Sussex Mobile Rally. Brighton Racecourse. Talk-in on 144MHz, S22 and 3·5MHz. Open 10.30am-5pm. Over 20,000 sq ft of exhibition area under cover. Free car parking. Free minibus rides to the beach. Excellent catering facilities. Large bring & buy stall plus usual trade stands. Advance tickets for clubs can be obtained from S. Sims, G8NFZ, QTHR, at 12 for £10 on receipt of an sae.

15 July—Cornish RAC Rally. Cambórne Technical College, Pool. Open 10am. Details from G4PEM, QTHR as G6DFE, tel Penzance 3948, or Helston 4141, during office hours.

21 July—West Kent ARS Radio & Electronics Fair. Royal Victoria Hall, Southborough. Open 10.30am-5pm. Car parking nearby. It is hoped to attract many suppliers and traders and there will be a special event station. Details from Dave Green, G4OTV, 13 Culverden Down, Tunbridge Wells, Kent, tel Tunbridge Wells (0892) 28275.

22 July—Anglian Mobile Rally, Stanway School, Colchester, Essex. Open 1000-1700. Talk-in on 144MHz. Further details from G3YAJ, tel 0206-39 3938.

22 July—McMichael ARS Mobile Rally. Bells Hill, Stoke Poges, nr Slough. Open 11am. Talk-in on S22. Attractions include trade stands, flea market, atv exhibitions and special event station GB2MRS. There will also be vintage wireless, family entertainment, refreshments and a CAMRA beer tent. Free parking. Details from G8IHF, c/o McMichael Ltd, Wexham Road, Slough, Berks.

29 July—Scarborough ARS Rally. The Spa, Scarborough. Open 11am. Talk-in on 144MHz (S22) and 432MHz (SU8). Further details from sec N. Lill, G6CXK, QTHR, tel 0723 60587.

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

5 August—RSGB Mobile Rally, Woburn. Details to follow.

12 August—27th Annual Derby Mobile Radio Rally. Lower Bemrose School, St Albans Road, Derby. Talk-in by GB3ERD on 144 and 432MHz. Free admission and parking, but not before 10.30am. All usual attractions including trade stands, prize draw, flea market, refreshments and "Derby junk sale" at 1.30pm. Ample accommodation if wet. Organized by the Derby & DARS. Details from G3SZJ, QTHR, tel 0332 556875.

19 August—Hamfest '84, Wimborne, Dorset. Organized by Flight Refuelling RS and Bournemouth & D RAIBC. More details to follow. Further information and booking forms from sec M. J. Owen, G8VFY, QTHR. Tel 0202 882271.

26 August—BARTG Rally, Sandown Park Racecourse, Esher, Surrey. Details from Edward Batts, G8LWY, 27 Cranmer Court, Richmond Road, Kingston-upon-Thames, Surrey KT2 5PY.

26 August—Preston ARS 17th Annual Mobile Rally. Lancaster University. Easy access, ample free parking. Leave M6 at junction 33 and proceed north on A6 for 2 miles. Opens 11am. Early admission for the disabled. Talk-in on 144MHz fm, S22. Cafeteria, licensed bar, bring & buy. All enquiries to G3DWQ, QTHR, tel Preston (0772) 53810.

26 August—Torbay Mobile Rally. STC Works, Old Brixham Road, Paignton. Talk-in on S22. Open 10am. Free admission and parking. Usual attractions. RSGB book stall. Trade stands. Refreshments available. Details fron sec Margaret Rider, 7 Kingston Close, Kingskerswell, Newton Abbot, S Devon TQ12 5EW, or G6GLP, QTHR.

9 September—Telford Radio Rally & Exhibition. Telford Town Centre Shopping Malls, Telford, Shropshire. All usual attractions, plus some unique to this venue. Over 80 trade stands and giant flea market. Further details from G8DIR, tel Shrewsbury 64273, G8UGL, tel Telford 584173, or G3UKV, tel Telford 55416, all QTHR.

16 September—Peterborough R&ES Mobile Rally. Wirrina Sports Stadium, Bishops Road, Peterborough. Open 10.30am until 5pm. Situated on the river embankment, good car parking, free on Sundays, caravans by arrangement. Food and bar meals in adjacent Gildenburgh Rooms, bar until 3pm. Details from D. T. Wilson, 4 Conway Avenue, Peterborough, tel Peterborough 76238.

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

30 September—Harlow & DARS Annual Mobile Rally. Harlow Sports Centre, Hammarskjold Road. Open 10am. Talk-in on 144MHz (S22). Ample car parking. Refeshments and licensed bar. Bring & buy and usual features. Details from G4TLU and G6STB, c/o Harlow & DARS, The Barn, First Avenue, Harlow, Essex.

7 October—Great Lumley ARES Rally. Community Centre, Great Lumley, nr Chester-le-Street, Co Durham. Open 11am. Talk-in on S22. Usual attractions including bring & buy. Further information from Ian Blackman, G4OCQ, QTHR, tel 0385 40827.

3 November—Street & DARS/Lions Club of Glastonbury and Street Rally (proceeds to charity). Crispin Hall, Street, Somerset. Open 11am–4pm. Admission 50p, under 14 years free if accompanied by an adult. Talk-in on 144MHz (S22). Details from Bill Scriven, tel Street 42277.

Special Event Stations

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

1–30 June, GB0GMT and GB1GMT
This station will operate during June to celebrate the centenary of gmt. Operation will be on all bands. Special QSL cards will be available, as will a special RSARS number. Details from Sam Kennard, St Dunstan's College, Catford, London SE6 4TY, tel 01-690 1274.

June, GB2ADC
The Southend & DRS will operate this station for the Anglican Diocese of Chelmsford each weekend in June. This is to celebrate the 70th anniversary of the founding of the diocese of Chelmsford. For details contact Brian, G4RDS, tel South Benfleet (03745) 50494.

1–30 June, GB4RAF
The RAF Halton ARE & CC will operate the station from RAF Halton to popularize the RAF Halton Award. Operation will be on hf and vhf, mainly in the evenings and at weekends. A special QSL card will be issued for each contact with the station. Details from the club sec, G8BVJ, tel 0296 623535, ext 5014 (office hours).

2 June, GB2NHF
The station will operate at the Nevill Hall Hospital Fete. Details from sec, tel 0873 78674.

2–3 June, GB2TSA
The station will be operated as part of the 75th anniversary celebrations of Tavistock Scouts. The venue will be the Scout Hall, Pixon Lane, Tavistock, Devon. Details from R. Hooper, G3SCW, tel Tavistock (0822) 2876.

2–6 June, GB2RIC
The station will operate on all bands from the Rotary International Convention at the NEC, Birmingham. Times of transmission will be determined by demand, but the regular weekly Rotary nets will take place at the normal times and frequencies. Special QSL cards will be available. Details on the air, or from G4EWY, QTHR.

2–9 June, GB4BLC
Southampton PARC will operate this station from the Royal British Legion, Netley, Southampton, during D-Day anniversary week. "Operation Overlord" will begin with a 36h session from 10am on 2 June to 10pm 3 June. On 6 June (D-Day anniversary) operation will be from 9.30am to 10pm, and on 9 June from 10am to 10pm. On other days operation will be from 7–10pm. QSL cards will be available. Details from L. Smith, 57 Newtown Road, Woolston, Southampton, Hants SO2 4MJ.

3 June, GB2RAF
The RAF Halton ARE & CC, in conjunction with the RAF Henlow RC, will operate the station at the RAF Henlow (Bedfordshire) Show. Operation will be on hf and vhf. A special QSL card will be issued and contacts with the station will be valid for the RAF Halton Award. Details from the club sec G8BVJ, tel 0296 623535, ext 5014 (office hours).

9 June, GB2MMS
The station will be operating on hf and vhf from Moatfield Middle School, Redditch, Worcs. Special QSL cards will be available. Details from G6ZHF, QTHR.

17 June, GB4CSW
This station will be operated from Castleton School Fete, Bromfords Drive, Wickford, Essex. The school serves children with special needs. Operation will be on 144MHz vhf and 3·5MHz to 30MHz hf from about 1330gmt. Special QSL cards will be available via the school. Overseas dx cards will be returned via the RSGB bureau. Please enclose sae. Details from Mick Butler, G6XCG, 57 Walthams Place, Basildon, Essex SS13 3PS, tel 0268 555645.

19–24 June, GB0BCW (provisional)
Cunninghame & DARC will operate the station during Beith Civic Week, from the Community Centre, Beith, Ayrshire. it is hoped to operate hf and vhf, all modes, ssb, cw, rtty and slow scan tv. Details from Norrie, GM4VHZ, tel Beith 2052.

22–24 June, GB4SUN
The Naturist Foundation ARS will operate this station from their headquarters at Brockenhurst. Operation will be on the hf bands, ssb, and phone. 1984 marks the silver jubilee of the foundation at Brockenhurst. A special QSL card will be sent via the bureau for all contacts. Details from The Naturist Foundation, Naturist Headquarters, Orpington, Kent BR5 4ET. Tel Orpington (0689) 71200.

22–24 June, GB2WRA
Wordsley RC will be operating this station from 1700 on 22 June to 1200 on 24 June, to celebrate the 65th anniversary of Wordsley Carnival. Operation will be on hf, vhf, and uhf, and amateur tv stations will give demonstrations to visitors. Special QSL cards will be available. Details from Andy Sherratt, G4TGM, QTHR. Tel Kingswinford 295082.

24 June, GB4CVD
The Radio Society of Harrow will operate from Battersea Park as part of Capital Radio's "Capital Venture Day". Operation will be on all bands 1·8–1,29 6MHz, cw, phone, rtty, and television (fast and slow scan). Special QSL cards will be sent via the bureau. Details from Dave Atkins, G8XBZ, 25 Maxwell Close, Rickmansworth, Herts WD3 2DR.

30 June, GB4MCW
The station, operated with the help of Walsall RC for WACRAL, will be based at Dew End Methodist Church, Rushell, Walsall. QSL cards will be available. Details from publicity officer B. Hancock, Leahurst, Augustine Road, Minster, Sheerness, Kent ME12 2NB.

7 July, GB2BAE
The Dynamics Hatfield Club ARS station will be operational on all bands from 3·5 to 144MHz at the British Aerospace Civil Airliner Division factory "Open Day" at Hatfield. Details from E. F. Videan, G4LWV, tel Hatfield (07072) 62345, ext 187.

14 July, GB4DSC
The Derwent Sailing Club will be running this station during their annual open day. It commemorates the 25th anniversary of the founding of the club, and will operate on hf and vhf. QSL cards will be available. Details from R. E. Monk, 1 Wade Drive, Mickleover, Derby DE3 5BS.

21–27 July, GB2ZOO
the Jersey ARS will be operating this station from the headquarters of the Jersey Wildlife Preservation Trust at Les Augres, Trinity, to assist in the celebration of the 25 and 21st years of the preservation trust, and the world famous Jersey Zoo, run by Gerald Durrell. Phone contacts on 21, 14, 7 and 3·5MHz. Details from Dennis Hinsley, GJ4TXB, tel 0534 24328.

28 July, GB2ABC
The station will be operated by the Abergavenny & Nevill Hall ARC at the Abergavenny & Border Counties Show. Details from sec, tel 0873 78674.

4 August, GB2PYF
Abergavenny & Nevill Hall ARC will operate the station at the Pen-y-Fal Hospital Fete. Details from sec, tel 0873 78674.

Other Events

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

8–11 June—European DX Council Annual Conference, Stockholm. Details from M. Murray, PO Box 4, St Ives, Huntingdon, Cambs PE17 4FE.
7–9 September—WACRAL Annual Conference. London Bible College, Northwood, Middx. Details from G3AGX or G4NPM, both QTHR.
8 September—Scottish Amateur Radio Convention, organized by West of Scotland ARS, Cardonald College, Glasgow. Details to follow.
30 September—Welsh Amateur Radio Convention, Oakdale Community College, Blackwood, Gwent. Details from R. B. Davies, GW3KYA, QTHR.
13 October—Midlands VHF Convention. British Telecom Training School, Stone, Staffs.
20–21 October—27th Jamboree on the Air.

OBITUARIES

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

Mr W. Brown, G4QA
Bill Brown died on 14 March, aged 84. Despite his age he was still active on 144MHz and was in the process of rebuilding a 3·5MHz ssb rig.

Mr J. Duffus, G4EWB
John Duffus died on 27 March. He took up amateur radio when he lost his sight, and by his high standard of operating and readiness to help others contributed as much to the hobby as he derived from it. He took part in Raynet exercises and was a popular member of the RAIBC nets. Last year he hosted a very successful "Midlands Picnic" for RAIBC.

Mr J. C. Foster, G2JF
Mr Foster died in Pietermaritzburg, South Africa, on 29 March, aged 80. As ZS5JF he had remained active on 144 and 432MHz until a few months before his death. G2JF was licensed in 1935 and became a member of the RSGB in 1936. He was controller, Civilian Wireless Reserve, from 1938 to 1939. After the war he was a notable cw operator on top band, then shifted his main interest to 144MHz telephony, with emphasis on the study of tropospheric propagation. He won numerous trophies in contests and was a member of RAOTA and FOC. In 1964 he was elected to Council. He became licensed as ZS5JF after moving to South Africa in 1973. His main interest was now in satellite communication, operating portable from a favoured site, 3,000ft asl. The 2JF radio tradition will be kept alive by his son-in-law, ZS5NO, to whom he left all his equipment.

Mr A. Goble, G8VAC
Arthur Goble died on 13 January, aged 65. He was very well known in the Midlands area for his friendly manner. He was an avid operator, and always wanted to try something new. Arthur was an active member of the Sutton Coldfield RS, and although he had worn a leg-iron from a very early age, would never admit to being disabled.

Mr C. G. Lampard, G8TTA
Colin Lampard died on 7 March after suffering 14 years of 80 per cent disablement following an electrical accident. Amateur radio was an ideal hobby in the circumstances. He was a member of Horndean & DARC and enjoyed working on 144MHz.

Mr S. Milligan, G4SPK
Steven Milligan, who died on 22 February, aged 60, had been a keen amateur since his days as a signals sergeant with the parachute regiment (TA). He had passed the morse test only last year.

Mr D. Pattle, G4NFN
David Pattle died on 19 March, aged 51. He had been interested in radio and electronics as a profession and as an amateur, obtaining his first amateur licence in Malta while serving with the Royal Signals during National Service.

Mr L. J. Potter, G4FJE
Les Potter died on 19 March. Until his illness he was very active on the 7 and 144MHz bands. He was a keen member of the 10th Warrington Scout Radio Club. He was the first radio amateur to use 144MHz portable equipment on the 40 mile White Rose Walk, which he completed with fellow scouters some five years ago.

Mr W. Rider, G3VHJ
Bill Rider died on 10 April. He was a radio interference officer with Coventry Telephone Area, and had been since 1950. He had not been active in recent years.

Also:
Mr R. L. Davis, G3VVK, on 31 January;
Mr C. W. E. Hardy, G8PIA, on 6 February; and
Mr L. J. Potter, G4FJE, on 19 March.

Members' Mailbag

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

LICENCES AND PIRATES

Sir—In reply to Mr Pursey's letter in February's issue. I too was issued with a duplicated callsign (G4VND) which I used almost constantly on hf for two months unaware that it was wrong. What a surprise when I heard the real G4VND one evening working through GB3MH. My first thought was that he was a pirate, but after exchanging addresses I knew better.

On the following morning I spoke to the department concerned in Chesterfield, and got a fantastic response. I was very speedily sent a new licence with my real callsign, G4VPD, along with a cheque for the loss of wrongly-printed QSL cards.

My only problem now is whether I will receive any of the many QSL cards I have sent under the wrong callsign.

I am afraid that the HO has certainly passed on the tips of the trade, computers or no computers.

Mick Pugh, G4VPD?

The Post Office system is of course, quite new and we are tempted to write one occurence off as part of their "learning curve"! The QSL sub-manager, with a little assistance from both parties, should be able to help sort out the problems from QSL cards which Mr Pugh mentions.

NOVICE LICENCE

Sir—I support the view that a novice licence should not be introduced in the UK. It would be a disaster.

I do not necessarily endorse a recent editorial in another magazine that the technical side of the RAE should be made harder to pass, nor that the RSGB should relieve the C&GI of its responsibilities. It is of course a much respected and valuable asset to the amateur radio movement in this country.

Having said that, there is no reason why the RSGB should not press for more involvement in the content or syllabus, nor in trying to influence the passmark level.

There is no doubt in my mind that we should concentrate our efforts toward the operating/discipline areas. For my own part, having held calls abroad, and whenever this was not possible returning to the short-wave-listener role, I feel that the standards in evidence worldwide are absolutely appalling.

It will do little in curtailing bad operating and inconsideration to others by increasing the degree of difficulty technically; we have good standard technicians operating now who could use some lessons in manners and operating technique. Such a remedy would do little within the international scene.

Those of us who listen or operate on hf/vhf experience the following on a daily basis:

(a) tuning without dummy loads;
(b) insufficient checking of a frequency before calling;
(c) calling a station ending a contact without checking who in fact is entitled to continue on it;
(d) unnecessary whistling/tuning on a specified calling channel;
(e) not adhering to the code of practice regarding band plans (advisory or not); and
(f) abuse voiced against another station; rowing with stations . . .

and a host of other distasteful practices. It points to one obvious fact—**it is time to put our house in order!**

The RSGB, our authorized body, must assume the role of guardian and mentor. Just as the Law Society disciplines itself, the British Medical Association likewise, so our national body must be entrusted with this task. In order to give our Society teeth, it should be a condition of licensing that the licensee should obtain membership of the Society. Furthermore, renewal should depend on continuing membership (subject to safeguards of course).

To those who would utter "closed shop" I would retort: No such thing! Full membership to those who want it; a registration fee for those not wishing full membership. A nominal sum for administration.

One of the causes of our dilemma today is that there now seem to be individuals entering our hobby without going through an apprenticeship as a short wave listener. Of course, that is not to say that everyone had experience as a listener, but a large proportion of amateurs came from that source.

Affiliated and non-affiliated clubs must bear a certain amount of responsibility for the situation, in that they train the individual in theory and procedure, and even the morse code. They seem to fail to train the individual in operating technique and practice.

It is for those who went before us to give their opinions; I feel we are letting them down in how we conduct ourselves. Do we allow this to continue, to allow the *idiots* to dictate the terms, or do we act?

S. J. Reading, G4LZD

It must be said that the RSGB feels that what Mr Reading calls ". . . more involvement in the content or syllabus", presumably of the RAE, is desirable. Certainly there is a legitimate argument for the national body having a good deal of involvement in examinations associated with a particular field of interest. To take one example, the Civil Aviation Authority delegates much of the routine examination work for the Private Pilot's Licence to that activity's national body, the Aircraft Owners & Pilot's Association, and there are many others. There is nothing wrong in principle with such a contracting-out, but it is essential that the organization administering the examinations is both relevant and knowledgeable. It is, therefore, legitimate to ask whether the City & Guilds of London Institute is best placed to do the job.

Perhaps the single biggest and most important change which could be made to the current Radio Amateur's Examination would be to include in it a practical element associated with day-to-day amateur operating. The chief question which requires to be asked is whether the Radio Amateur's Examination as it currently stands is testing the most important and relevant areas of knowledge required by an intending radio amateur in today's changing environment.

CHANGING THE G5s—continued

Sir—I have read with interest the correspondence from Ms Voss on the seemingly highly-emotive issue of a callsign change.

I feel this whole issue would fall into insignificance if it were compared with some of the problems faced by UK amateurs who live and work abroad. Many countries regard radio amateurs with more than a little suspicion. If and when licences are granted, it is often after long, drawn-out procedures, and sometimes with restrictions which Ms Voss would perhaps regard as monstrous. *The Month on The Air* has revealed several examples of UK licence holders being refused licences abroad.

Consider yourself lucky, Ms Voss, that you choose to reside in a reasonable country which allows you to practice your hobby so freely and, indeed, proposes to grant you a licence equivalent to that of a British citizen.

Surely a good operator is recognized by his or her operating styles and habits, rather than the allocated callsign?

F. C. Handscombe, G4BWP

*This topic has already had a considerable airing: the issues have been discussed and, as was stated in last month's "Members' Mailbag", the lesson for the future is that members **must** inform the Society if they have a problem. We have our virtues and abilities, but clairvoyance is not one of them! It is a fact that there are more important issues in amateur radio than the precise type of callsign which is issued to amateurs. If, to take an extreme example, the radio frequencies available to amateurs were withdrawn overnight for some reason—perhaps because the credibility of the amateur service as a whole had ceased to exist—then the matter of callsigns would become irrelevant. Equally, we can quite understand that individual callsigns are valued by amateurs and that they are individually well known by them. However, a callsign is just a callsign, and it ceases to have any meaning or relevance if there are no frequencies available on which to exercise it. As we have said on several occasions, we sympathize with Miss Voss' and others' feelings on this matter, but we would ask that the entire subject be kept in perspective.*

FORMULA PROBLEMS

Sir—The third and fourth editions of the *VHF/UHF Manual* contain what I am told is a mathematical error in at least one formula. Both a teacher of maths and one of physics have pointed out that the formula for a "wire in a rectangular trough" does not make any logical sense.

The problem is that either there are some brackets missing around the "Pi.h/w", or some of the variables cancel out. One of the teachers asked if the expression "tan H" was a hyperbolic.

Resisting the temptation to reply in the obvious manner, I persisted, and got the following:

$Zo = (138 \times \text{Log}(4 \times W \times \text{Tan} \quad (H \times \pi \times H/W)/(\pi \times D)))/\text{Log}10$

The "Log10" will convert the inherent "Log e" to a log to base 10, as required.

There is a mistake in the "Square Coax" formula. The revised version, as kindly supplied to me by the author, though I have converted it to a computer format is:

$Zo = ((138/\text{SQR}(K)) \times 1.178 \times \text{LOG}\ (D/d))/\text{Log}\ 10.$

I am trying to assemble a suite of programs for my computer to extract the unknown variable for experimental purposes, so if any reader, or expert in transmission lines, would be kind enough to put the matter right, I think it would be a great use to those of us who are trying to use the formulas.

D. R. Coomber, G8UYZ

PIRATES ON 6MHz

Sir—I am an active member of the RSGB, more so since I retired in 1976. I was wondering whether you could satisfy my curiosity on the following. Since acquiring a Racal RA17 receiver I do quite a bit of listening on the commercial hf frequencies; a habit stemming back to when I was in the GPO overseas telegraph services on hf.

There are a large number of amateurs(?) or pirates(?) around 6·650MHz. These stations use fictitious calls but appear organized and have networks etc. They appear oblivious to the fact that they cause QRM to registered assignments of commercial stations. Recently I heard a British coast station request that a net of these people move off its frequency, but it was ignored. It does seem a pity that this sort of thing is allowed to continue.

L. A. Reeves, G4CEM

The "net" to which Mr Reeves refers is an illicit offshoot of the a.m. cb fraternity, who apparently refer to themselves as "international breakers". Perhaps the various changes in the legislation which are referred to in this month's "Amateur Radio News", together with the more secure future of the RIS, will remove them from the spectrum, along with their cousins who operate illegally in amateur bands.

ODD ONE OUT

Sir—I wonder if you would like to add an element of competition to "Members' Mailbag"? The object being to identify the club concerned from the following comments of a potential member, a new G1 call, of mature age, a "gentleman" and a "radio amateur" in the traditional sense of the phrase. In his own words:

"I went to the local club one evening to make myself known and to get the feel of things generally in the area, only to be greeted with such disdain, snootiness and plain bad manners, that I said to myself 'Not for me' and went my way, never to return. What a difference to the welcome I received from the XYZ Club."

There will be no prizes if a reader recognizes the club as his. A clue? The club is in the Home Counties to the west.

The visitor was completely new to the area, having moved there from London about six weeks earlier.

Ralph Gordon, G6FYW

Oh dear! Hopefully a one-off. The clubs visited by headquarters staff have been without exception, friendly and helpful to their newcomers. The Society considers the club structure to be a vitally important and fundamental part of the well-being of the hobby.

EDUCATION COMMITTEE AND THE RAE

Sir—May I put on record my thanks and appreciation of the work of the RSGB Education Committee.

As a dyslexic person, in no way was I able to take the RAE in the normal manner, but thanks to the continued efforts of this committee through Mr L. E. Newnham, G6NZ, I was eventually examined orally and so obtained a Credit and a Distinction, and I am now very happy with my new call of G1FEU, which I hope to change to Class A in the not too distant future.

Thanks RSGB.

G. R. Wratten

WHAT'S IN A NAME—continued

Sir—Are we really going to get involved in a wrangle over dignifying our hobby by adopting some important-sounding title whose only impact on the laity will be to confuse the not-very-interested majority and amuse the knowledgeable minority?

Amateur radio is a pleasant, friendly hobby, comfortably sociable for the elderly, and thought provoking for the young. Let us not take ourselves too seriously. In the days of the *T & R Bulletin* even "funnies" were permitted, and we had a regular humorous contributor known as Uncle Tom. There was a strong engineering aspect to the hobby then, but nowadays we are much more operators than engineers, with our commercially-produced "rigs". That is no bad thing, for operating dx links in the amateur way is a skilled craft, but please let us not get so pompous about it. Amateur radio remains a hobby and we do it for pleasure!

Why does Mr Swinbank, G8AHB, denigrate the term "technology" ("Members' Mailbag" April 1984) as having a "rather dated 'sixties ring about it"? Are we to discard all nouns in our language which have been in general use for 25 years or so, or may we perhaps increase the life of their usage in step with Mr Swinbank's advance in years of age? What about colonels, scientists, postmen, dustmen etc?

May one who has a rather dated 'twenties ring about him propose that we continue to describe ourselves in the modest and affectionately unassuming way that others know us.

The word is **"ham"!**

N. H. Sedgwick, G8WV

Amateur radio is, indeed, a hobby carried out for pleasure, but that does not mean that some matters relating to it do not require to be taken seriously. The matter of its ***credibility*** *is important, since in order for amateur radio to exist at all it must be treated on the same footing as any other radio service which competes for what amounts to a very scarce natural resource—access to the radio frequency spectrum. In other words, without credibility in the professional radio world, and given the phenomenal amount of pressure on the rf spectrum, amateur radio will simply cease to exist. The Society spends a good deal of its time and resources attempting to make sure that this does not happen.*

There is nothing whatsoever wrong with the word "ham": the only problem is that the word is sorely abused by some sections of the media, who are prone to describe practically every illicit radio user as a "radio ham". It is incontrovertible that the word has contained an element of denigration in it ever since Tony Hancock did his worst with the subject . . .

THANK YOU, RSGB

Sir—I heard on the RSGB news broadcast on 18 March that the offending transmission in the 144MHz band by the Milton Keynes cable tv has now been removed.

All members of the Milton Keynes Radio Society wish to thank the RSGB for the extremely prompt and efficient way it dealt with the problem, and for quickly taking up the cudgels on behalf of the many RSGB members in and around Milton Keynes. In fact, the tv service concerned spent a week continuously displaying a picture to tell viewers that the channel was closing down and they should retune their tv sets to a new channel.

In matters such as this, it is appreciated that the RSGB plays such an important role.

D. O. White, G3ZPA
Secretary MKRS

The RSGB is delighted that this problem has been resolved quickly and positively, and it would like to hear of any similar problems which occur in other parts of the UK. The Society is firmly of the opinion that the primary users, as it were, of the radio spectrum should be radio transmitters and receivers, not cable television systems, and it will not hesitate to act, to the best of its ability, in defence of those parts of the spectrum allocated to the amateur service. Prevention, of course, is always better than cure, and a good deal of work continues to be carried out behind the scenes to ensure that radio amateurs in the UK do not suffer the crippling problems which have beset amateurs elsewhere in the world.

CONTESTS—continued

Sir—Since you clearly have no clear figures to substantiate your claim that "there is widespread interest in contests" (March 1984) and given that there are strong feelings for and against, why not ask the membership at renewal of subscription or by a returnable questionnaire in *Radio Communication* itself?

If the vast majority are keen on contests, people like me, G3RLO and others will stop complaining about our hf skeds being pushed out of the way, and the apparent mayhem that prevails. If, on the other hand, the membership does feel that contests are over-rated and given too much importance out of all proportion to the rest of the hobby, perhaps you will react accordingly.

So, how about it?

J. P. Boot, G4NJH

The Society intends to carry out another survey among its membership, probably later this year. This might be the ideal opportunity to explore members' interests in contests and to discover the facts.

Sir—There seems to be an awful song and dance about contests. The small ones do not affect one really. Even in the biggest ones there are plenty of spaces left free. At the worst, if it is ssb, those who are put out, literally as they think, can always go on cw for the weekend. I even found that a cw contest made me polish up my morse, although the speed was mostly beyond me!

Lots of amateurs never submit an entry for a contest but come on for an hour or two at a time. I never want to call "CQ contest" all the time because my voice gives up, but I like to give a call to those who do, so as to give them FC as a new multiplier, which is always acceptable.

Being older now and realizing the limits of my memory, I still keep a dupe list running to avoid calling a station a second time; a mistake which makes one feel rather small, especially if the other chap has a serial number running into several hundreds.

I like the big contests like CQ WW because there is something there for everyone and it is fun—at least I think so.

John Clarke, FC6FPH/G8KA

VANGUARD MEMORIES

Sir—I was quite intrigued to read the article "A Vanguard Story" by Stan Crabtree, GM3OXC, in your March 1984 issue. I well remember Stan collecting the Vanguard from me in 1957. Your members will be interested to know that quite a large number of KW Vanguards are still in regular use in different parts of the world. We at KW know because spare parts are sometimes ordered, and we can still supply most of them even after 25 years. We usually remind the customer that the equipment is now out of guarantee! (Wonder if this will be possible with current Japanese designs?)

During a recent trip to Nigeria I came across a KW Vanguard in an office in Lagos which was providing a speech circuit to Kaduna (approximately 430 miles away) operating just outside the 7MHz amateur band. No one could remember how long the equipment had been in use there, but it had been moved from another QTH about 10 years ago. The serial number indicated to me that the set was made at Dartford in 1960. There are hundreds of private telephone links in use in Nigeria, but most are using ssb. This is due to the shortage of telephone cables and microwave links. However, the old KW Vanguard in Kaduna still sounded very good on amplitude modulation.

In the development stages of the KW Vanguard I recall that we paid particular attention to the design of the modulator and modulation transformer and consequently the Vanguard became well known for extremely good audio quality and modulation. In 1959/60 we modified the Vanguard design to a medium-wave broadcast transmitter—crystal controlled; same pa and modulator; and 600Ω audio input to suit studio equipment. Several of these were supplied to the Forces Broadcasting Service to provide local programmes to the Forces (also BBC relays) in such places as Aden, Trucial Oman, Dubai, and Christmas Island in the South Pacific. I heard that the latter station was picked up in Hawaii over 1,000 miles away!

Around 1961/62, KW presented the RSGB with a Vanguard modified for crystal control for use in the Orkney Islands as a 28MHz beacon transmitter. We heard that the 6146 pa valve was replaced every two years and that over five years continuous operation, 24h/day, there was no transmitter failure. We often wondered what became of that rig!

A few days ago I had a call on 14MHz ssb from "Barney", 9H1FS, now retired from UK to Malta, and he reminded me that I sold him a new Vanguard in 1959 for £60. Kits were also available at that time for £45.

I expect a few tales could be told about the first-ever amateur sideband transmitter to be commercially made using a crystal filter, namely the KW Viceroy. In those pioneering days we had so many orders from the USA, Europe, and in fact, from all continents, that we were taken by surprise and could not buy in component parts from suppliers quick enough to cope. It did not take the American manufacturers long to catch-on to the situation. But there are a lot of Viceroys still giving good service around the world. The Japanese did not come into the market until some years later, and then their first models appear to have been based upon a KW design!

I shall be visiting Cyprus in May—I wonder if Stan Crabtree's KW Vanguard is there to be found?

Rowley Shears, G8KW,
managing director,
KW Communications Ltd

Nice to know that a British product still holds its own. To the best of our knowledge, the 28MHz beacon transmitter found its way to the BBC Ariel Radio Club station at Bush House, London, by a devious route in the late 'sixties: what happened to it after that is anyone's guess!

A TRANSCEIVER FOR THE HF BANDS

by Lorin Knight
MIEE, G2DXK*

Part One

Lorin Knight, MIEE, was born in 1922 and became interested in short-wave radio at the age of about 12. He obtained an AA licence shortly before the second world war, and had to wait until 1946 to get his G2DXK callsign. His main activity over the last 20 years or so has been on 21MHz ssb, always using home-built equipment. The earlier part of his professional career was spent with Murphy Radio, but for 30 years he held various technical and managerial posts with ICL. He is now retired and expects to be devoting much more time to amateur radio.

Introduction

This is a five-part article describing an hf transceiver project for the home constructor. The aim has not been to try to imitate the very sophisticated boxes now emanating from Japan. Neither has it been to provide an exceedingly simple design which can be thrown together over the weekend with parts salvaged from the junk box—and then discarded almost as rapidly when one has tired of its very limited capabilities. Instead the aim has been somewhere between these two extremes. It has been to provide a transceiver which, while lacking some of the features and facilities of a modern commercial rig, will give a good account of itself on the hf bands —and will not cost the earth to build.

Furthermore it is designed to be a flexible system which can be gradually expanded and enhanced as desired to suit the individual constructor's particular requirements, his enthusiasm, his pocket and his skills. Thus he can start by building a basic one-band receiver, expand this to cover several more bands, add the facilities for the low-power transmission of cw and/or ssb, increase the output power and so on.

The basic concept centres around two units, namely:

(a) The basic transceiver containing the receiver and a transmitter exciter which gives an output of around 0·5W. This unit operates from an external 12V supply.

(b) A linear amplifier. One option here will be for a mains-powered unit

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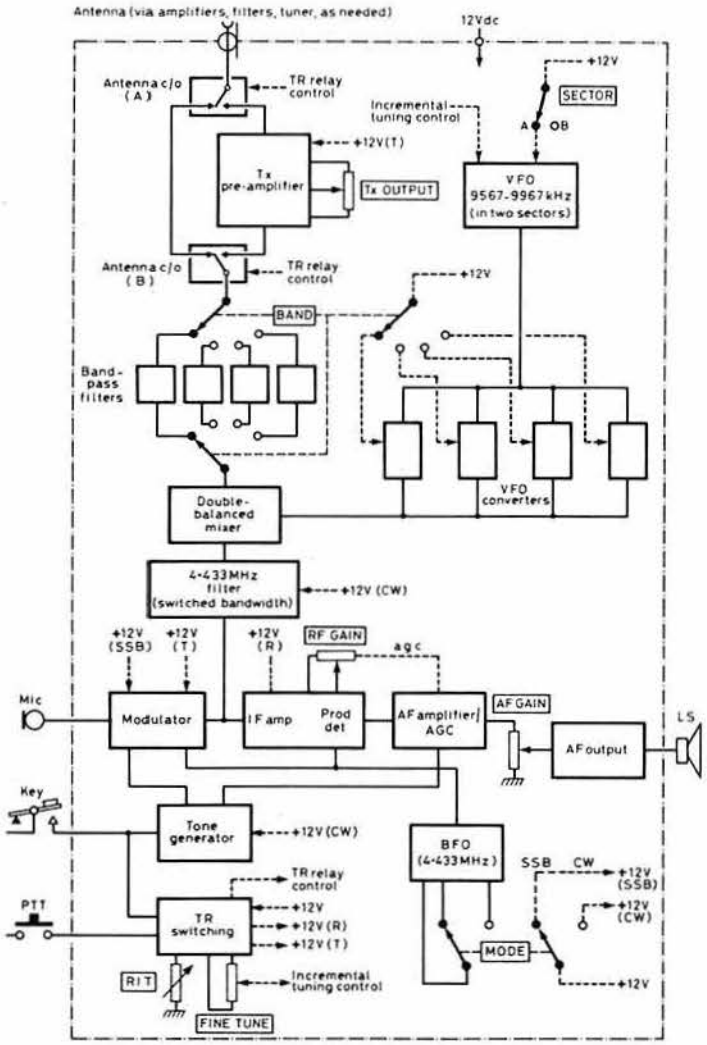
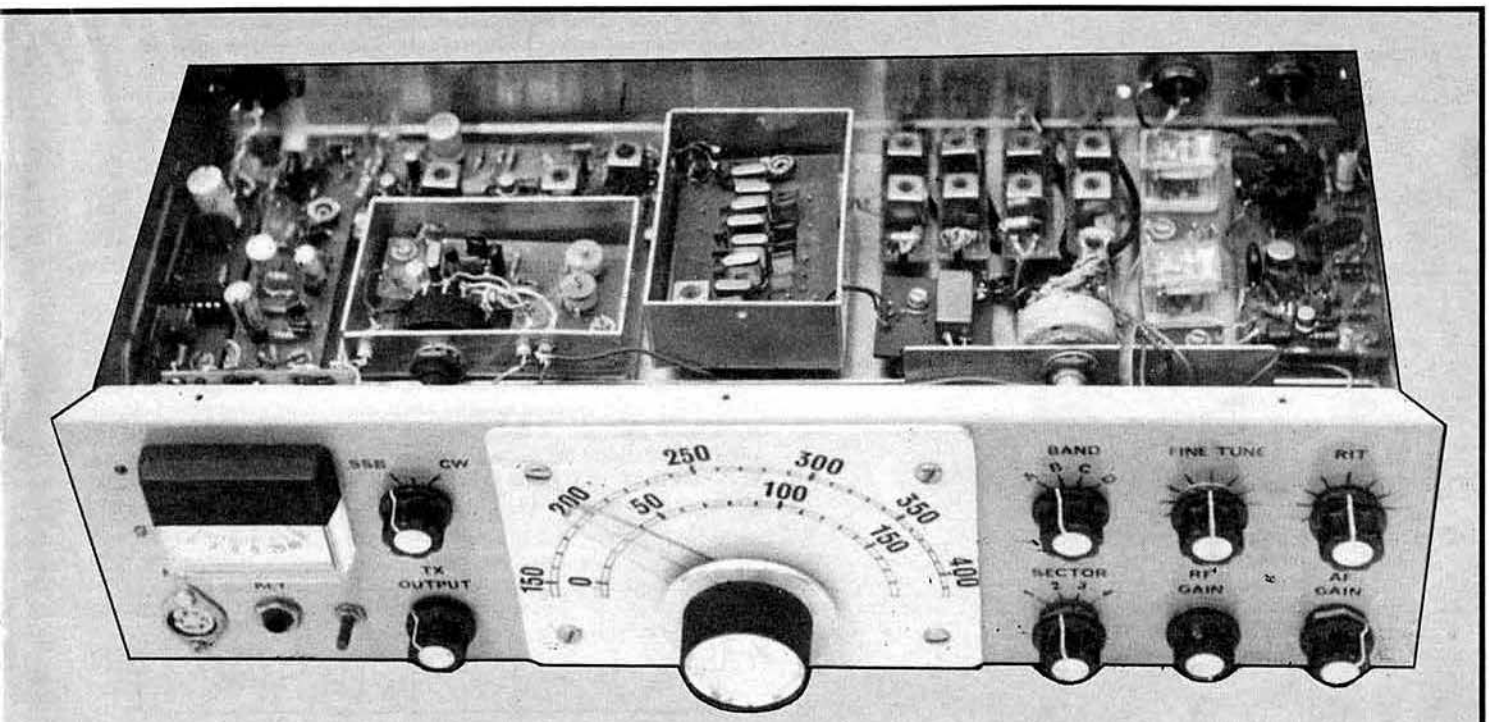


Fig 1. Block diagram of the basic transceiver unit



The basic transceiver unit with the lid removed to show the upper side of the chassis. The overall dimensions are approximately 14 by 6 by 4·25in

giving around 100W p.e.p. output. This unit would also include a 12V power supply for the basic transceiver, and might possibly also include a preamplifier/attenuator to enhance still further the performance of the receiver.

The basic transceiver

A block diagram of the basic transceiver is given in Fig 1. Each of the boxes in this diagram represents a separate, easily removable module, and it is this modular approach which gives the project its flexibility. Only about half the modules are required for a basic one-band receiver, and the additional modules can be added as one enhances the unit. Each module consists of a small printed circuit board, although in certain cases, eg the vfo, there is additionally a screening box and one or two components off the pcb. Some pcbs are very simple, containing only around half-a-dozen components; others are a little more complex. All the pcbs can be made by the home constructor using scraps of board material, an etch-resist pen and some etching fluid.

On RECEIVE, signals are passed from the antenna through a bandpass filter to the double-balanced mixer, where they are mixed with the output of one of the vfo converters to produce a 4,433kHz signal. This is then fed through the 4,433kHz filter to the i.f. amplifier. The filter is of the ladder type and uses inexpensive colour-tv crystals. By means of reed switches mounted on the filter pcb, the bandwidth can be switched from 2·4kHz (for ssb) to 300Hz (for cw), the switches all being operated by a single electromagnet which is energized from the "+12V(cw)" line.

Provision is made for four frequency bands, a single three-pole four-way switch selecting the appropriate bandpass filter and switching in the appropriate vfo converter to change the vfo output to the required frequency. Any four bands from 1·8 to 28MHz can be chosen. The choice can be modified subsequently, if required, merely by changing the bandpass filters and the vfo converters.

The vfo converters each contain a crystal oscillator and a mixer to convert the vfo frequency to that required for the selected band—except for 14MHz, where no conversion is needed. The basic tuning range of the vfo is around 200kHz, which is adequate for some of the hf bands. Where necessary, however, the SECTOR switch enables a second 200kHz sector to be selected, increasing the range to 400kHz. For the 28MHz band the range is doubled again by switching in a second crystal in the vfo converter. If more than 800kHz of the 28MHz band is required, it is necessary to use two vfo converters and two bandpass filters. On the 21MHz band, which is 450kHz wide, one has to sacrifice 50kHz of the band.

The total tuning range of the vfo (both sectors) is from 9,567 to 9,967kHz. By luck it works out that the conversion crystals required for some of the bands (10, 18, 21, 24MHz) are inexpensive off-the-shelf frequencies (see Table 1).

Table 1. Frequency conversion details

Band (MHz)	Crystal frequency (kHz)	Converter output frequency (kHz)			Receive/transmit frequency (kHz) (BFO @ 4,433kHz)			
		VFO @ 9,567	VFO @ 9,767	VFO @ 9,967	VFO @ 9,567	VFO @ 9,767	VFO @ 9,967	
1·8	3,534	—	6,233	6,433	—	1,800	2,000	(Note 1)
3·5	1,634	7,933	8,133	8,333	3,500	3,700	3,900	(Note 1)
7	1,864	11,433	11,633	—	7,000	7,200	—	(Note 1)
10	4,000	5,567	5,767	—	10,000	10,200	—	
14	—	9,567	9,767	9,967	14,000	14,200	14,400	
18	4,000	13,567	13,767	—	18,000	18,200	—	
21	7,000	16,567	16,767	16,967	21,000	21,200	21,400	(Note 2)
24	10,700	20,267	20,467	20,667	24,700	24,900	25,100	
28(a)	14,000	23,567	23,767	23,967	28,000	28,200	28,400	(Note 3)
	14,400	23,967	24,167	24,367	28,400	28,600	28,800	
28(b)	14,800	24,367	24,567	24,767	28,800	29,000	29,200	(Note 3)
	15,200	24,767	24,967	25,167	29,200	29,400	29,600	

Notes

1. The table assumes a bfo frequency of 4,433kHz. In practice the frequency will be somewhere between 4,432 and 4,433kHz. Thus the vfo and converter output frequencies will not be precisely as shown—and for the 1·8, 3·5 and 7MHz bands the crystal oscillator frequency should be approximately 1kHz higher than shown.
2. The top 50kHz of this band are lost.
3. The vfo converter has two crystals. Other 800kHz sections of the band can be obtained with suitably chosen crystal frequencies.

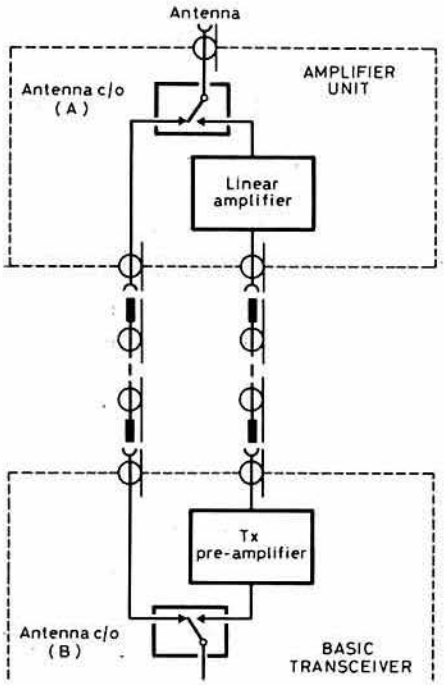


Fig 2. How the basic transceiver unit will eventually be connected to a linear amplifier

The required bfo frequency is slightly below 4,433kHz, the optimum frequencies for ssb and cw being slightly different. The bfo uses a 4,433kHz colour-tv crystal, the MODE switch changing the loading on the crystal to give the precise frequencies required for each mode. A second bank of contacts on the MODE switch provides the control voltages to change from ssb to cw operation, eg to change the filter bandwidth and to modify the transmitter circuits.

On TRANSMIT, the i.f. amplifier is muted and the modulator switched on. The latter produces a double-sideband suppressed-carrier signal at 4,433kHz which is then passed through the filter to remove the unwanted sideband and give additional carrier suppression. The resultant ssb signal is then converted to the required frequency by the double-balanced mixer, passed through the bandpass filter and amplified to around 0·5W p.e.p. by the transmitter preamplifier. When switched to ssb, the modulator takes its af input from the microphone socket. On cw it takes a keyed 800Hz tone from the tone generator. A similar keyed tone is fed to the receiver af amplifier, enabling the operator to hear what he is sending.

The double-balanced mixer is one of the excellent Schottky-diode units which are available relatively cheaply. This allows the receiver to have a good signal:noise ratio without any rf stage, and also allows it to handle a wide dynamic range.

At 4,433kHz it is the upper sideband which is selected. On the 1·8, 3·5 and 7MHz bands there is subtractive mixing in the double-balanced mixer (dbm) which results in the selected sideband at the antenna frequency being the lower one. On all other bands, where there is additive mixing in the dbm, it is the higher one. Thus the sideband selected is always in accord with the standard convention and no switching between sidebands is provided.

The t/r switching module provides the dc controls for switching from RECEIVE to TRANSMIT. The switching is initiated by either the microphone press-to-talk switch or by the morse key. In the latter case there is a delay of about 1s after key-up before the transceiver returns to RECEIVE. In conjunction with two front-panel controls, the t/r switching module also provides a dc voltage for the incremental tuning of the vfo. One of these controls (RIT) allows the receiving frequency to be varied approximately ±1kHz without affecting the transmitting frequency. The second control (FINE TUNE) allows the receiving and transmitting frequencies to be varied together by ±1kHz or so.

The transmitter preamplifier uses broadband circuitry covering the range 1·8 to 30MHz. Automatic level control maintains the output at around 0·5W p.e.p., thus preventing overload and unnecessary distortion, but some harmonic suppression is needed before the signal reaches the antenna. This can be done by using suitable filters or by using narrowband circuits in the linear amplifier. A linear amplifier is essential for serious operating, although the author has had a lot of fun operating the prototype barefoot. With only 0·5W of rf going to the antenna he has had numerous good ssb QSOs with Europe on 14, 21 and 28MHz—and has had a number of

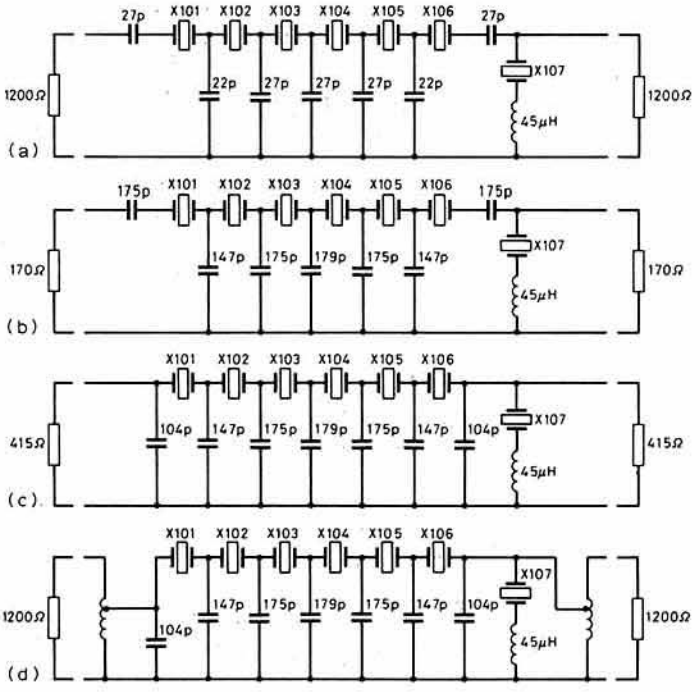


Fig 3. Derivation of the 4·433MHz filter. (a) Circuit for 2·4kHz bandwidth. (b) Circuit for 300Hz bandwidth. (c) Alternative termination for 300Hz bandwidth. (d) Use of transformers to adapt circuit (c) for 1,200Ω termination. All capacitor values in picofarads

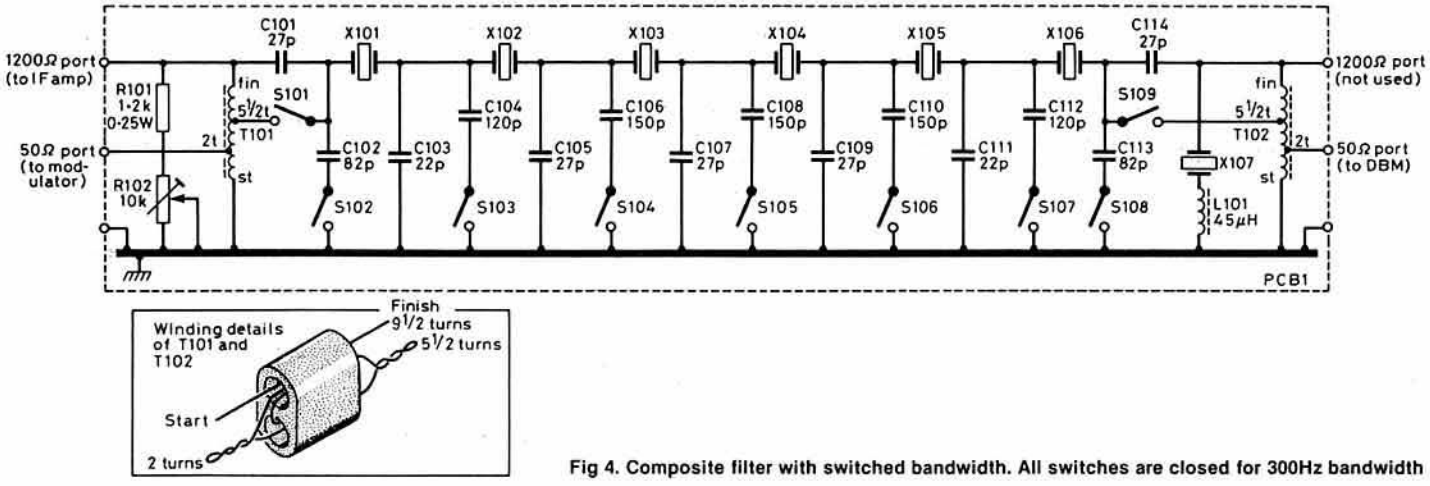


Fig 4. Composite filter with switched bandwidth. All switches are closed for 300Hz bandwidth

long ragchews with North America on 28MHz. For all these contacts the antenna was a 33ft dipole, 20ft above the ground, fed with tuned feeders.

When the linear amplifier is used, the antenna changeover switch c/o(A) is transferred to the amplifier unit as shown in Fig 2. To allow for this the transceiver unit is fitted with two coaxial sockets.

4,433kHz filter

The first module to be looked at in detail will be the 4·433MHz filter. The starting point for the design of this filter was the circuit in Fig 3(a). This gives a bandwidth of approximately 2·4kHz at −6dB, and approximately 3·9kHz at −60dB. It is based on the design procedure given by G3JIR[1] for a six-pole Chebyschev filter, and has an additional crystal, X107, to sharpen up the response on the low-frequency side and give a fairly symmetrical response curve. Strict adherence to the G3JIR procedure would require a 120pF capacitor in series with X103 and another in series with X104, but, as pointed out by G3UUR[2], these capacitors can be omitted if X103 and X104 have a higher series resonant frequency than the other crystals (ideally a difference of about 200Hz). Since there will always be some variation in the individual resonant frequencies of the crystals in any batch, it can be arranged that X103 and X104 are those with the highest frequencies.

In order to reduce the bandwidth to 300Hz it is necessary to change the capacitance values to those shown in Fig 3(b) and to reduce the terminating resistance to 170Ω. This is a little unfortunate, since it would have been convenient to have the same terminating resistance for both bandwidths. The required termination for 300Hz can be increased to 415Ω by using the alternative terminating arrangement of Fig 3(c), but this is still some way from 1,200Ω. It is necessary, therefore, to use matching transformers as shown in Fig 3(d).

Fig 4 shows the composite filter which uses reed switches to change from the filter of Fig 3(a) to that of Fig 3(d). Switches S102 to S108 add in the required extra capacitances for the lower bandwidth, while S1 switches the input to a tap on the input transformer. Note that this results in C101 being shunted across the top half of T101. This is equivalent to shunting approximately 14pF across the lower half of T101 and it therefore reduces the required value of C102 from 104 to 90pF. (The value actually used is 82pF, since this is the nearest standard value). Switch S109 performs a similar function to S101.

The two transformers are wound on small inexpensive two-hole ferrite beads. One bonus which results from the use of these transformers is that, by using suitable transformer taps, the filter can be matched to any required terminating resistance. As will be seen from Fig 4, advantage has been taken of this, and 50Ω taps provided. The 50Ω tap of T102 is taken direct to the dbm, the i.f. port of which has an impedance of 50Ω. T101 is connected both to the input of the i.f. amplifier (from the 1,200Ω tap) and to the modulator (from the 50Ω tap). The total loading imposed by both of these is equivalent to something like 1,600Ω across the 1,200Ω tap, and R102 provides the additional loading required to give the correct termination.

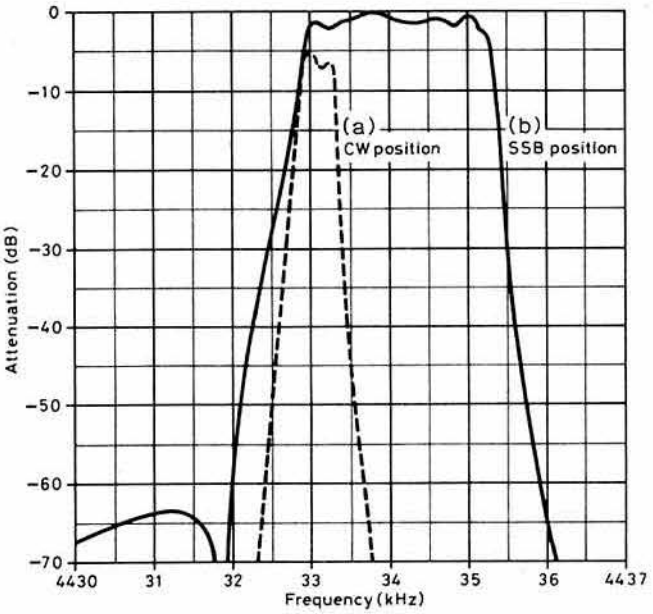


Fig 5. Typical response curves. (a) CW position. (b) SSB position. Crystal frequencies relative to X102: X101, +40Hz; X102 0; X103, +120Hz; X104, +170Hz; X105, +10Hz; X106, +70Hz; X107, +80Hz

As pointed out by G3UUR[2], there are at least two types of 4·433MHz crystal on the market, each with quite different characteristics. This design uses the crystals supplied by Ambit International, which correspond to what G3UUR calls Specification P128. Similar crystals are obtainable elsewhere, but the constructor should make sure he is getting the right ones.

(Continued on p486)

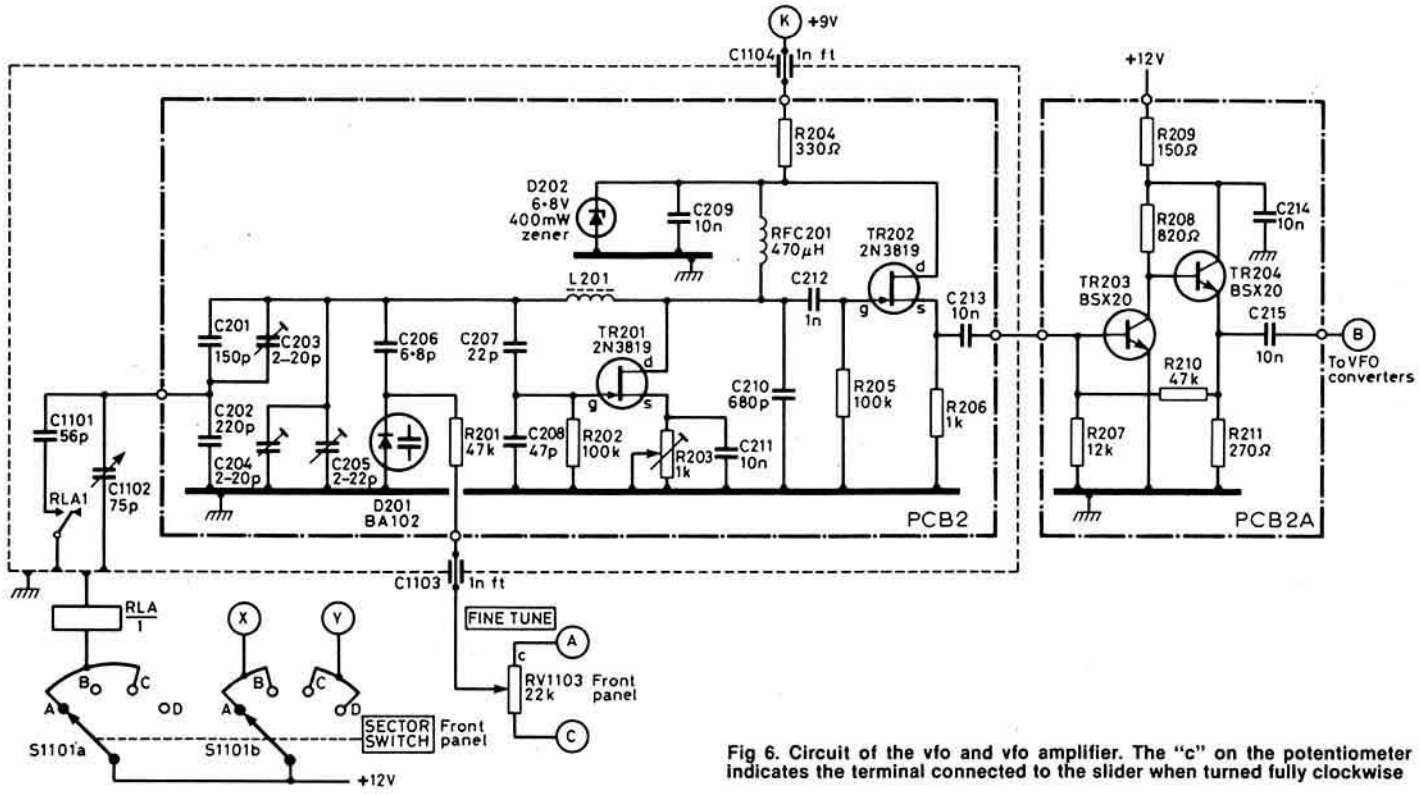


Fig 6. Circuit of the vfo and vfo amplifier. The "c" on the potentiometer indicates the terminal connected to the slider when turned fully clockwise

Equipment Review

The Yaesu Musen FT77 hf transceiver

by Peter Hart, G3SJX*

Front view of the FT77

Introduction

The FT77 was introduced during the early part of 1983 as a successor to the FT7B hf mobile transceiver. It is a small budget-priced 100W transceiver for 12V operation covering eight bands, 3·5 to 28MHz. It is available in a 10W version, the FT77S, at lower cost, and accompanying accessories include the FP700 mains psu, FC700 antenna tuner, FV700DM digital vfo and FTV700 vhf transverter. Accessories intended for the FT707 transceiver are also compatible.

Principal features

The FT77 is fully solidstate and covers the amateur bands from 3·5 to 30MHz in 11 500kHz ranges; 1·8MHz is unfortunately not included. SSB and cw operation are provided with fm as an optional extra. An analogue vfo is used, controlled by a 45mm diameter rubberized knob at a tuning rate of about 18kHz/revolution. A blue fluorescent display gives a bright indication of frequency to 100Hz resolution.

Receiver functions include clarifier (irt), switchable 20dB rf attenuator, fast/slow agc and noise blanker. The noise blanker may be optimized to suppress either narrow pulses (eg ignition interference) or wide pulses ("woodpecker" interference) via a switch located under an access panel in the top of the case. Transmitter functions include metering of alc, relative forward and reflected power, semi-break-in on cw with sidetone, and a thermostatically-controlled fan. The cw sidetone, delay and meter controls are located under the top access panel. There is no provision for speech processor, vox or mox.

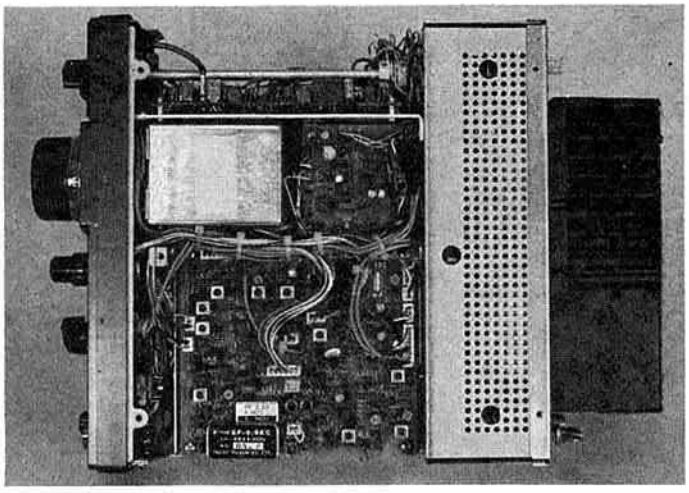
Three DIN connectors on the rear panel provide interfacing for linear, transverters and external vfo. Other connectors provide for antenna, low-power output, audio in/out, 12V input, 8V output, key, headphone and speaker jacks.

Internal options include fm board, 25kHz crystal marker unit and 600Hz narrow bandwidth cw filter.

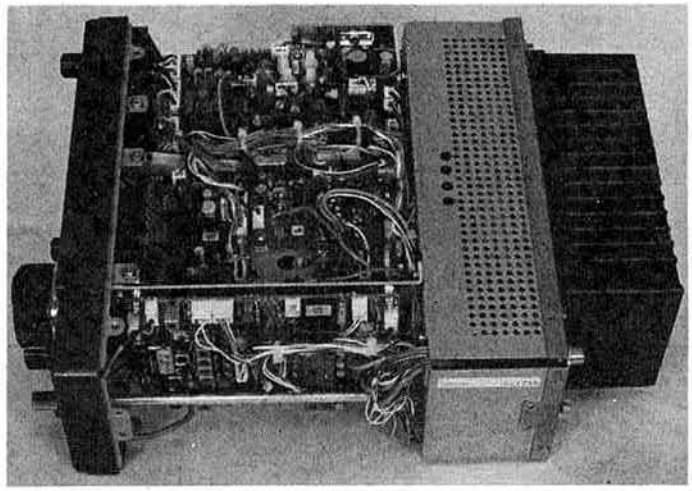
A comprehensive 64-page instruction manual is provided which covers full operation and installation of the equipment. Circuit descriptions and a parts list are included, together with full alignment instructions, circuit diagrams and photographs of the board layouts.

Description

The FT77 measures 24 (w) by 9·5 (h) by 30cm (d) and weighs 6kg. It is sturdily constructed on eight easily-accessible printed boards which are interlinked by miniature multiway plug and sockets and a cable harness assembly. The pa unit with integral heatsink and fan is mounted at the rear and is detachable. A plastic "mock diecast" front panel covers a steel inner



Bottom view of the FT77 with covers removed



Top and side view of the FT77 with covers removed

* 42 Gravel Hill, Addington, Croydon, Surrey.

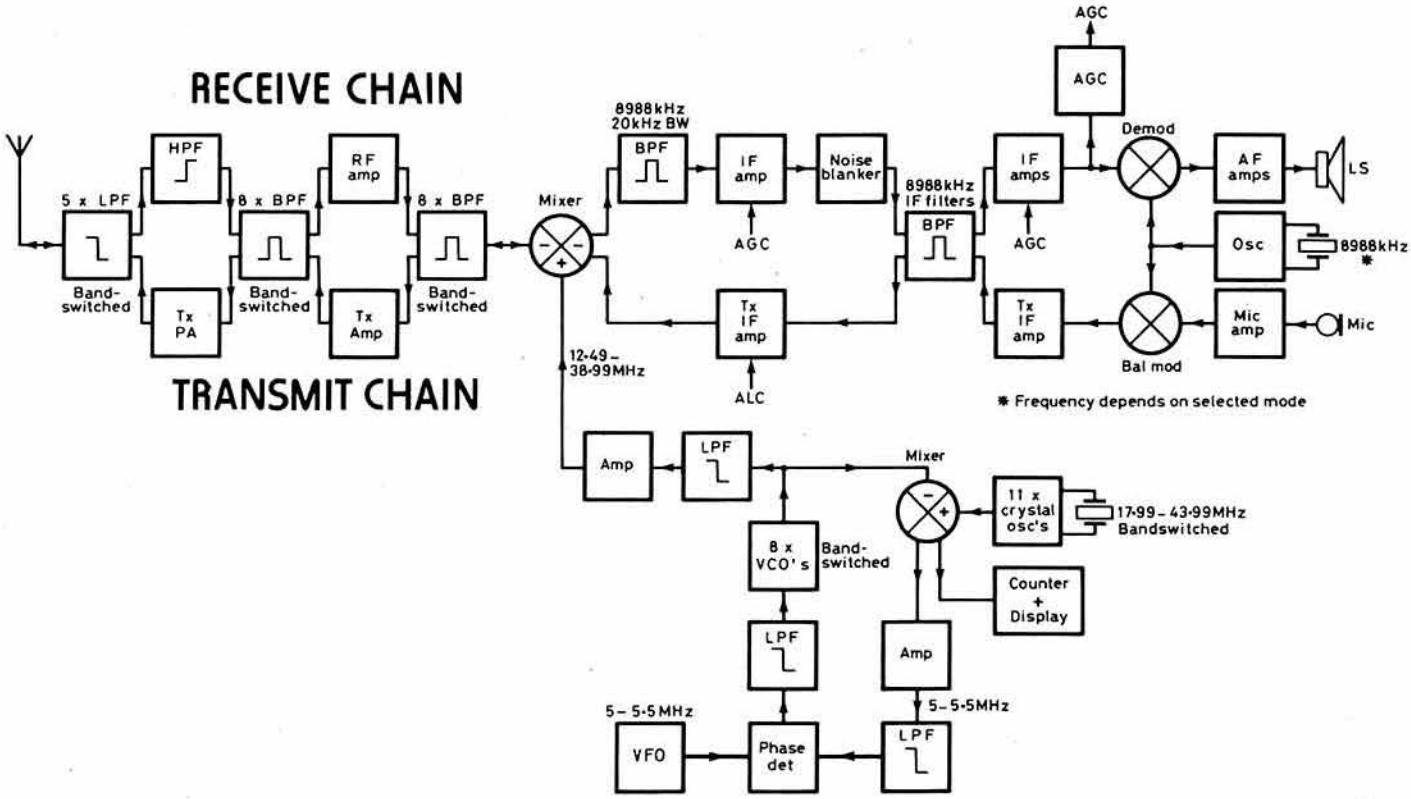


Fig 1. Simplified block diagram of the FT77

panel on which the controls are mounted. A conventional two-section case is used with small foldaway front legs to tilt the front panel to a more convenient angle. These legs annoyingly collapse whenever the unit is moved. Except for the rubber tuning knob, the control layout is uncluttered and easy to use. A 7cm diameter speaker is mounted in the top of the case. An alternative forward-facing and somewhat larger speaker is mounted in the FP700 psu.

A simplified block diagram of the FT77 is shown in Fig 1. The transceiver is single conversion with an 8,988kHz i.f. On fm receive a second i.f. of 455kHz is used. Extensive front-end selectivity is incorporated via bandswitched lowpass and two separate bandswitched bandpass networks, one on each side of the rf amplifier. A fet rf amplifier and diode ring mixer are used. A 20kHz wide roofing filter is used in the i.f. before the noise blanker, followed by the main i.f. filter block. The transmitter uses the same filters and mixer as on receive.

The local oscillator uses a phase-locked-loop with one vco for each main band. The vco selected is mixed down to a frequency in the range 5–5·5MHz, and fed to one input of the phase comparator. The other phase comparator input is provided by the capacitor-tuned temperature compensated vfo.

Measurement technique

The measurement technique was similar to that used in previous reviews [1] [2]. All signal input voltages are given as pd across the antenna terminal. Two-tone intermodulation products are quoted with respect to either originating tone. Unless stated otherwise, all measurements were made on ssb.

A measurement was made on the transmitter of power delivered into a mismatched load. Fig 2 shows the test arrangement. A known mismatch is generated at low loss using an atu or a length of non-50Ω line. For example, a $\lambda/4$ length of 70Ω line terminated in 50Ω will have an input impedance of 100Ω purely resistive. This is a vswr of 2:1. Twenty-five-ohm resistive is also a vswr of 2:1, and this together with the whole range of complex impedances corresponding to 2:1 vswr can be generated by inserting a length of 50Ω line variable over the range 0 to $\lambda/2$ between the mismatch and the source. On 432MHz such a line is only 35cm long, and variable air spaced lines of this length are available (often called trombone lines). For 28MHz this line needs to be variable over a length of 5m, and this was fabricated out of 50Ω coaxial cable switched in steps of $\lambda/4$, $\lambda/8$, $\lambda/16$ and $\lambda/32$ in series with a 40cm trombone line.

Fig 2. Test arrangement for performing transmitter load vswr measurements

Measurements were made at 2:1 and 3:1 load vswr. The mismatch line for 2:1 vswr comprised a 0·16λ length of 75Ω coaxial cable, and for 3:1 vswr a 0·14λ length of 25Ω line (two 50Ω coaxial cables in parallel). The lines were pruned to length using a network analyser.

Receiver measurements

Sensitivity

Table 1 shows the sensitivity figures on ssb. These indicate a noise floor of – 132 to – 136dBm or a noise figure of about 5 to 9dB. On fm the sensitivity was about 0·4μV for 12dB s + n:n, with 3kHz peak deviation of a 1kHz modulating tone. The rf attenuator measured 20dB on all bands.

Table 1. Receiver measurements

Frequency	Sensitivity on ssb for 10dB s + n:n	Input for S9	Image rejection	8,988kHz i.f. rejection
3·5MHz	0·11μV (– 126dBm)	50μV	107dB	106dB
7MHz	0·11μV (– 126dBm)	50μV	115dB	68dB
10MHz	0·13μV (– 125dBm)	70μV	94dB	81dB
14MHz	0·14μV (– 124dBm)	63μV	107dB	94dB
18MHz	0·16μV (– 123dBm)	70μV	95dB	94dB
21MHz	0·16μV (– 123dBm)	63μV	115dB	96dB
24MHz	0·16μV (– 123dBm)	63μV	77dB	98dB
28MHz	0·18μV (– 122dBm)	70μV	82dB	97dB

S-meter calibration

The input signal level required to give an S9 meter reading is shown in Table 1, and on 14MHz the calibration was as follows:

S-reading	Input signal	Relative increase
S3	2·2μV	
		9dB
S5	6·3μV	
		9dB
S7	18μV	
		11dB
S9	63μV	
		27dB
S9 + 20	1·4mV	
		21dB
S9 + 40	16mV	
		19dB
S9 + 60	140mV	

The S9 level is about right, but the linearity above S9 is somewhat variable. The S-meter calibration on fm was the same as ssb.

Spurious responses

Table 1 shows the image and i.f. rejection figures. These are perfectly adequate, with perhaps the exception of the i.f. rejection on 7MHz.

Six internally-generated spurious signals were logged with the antenna terminated in 50Ω. None was strong enough to move the S-meter. Other spurious responses checked as in [2] were:

Frequency	Worst response	Other responses
3·5MHz	9mV	Several around 70mV
7MHz	13mV	Several around 70mV
10MHz	40mV	A few around 100mV
14MHz	20mV	A few around 100mV
18MHz	56mV	A few around 100mV
21MHz	45mV	A few around 100mV
24MHz	28mV	Several around 40mV
28MHz	9mV	Several around 27MHz at 70mV

AGC performance

The agc threshold was measured as 0·5μV. A 10dB increase in the signal level above the threshold resulted in a 2dB increase in audio output. A further 100dB increase in signal gave a further 1dB increase in audio. The attack time was measured as around 2ms in the fast position or 5ms in the slow position. Corresponding decay times for a 40dB decrease in level were 60–80ms (fast) or 0·8–1s (slow) depending on level.

Selectivity

The i.f. selectivity was evaluated for both the ssb and narrow cw filters as follows:

Response	SSB bandwidth	Narrow cw bandwidth
−3dB	2·23kHz	460Hz
−6dB	2·52kHz	560Hz
−20dB	3·04kHz	780Hz
−40dB	3·69kHz	960Hz
−60dB	4·91kHz	1·68kHz
−70dB	16kHz	14kHz

Both filters seemed to lack sufficient skirt selectivity below −60dB. This may be due to circuit layout problems causing leakage around the filters. The ssb filter response was reasonably symmetrical, and passband ripple less than 1dB.

Reciprocal mixing

Insufficient skirt selectivity on the i.f. filter prevented measurements closer than 15kHz to the on-tune frequency. Results at 21·4MHz on ssb (approx 2·5kHz bandwidth) were:

Frequency offset	Input level	Level with respect to noise level
15kHz	−43dBm	90dB
20kHz	−40dBm	93dB
30kHz	−35dBm	98dB
50kHz	−30dBm	103dB
75kHz	−26dBm	107dB
100kHz	−22dBm	111dB
200kHz	−16dBm	117dB
300kHz	−11dBm	122dB

Fig 3 shows the combined effects of i.f. selectivity and reciprocal mixing.

Blocking

Front-end blocking occurred at input levels of −4dBm (140mV) on 7MHz, and −2dBm (180mV) on 28MHz, independent of on-tune level as there is no agc applied to the rf amplifier.

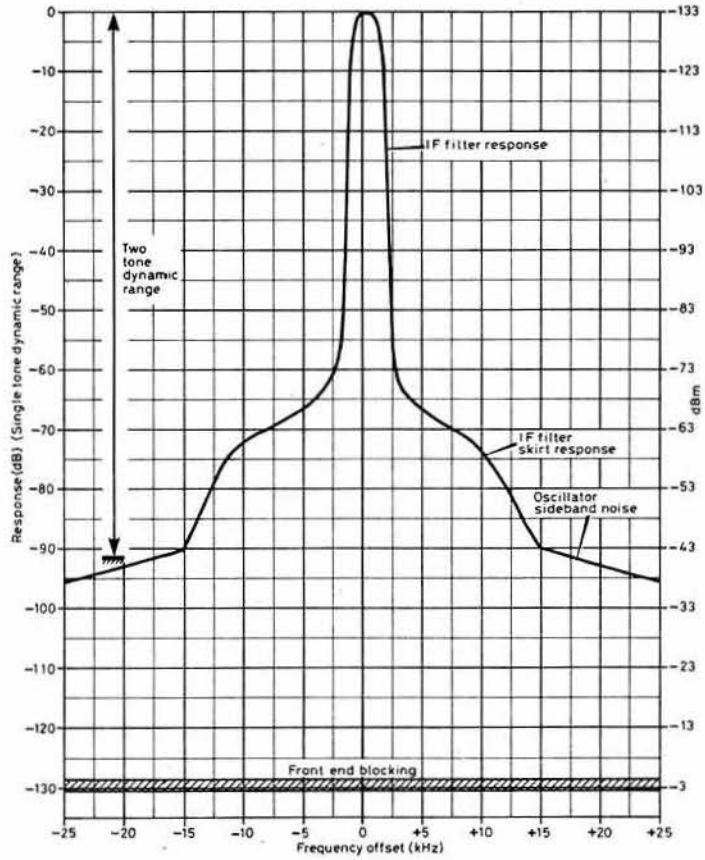


Fig 3. FT77 effective selectivity curve on usb

Third-order intermodulation

A signal spacing of 50kHz was required to avoid the effects of reciprocal mixing.

Frequency	Third order intercept	Dynamic range
7MHz	+7dBm	95dB
28MHz	+3dBm	91dB

The dynamic range quoted is the two-tone spurious-free dynamic range measured on ssb (2·5kHz bandwidth) related to the receiver noise floor. The noise blanker did not degrade the intermodulation performance.

I.F. inband linearity was assessed with 200Hz signal spacings [2]. −30dB intermodulation products were generated with input signals from 2μV up to 7mV, degrading to −15dB with 22mV input signals.

Audio

The maximum audio power output before the onset of clipping was 2W into an 8Ω load, or 3·1W into a 4Ω load. Up to this level the distortion was less than one per cent. Maximum audio output could be achieved with 0·35μV input signal. The extra power into a 4Ω load is useful for mobile operation.

Transmitter measurements

CW power output, harmonics and spurii

Setting the drive according to the manual, the maximum cw power output together with the harmonics and other spurii were:

Frequency	Power output	Harmonics	Other spurii
3·5MHz	85W	−52dB	Two at −72dB
7MHz	100W	−55dB	Three −65 to −70dB
10MHz	108W	−42dB	Five −57 to −70dB
14MHz	114W	−55dB	Three at −70dB
18MHz	110W	−54dB	Four close-in at −50dB
21MHz	105W	−53dB	One only at −62dB
24MHz	105W	−53dB	Four −70 to −80dB
28MHz	90W	−53dB	Several −50 to −80dB

The drive control can be used to reduce output to very low levels.

Spurii on 18MHz are inevitable when using i.fs around 9MHz. It is important not to overdrive on this band. Fig 4 shows the output spectrum on 28MHz at 90W output. Many of these spurious signals disappear at power levels below 60W.

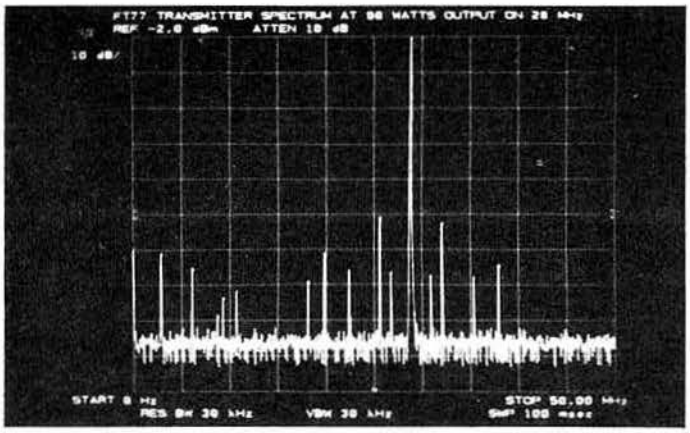


Fig 4. Transmitter output spectrum on 28MHz between 0 and 50MHz. Vertical scale 10dB/division

Fig 5 shows the cw keying envelope when keying at 40wpm. The envelope is nicely rounded.

The maximum available power output on fm is the same as on cw, but the manual states that it is necessary to limit the power to 50W output to avoid overheating the pa. From experience, this would seem to be over-cautious.

SSB power output and distortion

With two equal-amplitude audio tones separated by 1kHz applied to the microphone socket, and maximum drive according to the manual (alc at the start of the red zone), the following results were obtained:

Frequency	Power output (p.e.p.)	Third-order ips
3·5MHz	82W	−34dB
7MHz	96W	−29dB
10MHz	105W	−24dB
14MHz	112W	−21dB
18MHz	105W	−18dB
21MHz	104W	−18dB
24MHz	104W	−16dB
28MHz	88W	−24dB

The intermodulation product level at ±10kHz was −58 to −60dB, and at ±20kHz was −68 to −72dB. Reducing the drive to keep the alc deflection towards the bottom of the black zone resulted in a dramatic improvement in ip level on the higher frequency bands with only a marginal reduction in power output.

The FT77 with matching FP700 psu and FC700 atu

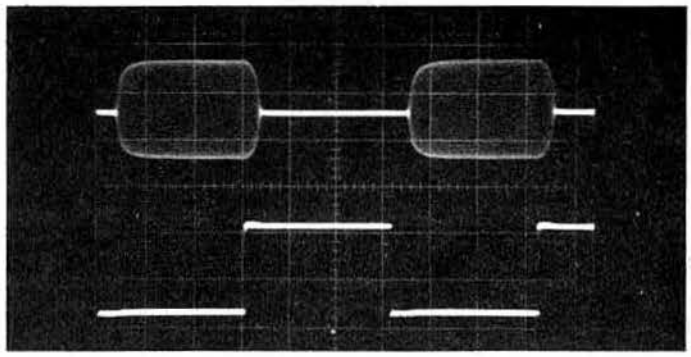


Fig 5. CW keying waveform (bottom) and rf envelope (top) at 40wpm. Horizontal scale 10ms/div

The carrier suppression was 50 to 60dB depending on the af level, and the sideband suppression with a 1kHz audio tone was about 50dB.

Audio

The audio bandwidth was measured as 300Hz–2·8kHz at the −6dB points, and both lsb and usb gave similar results. Full output could be achieved with 3mV af input. Some distortion in the transmitter af stages was observed. Harmonics of a 1kHz tone driving the transmitter to the maximum recommended alc level were −30dB (three per cent distortion). At lower alc levels this reduced to −50dB (0·3 per cent distortion). As always, avoid overdrive.

Transmitter noise output

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

Frequency offset	Noise output	Noise output wrt carrier in a 2·5kHz bandwidth
5kHz	−61dBm/Hz	−77dB
10kHz	−68dBm/Hz	−84dB
20kHz	−76dBm/Hz	−92dB
50kHz	−85dBm/Hz	−101dB
100kHz	−91dBm/Hz	−107dB

These results agree quite well with the receiver reciprocal mixing figures, and show that the local oscillator is fairly noisy. This is probably due to the large amount of amplification used in the oscillator chain. The measured noise at 10kHz offset corresponds to −118dBc/Hz.

Operation into mismatched loads

On 28MHz, with full cw power output into a mismatched load, the transmitter delivered between 64 and 86W with 2:1 load vswr, and between 37 and 60W into a 3:1 vswr.

Low-power (transverter) output

The pa is disabled by removing the link from inside the four-pin 12V power plug. About −4dBm cw output is available from the low-power output socket, and about −6dBm p.e.p. at −30dB intermodulation products on ssb. It is advisable to keep the mic gain control well down to avoid overdrive, and in general the relative harmonics and spurii are worse than the full transmitter. Fig 6 shows the output spectrum on 28MHz.

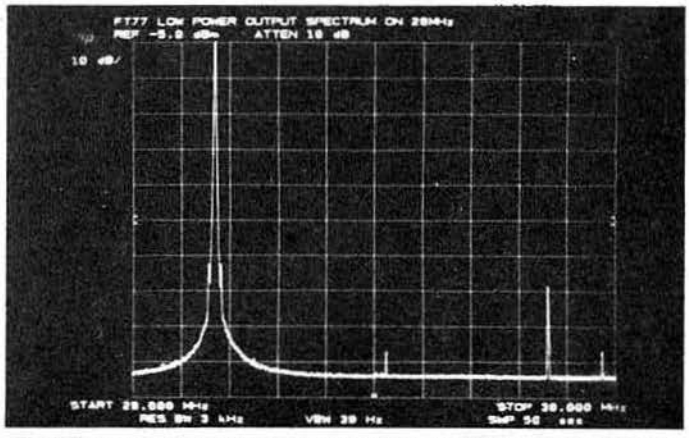


Fig 6. Transverter low-power output spectrum on 28MHz. Horizontal span 28 to 30MHz. Vertical scale 10dB/division

Other measurements

Frequency indication and stability

The frequency drift on 28MHz was 200Hz during the first hour after switch-on, and a further 100Hz during the next hour. The analogue vfo appeared to be carefully temperature compensated. The readout on 28MHz was 400Hz low, but this is settable if an accurate frequency counter is available. The cw frequency readout was correct for a beat note of about 800Hz.

Low voltage supply

The receiver operated satisfactorily down to a supply voltage of 10V. Below this level, frequency changes occurred. At 11V the transmit power had reduced to 60W.

On-the-air performance

The FT77 was used over a period of several months from the home QTH, in the car, and as an exciter for a 70MHz transverter in vhf field day. This covered operation in several hf contests, and the FT77 performed well under all conditions. One of its chief attributes is simplicity of operation, and this together with its small size makes it ideal for an all-purpose rig. Ergonomically the only complaint was the rubber tuning knob, which made rapid changes in frequency awkward and the drive exhibited excessive friction and springiness. Although lacking the frills of more comprehensive base stations, the only facilities which were really missed were the omission of 1·8MHz, a speech processor and possibly the rf gain control.

In terms of performance the receiver coped well with strong signals on 7MHz provided the attenuator was used, and seemed adequately sensitive for 28MHz. The audio quality was a little "boxy", and use of the larger speaker in the psu did not result in a great improvement. The wide skirt selectivity of the i.f. filter was noticeable at times. FM was used from the car on 29MHz on a number of occasions and worked well.

On transmit, reports were generally complementary. A slight harshness to the audio was reported by some stations, and there was a tendency for the transmission to widen if overdriven. Two microphones were used, the MH-1B8 handheld microphone and the MD-1B8 desk microphone; better reports were received using the cheaper handheld microphone, particularly in tone position 1. On cw, the transmission was very clean and narrow with no sign of any clicks.

Conclusion

The FT77 is an ideal general-purpose transceiver where small size and low cost are important for home station, mobile and portable operation. The FT77S 10W version is particularly attractive for driving transverters. The performance is generally quite good, with the exception of i.f. skirt selectivity, oscillator sideband noise and spurious transmitter outputs on 28MHz.

The prices are as follows, all inclusive of VAT—FT77 £459, FT77S £425, crystal marker option £10.35, FM option £27.20, FP700 ac psu £135, FC700 antenna tuner £98.90, FV700DM digital vfo £200.

Acknowledgements

The reviewer would like to thank G3UFY and G3RQZ for critical comments on the transmission, and South Midlands Communications Ltd for the loan of the equipment.

References

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

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

A TRANSCEIVER FOR THE HF BANDS

(Continued from p481)

Table 2. Recommended placement of 4·433619MHz crystals

Crystals in order of series resonant frequency	Position
A (lowest)	Filter X102
B	,, X105
C	,, X101
D	,, X106
E	,, X107
F	BFO
G	Filter X103
H (highest)	,, X104

Table 2 shows how the crystals should be positioned according to their individual series resonant frequencies. (It will be shown later how the crystal frequencies can be ranked without using any expensive test gear.) Note that, although the frequency of these crystals is given as 4·433619MHz, ie to within 1Hz, they are not cut to anything like this accuracy. In any case the quoted figure is for the parallel resonant frequency; the series resonant frequency is something like 1kHz lower.

The basic six-pole 2·4kHz filter, terminated with a 1,200Ω resistive load at either end, has a measured passband ripple close to the theoretical figure of 1dB. The ripple is increased somewhat by all the added circuitry, in particular by the shunt crystal X107, but it is possible to keep the ripple to 2 or 3dB, which is quite acceptable. Fig 5 shows a typical measured response curve.

Table 3. Use of alternative value of tuning capacitor

Maximum value of tuning capacitor, C1102	50pF	25pF
Required value of C1101 (silvered mica)	39pF	18pF
Required value of C101 (PCB2) (silvered mica)	180pF	330pF
Required value of C102 (PCB2) (silvered mica)	200pF	150pF

All other components remain as shown in Fig 6.

VFO

The other module to be looked at in more detail this month will be the vfo, the circuit of which is given in Fig 6. The vfo uses a fet, TR201, in a Vackar-type oscillator followed by a second fet, TR202, as a source-follower to give isolation. The vfo amplifier, TR203 and TR204, gives an output of 1V rms. The frequency range is approximately 9,567 to 9,757kHz with C1101 switched across the tuning capacitor and 9,717 to 9,967 with C1101 out of circuit.

The tuning capacitor should be a good quality one having bearings at either end (eg the Jackson Bros 100 series). Should a suitable 75pF capacitor not be available, one of a different value can be used by modifying some of the other capacitor values, as is shown in Table 3.

The preset capacitor, C204, is a miniature air-spaced trimmer, such as is often obtainable very cheaply on the surplus market, and has a positive temperature coefficient, while C205 has a negative temperature coefficient. By suitable adjustment of these two trimmers the overall temperature coefficient can be tuned to give minimum frequency drift. C203 is also specified as a miniature air-spaced trimmer. Should such trimmers not be available, C203 can be replaced by a film dielectric trimmer, and C204 by a 10pF silvered-mica capacitor. It will then be a little more difficult to adjust the overall temperature coefficient, but an acceptable frequency stability should still be attainable.

Fine tuning of the vfo is achieved by controlling the dc potential applied to the varicap diode, D201.

It will be noted that the SECTOR switch has four positions. Normally only positions A and B are used. Positions C and D allow the vfo converter to be switched to provide the additional sectors when operating on the 28MHz band.

References

[1]. "Ladder crystal filter design," J. A. Hardcastle, G3JIR, *Rad Com* February 1979, pp116–120.

[2]. "Filters using tv crystals," "Technical Topics," J. P. Hawker, *Rad Com* December 1980, p 1294.

To be continued

Part 2 will look at the circuits of the other modules required for the basic receiver, while Part 3 will give full constructional details.

A Droitwich-locked frequency reference for carrier frequencies of 200 and 198kHz

by N. D. N. Belham, G2BKO*

N.D.N. Belham is a long-retired physics master who studied at King's College, London, under Prof Appleton. During the war he was a member of TRE, first at Swanage and then at Malvern. After the war he joined the staff of the Mid-Essex Technical College but later transferred to grammar school teaching. Owing to his location he is confined to the fm transmit mode, and greatly enjoyed the 28MHz activity during the recent sunspot maximum.

IT SEEMS to be human nature to regard digital displays as infallible. This is particularly the case with digital frequency meters! However, the display is only passing-on information supplied by other components. In the case of dfms it is the crystal that controls the clock frequency, which determines the time for which pulses shall be counted, and so this sets the accuracy of the dfm. It is true that crystal oscillators can be adjusted, but how many dfms have crystal ovens?

Many years ago I decided that the real answer was to use the incredibly-accurate Droitwich carrier itself to clock my dfm—the accuracy is stated to be one part in 10^{11}! The problem is, of course, how to demodulate the carrier. It might be thought that simple, but hard, limiting would do the job but, as has been explained before [1], the limiting process produces frequency modulation. One practical solution is to use a phase-locked-loop oscillator where the control voltage from the comparator is partially smoothed on its way to the voltage-controlled oscillator. The effectiveness of the method relies on the average frequency of the signal remaining constant, which is no doubt very nearly true. The feeling remains, however, that this cannot be true for speech and "pop" music!

Although sharply-tuned circuits reduce the modulation considerably, I always use a crystal filter as well; see Fig 1. Even a single crystal filter will reduce remaining modulation to about a fifth of the value before the filter. This may well result in the units figure of a dfm remaining steady. A balanced two-crystal filter will reduce the modulation much more. Of course, if the two crystals were really identical the balanced filter would give no output at all! The series resonances need to be separated by, say, 10Hz.

Experiments have shown that the series-resonant frequency of a 200kHz crystal can be "pulled" by a series or reactance, but that the pulling is limited to about ±200Hz. Fig 2 shows the results of such experiments; the left-hand graph for series inductance, and the right-hand one for series capacitance. The cost of crystals in the 200kHz range may be expensive, but one firm, at least, does offer a total tolerance of ±100ppm for a temperature range of 0°C–70°C. At 200kHz this means a range of ±20Hz. The fact that steady readings for the units figure of a dfm, clocked by the Droitwich carrier derived from the unit to be described, can be obtained indicates that the techniques of limiting and the phase locked loop can be employed if the original modulation first has been reduced by a crystal filter.

Now for the bad news! The carrier frequency of Droitwich is to be changed from 200 to 198kHz, probably early in 1986. This is a very awkward number from which to derive a frequency standard, but the unit to be described can be changed, at the snap of a switch, to accept either a 200 or 198kHz input. (If a crystal filter is used this must be changed as well.)

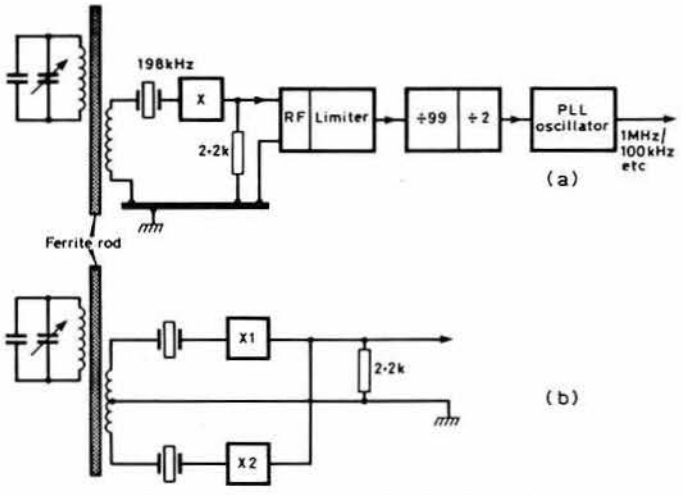


Fig 1. (a) Block diagram. (b) Alternative filter

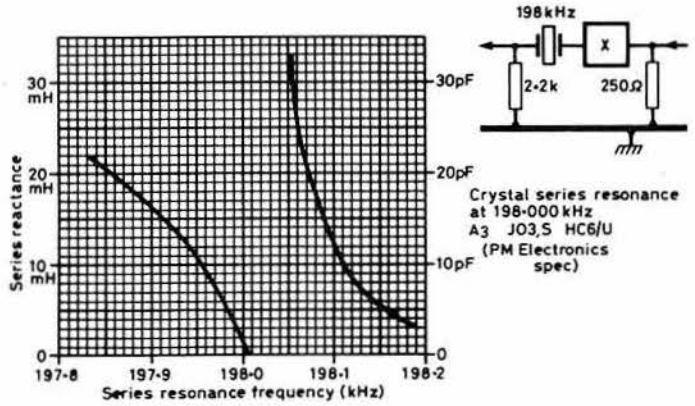


Fig 2. The results of "pulling" a single crystal filter by a series reactance: series inductance on left, series capacitance on right

*7 Binyon Close, Badsey, Evesham, Worcs WR11 5EY.

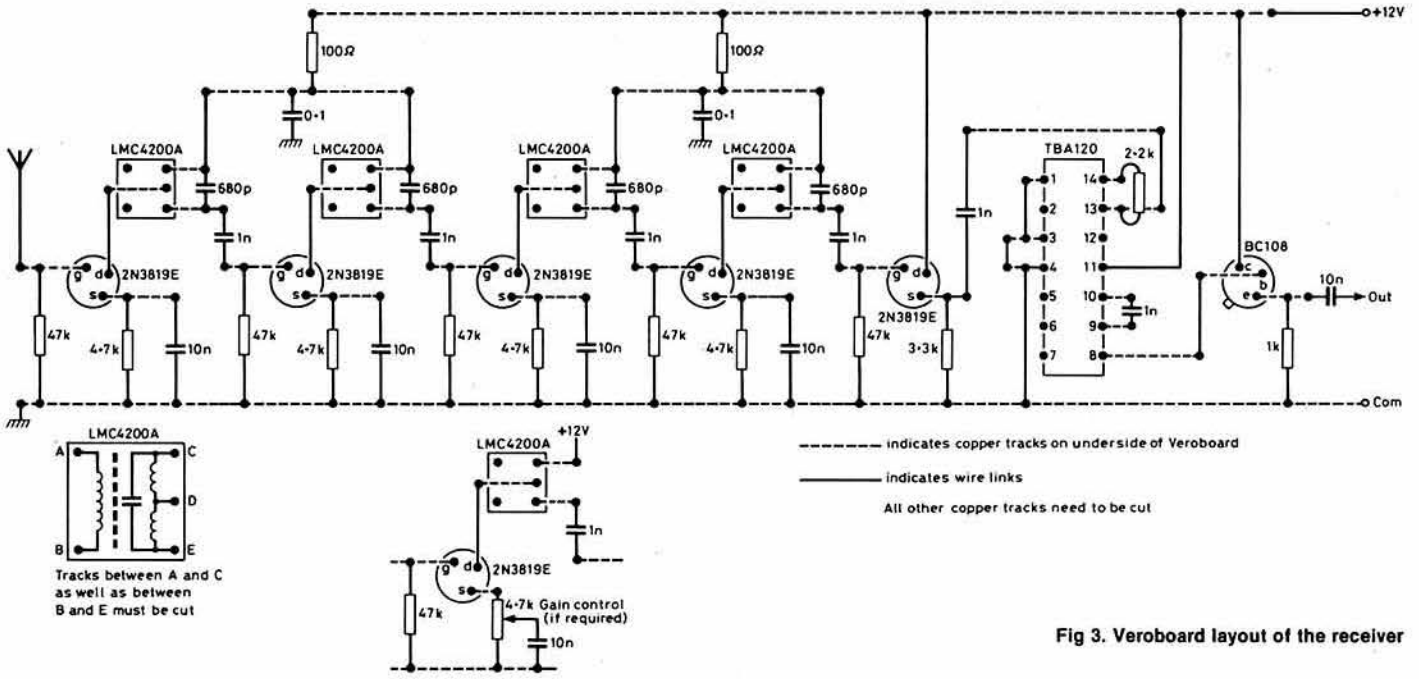


Fig 3. Veroboard layout of the receiver

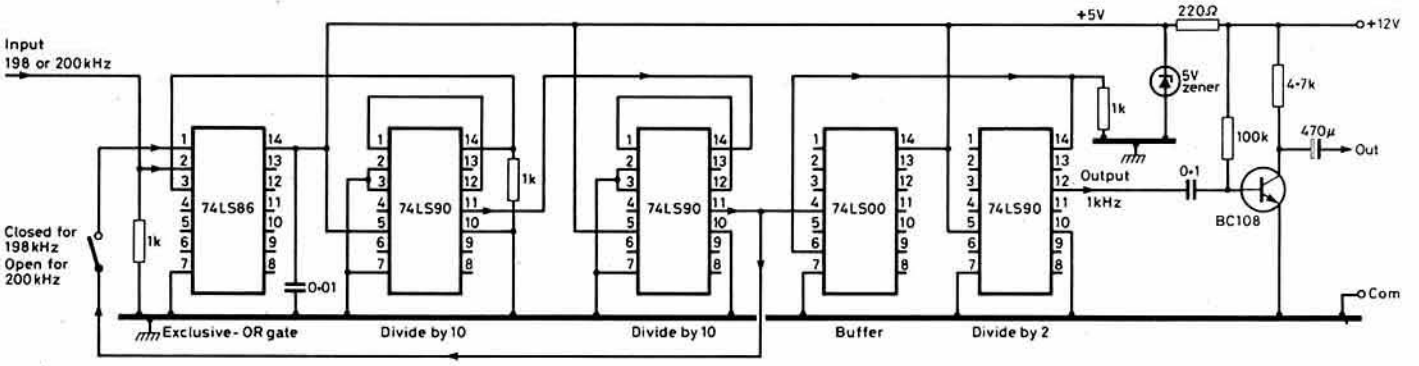


Fig 4. The divide-by 198/200 stage

The receiver

Since my location is only a few miles from Droitwich, only a very simple receiver was needed. A more elaborate receiver is shown in Fig 3. Finding suitable miniature 200kHz coils proved difficult, but the problem was solved by loading-up tuned circuits, designed for 455kHz i.f. use, with external capacitance. For example, the LMC4200A or the LMC4201A have internal tuning capacitors of 150pF. Since the resonant frequency is inversely proportional to the square root of capacitance an extra 630pF is needed for resonance at 200kHz. The adjustable core allowed the use of a 680pF capacitor. The number of rf stages required will, of course, depend upon the location in which the receiver is to be used. As the gain is relatively low, about 10 times in terms of voltage per stage, no serious feedback problems have been found. A stage gain may be made variable by replacing the source resistor by a corresponding preset variable as shown in Fig 3.

As the number of stages is increased, a point will be reached at which limiting takes place. Due to the use of tuned circuits, square waves are not produced, but the gain of the final stages will appear to fall off. Final limiting was provided by the use of a TBA120, and an emitter-follower feeds the divider unit.

A ferrite rod antenna is convenient, with its tuning capacitor mounted on its stand, but a long wire may be considered if the received signal is very weak. If a very sensitive receiver is used it may be necessary to place the antenna at a distance of several feet. The crystal filter was built in the same box as the receiver.

The divider unit

In the case of a 200kHz carrier, the output of the receiver limiter has only to be divided by two to produce a very useful 100kHz square wave that can be used to drive the dfm clock chain. However, with a carrier frequency of 198kHz a very awkward 99kHz is produced. Fortunately there is a comparatively simple circuit that will divide by 99 to produce a much more useful 1kHz; this is shown in Fig 4. The resulting waveforms are shown in Fig 5. On their own, two decade dividers (7490s) will divide by 100, producing one output pulse for every 100 at their input. The circuit of Fig 4 manufactures an extra pulse, so that after 99 signal pulses from Droitwich, the decade output dividers actually receive 100 pulses at their input. Thus there is one output pulse for every 99 signal pulses and division by 99 has been achieved.

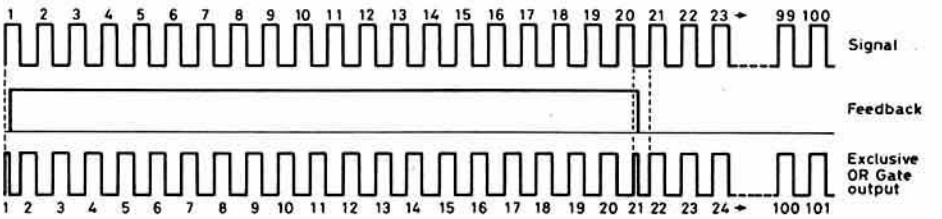


Fig 5. Operation of the divide-by-99 unit

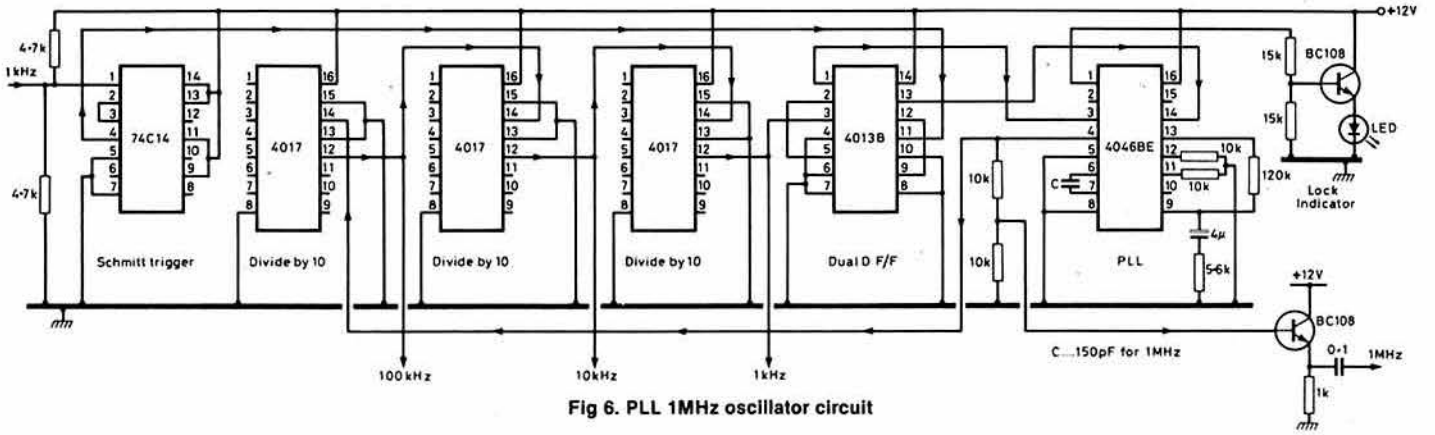


Fig 6. PLL 1MHz oscillator circuit

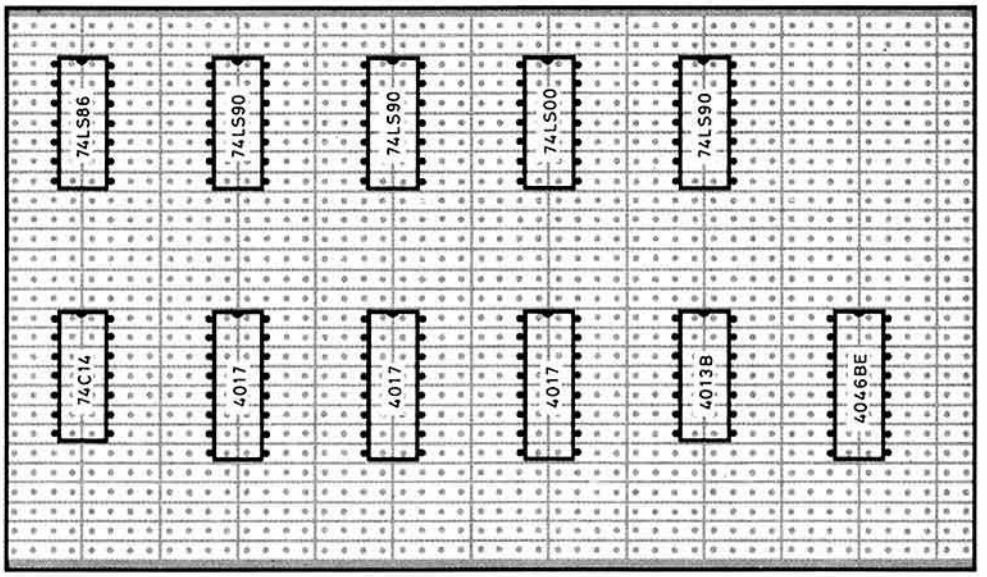


Fig 7. Veroboard layout for the divider and multiplier unit

The "extra" pulse is provided by feeding the decade output pulse back to one input of an exclusive OR gate, while the signal enters through the other input. The OR gate only gives an output when its two inputs are unlike. Since the fed-back output pulse is delayed, compared with the signal pulse, an extra pulse is manufactured by the exclusive OR gate. If the divide by two is placed after the divide by 99, an equal space to mark is restored.

The pll oscillator

The 1kHz output of the divider chain is locked to the Droitwich carrier as described after the 198kHz carrier has been divided by 99 and then by 2. In the case of a 200kHz carrier the feedback link to the exclusive OR gate is switched off. An output of 1kHz is not much use as a dfm clock on its own. It needs to be "multiplied up" to give 1MHz, 100kHz, 10kHz etc. This is done by means of a phase-locked-loop oscillator. The circuit is given in Fig 6.

The 1kHz is fed into a Schmitt trigger (74C14) and then into one half of a dual-D flip-flop (4013). The other half of this receives the feedback signal from the voltage-controlled oscillator via three decade dividers. If the maximum final output is to be 100kHz, two dividers are used and the oscillator frequency made 100kHz by making the value of its capacitor 1·5nF. If the final output is to be 1MHz three decade dividers are needed and the oscillator capacity made 150pF. The dual-D flip-flops also ensure that their outputs have an equal mark-to-space ratio. The fact that they also divide by two does not affect the phase relationships of the outputs, subsequently supplied to the comparator section (4046). A lock indication is provided at pin 1 and is used to operate an l.e.d. The final output, which may be switched, is through an emitter follower.

Construction

The crystal filter was constructed on a piece of Veroboard 2in square. Another piece of Veroboard 2in square was used for the first two rf stages according to the layout shown in Fig 3. No doubt owing to the low stage gain, this proved completely stable. A further two rf stages were constructed in the same way and, when the two pairs were connected together, spaced by 0·5in, the four stages proved stable. It should be noted that input and output were separated by almost 4in. In some locations four stages will not be needed. The method of construction allows building to stop when experiment shows that the gain is sufficient.

The input amplifier, limiter ic and output amplifier were constructed on a piece of Veroboard 2 by 3in, as shown in Fig 3. When the units were completed and tested they were fitted into an aluminium box. Input and output connections were made through coaxial sockets.

A second box housed the divider and pll board. The suggested layout is shown in Fig 7. Care must be taken in mounting the dil holders as some devices are 14-pin and others 16-pin. The divider chain uses 74 devices and operates at 5V and is thus a relatively low-impedance arrangement. The pll chain was made from cmos devices operating at 12V and therefore of relatively high impedance. It was found possible to build both of these on a single piece of dil Veroboard 5·25 by 3in without causing mutual interference.

It might have been less risky for amateur use to use all 74 devices, but there seems to be no 74 equivalent for the 4046. Care must therefore be taken with the cmos devices to avoid damage by static. If the coaxial sockets are lined up during construction, interconnection between the two aluminium boxes can neatly be made by a double-ended male coaxial plug. Such a plug can easily be made by cutting off the flange from the cap of one plug, removing the cap from a second plug and, by means of the deflanged cap, screwing the two bodies back to back and connecting the two centre pins. Small Vero squares carrying the matching and output transistors for the divider and pll chains were mounted on the sides of the aluminium box.

Reference

[1] "How accurate is a dfm?", N. D. N. Belham. *Radio Communication* April 1980.

Technical Topics

by Pat Hawker, G3VA

AN ANCIENT CURSE of the Chinese is: "May you live in interesting times" (a modern one, unfortunately, is 7·0MHz broadcasting!). The curse recognizes that most of us wish only to be left to plod quietly along well-trodden paths without waking up each morning to be confronted with some new crisis of world affairs or emerging technology—ET as some people now call anything with a microprocessor attached. To enjoy facing up to the challenge of new technology may look fine on a job application form, but how much happier we usually are in "uninteresting times"!

THIS MONTH

Forty years on from Normandy
30 miles at night on hf
Snafu, tarfu and fubar
Another look at high-current psus
In-rush protection
Drift and the KW2000E
Masts and towers—more thoughts
The vxo revisited
The vxo synthesizer
End-fed vertical dipoles
Tips and topics

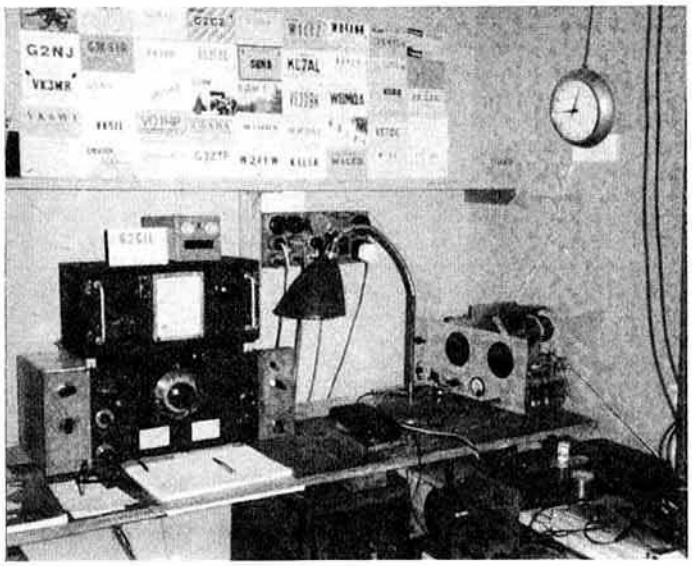
40 years on from Normandy

It is now 40 years since some of us lived through "interesting times" in the *bocage* countryside of Normandy, 1944—though I hasten to add that I spent an entirely unheroic D-Day playing French cricket in an antenna-littered field near Bletchley. As a result of the stormy weather and the usual snafu it was not until D + 50 that I eventually arrived on board an American LST at the remarkable Mulberry harbour at Arromanches. This was partly in support of a secret British/American/French operation called "Sussex" which aimed to put some 50 French two-man teams equipped with QRP radios into positions where they could report enemy troop movements. Pathfinders for "Sussex" had begun to drop into France about D – 50. Incidentally, for those who think it can be tough on NFD—and in humble tribute to those Frenchmen—I must add that one of the operators, who seriously injured his back while landing by parachute, tapped out his colleague's reports lying ill on the floor of a farm outhouse until the inevitable happened and he was dragged outside and summarily shot. A "Sussex" agent was also the first to report the shooting-up of Field Marshal Rommel by low-flying aircraft, though he rather anticipated events by reporting him dead.

As the Duke of Wellington remarked: "There's only one thing as sad as a battle lost, and that's a battle won."

Wartime field communications were seldom an unqualified success. Technically the most important development in time for Normandy was the No 10 microwave radio relay system providing time-multiplexed, pulse-amplitude-modulated speech channels—though such marvels never came my way and it was more a question of morse keys, crystals, 807, 6V6 or even 3S4 power amplifiers, and far from reliable petrol-electric ac and battery-charging dc generators.

But wartime hf communications taught some lasting lessons. What counts in the end is getting the messages through; reliability, not the elegance and technical specification of the equipment. Basic electrical power can be more difficult to come by than the means to generate rf power. A good makeshift antenna is far, far more important than extra watts of rf. It is wise to remember to tune a power amplifier to its fundamental frequency, unless you really intend it to work as a power doubler. Make sure you know whether the "sked" time is in gmt or local time. But above all learn the knack of putting a signal the right distance at the right time, on a frequency that is not way above the muf for the path and skipping over its destination, or right down below the lowest usable high frequency and lost in the mush!



40 years on. Old soldiers need not fade away if kept going with injections of new bits and pieces. A January 1984 photograph of the station of George Hook, G2CIL, features two long lasting items of wartime equipment: a modified HRO (re-valved with EF92s etc) and a vfo/45W rig built around the once-popular TU5B tuning units. George shows he ain't agin modern Ic devices with an SL6600 for fm reception!

30 miles at night on hf

In February *TT* I referred to the unfair criticism of such suitcase transmitter-receivers as the B2 by some historians, who described them as "useless" for distances of 30 to 40 miles in jungle conditions. This brought a number of comments, including one from A. D. Taylor, G8PG, who wrote: "The lamps were swinging a little here while reading the comments from John Brown, G3EUR. 'How can I work 30 miles at night?' will be found engraved on the heart of *every* signals officer, not just the SOE, SAS or SCU variety! Anybody who can crack the problem should make a million." G8PG shares my feeling that it is a pity that historians writing on communications do not take more trouble to obtain technical guidance. Incidentally, a recent hour-plus programme about SOE on Radio 4 had only a single brief mention of their radio activities, and that was simply to say that at first suitable radio transmitters were in very short supply! On the other hand a BBC television team under Brian Johnson, G3LOX, has been spending many months carefully researching the use of clandestine radio by SOE and Special Communications for a forthcoming series of programmes.

Mike Pavely, G3GWD (ex VQ4CW etc), regards the B2 as "a remarkable piece of gear". He adds: "In 1951 I went out to East Africa and took with me a B2 (still in my shack) purchased for £6 without a psu; a power pack was subsequently obtained from Stan Crow, then VQ4SGC. It was my main rig in VQ4 and VQ5 for about eight years. With one 7,010kHz crystal (doubling to 14,020kHz) I worked DXCC in a very short space of time.

"Due to the nature of my work in East Africa I was moving QTH fairly often and living in hotels most of the time. I never used an antenna more sophisticated than a λ/2 14MHz dipole fed with plastic lighting flex, with the feeders strapped on 7MHz to form a T-antenna tuned against ground. A few

contacts were made on a.m. phone using various forms of modulation: clamp, cathode, plate-and-screen.

"Later on I squeezed an 807 into the rig as pa, and operated on 21MHz with 5MHz crystals. The B2 was used many times as an out-station during the East African safari rallies and, going full circle, as a clandestine rig (though not operated by me) during the Congo troubles in 1960.

"Perhaps the single most remarkable QSO using the B2 as both transmitter and receiver was in January 1952 when, as VQ5CW in Uganda, I worked W6DFY on 7MHz cw with the T-antenna.

"When one considers that the receiver has no rf stage, crystal filter etc, it really was a remarkable piece of gear for its time. It still astonishes me to recall its performance, even though helped by a VQ4 or VQ5 callsign." Historians please note!

Snafu, tarfu and fubar

To wind up this D-Day nostalgia it may be worth tracing the origins of the graphic term, snafu, used above. Younger readers may not have readily translated this, in bowdlerised form, as "situation normal, all fouled up." A couple of years ago, C. H. Banthorpe in *Wireless World* suggested that the expression originated among American telephone engineers as one of a series of pithy situation reports when faced with trouble at a switch (telephone exchange to the British). Beyond snafu were two further terms: tarfu or "things are really fouled up" and fubar, meaning "fouled up beyond any repair".

The Services admire and cultivate verbal and written precision. Rod Beavon, G3PPR, has reminded me of that classic Admiralty instruction: "It is necessary for technical reasons that these warheads be stored upside-down; that is with the top at the bottom and the bottom at the top. In order that there may be no doubt . . . the bottom of each warhead (will) immediately be labelled with the word TOP." What could be clearer?

Another look at high-current psus

In the "Marchwood" 30A psu five 2N3055 power transistors are used as the pass transistors, with a sixth 2N3055 as a dc amplifier. With the 0·11Ω current-sharing resistors this represents 6A per device at the full rated output. A recent design reviewed by Fernard Decofour, F6AXD *(Ondre Courtes Informations,* November/December 1983), suggests using six 2N3055 pass transistors for 30A, or four for 20A, representing 5A per device.

On the other hand, in the comprehensive article on 13·8V power supplies, Ted Hatch, G3ISD (*Radio Communication,* July 1983, pp 590-5) proposed the use of the 2N3055 in this application at currents up to about 10A per device. At all these currents, the 2N3055 may appear to be working within acceptable collector current ratings. However in an interesting letter from the Philippines, Earl Hornbostel, DU1AE of Republic Crystal Labs points out the serious shortcomings of the 2N3055 when used at currents of the order of 10A in the arrangements shown by G3ISD. He writes:

"In my own experience of the 2N3055 in the series-pass configuration I would never use this device at more than 4A load current. The reason will be found from careful examination of the data sheets for the 2N3055 showing a rapid drop in gain above 4A and the consequent danger of loss of regulation.

"G3ISD has carefully tabulated the voltage losses in regulated power supplies in order to show the need for the required level of input voltage to the regulator circuit. However he seems to have ignored one important factor, and that is the saturation voltage of the transistor. The worst-case rating of the 2N3055 for a 4A load is 1·1V but at 10A is no less than 8V. Again, at 10A the minimum gain would be five. Clearly a 7812 could not control a worst case 2N3055 as it is incapable of delivering the necessary current. Another point to consider is that with a supply voltage of around 25V and with a load voltage of about 13·5V and a load current of 10A, you would reach the maximum power rating of the device which is 114W and this rating applies only when a very large heatsink is used. This all adds up to an unsafe usage of the 2N3055. Another criticism is that when approaching or exceeding the power rating of the device it may well be operating outside the safe operating area; the intersection of 10A with the dc operation curve in the safe operating chart of the device specifications is at 11·5V.

"Thus with increases in mains voltage or increases in ambient temperature, the transistor could be operating in the danger area. The problem of 'worst-case' transistors cannot be ignored. When 2N3055 devices are purchased at bargain prices, they do, in fact, often tend to be devices near the bottom end of the range permitted by the device specifications, particularly is this true in terms of gain and saturation voltage. When a manufacturer buys a fairly large sample group of 2N3055 devices from a reputable supplier or manufacturer, it is usually found that the minimum or worst-case specifications are well exceeded, ie at 10A the saturation voltage may only be 2V rather than 8V. However, in my experience, which I am sure is representative of other manufacturing firms, even from supplies such as Philips and RCA, a certain number of devices tend to be near the low end, if not very close to it. Such devices are often sorted out by large scale users who find this cheaper than paying the much higher price for premium devices from the 2N3055 family. Often these low-end devices end up as 'bargain' 2N3055 devices bought by radio amateurs.

"There are two kinds of 2N3055, the epitaxial and homotaxial or single diffused. For a voltage regulator, there is not much to choose between these two types but when using the transistor in other applications, the ability of the homotaxial devices to withstand higher values of secondary breakdown should be considered. So far as I know, it is only RCA which offers the choice of 2N3055 in either version. However, the usage of the homotaxial devices must be considered cautiously if switching power supplies are involved, because of their much lower speed. In considering the problems of the series pass transistor, a better choice would be the 2N3771.

"The other constructive criticism I would make of G3ISD's recommendations involves the use of the electronic crowbar circuit in his form of psu. The error here is very common and dozens of articles have appeared over the past ten years, particularly in American amateur radio journals, showing the same arrangement, which I am convinced serves only to give the user a false feeling of safety. The problem is that when a psu of this type is connected to a load that puts several hundred microfarads of capacitance across the output of the psu, the thyristor (scr) stands a good chance of being fused before the protective fuse blows. The instantaneous current available from good quality charged capacitors is surprisingly high. Furthermore, when the scr fires, it also tries to absorb the charged energy from the capacitors across the input side of the regulator through the pass transistors. Whether or not this will prove a destructive amount of current depends on the sensing resistor and the saturation voltage of the pass transistor, but, added to the current provided by the load, it can, and in my experience has, added up to cause scr breakdown. The fusing currents of an scr are usually shown in the data sheets and are time limited, but the time is quite short.

"Fortunately the cure for this problem is very, very simple. It is necessary only to put a resistor in series with the scr, from the load. The resistance should be of such a value as to limit the current through the scr to two or three times its normal rating. With this amount of current, the drop in the scr is about 2V, so that the use of Ohm's Law allows a simple calculation. The value of the series resistor should not be so high that the fuse will not blow quite quickly. If one were to calculate the wattage of the resistor based on the maximum current and voltage across it, the wattage rating would be quite high. The designer might find this awkward when space is at a premium. However there is no need to use a resistor of the correct wattage rating. One of 10 or 20 per cent of the calculated wattage will be sufficient, specially if wirewound, since the fuse will blow long before the resistor fully heats up."

In-rush protection

The use of very large value smoothing capacitors in low-voltage power supply units, and the desire to prolong the life of large power valves have both increased the need for incorporating some form of in-rush protection, to eliminate the very large current surges that can occur when equipment is switched on. A number of techniques have already been described in *TT* and elsewhere in recent years, but two additional techniques have come to my notice recently.

W. H. Sayer, WA6BAN, noted the use of a hand-switched current-limiting resistor in the notes on valve longevity based on the *QST* article by W6SAI (*TT,* November 1983, Fig 1). He suggests that a more sophisticated way of solving both in-rush current and line (mains) voltage variations

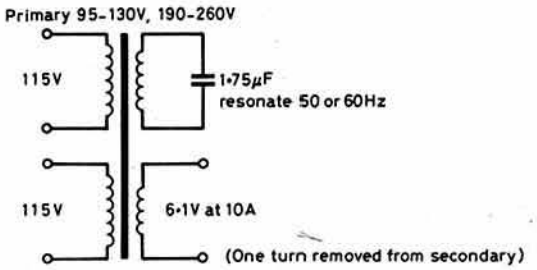


Fig 1. The sola current-limited, constant-voltage transformer as used by WA6BAN for in-rush protection and valve longevity

would be the use of a special type of "sola" current-limiting, constant-voltage transformer, the original patents on the system having now expired. The basic idea is the use of an overcoupled resonant circuit built into the transformer; this means that a sola transformer has to be designed specifically for either 50Hz or 60Hz mains supplies: Fig 1.

WA6BAN provided graphs showing typical performance when such a transformer is used to feed the 6V heater of a high-power 4CX1500B power amplifier. These show the output voltage remaining constant to within about 0·1V rms for line variations of 90 to 130V and 3 to 14A using a 6·3V 10A transformer modified (one turn off secondary) for 6·1V at 10A. Inrush current, he states, is limited to about twice normal operating current. With this type of sola transformer, WA6BAN warns that voltage measurements must be made with an old-fashioned iron-vane voltmeter or a dynamometer (Siemens L35SO4) or a new true-rms meter since the waveform is not always a true sinewave for some input voltages.

I have never come across this idea before and am uncertain whether sola-type transformers have ever been marketed in the UK, or whether it would be possible to incorporate a suitable resonate circuit in a home-built unit.

On the other hand, Rhopoint Ltd in the UK market a range of "Surge-Garde" heavy current thermistors with a high negative temperature coefficient specifically to overcome heavy inrush currents into switched-mode power supply units, electric motors etc. These are simple two-wire devices that can be connected in the mains input circuit without incurring the power-wastage of conventional current-limiting resistors where these are not switched out of circuit after the initial surge period. Initial resistance of, for example, the Surge-Garde SG250 is about 120Ω, decreasing to 0·9Ω at its maximum steady-state current rating of 3A. Other devices in this range cover steady-state currents of from 0·3A to 30A.

Since these Surge-Garde devices are self-heating there remains a problem common to all thermistor-type protection devices. On switching a unit off they require a cool-down period (of about one minute) before they will again protect against a switch-on surge. This can be a handicap for the absent-minded operator who switches a unit off and then suddenly remembers he has not quite finished.

Drift and the KW2000E

W. M. Frost, G3OHE, in reporting how he has reduced frequency drift on his KW2000E highlights the difficulty of obtaining as stable an output voltage from a simple zener diode arrangement as from the classic gas-filled voltage regulator tube, due mainly to the much greater effect of temperature on the semiconductor device. He writes:

"Much has been written about frequency drift of the KW2000E transceiver compared with the earlier KW2000 models and with current equipments. Few have attempted to show how this can be overcome. The 2000E has a vfo with stabilized ht and heater supplies and it would seem that many users are uncertain what more could be done:

(1) 150V zener diode (D10): Measure the output voltage of the diode immediately at switch-on and thereafter at 10min intervals. You are likely to find the voltage increasing by about 3V as the chassis of the rig (used as the diode heatsink) warms up. Similarly a variac test will show that the zener tends to fail to iron out changes in mains voltage. The effect can be readily checked on the beat note from the crystal calibrator. Substitution of a neon stabilizer, type OA2, mounted on a small sub-chassis immediately alongside the ECL82, will remove both these deficiencies.

(2) C109 - 300pF silvered mica capacitor: The transmitted frequency normally drifts hf as the vfo drifts lf. The lf drift of the vfo when warming up is what would be expected from the use of an sm capacitor in the vfo. C109 is readily accessible at the top of the vfo compartment. At G3OHE this component has been replaced by 100pF tubular ceramic and 200pF sm capacitors in parallel. The opposing temperature coefficients of these components balance out so well that total drift from cold is within 1kHz and the frequency then remains within a few hertz over long periods. This particular mix may not prove optimum in all cases and with some trial and error an even better result could probably be achieved. G3OHE acknowledges that this second modification stemmed from Reg Gordon, G3UHJ.

Masts and towers—more thoughts

The March *TT* drew attention to BS6330:1983, the recently published British Standard code of practice for the reception of sound and television broadcasting, containing some useful advice on masts, wall and chimney mountings, safety etc. John Holmes, G4LRS, adds some further thoughts on the use and guying of aluminium poles. He uses several such poles, clamped together, to raise a 15-element array 48ft above ground—originally he aimed for 52ft but after encountering problems settled for 4ft less. His mast is checked regularly for safety and he has taken the precaution of obtaining third-party insurance cover.

He believes there is a tendency among radio amateurs to over-tighten their guy lines on such masts; in particular he points to the danger of a metallic guy snapping and then reacting like a whip lash. He much prefers to use a non-metallic polyprop-type of nylon-strengthened washing line which, he considers, can withstand all the strain necessary for pre-set (self-releasing) turnbuckles. A certain amount of sway at the top of a mast is preferable to overtight guys; it is when there is virtually no movement even in an 80mph gale that one needs to start worrying, G4LRS feels.

It will be appreciated that BS6330:1983 is not really intended to cover very high masts or towers, as these should not be required for service-area reception of broadcast signals: coverage areas of uhf television stations are based on the use of antennas at a height of 10m, much of which is normally provided by the building.

In "Aiming high safely" *(Practical Wireless,* June 1983, pp22–4) Rob Mannion, G3XFD, describes some low-cost creosoted wooden masts and bases suitable for use as antenna supports up to about 7·5m for a total cost of around £8. For the more ambitious he writes: "Telegraph poles are one of the biggest gifts to radio amateurs, when you can get hold of them . . . Not many people realise that British Telecom will sell you a pole and deliver it to you for a modest charge . . . the snag is you have to wait until some poles are being taken down in your area . . . a telegraph pole forms an ideal foundation for a fold-over mast consisting of one telegraph pole, one or two alloy scaffold poles (costing around £25 for a 6m length), some metalwork and whatever you intend to put on top". He provides constructional notes for such an antenna support costing around £45.

The vxo revisited

The effect of external reactance, in the form of load capacitance, on the precise frequency of a crystal oscillator was highlighted in the January *TT*. While this is often an unwanted feature of crystals for designers, and manufacturers, in practice the operational advantages vastly outweigh the disadvantages. It provides the means of accurately trimming the oscillator frequency, both at installation and after ageing; it enables us to put together ssb bandpass filters from a handful of crystals of nominally the same frequency: and it also makes possible the variable-frequency crystal oscillator (vxo) with its useful, if limited, tuning range. Most crystals can be pulled about 0·1 per cent from nominal (ie 7kHz for a 7MHz crystal, etc) while retaining a clean output, and sometimes appreciably more with stability equivalent to a good free-running vfo.

Some crystals are much easier to pull effectively than others. Much of the early work carried out almost 40 years ago was based on X-cut quartz plates; a modern plated AT-cut crystal (eg HC6U), however, tends to have considerably higher Q than, for example, FT243-type air-gap crystals, and so retains better "keying" characteristics while being pulled (this is important not only for cw but also when an oscillator is switched on and off).

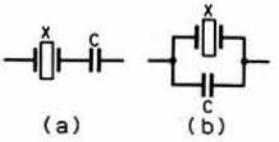


Fig 2. (a) A series capacitor tends to raise the frequency of oscillation of a crystal. (b) A parallel capacitance tends to lower it

Using a variable capacitor alone, a typical AT-cut hf crystal can be pulled rather more than 0·05 per cent off its fundamental frequency when its load capacitance is varied between, say, 10 and 100pF. This is shown in Table 1 of the January notes, which indicates for a typical HC6U 4MHz crystal a variation from +1,420Hz at 10pF to −1,038Hz at 100pF. A good quality capacitor will result in virtually no degradation of stability, but if carried to extremes (ie too small a series or too large a parallel capacitance) may reduce the drive level to the point where oscillation becomes uncertain. As indicated in Fig 2 a series capacitor tends to increase frequency; a parallel capacitor to decrease it. Series and parallel inductances have the opposite effect. For a 75pF variable series capacitance with a crystal designed for a 30pF load the crystal should have a frequency at roughly the centre of the desired tuning range.

Greater pulling ranges can be achieved using a combination of inductance and capacitance, for example as shown in Fig 3. In such arrangements it is important that the inductor L should be of the highest possible Q, mechanically stable and with a reasonably low temperature coefficient.

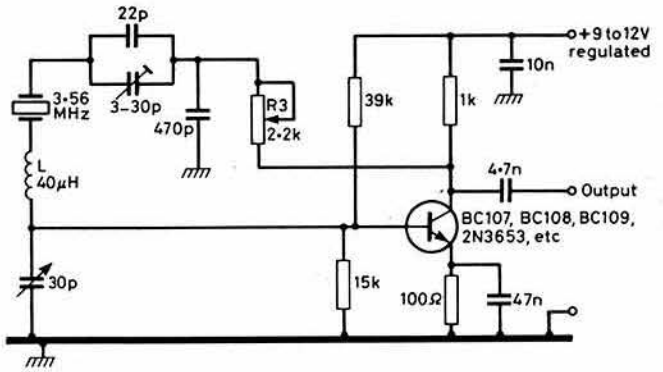


Fig 3. Typical 3·5MHz vxo with inductive and capacitative loading, providing a tuning range of some 3·5kHz, though with some crystals a greater pulling range is possible without significantly degrading the output signal. (F3IM in *Ondes Courtes Informations*, November/December 1983)

With some crystals, careful adjustment of R3 and the 3–30pF trimmer may be necessary to achieve a reasonable pulling range while maintaining a near-to crystal signal. Despite the extra care required with an LC vxo, such an arrangement offers some useful operational advantages over a free-running vfo for applications such as portable or mobile operation, as the operator is more confident of retaining calibration etc.

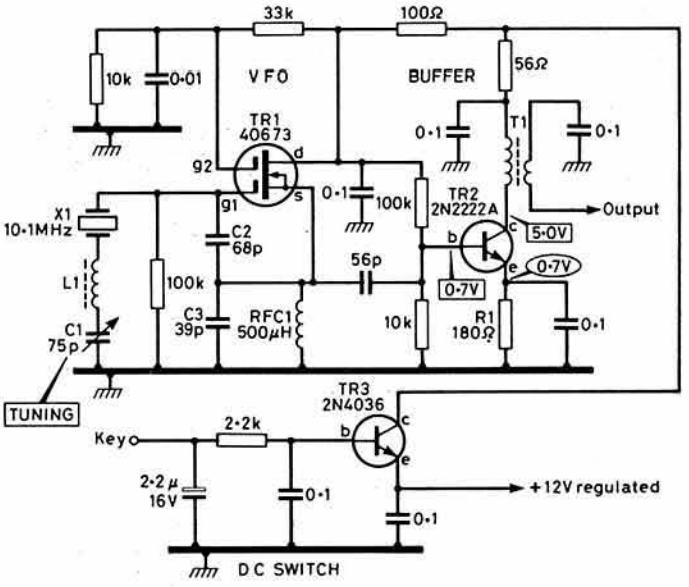


Fig 4. The vxo section of W1FB's low-power 10·1MHz cw transmitter. L1 12μH, 50 turns No28 enam on T50-2 toroid core. T1 broadband transformer primary 12t No 26 on FT50-43 ferrite toroid, secondary 6t. Crystal AT-cut HC6U holder for centre of 10kHz range (30pF load capacitance) 12V regulated supply from LM340-T12 ic regulator

It should perhaps be stressed that the desirable characteristics of a crystal for a vxo are not the same as those sought for crystals used in frequency standards etc, as brought out in the April *TT* by G8XLE.

A QRP vxo cw rig for 10·1MHz was described by Doug De Maw, W1FB, in *QST* November 1983. Fig 4 shows the vxo and buffer stages (the power amplifier for 1–2W output is a VN67AF vmos power-fet using a 24V psu). This vxo is stated to provide about 10kHz swing with an AT-cut plated crystal (HC6U), although W1FB warns against the use of surplus FT243 types as they can prove sluggish and difficult to pull effectively.

A vxo synthesizer

TT has often had some harsh words to say about the growing belief that every hf or vhf transceiver should contain one or more digital pll/vco type frequency synthesizers. The convenience is often offset by the problems of reciprocal mixing etc which arise from the appreciable jitter or fm phase-noise. Professional synthesizers, when designed to minimize this problem and provide rf signals of high spectrum purity, tend to be prohibitively expensive.

But it is worth remembering that the earliest form of frequency synthesis, widely used at one time in advanced professional equipment, was based entirely on mixing techniques in conjunction with stable low-noise oscillators. I recall some lively debates around 1963 between engineers of the Marconi Company, who then used mixer-type synthesizers, and those of Racal, who already favoured the pll/vco approach. The later development of dividers and phase-lock loops in integrated form made the pll/vco approach much the less expensive, though not necessarily providing better performance.

Frank Noble, W3MT, in *Ham Radio* February 1984, describes a most interesting mixer-synthesizer covering 5·0–6·0MHz continuously, based on a 100kHz vxo in which the crystal needs to be pulled only 200Hz—this is done with a 250pF series-connected variable capacitor. He claims that his synthesizer, using harmonic selection, is significantly quieter than pll-type digital synthesizers, yet provides equivalent stability. His prototype design is based on about nine discrete transistors and five ic devices, but also requires two SRA-1 double-balanced mixers and two Kenwood (Trio) YK-88S (8830kHz) ssb filters. It is unlikely that his design will be widely copied, but his ideas are well worth considering by anyone wishing to try his hand at building a high-performance synthesizer. In brief, W3MT generates a "comb" of vxo harmonics, multiplying up from his vxo frequency after this has been divided down by 10, creating short pulses with a pulse repetition rate variable from 10·00 to 10·02kHz. After multiplication by 500 his comb of pulses is in the 5MHz band, spaced roughly 10kHz apart. These pulses are changed in frequency to 8·8MHz where the filters select one signal while rejecting all the others. The signal is then re-mixed down to 5MHz using as oscillator a 13·83–14·83MHz vfo. This double-mixing technique is, in effect, a drift-cancellation circuit so that the stability of the 14MHz vfo in no way affects the final output stability (similar to the well-known triple-mix system of the old RA17). Fig 5 provides a basic outline of the system, but for full circuit details the original W3MT article needs to be consulted.

End-fed vertical dipoles

In the December 1983 *TT* (p1085) I was rash enough to suggest that the intermittent debate in *TT* from November 1981 onwards concerning the impedance and vertical radiation patterns of grounded monopoles and groundplane antennas had come to an "acceptable conclusion" in printing some comments by G6CJ.

What a hope! Several readers, among them acknowledged experts on antenna theory, strongly disagree. They feel there are still misconceptions and fallacies that need to be cleared up. G6CJ himself appreciated that his earlier brief note may have been misinterpreted to imply that it is only with elevated radials that the lower part of the field is dragged in towards the "ground" element, whereas in fact the same situation applies to the earthed

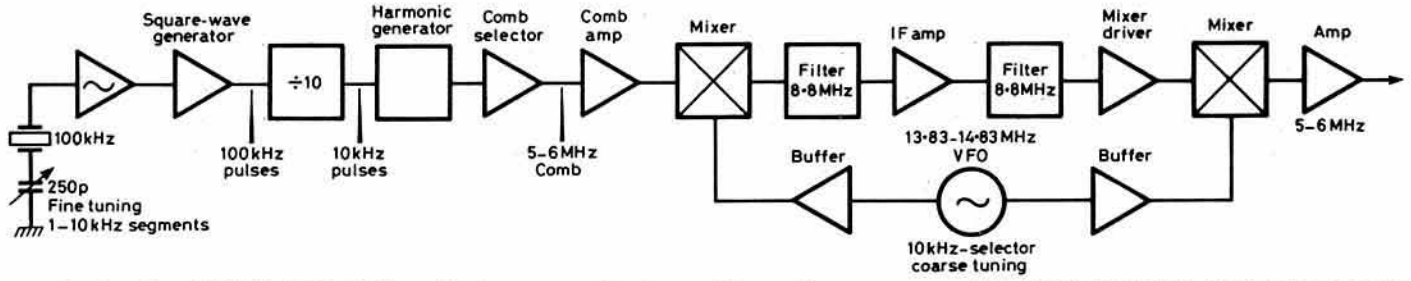


Fig 5. Basic outline of W3MT's 5·0 to 6·0 low-noise frequency synthesizer providing continuous coverage without incremental steps. All signals are derived from a 100kHz vxo that covers 100·0 to 100·2kHz. The 14MHz vfo has no effect on stability because of the double-mixing drift-cancellation arrangement, but two ssb filters are needed to select just one of a 1MHz comb of frequencies spaced 10kHz apart

Table 1. Summary of end-fed antenna parameters

Antenna	Height (h/λ)	Gain ref Half-wave dipole	Impedance (ohms)
Quarter-wave monopole	0·23	−1·55	36
Quarter-wave extended	0·25	−1·55	50 + j50
Half-wave	0·45	1·67	900
Five-eighths-wave	0·6	3·02	108 − j280
Half-wave with centre λ/2 above ground plane	—	3·26	—
Two end-on half-waves in phase	—	4·67	—

A rubber flexible antenna has gain of about −6dBd (even less if inside vehicle) *(VE2CV)*

monopole with a finite groundplane, so that over a real earth it also sends its strongest radiation at an upward angle and not in the horizontal direction shown in many textbooks in relation to "perfect" earth, a subject that has arisen before in *TT*.

G6CJ has contributed some further notes on this subject but, for the moment, I am holding these over while checking to what extent they overlap with the other comments that have come in.

Among the correspondents is Dr John S. Belrose, VE2CV, well known for his conference papers and articles on antennas on both sides of the Atlantic. He finds some of the comments "provocative, misleading or wrong". He has sent along a mass of detailed notes and reference material that I hope can be published in due course as a full-length article. But a few notes, here and now, will serve to introduce his belief in the value of the end-fed vertical λ/2 dipole as a preferred alternative to λ/4 radiators, particularly where effective earthing or a groundplane of radials is not available.

He writes: "In the professional literature a clear understanding has been reached about the upward tilting of the beam for monopole antennas on finite flat groundplanes, and the corresponding loss of field on the horizon; theory has been validated by experiment. It is also important to point out that the input impedance at the end of a λ/2 dipole is very much lower than the 14,000Ω suggested by G6CJ. In fact for a typical 144MHz rod antenna this impedance can be as low as 500Ω; 1,000Ω is typical for a 144MHz whip; and even for thin-wire hf antennas typically 2,000 to 4,000Ω. Table 1. An end-fed λ/2 is a very efficient radiator. It can be readily matched at vhf or hf: Fig 6."

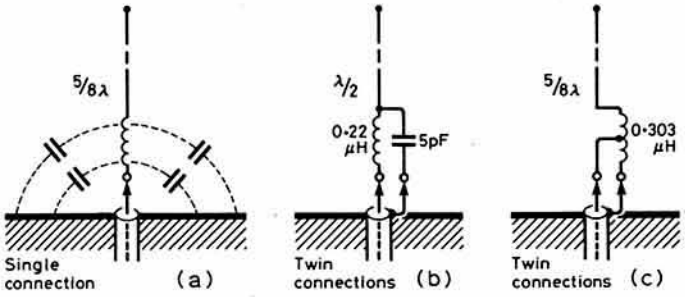


Fig 6. Methods of matching into the base of λ2 and 5λ/8 144MHz whip antennas

In his notes he describes the significant advantages of λ/2 verticals, adding: "End-fed λ/2 dipoles are available for mobile or handheld portable use. An L-section match is employed and, while the antenna is not so well decoupled from the feeder as for a coaxial dipole, nevertheless the antenna outperforms other antennas (such as a λ/4) when no groundplane or radial

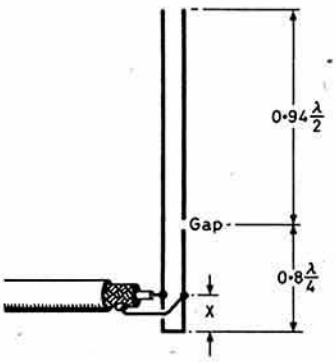


Fig 7. A roll-up J-antenna formed from 300Ω transmission line. The impedance matching distance X is best found by experiments but is about 0·0134λ from the shorted end. VE2CV used a 3·5MHz version of this antenna during experiments on kite and balloon supported antennas as described in *QST* March 1981

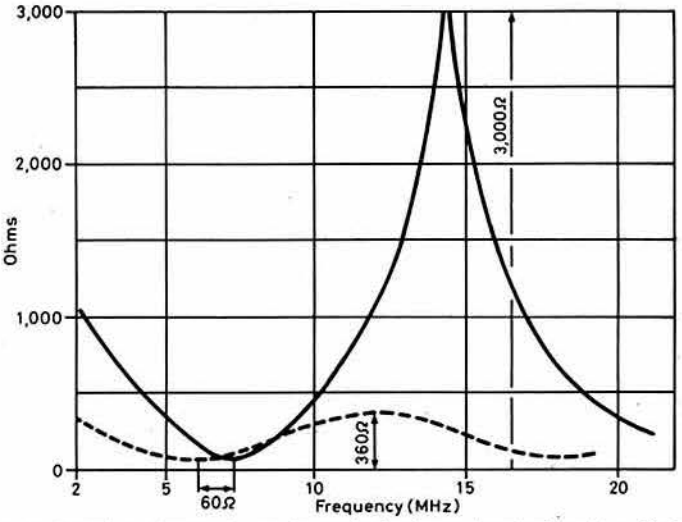


Fig 8. Base impedance of a 10m-long single wire and a 10m long "cage" of six wires with 1m diameter showing the lower and more constant impedance with the "fatter" element. From Dick Keen's *Wireless Direction Finding*, a classic text book of the 'thirties and 'forties. Vertical cages were used as the "sense" antenna in some df stations

rods are used. For example, λ/2 will provide an "effective gain" of 5dB or more for a transceiver held in the hand of a man. A number of commercial models are available . . . . . including a Larsen base-loaded steel flexible radiating element; this can be rolled up for easy carrying and hung from a tree branch, a hook in the hotel room etc. A roll-up and put in your pocket ribbon J-antenna (Fig 7) can also be easily constructed for portable operation."

The topic of base impedance of long elements is also raised in a note from G. E. Cripps, G3DWW, although this was not intended specifically to deal with the groundplane controversy, but shows well the effect of "fat" elements on impedance. He writes:

"In the course of re-reading *Wireless Direction Finding* by Richard Keen, (4th edn, p274) I found an interesting graph of the base impedance of a 10m high, 1m diameter, six-wire "cage" antenna, of the type used as a sense antenna in some df stations of that period: Fig 8. This showed that over the 2–20MHz range the base impedance was between 60 and 360Ω with only a very gradual variation over the entire range. This compares with a variation over the same frequency range for a single wire given as 60–3,000Ω, and could form a relatively easily matched transmitting antenna. The resonant length is also seen to be significantly decreased with the cage, the 10m wire antenna showing λ/4 resonance at 7·3MHz compared with the 10m cage at 6MHz due to the increased value of the phase constant."

Tips and topics

W6SAI has drawn attention (*Ham Radio*, February 1984) to experiments by G. J. McDonald, VK2ZAB, which suggested that an improved front-to-back ratio of stacked Yagi antennas can be obtained by staggering the two arrays by a quarter-wave and adding an extra quarter-wave to the phasing

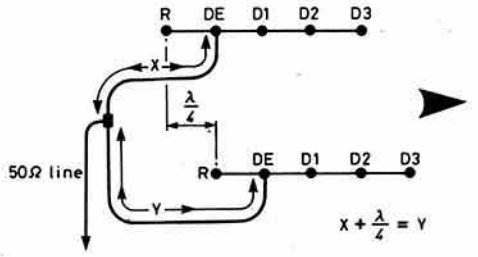


Fig 9. A staggered VK2ZAB stacked antenna array providing improved front-to-back ratio. The lower Yagi is advanced by a quarter-wave in front of the upper array and an extra quarter-wave (electrical) is added to the phasing line

line, Fig 9. In his experiments, VK2ZAB increased the measured 12·5dB fb ratio to 24dB with the staggered arrays. He also found that the staggered arrays had slightly more forward gain (about 0·25dB) and the sidelobes were reduced to some extent. □

4-2-70

*by Ken Willis, G8VR**

AFTER A VERY FLAT PERIOD lasting several weeks, vhf/uhf propagation improved somewhat from Easter to the beginning of May as a very stable weather pattern settled over the British Isles and much of Europe with high daytime temperatures and record sunshine in many places. However, the "lifts" were not exceptional, though on one or two occasions stations in the south worked into northern squares such as ZR, YR and XR on 144MHz ssb with good reports exchanged both ways. G4KXV (Bexleyheath) who was previously G6CPN, broke his duck by working his first GM on 2m—in ZR square! Many old-timers have toiled for months or years for this one, though activity throughout the British Isles is now such that few squares are not represented these days. Seventy centimetres has been very good on occasions too, and there are many signs of stations migrating to this band from 2m to escape the QRM which at times makes weak-signal operation well-nigh impossible in the more heavily populated centres.

There has also been some unexpected auroral activity too, with the sun displaying unusual ferocity and as this is being penned, results are awaited from a massive solar flare which occurred on 26 April, lasting 410min. See "Aurora" for details.

We are into June, so it may be relevant to remind newcomers to vhf that the 2m sporadic-E season will be well and truly under way by the time this is read. The only way to use this mode is to be *where* the action is *when* it happens, and be prepared to move fast if you want to work that LZ, YO, SV or UC2, not to mention all those mouth-watering prefixes along the Mediterranean coastline. As my old petty officer in the Navy would say, "Don't say you haven't been told!" (See *4-2-70* in earlier issues for further information.)

The IARU Region 1 Conference

The conference held in Cefalu, Sicily, by IARU Region 1 representatives came up with several resolutions based on proposals submitted by member societies. Most of these will be reported elsewhere, but it will be of particular interest to vhf operators to learn that the proposed new QTH locator scheme ("Maidenhead") mentioned in *4-2-70* April 1984, and elsewhere, is to be adopted by Region 1 as from 1 January 1985. This means that all European operators will be expected to use their new locator, known as "UL" (Universal Locator).

The conference also took a number of decisions affecting repeater channels. Two metre channels R8 and R9 are to be deleted permanently from the band plan. Should extra channels be needed, the "X" channels (12·5kHz between existing channels) were recommended. There was continued controversy at the conference over the UK non-standard uhf repeater channel allocations, and the RSGB has been requested to host a meeting between repeater managers from Denmark, Holland, Belgium and the UK in an attempt to resolve the problems of interference between the UK "RB" channels and the IARU "RU" channels.

Repeater news

Andy Clark, G8TJQ, who is secretary of the Sussex Repeater Group, sent in a copy of the group's first newsletter for 1984, plus details of their current constitution as ratified at a recent agm. For newly-licensed members, the newsletter lists the repeaters operated by the group—GB3BP, GB3BR, GB3CP, GB3HO, GB3NX, GB3SR and GB3WX. Just keeping all these installations operational represents a major task, so the group has implemented a system whereby each repeater site is the overall responsibility of a single site "co-ordinator" who manages the day-to-day running of the units, calling on specialist knowledge and expertise within the group as required. For information relating to any of the repeaters operated by the group, the site co-ordinator should be contacted. These are G4HSY (GB3SR), G8GEZ (GB3BR/GB3WX), G4EFO (GB3BP/GB3HO), G4EUG (GB3NX) and G3GRO (GB3CP).

GB3BP (R6) is located near Horsham and covers an area from Reigate in the north to the South Downs, and from Haslemere to Heathfield. Access is by normal toneburst plus 3s of speech, to be acknowledged by a "K". Re-access is without toneburst after the "K" for a maximum talkthrough period of 90s before timeout. A callsign change for this repeater is proposed for 1984 (to be GB3WS)—the paperwork has already been submitted to RMG.

GB3SR (R3) is now settled at a new site in Worthing following a move from Brighton. The access and re-access requirements are the same as for GB3BP. Coverage is good along the coastal strip from Seaford to Chichester. In 1984 a channel change is planned (to R7), and documentation is currently with the licensing authority.

GB3BR (RB6) is the group's original repeater station, located on Race Hill, Brighton. It provides good coverage along the coastal strip between Seaford and Arundel. Access is by toneburst, acknowledged by a "K", and re-access without toneburst after a "K" for an unlimited talkthrough period, though a 5min timeout is to be fitted soon.

GB3NX (RB2) is located near East Grinstead, and has recently been the subject of major antenna changes to improve its coverage area. Further changes involving the installation of a Pye 460T are in hand, plus new logic, including a 5min timeout. Currently, access is by toneburst with a "K" acknowledgement, re-access by carrier only.

The group's other two repeaters are on RM3 (GB3CP) and RM9 (GB3WX). The latter operates as a beacon as well as a repeater from Race Hill, Brighton, and also provides weather telemetry data at frequent intervals using 45·5 baud rtty. It is planned to add 300 baud ACSII CCITT standard in the latter part of 1984. The group has some 200 or so members, but further contributions or membership applications would be much appreciated by the secretary, G8TJQ, QTHR, so that this fine array of units can be kept on the air and continue the excellent service provided.

The Leicestershire Repeater Group, so Jack Hum tells me, is the oldest in the country. Plans for 1984 include replacing the existing 432 and 144MHz repeater units with modules containing dual transceivers, and an automatic change-over complex, which will bring the spare into service in the event of breakdown. The group also operates microwave beacons on its 700ft asl site north-west of Leicester. Membership of this group is offered at the modest price of £5 per annum. Membership approaches the 200 mark, and regular meetings are held at various venues within the county. Another attraction of the club is the receipt by members of the quarterly magazine, *Lens,* which from first-hand experience I can recommend as a readable and useful publication, very well presented. Applications for membership should go to G4MGG, 565 Uppingham Road, Leicester.

As announced in RSGB newscast, GB3BI (R5), the Inverness repeater, was due to come on the air on 7 April. No news had been received at the time of going to press on how these plans fared, but reports, especially from mobile stations, would be welcomed by Brian Robertson, GM4OIJ, QTHR.

The Bristol Channel Repeater Group, GB3BC, celebrates its tenth anniversary on 11 June this year. The current committee would like to bring this to the attention of all those interested in repeaters, and to thank the founder members and all involved since its inception for their efforts in keeping this distinctive repeater operational. GB3BC was the second repeater to be licensed in the UK. Users are reminded that 5s of acceptable audio, in addition to the normal toneburst, are required to latch the repeater. The familiar 'ding dong' indicates that the repeater is closing down and that the tone and audio are now required to re-access. For membership details please see Region 10 in "Club News".

G8CYZ (Crowborough) comments on the decision by the RMG not to close down GB3SL (*4-2-70* March 1984). Having spent some time monitoring its output, he feels that this repeater offers very little to the genuine radio amateur because of the general abuse, obscenities, music etc "broadcast" over the channel, much of it from unlicensed operation. There will be many who share this view; those who have spent so much time, effort and money in making this repeater possible must feel a sense of desperation that this state of affairs continues.

Some late news from the RMG confirms that GB3DA (Danbury, Essex) on R5 is back on the air after overhaul, while GB3RD (Reading) on R3 is now running 20W erp. The East London 2m repeater GB3EL is to be

*11 Old Downs, Hartley, Kent DA3 7AA.

resurrected by a new group; the RMG expecting to receive the paperwork associated with a new site in the East End of London. The 70cm Fife repeater GB3FE has been "temporarily" off the air for some time, so there is a view that it will not reappear unless someone who is willing to take on the repeater licence approaches the RMG. Statistics put out by the RMG at the NEC Convention were: repeaters operational (number actually *licensed* in brackets) 2m, 63 (67); 70cm, 105 (123).

The RMG hopes soon to publish black and white maps of repeater coverage for both vhf and uhf repeaters. A re-issue every two years is contemplated as funds permit.

Aurora

In August and December 1982, Charlie Newton, G2FKZ, the IARU auroral co-ordinator, gave his opinion in *4-2-70* on the probability of auroras occurring in the future now that we are on the downward slope of Solar Cycle 21. He followed this up by providing a graphical representation (*4-2-70* November 1983) of the probability of auroras month by month, and gave March as 73 per cent and April as 80 per cent. He went on to say that 1984 should produce about 10 auroras, one half of them possibly reaching an index of 50, which would mean they would be useful for amateurs in quite southerly latitudes. Recent events indicate that he was not far off the mark in these predictions; if anything he was a little conservative. *4-2-70* has carried reports from readers of no fewer than 18 auroras between 1 January and 7 March 1984, not all of them audible outside the northern parts of the country, though some of them have provided useful dx contacts right down into France, Holland and Belgium.

Now, as this report is being prepared (30 April) sun noise on the 2m band exceeds S6, having dropped to this level from 9-plus over the weekend 28/29 April (during NEC!) as a result of the major solar disturbance on 26 April already mentioned. This event produced a peak solar flux at 245MHz of 220,000 flux units, an enormous figure. An X-ray burst from the sun during the same event was in the category of X13, which is the highest ever recorded. This, coupled with a very high polar-cap absorption, caused NASA to remove their "Solar Max" satellite from normal service in order to use it to obtain some up-to-date solar data. The hf bands predictably took a beating, but seemed to have recovered well by the 28/29 April though sun noise remained very high.

Meanwhile amateurs all over Europe waited to see if a really massive auroral event with all its dx potential is going to burst upon us soon, and it is the vhf columnist's dread that it will do so immediately after the final copy date. Not that we lack auroral data for the past month, however. The last event recorded in *4-2-70* took place on 7 March. Reporting from Aberdeenshire for the first time, Graham Sangster, GM4OBD, who uses a home-brew 11-over-11 slot-fed beam, left it pointing NE from late afternoon each day until late evening, starting in mid-February. His FT480R was left scanning through 144·910, 144·960, 144·965 and 144·050MHz. Graham was very surprised at what this systematic approach told him, as opposed to randomly tuning the band. He found auroral events to be very much more frequent than his past experience would have suggested, so he started to compile a 27-day chart which enabled him to predict with considerable accuracy when events would occur. Remember, of course, he is closer to the action than the bulk of UK amateurs, and so will be able to hear auroral signals which would not penetrate to the south. Nevertheless the frequency of auroral events is really surprising. He says he has only mentioned the "better" ones, so by implication there were even more than his list suggests. The events he recorded and the prefixes and squares he heard or worked were:

12 Feb	SM, LA, OY, GM	in HU, EU, FU, WV, YR, YP
13 Feb	PA, G (G3LTF)	in CM, AL, ZM
8 Mar	OY, SM, GM, G	in WV, IT, YR, YP
10 Mar	GM	in YR (Elgin)
11 Mar	SM	?
17 Mar	LA	in CU
25 Mar	GM, LA, OZ, G, D, PA	in XR, FT, FR, AL, YN, FN, CM
31 Mar	GM	in ZT
1 Apr	GM	in YR, YP
4 Apr	OH2MQ	Heard but not worked
4 Apr	G, OZ, PA, Y22	in YN, AM, AL, FR, CK, DM, FM
5 Apr	G, D, PA, LA, GM, SM	in AL, DK, FO, CM, CL, FT, EW, XR, HU
5 Apr	Y21TCK in QSO with RR2TBH both stations Q5 but not worked	

Graham is now considering monitoring 4m, which would certainly evoke a good deal of interest among users of that band. Fifty megahertz might be even better, providing more support for an auroral indicator at this frequency. On four out of the 11 days on which Graham recorded auroral activity in the late afternoon/evening period, signals penetrated at least down to AL square.

Writing from Bourne, Lincs, David, G4DHF, reports an unusual auroral contact on 9 April with LA1K. He first noticed auroral signals around 0015gmt when listening "off the moon". SM4IVE was heard at 58A when Dave was beaming to the north west (285°). There was little or no other activity at the time. At 0135, Dave turned the beam north and heard GB3LER at 53A. He moved to the cw calling channel and a "CQ" call immediately raised LA1K (FX42c). This is very north indeed for an auroral contact, and outside the normal "boundary fence" for G4DHF's location (see the *VHF/UHF Manual* for a description of this term). Later G4KUX and G3UTS both contacted LA1K, but the path was within their own "boundary fences", being that much further to the north than G4DHF. G2FKZ says that the number of contacts made outside boundary fences of the stations concerned are no more than a handful in every 10,000 contacts made via aurora. In that same event, G4DHF continued until the aurora faded at 0200gmt with him, and worked SM, OZ, G, GI, GM and UQ2AO (MQ) as well as LA1K.

To fill in some further gaps in 27-day charts, GM3XOQ in Shetland reports having heard or operated auroras on 4 and 26 February, and 7, 8 and 18 March. Only that on 4 February was at all intense at his location.

There were other events known to have reached the south between 9 and 24 April, but no reports have so far come in. If they do so later, they will be included to complete the overall picture. However, presumably as a result of the solar eruption on 26 April, there were quite good auroras on the late afternoon of 25 April with GM, GI, GW and SM stations being worked both on cw and ssb in the south, with a second phase occurring betweeen 0030 and 0215gmt, with a very good signal from LA6VBA (ES) providing much excitement in the south. The following afternoon/evening another event reached the south (26 April), being mainly of the "Scottish type" as far as southern operators were concerned. GW3LDH heard the 6m beacon GB3SIX go auroral *after* the main event on 25 April. To those of us who thought auroras were gone for years, all the activity reported comes like a breath of fresh air. Can we hope to get one of those huge affairs which embraced all Europe down to the Mediterranean, lasting for hours, ever again? Let's hope so, if only for the benefit of those who have recently taken up the hobby and have still to sample all its pleasures.

Expeditions

News of the proposed expedition to XS square by G4DHF *et al* mentioned in *4-2-70* in April has prompted a letter from Clive O'Hennessy, GW4VVX, of Gwent. Clive says that G4DHF must be "taking the high road—because he'll be in Scotland before him!" Clive plans to operate from XS78d, near Lairg in Sutherland, from the evening of 16 June until the morning of 29 June. Callsign will be GM4VVX/A, and operating times will be mostly early morning and evenings unless a "lift" occurs. Clive will monitor 144·300MHz and will also have facilities for 28 and 7MHz with him. He casually mentions m/s, but does not say whether he will be looking for skeds via the vhf net—though he does comment on the fact that there will be no major m/s shower at that time. Equipment will be 50W to a 13-element Tonna on 144MHz, and Clive wishes to give as many stations as possible a contact with this square which, he says, is very rare, especially to South Wales operators. Those stations who worked Clive last year when he was GM6RPZ/A and who have not yet received a QSL card from him should send a card to GW6RPZ c/o GW6GW (QTHR). Finally, GM4VVX/A will participate in the PW QRP Contest from XS square on 17 June, and in the WAB 144MHz Contest on 23/24 June (see "Contests Calendar" in *Rad Com*).

Richard, GW8TVX (Swansea) has sent some advance information on an expedition to XQ square in August, to be mounted by Walt, GW3NYY, Jonathan, GW4LXO, Chris, G8TFI, and Richard, GW8TVX. Timed to coincide with the Perseids meteor shower, they plan to be on site from 6 to 15 August using callsigns GB2XM and GB2XN, with activity on 2m, 70cm and 23cm. From 11 to 14 August, around the peak of the shower, they will concentrate on 2m ms skeds, but will look for normal contacts also when time allows. Final details will be announced on GB2RS prior to departure. The group hopes to meet many old and new friends during its stay in XQ square.

A more relaxed expedition, combined with a holiday, is planned by the husband and wife team G1AAJ (June) and G6PPK (Alan). They are bound for the high peaks of the Lake District between 26 July and 11 August, carrrying QRP portable equipment with them in the shape of an FT290R and a HB9CV antenna on an 8ft portable mast. Most operation will be from altitudes above 2,500ft asl, and it is hoped that most of the well-known peaks such as Helvellyn, Skiddaw, Scafell and Great Gable will be activated. No skeds will be arranged before departure, since climbing conditions will depend very much on the weather. However, keep an ear on or around 144·335MHz (ssb) on most days between 1000 and 1500gmt. A special QSL card will be available to confirm contacts with this interesting expedition. Last year they used 3·5W from Helvellyn and worked nine countries plus 19 squares under rather flat conditions, so they should be a good signal. My congratulations to the "weaker sex" (June), who Alan says is able to pass the RAE, climb 3,000ft mountains, backpack her share of equipment, and, no doubt, run a home as well!

To the SM6AFH/SM6EOC 2m news-sheet we are indebted for the following information on expeditions/rare square operations this summer. YG square will be activated by a group of Swiss amateurs between 3 and 16 August. QRGs will be 144·270, 432·270 and 1,296·270MHz, callsign being F0GAL. No meteor scatter will be worked, but they will arrange skeds via the vhf net.

During VHF NFD, F6DQX will operate from BE square on 144, 432 and 1,296MHz. Every first weekend in the months of May to November there will be activity from ZA47d in the form of EA3ECY/2 (144MHz) and EA3LL/2 (432 and 1,296MHz). They will not work ms, but maybe during the summer they will stay on some extra days for this purpose if the demand is great enough. This weekend operation is during a Spanish vhf contest, so many other EA stations should be active at the same times.

LA1K is going to EY80e for ms operation from 7 to 14 August. QRGs will be 144·117 and 144·147 (cw) and 144·157 and 144·357 (ssb). One-hour skeds are preferred. Write to LA1K, QTHR, or catch him on the vhf net. They will also look for tropo, Es and Au QSOs during their stay in EY.

SM0FSK/3 will be active from GY square during the Perseids. He will be on the vhf net for skeds. Finally, a group of LZ stations will go into squares NB, NC, OB and OC this summer, hopefully to coincide with Es openings, though they will try later to be QRV on cw ms.

Six and four

Malcolm Franks, G4MKF (Newbury) seeks meteor scatter skeds on the 4m band and prefers cw, though he will work ssb if required. He can be contacted QTHR or by telephone on 0635 43999.

G8VN (Mickleover) writes to say that he is still active on 4m but finds activity on that band to have fallen off since the end of January. Harold has worked seven countries on 70MHz, plus most of the English counties, all with 10W to a three-element close-spaced Yagi. He has also worked SM6PU crossband, 4/10, and is very interested in 50MHz where he has been working crossband to both 4m and the 80m net. He comments on the need for a good beacon on 50MHz, since at his location GB3SIX cannot be heard most of the time. Harold refers to the 6m tables in *QST* as an indication of what could be done on 50MHz. JA4MBM has worked and confirmed 76 countries, VE1YX 72 and KH6IAA 68.

Maureen Wright, GW8ZCP (Wrexham) has drawn attention to a proposal for a 50MHz beacon system submitted by GW3LDH with his 50MHz report in September 1983, and subsequently published in *QEX*. This proposal comments on the success of GB3SIX from the point of view that it has been copied in North America, Canada and the Bahamas, but goes on to make a case for beacons on 50MHz to be located in Cornwall and Scotland. GW3LDH favours, for example, 4 × 5-element Yagis in tandem, but phased operation, fed by low-power cw. Antenna headings suggested are between ±70° and ±20° of true north, with similar off-sets on southerly headings. By time-sharing of, say, 30s each (−70 and +20, and −20 and +70 on both north and south headings) it would be easy to identify which beacon was in use. The system would give excellent coverage into USA, Canada, northern and southern Europe, Australia, New Zealand etc, and therefore make a valuable contribution to propagation research.

Overseas postbag

SM4AXY wishes to draw attention to the vhf-uhf-shf meeting to be held in Annaboda, Sweden, on 9 and 10 June 1984. Annaboda is a sport and recreation centre located 25km north-west of the city of Örebro (HT55b, 25m asl). Facilities are being provided for antenna gain measurement on 432MHz, noise-factor checking, and instrument calibration, plus fox-hunting on 10GHz. The organizer, for anyone lucky enough to be in the area at the right time, is Gun Grannsjö, SM4LMU, telephone 019-246280.

Mats Espling, SM6EAN, says that the radio club SK6AB has made a study of what it calls "false QSLs"—that is, cards received which do not tally with the log. The club has found that the highest percentage of such cards arose from sporadic-E openings. We have commented here from time to time on how easily one can be misled into thinking that a contact has been made via Es when there is a pile-up and the minimum of callsigns are being transmitted in the interests of speed. The next highest level of false cards came from random m/s working using ssb. Here again, the possibility of misreading calls during relatively short bursts from non-English speaking operators with heavily accented voices is obviously quite high. In quite another category are the truly "phoney" cards, usually from listener stations, who appear to have read the details of exotic or unusual QSOs in *DUBUS* and similar magazines and then proceeded to send both stations involved a card purporting to have heard the contact, giving details based on the magazine information, and requesting a QSL card.

Yet another letter from Sweden came from Arne, SM7AED, one of the most experienced and best-known vhf operators in the world. There are places that even Arne still needs to work on 144MHz, and he is particularly interested in squares in Eire, especially the rare ones to the west of the country which some expeditions are due to visit this year. He can work m/s and is active on the 14MHz vhf net for those who can offer skeds.

Anyone who operated on the vhf bands in the 'forties to 'sixties' will be very sad to learn of the death in South Africa of Jim Foster, G2JF/ZS5JF, who operated from near Ashford in Kent on the 2m band with such effect in those early days of vhf. Jim had been in touch with *4-2-70* only recently, and was still a keen vhf operator following his move to South Africa on his retirement.

Midlands VHF Convention

The 1984 Midlands VHF Convention will be held on 13 October at the British Telecom Training College, Stone, Staffs. Provisionally-arranged lectures are "Yagi aerial design", by Ian White, G3SEK, and "Improving your 2m dx", by Ken Willis, G8VR. There will also be a vhf forum with a panel of well-known vhf/uhf personalities, plus an equipment measurement area, a live display of computer software for the vhf/uhf operator, and a bring-&-buy stall. There will be ample free car parking space available and good catering facilities, with an admission charge of £1.30. Plans for an evening buffet meal will be announced later. Further information can be obtained from Peter Burden, G3UBX, QTHR, who is secretary to the organizing committee. This promises to be a very good day out for the vhf enthusiast if last year's event is any guide, so mark your diary accordingly.

Keeping an eye on the weather

At the VHF Convention at Sandown Park this year, G3REH (Lincs) sponsored a stand which displayed some excellent pictures by himself and other radio amateurs recorded over vhf links from weather satellites.

Ultimately it should be possible for micro-computers to be interfaced with vhf receiving equipment to produce such pictures on conventional printers or on a vdu. Its interest to the diehard vhf operator is that propagation from these "birds" does not depend upon conditions, but is available every time the satellite is within range. It is not too far-fetched to look to the days when with homebuilt equipment an amateur will produce his own weather maps and decide when tropo conditions are likely to be good. G3REH wishes to compile a list of all amateurs with an interest in weather satellite recording via vhf/shf. Please write to him, QTHR.

I recently saw a copy of the latest ARRL publication *The Satellite Experimenter's Handbook*, by Martin Davidoff, K2UBC; an excellent book covering all aspects of amateur satellite working. In particular, the chapter on weather satellites was very revealing for me, as was the information given on satellite tv. It is available from RSGB Publications (Sales).

From here and there

"Mac" MacBrayne, G3KGU, RSGB slow morse practice transmissions organizer, followed up the comment in *4-2-70* April on the use of the random ms cw channel by slow morse groups. He had, in fact, contacted all stations in February who were not adhering to correct channels, and received encouraging co-operation; the result was that the majority now use either 144·250 or 145·250MHz. He found that those not conforming with the bandplan had their own reasons for not doing so. For example, GW4OXB found that 145·250MHz was used for talk-back by atv locals, and they declined to move. G4BFJ started up on 145·250MHz only to find that some operators of a Hertfordshire club decided to use linears on their local net to cause him maximum interference, so G4BFJ moved off to 144·625MHz.

Specific stations mentioned in the April comment were GI3SXG, who has now ceased making such transmissions, and G3AWL, who agreed to QSY though he said the move would be very unpopular with his locals. Mac requests that slow morse transmissions, whatever frequency is used, be given a clear channel, since such activities do not last all day and the operator transmitting is giving up his time to help fellow enthusiasts, so he deserves a break. Few would disagree with that. Equally, of course, such operators should keep an ear for significant events such as Es openings and major meteor showers and consider whether they might curtail their transmissions if momentous things are heard to be taking place and which could result in undue QRM in the part of the band being used for the slow morse.

The RSGB National Convention at the NEC, Birmingham, on 28/29 April was very well attended and there was much interest in the display material used on the VHF Committee stand and on neighbouring stands manned by Repeater Management Group and VHF Contests Committee representatives. Lectures aimed at relative newcomers to vhf, given by VHF Committee members on both days, were also well supported, while traders seemed to be doing good business in the sale of vhf equipment of all types. Thousands of amateurs, wives, young-ladies etc thronged the hall, and it was good to meet many *4-2-70* readers for the first time. □

Microwaves

*by Mike Dixon, G3PFR**

Operational news

Two information sheets containing much detail concerning AMSAT Oscar 10, mode L, have been received via G3WDG. The first, from Hiro, JA1SYK, lists some 72 stations active on this mode, of which he has worked about half of the callsigns mentioned. The outstanding feature of his listing is the huge predominance of Japanese and European stations active, some 81 per cent of the callsigns being JA/Eu, with the remaining 19 per cent scattered throughout the rest of the amateur world!

In similar vein Bill, K0RZ, lists 32 stations in 13 countries worked. Both reports include details of the various stations' uplink systems which vary from as little as 2W to a single Yagi, up to 400W to 16 by 23-element Yagis and all possible combinations in between! Bill's comments are particularly pertinent—first, "mode L continues to perform as it has since its turn on", and second, "The secret of successful operation lies in the downlink antenna and receiver system". It would seem that fairly modest 1·3GHz uplink systems, lying well within the capability of many "back garden" operators, coupled with a good 436MHz system should ensure success, and I look forward to receiving reports from "smaller" stations in due course.

From Petra, G4KGC, comes a listing of European 10GHz contests. Some of the dates are past, but since the RSGB and DARC are trying to co-ordinate contest dates for 1985, the complete list is given here. The idea of the RSGB 10GHz cumulative contest has been quite enthusiastically received by DARC, and it is expected that there may well be quite a large "foreign section" entry this year from Germany. The list reads (all times gmt): 3-4 March, DARC VHF/UHF/SHF, 1400-1400; 5-6 May, DARC VHF/UHF/SHF, 1400-1400 (corresponding to RSGB 432MHz/24GHz event); 13 May, RSGB Cumulative; 27 May, Bavarian Mountain Day, 0900-1400; 16-17 June, DARC Microwave, 1400-1400; 17 June, RSGB Cumulative; 7-8 July, DARC VHF/UHF/SHF, 1400-1400; 15 July, 12 August, 16 September, RSGB Cumulatives; 6-7 October, IARU Region 1 UHF/SHF, 1400-1400.

Operators intending to participate in the two RSGB 24GHz events this year are reminded that they will need to get written permission from the Department of Trade & Industry to operate (from nominated sites) prior to these events.

Apropos 2·3GHz eme, news has been received that the OK1KIR Group is now QRV on transmit with 60W of rf, and by the time this information is published should be fully operational with an MGF1412/1400 preamp combination.

Don, G3JHM, has responded on the subject of microwave nets, and has indicated that there is a south-coast net operative weekly on 144·33MHz at 8pm each Wednesday. He also renews the plea for 10GHz operators to use higher power and at least a four-element beam on 144MHz for talk-back during the forthcoming cumulative season, so that they will at least be heard on that band! This point has often been made before: 144MHz will often not work too well when 10GHz will!

Components

Details of a new and important source of microwave equipment have just come to hand. Mike Walters, G3JVL, well known for his various and significant contributions to the amateur microwave scene, has formed a company, JVL Electronics, aimed at the expanding microwave market. His initial information sheet lists 26- and 44-element quad-loop Yagis for 1·3GHz, a 44-element for 2·3GHz (all supplied in self-assembly form), image recovery mixers for 5·7 and 10GHz, Alford slot antennas, interdigital and waveguide filters, and "fly-swatter" antenna systems; the latter four items customer-specified. He will also hold stocks of 0·141in semi-rigid coaxial cable and an appropriate range of connectors. Further details can be obtained from G3JVL, QTHR.

Two further items of Microwave Committee components, which should be available by the time this issue is published, will be of particular interest to aspiring 24GHz operators. By special arrangement with the Gabriel Manufacturing Company, copper waveguide 20 will be available at a price to be announced once the postal charges are determined. The second item is the Plessey GDHO 33 oscillator which will give, typically, 10 to 12mW output from a nominal 5V supply; the version available will be of the improved-stability type similar in construction to that described by G3YGF in the *Microwave Newsletter* 05/81 (June). Again the price will be announced once the postal charges are known.

Fundamentals

Right at the outset it was indicated that I had an interest in introducing newcomers to the "mysteries and arts" of microwaves. For the newer and perhaps less technical amateur, microwave techniques can appear to be formidably demanding "hi-tech", and thus many potential recruits to this diverse aspect of the hobby are lost before they have taken their first faltering steps.

In order to help in rectifying this impression, or at least put it into reasonable perspective, I intend over the coming months to introduce and discuss various aspects of current amateur microwave technique at a fairly elementary level. I trust that the more experienced and esoteric reader will bear with this approach, not that it is intended that the more advanced techniques will be neglected. Some of the simpler material will almost certainly have been published in *Microwaves* (and elsewhere) before, but will bear some degree of re-presentation in order to guide the newcomer through the many possible approaches which he or she could make to microwaves. Most of what will be presented will be intended to point the newcomer in the right direction rather than to provide very specific instruction, although this may occasionally be necessary.

It is debatable where one should begin—should one move up in frequency from 432 to 1,296MHz and beyond, or should one start at, say, 10GHz and move down? Should one go for simple systems (separate receive converters and transmitters using cw, fm and multipliers) or for more complex systems (transceivers employing mixing, filtering and perhaps linear amplification)? There are merits and demerits in each of these approaches, but the one fact most obvious to me is that until the "black box" arrives on the microwave bands, the amateur is entirely free to take an individualistic, possibly unique and certainly novel approach to equipment design and construction.

Having said that, there still appears to be a need for "definitive" designs based on simple, reliable building blocks needing the minimum investment of time and money to be effective. Once basic manual and operational skills have been developed using such equipment, then the decision can be taken as to whether further investment of time and resources is needed or justified.

If this starts to sound like a philosophical debate, my apologies! I would always, personally, advocate a "softly, softly" approach. That is, start small and simple, recognize the limitations of QRP and less sophisticated techniques, adapt one's operating techniques to compensate, and then, as skills and understanding increase, think more ambitiously! By the time the newcomer has reached the end of this first learning curve, my guess would be that the bug will have bitten and that the move into the next phase of more advanced technology and operating is assured. It was once thus with the hf (and later the vhf) bands; the traditional start to the amateurs' career used to be a few watts on 1·8 or 3·5MHz, why should it not now be a watt or a few fractions of a watt on one or other of the microwave bands?

I believe that the most convenient point at which to start is probably the 10GHz wide-band system. While suffering from many disadvantages, it is a system which can be simple, inexpensive, easy to construct, requires minimum alignment, and yet, when operated correctly, is capable of very acceptable results. Next month I will start by considering the "basic" system requirements, and then go on to consider each building block and the alternatives which are possible, outlining the "pros and cons" of each. A building block (or, if you prefer the modern jargon, modular) approach will be taken because this offers the newcomer the opportunity to experiment around the basic system and substitute blocks without needing to start afresh with each improvement to be attempted. This approach also avoids future redundancy since each block may later be pressed into other uses!

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

Awards

Jack, G5UM, (vhf, uhf and microwave awards manager) QTHR, has sent details of a small batch of awards made recently. John Pilags, G8HHI, of Yateley in Hampshire receives Supreme Award No 55 for two Senior Awards plus the 1·3GHz Standard Award (No 52) and the 1·3GHz Distance Award (No76) for a contact with DF5LQ, the ninth such award this year.

Petra, G4KGC, who very recently received her "Supreme", has now claimed her 10GHz Distance Award (No 70), and no doubt will be making further claims in the coming season!

Late news

G3WDG reports what are believed to be the first successful 2·3GHz eme contacts out of the UK. During the DF0EME tests on 7 April, Charlie worked both DF0EME and OE9XXI, using a two-valve amplifier similar to that exhibited at the RSGB VHF Convention; he had (allowing for feeder loss) about 60W at the antenna, which was a 13ft dish. Charlie reports DF0EME's signals averaged S5, and were so strong that they were perfectly readable even in the depths of libration fading: so strong indeed that it is estimated that the signals would have been receivable on a dish as small as 4ft diameter. Charlie was also able to receive his own echoes without difficulty. □

EPHEMERIS

Satellite news and views

*by R. O. Phillips, G4IQQ**

UOSAT

Efforts to trace and rectify the problems on Uosat 2 continue, but no positive indications have yet been obtained. Attempts were made to pick up the 145·825MHz downlink signal using the 85ft antenna at Jodrell Bank, but nothing was heard. At best the satellite is in range for no more than one hour each day from the UK, and half of this time is somewhat outside normal working hours. Martin, G3YJO, remains, at least outwardly, optimistic, though he does concede that it may take some considerable time to overcome the problems, if indeed there is a possibility of doing so. Needless to say Martin would welcome data on "sightings" of the satellite that correlate with the available orbital predictions. The important features to report would be the aos, los, doppler shift and beam headings at your particular location.

Meanwhile, Uosat 1 (Oscar 9) continues to provide a useful up-date of events via its 1,200 baud bulletin board which is transmitted on the 145·825MHz beacon every weekend. In addition, the same frequency carries telemetry information for Uosat 1, both by 1,200 baud ASCII as well as the digitalker, which literally speaks each of the values for the 60 telemetry channels. It has been said many times before, but is worth repeating again, that these signals from Uosat 1 may be received using the simplest of equipment. A simple dipole (or preferably crossed dipoles) into an fm receiver is all that is needed. The deviation on the signal is rather lower than is ideal for most receivers, so if you are able to reduce the predetector bandwidth some improvement will be obtained. A great number of schools, colleges and universities around the country and overseas have found the satellite to be an invaluable teaching aid.

RS

The four Russian satellites RS5, 6, 7 and 8 have been active for much of the month of April, and are likely to become even more popular as hf activity declines.

Oscar 10

By the time you read this, the apogee of Oscar 10 should have passed its most northerly latitude at around 26° N. As I indicated in *Ephemeris* January 1984, the latitude will continue to fall for almost two years until it reaches 26° S. This change in the orbital characteristic of the satellite has a marked impact on those locations that fall into the extreme coverage. This means that over a period of several years it will be possible to access almost every area in the world, subject to there being inhabitants with a similar interest in amateur radio.

Transmission of news bulletins via Oscar 10 is carried out on most weekends under the callsign GB2RS. The downlink frequency is the special service channel on 145·967MHz (plus or minus QRM) and anyone wishing to provide a reception report should do so at the end of the bulletin or send a QSL card. The schedule for the June and July transmissions is indicated above.

News bulletin transmissions via Oscar 10
(Bearing and elevation are for London)

Date	Time (gmt)	Bearing	Elevation
3 June	1000	286	8
3 June	1930	65	4
17 June	2000	93	27
8 July	1900	81	17
22 July	2030	115	43
29 July	1630	66	3

Other news

My comments in *Ephemeris* March 1984 concerning the use of amateur satellite frequencies for "fringe" activities provoked a small response, most of it in agreement. In fact the only negative reaction was from SU1CR in Cairo, who wrote to AMSAT-UK (Oscar News No 46). He suggested that you need to pull the definition of the amateur satellite service to breaking point to justify the use of the frequency allocations for scientific research. To add further fuel to this subject, the May issue of *Space Education* (from the British Interplanetary Society) carries an interesting feature on an amateur space telescope project. It is planned that control of the satellite will be handled by a network of advanced amateur radio stations though no specific transmission details are provided. Discussions are apparently taking place between the project organizers—the Independent Space Research Group—and AMSAT, which have included the possibility of using Oscar 10 to relay the signals to remote locations.

The IARU Region 1 Conference in April provided a useful forum for exchange of ideas and information. One particularly good outcome from the satellite users' point of view was that the repeater channels R8 and R9 (ie output frequencies of 145·800 and 145·825MHz) should no longer be used. It was also decided not to continue with the Satellite Co-ordinating Group but to maintain HA5WH as the Region 1 satellite convener. It became evident during the conference that the terms of reference for the Satellite Co-ordinating Group were not well understood, and this probably accounts for the disappointingly low level of activity. The scope of interest for the satellite convener has now been clarified to specifically include satellite construction groups as well as user groups.

Dave Rowan, G4CUO, gave some interesting information concerning the Monday night teach-in nets which have provided more than 120 amateurs with their first satellite contact. Dave comments on the lack of Eastern-block countries on Oscar 10, due no doubt to the 435MHz allocation not being available in those countries. He puts his success at dx working down to five factors: calculations, equipment, propagation information, dedication and last, but not least, patience.

Finally, any comments on what I have said, or not said, would be welcome and should be sent to the address on this page. □

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

The Month on The Air

*by John Allaway, G3FKM**

THE MENTION of misdirected QSL cards in April *MOTA* produced two very interesting responses—one from G3DRN who enclosed a specimen of QSL cards which were printed and sent out by a pirate in England who was using the callsign of a genuine station located in Wales. This individual even kept a supply of envelopes with the bureau to collect incoming cards! The authorities have now caught up with him. The second letter came from a listener on the south coast who enclosed a sample of a card from the pirate "G4OTY" who appears to be a cb operator who operates /M on 28MHz.

GW4KGR, QTHR, would be very grateful to anyone who can help him to locate the operator of FW8SC who was on the air from Wallis Is in 1980.

Overseas news

Glynn Burhouse, G4MVA, has just commenced a three-year tour of duty in Cyprus. His callsign is ZC4CZ, and he intends to be very active, especially on 1·8, 3·5 and 7MHz, as well as on the new bands—his main operating mode being cw and rtty. QSL cards should be sent to the address in "QTH Corner".

ZL1AXM (formerly G2KK) has sent along some newspaper cuttings from the *Auckland Star*. These refer to the disaster which struck the yacht *Shiner,* which carried the members of the recent Kermadec Is expedition. It was wrecked while anchored at the island, and it was expected that a freighter would have to be diverted to rescue the 10-man team of scientists and radio amateurs.

JH4PRU, presently the QSL manager for JD1BAT (Yoshi), who was located on Minami Torishima, will only continue to answer QSL card requests until the end of October. He has logbooks between 23 September 1981 and 25 March 1982, and anyone still needing a card should send an sae and three ircs for each contact—please not via the bureau. Yoshi did not operate on cw, and it seems that there was in fact a pirate using the call. *Electronics in Japan, 83-84* comments that at the end of March 1983 the number of amateur radio stations in Japan was over 550,000.

John Clarke, G8KA, writes to say that he is no longer FC6FPH due to the changes in the French callsign system. His new call is TK5FF, and his QTH will be found in "QTH Corner".

Rex Toby, formerly G2CDN and now ZS2RJ, has pointed out that for activity from Marion Is (ZS2MI) to take place there must be a licensed ZS licence holder on the staff at the weather station. This does not apply at the present time.

David Calderwood, G4VHO, is no longer CE3EYN but is now in Selangor and on the air as 9M2DC with a TS430S and triband beam. He is in charge of the incoming 9M2 QSL bureau (PO Box 10777, Kuala Lumpur) which handles cards for members only. David offers to try to answer queries about MARTS members (a list of which will appear in this column in the near future).

DX news

The ZB2 DX Net meets on 21,380kHz at 1900 on Thursdays. There is a special award for working five Gibraltar stations, and information on how to apply can be obtained from those on frequency.

As mentioned elsewhere, there are some changes in the French callsign system taking place: FC will become TK, FB8 becomes FT8, and the prefixes in France will in future indicate which class of licence the holder has—FC, FD, FE, plus the former F2-F9 series for full class licensees who have held that class for several years. The TK series is already in use but it is believed that the other changes may not take place until 1 January 1985.

The VERON Club station PA0AA transmits useful dx information each Friday at 1845 on 3,602 and 14,100kHz. This is followed at 1900 by a beginners morse course; at 1930 by morse for advanced operators; an rtty bulletin at 2000; news in Dutch at 2030, and a repeat of the English news at 2045.

Newly active from Franz Josef Land is UW3HY/1 who has been worked on 14MHz cw and who asks for QSLs via the bureau.

DX'press says that 4K1GDW is now operating from Antarctica (no longer South Shetlands). 4K1ANO (QSL to UA3AEL), and 4K1GAG (QSL to UQ2OC) have also been worked. 4K1F is still in South Shetland, and has been found near 14,220kHz after 2000—QSLs in this instance also go via UQ2OC.

JA8BMK has given up trying to act as QSL manager for the Burmese stations XZ9A, XZ9B, XZ9C, 1Z9A and 1Z9B, as he has had great problems trying to get the logs. At the time of writing he was said to be about to destroy all unused QSL cards on 1 May.

In spite of the situation in Iraq, YI1BGD seems to be on the air every day except Friday. There are three new operators and 10 more in training. Usually the station is in the 14,200—14,230kHz area between 0400 and 1200, and on Wednesdays and Sundays they sometimes go to 21MHz between 21,320 and 21,345kHz. *Long Island DX Bulletin* says that a 7MHz delta loop and 3·5MHz dipole should have been in use by the end of April.

Stations in Brunei are using the prefix V8—the former VS5GA now being V85GA.

ET3PS has been worked on 14MHz, and gave his name as Tensay "working from the police club station". The station is believed to be genuine.

Stations on Lord Howe Is will in future use callsigns in the series VK9LA-VK9LZ. VK2AGT is said to have applied for VK9LH, and VK2LHI for VK9LA.

9N1RN has recently been reported on 28MHz ssb, and has also been heard signing as 9N1RNK.

9Q5JE is said to keep the following schedules: Mondays on 21,345kHz at 1445; Sundays on 21,305 or 14,305kHz at 0900, and occasionally from 2100 to 2300 on 3,780-3,800kHz.

Stations in Ivory Coast now use prefixes other than the usual TU2 for novices (TU1) and visitors (TU4).

The DX Family Foundation

This organization has its HQ in Japan, and its president is JG1QGT. Overseas membership costs US $25 for the first year, and US $20 afterwards, and brings with it a monthly dx bulletin and membership rubber stamp. An interesting item in the club's March bulletin was that the authority which controls the part of Kampuchea where XU1SS is located will also grant permission for visitors to operate using XU0 callsigns.

Peter Carbutt (ex-G2AFV) has been on the air for seven years from Singapore, where he is 9V1TL.

* 10 Knightlow Road, Birmingham B17 8QB

Anyone interested should contact Mr C. L. Meas, 2-10-2-1007 TBR, Nagata, Tokyo 100, Japan (enclosing sae and return postage). The foundation may be contacted via Mike, JH1KRC (Michiaka Watanabe, 2-2-39-319 Jingumnae, Shibuya, Tokyo 150). XU1SS is very active and checks into the DK9KE net almost every evening except Sunday, when attempts are made to work into Europe. On Sundays the station is on 14,320kHz from 1100 looking for QSOs with the USA. Equipment seems to be an FT107 or FT707 with battery power supply, and the antenna is a rotary TA33Jr some 8m above ground level. The operators would appreciate the donation of books or materials, which should be sent c/o C. Bory, KPNLF, PO Box 22-25 Ramintra, Bangkok, Thailand.

DX News Sheet

A number of enquiries have been received about the *DX News Sheet* referred to in the final paragraph of *MOTA* each month. This is a weekly RSGB publication, compiled and edited by G3XTT and G3ZAY in Cambridge, but mailed from Potters Bar. It consists of a double-sided A4 sheet packed with information about forthcoming dx operations, stations worked during the previous week, operating tips, contest news, QSL information, propagation predictions, DXCC news, and a wide range of other operating information. It is available to both members and non-members, but subscriptions must be taken out to the end of the subscription year (30 June 1985). At the time of writing, the subscription level had not been determined for 1984-5, but an sae to RSGB HQ will bring a sample copy and details of the new subscription rate.

Geoff Watts, editor of *DX News-Sheet* from 1962 to 1982, produces a very useful *Radio Amateur Prefix-Country-Zone List*. It gives, for each country, its DXCC status, normal and special prefixes, ITU block callsign allocation, continent, *CQ* zone, and ITU zone. In addition there is information on Antarctic stations, USSR club stations, obsolete prefixes, and much more—space has also been left for updating. The 15-page list costs 75p, or will be sent overseas by air-mail for $2 or six ircs, from Geoff Watts, 62 Belmore Rd, Norwich NR7 0PU. Geoff also administers the very interesting Islands-on-the-Air (IOTA) Award. The list contains full information on this too.

Top band

VK6HD has sent along his regular 1·8MHz report. He found conditions very mixed during the last "season" with some unusual openings which lasted until 30min after sunrise—these on days when the band didn't open until after local sunrise. On two days European signals had a pronounced "auroral" flutter, and Mike's signals heard in Europe had the same character. During the season 235 contacts were made with Europe, 80 of them with the UK. Average band opening duration was 15 to 20min, and the best QSOs were with ZB2EO, G6ZY/EA6 and 5B4PW. So far no UA2, UC2, 1, IS0, LX, T77, SV or CT1 stations have been worked, largely due to the problem that the VK6HD signals are heard all over Europe and the QRM is heavy. The band still seems to favour the VKs in November and December, and Europe during January and February. Mike is QRV most days for up to 30min before sunrise, and at the time of writing (mid-April) was still working the occasional European. Total countries heard on the band are 110, so DXCC is a possibility—so far 80 have been confirmed.

ARRL *Bulletin No 26* gives the news that in response to a request from ARRL the FCC has lifted all power restrictions in the 1,900 to 2,000kHz band. Phone and cw transmissions with maximum permitted p.e.p. output of 1,500W are now permitted in all areas under FCC jurisdiction on the entire 1,800 to 2,000kHz band.

SV5OX was on 1,832kHz most days from 0300 to 0345 at the time of writing, and UO5GQ near 1,850kHz most weekends at the same time. 3D6AK works around his sunrise time (0330—0400) near 1,825kHz.

Expeditions

From 18 to 28 June OZ1FFG, Kristian; OZ5DL, Ole; OZ5UR, Preben; and OZ8AE, Joergen, will be operating from the Faeroe Is with their respective home callsigns/OY. Likely frequencies on which to find the group include 1,837, 3,510, 7,010, 14,015, 18,070, 21,015, 24,900 and 28,015kHz (on cw) and 3,645, 3,795, 7,045, 14,210, 21,210 and 28,510kHz on phone. Some rtty activity may take place. QSL cards should be sent to the operator's home call.

Unfortunately the 1984 Clipperton Is expedition did not succeed in making the trip. Planning and organization began two years ago, and once the landing and licence permission had been obtained the effort necessary for a 14-operator, six-transmitter, multi-national expedition became almost a full-time job. In early November the charter for the 90ft sailing boat *Svanen* was signed and at that time the boat was in Venezuela. However, it developed mechanical trouble and an intensive search in Mexico revealed the 92ft steel-hulled schooner *Black Eyes*. This was in Panama, and it was promised that it would be in Manzanillo by 5 March. DJ9ZB, F6GXB, F9LX, FO8IW, FO8HL and FO8GW left home, to arrive in California only to find that the ship's arrival had been delayed. It had not arrived by 12 March, and further search for suitable transport was unsuccessful, so the group returned home on 18 March, bitterly disappointed. They have not given up and are still hopeful that the trip will take place, but not necessarily in the immediate future.

The very attractive QSL card being sent to those who contacted 8I0WCY between 28 and 31 December 1983. (This is still available from PO Box 96, Jakarta 10002, Indonesia)

Iris and Lloyd Colvin finally closed the recent phase of their travels when they returned to the USA to attend the Visalia convention. Prior to that they had been on the air as W6KG/CE0 from Easter Is, and as W6QL/CE0Z from Juan Fernandez Is. They report that the Chilean authorities have recently issued callsigns to Easter, San Felix and Juan Fernandez which have not followed the traditional CE0A, CE0X and CE0Z allocations respectively, and CE0Z and CE0F calls have been issued at random to stations in Easter and Juan Fernandez.

The LA DX Group has issued a bulletin concerning possible operation from Bouvet Is. There may possibly be radio amateurs among the crew of the Norwegian scientific expedition which is due to sail from South America before the end of the year. Bouvet will be the last stop after about two months *en-route*, and a one to three day stay is all that is anticipated. Possibilities for a dxpedition are being investigated by LA5UF (project manager) and LA1EE; January/February 1985 being given as a target date. Anyone who can advise on transportation is asked to contact the group, and it would also be useful to have an indication of the likely level of funds which could be counted on—please contact Jorgen Hoel, LA5UF, Munkerudasen 12E, 1165 Oslo 11, Norway.

K4YT expects to be going overseas again next month, possibly to TU or DU. Previous to this he will be visiting Bermuda and South Africa.

Welcome

The following joined the Society during March: C53EK, EI3CY, F6IHS, IW3EEM, K5MM, N3CMO, N5RM, ON4SK, G1FKU/PE, SK4NI, VE2AQU, VK3XUK, W4OJK, W6ATC, YU7NQM, YB0CAR, YC0EBS, and listener members M. Tarafi (EP), A. Armstrong (ZS), E. Lindsay (ZD8), T. Mckinney (P2), I. Millhouse (VK5), J. Lum (9M2), D. O'Dowd (EI), D. Holmwood (PY), and A. Tampellan (OH).

Contests

All Asian DX Contest

0000 16 June to 2400 17 June (phone)
0000 25 August to 2400 26 August (cw)

The official rules say "amateur bands under 30MHz", but presumably the WARC bands are excluded. There are single-operator single-band, single-operator multi-band, and multi-operator multi-band categories. Exchanges consist of RS/T plus two figures indicating the operator's age—ladies send 00! QSOs with Asian stations (but excluding US military stations in the Far East) count three points on 1·8MHz, two on 3·5MHz, and one on other bands, and the multiplier is the number of different countries worked on each band (in the case of multi-band entries—added together). Note that JD1 stations in Minami Torishima do not count. Photocopies of the summary sheet are available from G3FKM (sae please) and logs should be

QTH CORNER

BV0AA	via OH2BH, Pyorrekuja 4 C 43, SF-01600 Vaantaa 60, Finland.
FB8YK	via F6EMY, 3 Rue Louis-Barilett, 61000 Alencon, France.
IY4FGM	I4IKW, PO Box 3113, I-40100 Bologna, Italy.
JX5DW } **LA5DW**	LA9PCA, R. Kirkhus, Box 88, N-5014 Bergen Universitet, Norway.
OX3SG	via LA5NM, Box 210, 9401 Harstad, Norway.
K3UOC/PJ	Mike Manofo, 2419 Willow St, Wesleyville, Pa, 16510, USA.
DF4RD/SV9	G. Jager, DF3RG, Ruksengstr 6A, D-8460 Schwandorf 1, FR Germany.
TK5FF	(ex-F6FPH) J. Clarke, Villa de l'Alzelli, Ocana par 20117 Cauro, France.
ZB2FX	via G3RFX, M. Phillips, 8 Hill Rd, Theydon Bois, Epping, Essex.
ZC4CZ	via G4MGQ (ex-G8MWS), R. Boddy, 23 Farside Rd, W Ayton, Scarborough, N Yorks.
1S2CK	via WB0TEC, C. L. Baker, McCook Mobile Est Lot 20 RR2, Jefferson, SD, 57038, USA.
3X4Z	W4LZZ, J. Bernier, 121 Alonquin Terr, Indian Harbor Beach, Fla, 32937, USA.
4S7OM	via HB9CFD, Hans-Heinrich Ehlers, Box 1101, CH-8036 Zurich, Switzerland.
5B4LP	via KA3FIB, Barbara Poore, 13 Autumn Trl SW Crrl Vly, Fairfield, PA, 17320, USA.
5B4MF	PO Box 9129, Nicosia, Cyprus.
9M2DC	D. Calderwood, 11 Jalan Beta 55 21/10, Damansara Utama Petaling Jaya, Selangor, Malaysia.

sent to reach JARL, Box 377, Tokyo Central, Japan, no later than 30 September for the phone section, and by 30 November for the cw. Logs containing more than two per cent of duplicates will be disqualified. Those who would like a copy of the results should enclose an irc and sae with their entry.

In the **1983 Phone** contest **GI4MUE** scored 496 points in the multi-band section, and **GW4KGR** 56 on 14MHz. In the **cw section** UK results were as follows: (Multi-band) **G3ESF**, 37,375; G3HRY, 11,856; **GW3MPB**, 6,888; G3OLU, 2,880. (3·5MHz) **G3SXW**, 480; G3XWA/A, 364. (7MHz) **G3TXF**, 836. (14MHz) **G3DQL**, 2,688; G3WZ, 1,518; G4NK, 714. (21MHz) **G6GH**, 315.

GB2WCY scored 39,211 in the multi-operator section.

Awards

Catch 22 Award

Applicants must submit verified evidence of two-way contact with other amateur stations located on the 22nd parallel of latitude north—a contact with one in VS6 is obligatory. Only QSOs after 1 January 1980 are valid. Endorsements for band/mode may be requested. The award is available in three classes: Class 3—contact with at least 15 countries; Class 2—contact with at least 20 countries; Class 1—contact with all 25 countries. The cost is US $7, and all awards will be sent out via airmail. Upgrade stickers will be issued on receipt of a fee of US $1. The countries on 22N are: VS6, CR9, BY, BV, XV, XW, XZ, S2, VU2 (India), A4X, A6X, HZ, ST, SU, 5A, TT, 5U, 7X, TZ, 5T5, CN, C6, CO, XE and KH6.

Nine Dragons Award

One contact with each of *CQ* zones 18, 19, and 24–30 inclusive (nine in all). One *must* be with a VS6. Contacts after 1 January 1979 are valid, and the fee, US $3, £1.50 (postal order), or 25 ircs.

Firecracker Award

This requires contact with at least six VS6 stations since 1 January 1964. The fee is US $2, £1, or 10 ircs.

Certified log extracts only are needed—no QSL cards for any of the above awards issued by HARTS. Payment should be made in cash or cheques payable to HARTS, but if sending postal orders please leave the "payee" space blank. Send claims to: Awards Manager, HARTS, GPO Box 541, Hong Kong.

Special event/contest station A4XXC with A4XJP at the key. Omani Field Day, Brady's Beacon, Masirah Is, December 1983

WAPY Award

For contacts made on or after 15 May 1981. One QSO is needed with each of the nine Brazilian continental PY call areas, PY1–PY9 (only PY prefixes, not PP, PR, etc). Endorsements will be given for two-way cw, two-way phone, and QRP (less than 10W input. Send declaration to that effect). One PY0 may be counted in place of another area if needed. Send certified list of QSOs (plus five ircs for postage) to: Antenna Editorial Group, Caixa Postal 1131, 20001 Rio de Janeiro, RJ, Brazil.

1984 28MHz table

G3XQU —123	G4TTR — 65	GW4TEJ — 32 (ssb)
G4SKI — 99	G3TXF — 64 (cw)	G4DXW — 25
G4MUW — 69 (ssb)	G4RAB — 52	G4OBK — 20 (cw)
G4VJK — 67	G3WVG —49 (cw)	GM3CHX — 19
G3KDB — 67 (cw)	G3XTT — 49	G3KSH — 18 (cw)
G3SXW — 66 (cw)	G4NXG/M — 45	G4FVK — 2
G4PEL — 65		

Scores for this table direct to G3FKM please, not via G3GIQ.

1984 six-band table

	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total
G3XQU	1	65	**79**	86	**140**	**119**	490
G4SKI	2	46	9	**111**	131	109	408
G3SXW	47	51	78	50	40	28	302 (cw)
G3KDB	36	43	50	62	54	56	301 (cw)
G3TXF	47	51	78	53	32	25	286 (cw)
G3XTT	**63**	23	58	33	25	49	251
GW4OFQ	9	**78**	47	41	36	—	211
G3KSH	12	21	20	45	25	18	141

Band leaders are printed in bold type. Closing date for the next table: entries to reach G3GIQ no later than 15 June please. The next listing of this table will appear in August *MOTA* (please disregard the information given at the foot of the table in the March issue). The "current countries" six-band table will appear in September (deadline 15 July).

Honor Roll

March *QST* listed the latest DXCC listings in the Honor Roll. British stations appearing are as follows (first number is total of current countries, second the "all-time" country score). **Mixed:** G3AAE (315/360); G3FKM (315/358); G3FXB (315/358); G3HCT (315/352); GI3IVJ (315/355); GM3ITN (315/349); GW3AHN (315/360); G2FSP (314/351); G3JAG (314/335); G4CP (314/361); G5VT (314/359); G2FYT (313/349); G3LQP (312/330); G3UML (312/336); G3JEC (311/334); G3IOR (310/345); G5RP (310/337); GI3OQR (310/339); G3HTA (309/331); G3KDB (309/325); G2BOZ (308/351); G3GIQ (307/333); G3RCA (307/313); G3RUX (307/323); G3TOE (307/319); G3ZAY (307/320); G3MCS (306/322); and G3SJH (306/318). In the **phone** listing: G3FKM (315/354); G5VT (314/359); GI3IVJ (313/351); G3NLY (312/336); G3UML (312/336); G3JEC (311/334); G5AFA (311/329); G3TJW (310/327); G3ZBA (309/326); G3TOE (307/319); and G3SJH (306/318). (There are no UK stations in the cw listing yet.)

Around the bands

Some quite interesting openings seem to have taken place on all bands, and the top 1984 28MHz score of 123 countries suggests that even that band is far from dead!

The following supplied logs from which the section below was compiled: G2HKU, G5JL, G3YY, G3s, GIQ, GVV, KSH, LPS, SXW, YRM, G4s, EHQ, FVK, GM4KEE, G4KGG, GW4KGR, G4s, NXG/M, OBK, GM4RFE, G4RVV, GW4TEJ, G4s, UOL and UYR, and RS10906.

Stations listed in italics were on A1A.

1·8MHz. 0300 *AA1K, CT4BD, N3DAY, SV0AA/8, W2BXA.* **0500** *K1ZM.* **2100** *OH0BA, 4X4NJ.* **2200** *IT84ZGY.* **2300** *ON5NT/IT84, RA9AKM.*

3·5MHz. 0500 *HH2VP, N7CW, ZS1CT.* **0600** *CT2QN, VK9NS, VP2KCA, W6, ZF1MA,* ZLs 1DYC, 2SN, *3GQ.* **2000** A92EB, ST2SA, *UK9FER, UL7CAD.* **2100** *OH0AP,* VP8LP, ZS3GB, *5Z4MX.* **2200** CP8IH, FM7WS, VP8LM, 5B4LP.

7MHz. 0100 *IP9IURU, TR8IG.* **0400** *K3UOC/PJ6, PZ1DT.* **0500** *CE1ANF, LU,* ZS1a, *AAX, FT.* **0600** HK0HBY, LU6EYK/X, OA4WM, TE5DX, *VK, W6-7.* **0700** *W6KG/CE0,* D44BC, *FG7CP, FO8KP, VE3LKU/HI8,* XE1UF, *ZK1XL, ZL, ZL8AMO, 7X2MB.* **1800** *HZ1AB, VU2REC,* 4S7NMR. **1900** 7Q7LW. **2000** *A92DY, CT2EV,* JY9CL, *ZS5DN.* **2100** *SV1IW/A.* **2200** *FM7BH, OD5NZ, YB5ASO.* **2300** *HH2CF, JW5NM, OY2J, TR8DR, UW3HY/1, VK6RZ, 4K1ANO.*

10MHz. 0200 *W7ULC.* **0600** *K5VT, KT7G, N5VV, VK2, W7BNK, ZL2US, 9H1BB.* **0700** *VK, WL7VI.* **0800** *JA, VK, W6.* **0900** *K5ONF.* **1700** *EA6KZ.* **2000** *JA6HW.* **2100** *KP2J, OX3RL, VK3MR, W1OER.* **2200** *SV0AH, ZP5XDW.* **2300** *W7BNK, DL2GG/YV5.*

14MHz. 0000 *OH9TH/I4U,* (OD5). **0700** CE0BGL, FK0AQ, JA (to 0900), KC6HA, KH6WW, *KL7PJ, UK8JAA,* VK9LH, YJ8GX, ZM7VU, 6W1DY. **0800** AH9AB, W6QL/CE0, FO8JV, V85GA, *ZK1AL, ZK1XL.* **0900** FO8HL, *P29PR,* TA2TAT, 9M2VR. **1100** 9M6MH. **1400** KC6IN, VK6DU, VS6DX, YB3AF, 4U1ITU/9N1. **1500** JA, *T77C, UK1PGO,* YI1BGD. **1600** OE6BVG/KH0, 4S7EA. **1700** JW6MY,

SU1ER, *6Y5HN*, 9V1VP. **1800** *BV0AA*. **1900** A71AD, HS1BV, KL7KJ, U9Z, VK2-VK6, YS6HMT, ZL2QW. **2000** AL7BL, *FM7WH*, J73AH, TA1MO, ZL1, 4K1GAG. **2100** JA, ZL4. **2200** TU73, UW3HY/1, VQ9AC, W6-W7. **2300** C6ANU, *K3UOC/PJ5*, 4U1UN.

18MHz. 0900 *CT1, DL, LA, VK3AWA*. **1500** *LA8CE*.

21MHz. 0700 JA (until 1000), KD7P/NH2. **0800** TA1UA. **0900** *HL1SF*. **1100** A71BK. **1200** AP2P, *BV0AA, VU2BK*. **1300** HH2WL, JY9CL, *UW3HY/1*, 4S7PVR. **1400** *VK6HD*, W6-W7 (until 2000), *ZC4WW*, 9V1RN. **1500** DU9AB/1, *V2AU*. **1600** A4XRS, *J28DM*, S83H, V2AZN, VK8NRW, VS6CT, ZB2FX, 5N6CJR, 8Q7AC. **1700** C53BI, *FR7BX*, OD5LT, 3D6AN, 7Q7LW, 9M2AP. **1800** AH8A, HZ1AB, *OX3PH*, VP5GT, 4M5ARV/6, 8Q7AV. **1900** J37AH, J88AQ, P42J, VP8, W5-W6. **2000** D68WB, HK0HEU, JW5NM, TZ6CY, ZL1-ZL4. **2100** 5V7NG. **2200** W1-4, *ZF2AA*.

24MHz. 0900 *DL, HB, IT, OZ*. **1500** *5B4PW*.

28MHz. 0800 JA, VK2DDC. **0900** VS6HI, 5H3RF. **1000** BV0AA. **1100** J28DM, TJ1AF, ZD9GI, 3B8FK. **1200** G4CJC/EA8, DF3NZ/ST2, VU2GA, 4S7VG. **1300** CE6AFK, J39BS, OD5YU, UA9, UI8, YC7OD, DF3LK/ZS3. **1400** A71BJ, G4DUW/DU1, FB8WK, JY9CL, UK8MFA, VP2EH, 5B4ES, 5N9GM, 5R8AL. **1500** W6QL/CE0, CX, W4JVN/KV4, ZP, 5U7ES/M. **1600** C53FG, TR8CD, 5H3BH. **1700** W1-4, 5Z4DJ. **1800** FG0IHU, ZB2FX, ZD8TM. **1900** K6DDO. **2100** W2.

Thanks to the following for items extracted: the *Long Island DX Bulletin* (W2IYX), *DX News Sheet* (G3XTT/G3ZAY), the *Ex-G Radio Club Bulletin* (GI3OEN/W6), *Long Skip* (VE3GCO), *Lynx DX Group Bulletin* (EA2JG/EA3CBQ), *DX'press* (PA0GAM), *CQ Magazine* (W1WY), *DXNL* (DL3RK), and the *DX Bulletin* (K1IN).

All information for the **August** issue to reach G3FKM by **21 June** please.

HF propagation predictions for June 1984

Using the table

The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band, ie 0 = 0000, 2 = 0200, 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				10MHz				7MHz				3·5MHz			
GMT	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122
	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802
EUROPE																								
Moscow	. . .	. . .	. . .	. . .	. . .	1 1 2	1 1 2	3 1 .	4 3 5	6 6 6	6 5 6	8 9 7	8 7 6	5 4 4	4 4 5	6 8 9	7 5 3	2 1 1	1 1 2	4 6 7	4 2 .	. . .	. . .	. 3 5
Malta	. . .	. . .	. . .	. . .	. . .	1 2 1	1 1 1	3 4 1	5 2 3	7 7 6	6 6 7	8 9 8	9 7 7	6 5 5	4 5 5	7 8 9	8 8 6	3 2 2	2 2 3	4 7 8	† † 3	. . .	. . .	. 4 †
Gibraltar	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1 2 .	3 1	4 6 5	5 5 5	7 8 7	8 6 5	7 6 5	5 5 5	7 8 9	9 8 7	5 3 2	2 2 3	5 7 8	† † 4	2 . .	. . .	2 4 †
Iceland	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	2 1	1 3 4	3 3 3	4 6 5	7 5 5	5 5 5	5 5 5	6 7 8	7 7 6	4 3 2	2 2 3	3 5 6	4 4 3	2 . .	. . .	. 2 3
ASIA																								
Osaka	. . .	. . .	. . .	. . .	. . .	. 1 1	1 . 1	1 1 .	2 1 1	2 4 3	2 2 4	6 7 4	. . .	. 2 1	. . 2	4 6 3	. . .	. . .	. . .	1 3 .	. . .	. . .	. . .	. . .
Hong Kong	. . .	. . .	. . .	. . .	. . .	1 2 2	1 1 2	3 3 .	2 1 1	2 3 3	2 3 4	6 8 6	2 . .	. . .	. . 2	4 6 5	. . .	. . .	. . .	1 4 2	. . .	. . .	. . .	. . .
Bangkok	. . .	. . .	. . .	. . .	. . 1	2 2 3	2 1 3	4 4 1	3 2 1	1 2 3	2 3 5	7 8 7	4 . .	. . .	. . 2	4 7 7	1 . .	. . .	. . .	1 4 5	. . .	. . .	. . .	. . 2
Singapore	. . .	. . .	. . .	. . .	. . 1	2 3 3	2 1 3	5 5 1	3 2 1	1 3 3	2 3 5	7 8 8	4 . .	. . .	. . 2	4 7 8	1 . .	. . .	. . .	1 4 6	. . .	. . .	. . .	. . 3
New Delhi	. . .	. . .	. . .	. . .	. . 1	2 3 3	2 1 3	5 5 1	4 3 2	2 1 2	3 5 5	7 8 8	6 3 .	. . .	. . 2	4 7 8	3 . .	. . .	. . .	1 4 6	. . .	. . .	. . .	. . 3
Teheran	. . .	. . .	. . .	1 1 .	. . 2	3 3 4	3 2 4	6 6 2	6 4 5	2 2 2	3 5 5	7 8 8	8 5 2	. . .	. . 2	4 7 8	6 3 .	. . .	. . .	1 4 6	3 . .	. . .	. . .	. . 3
Colombo	. . .	. . .	. . .	1 1 .	. . 1	3 3 4	3 2 4	6 6 2	5 3 2	1 3 3	2 3 5	7 8 8	7 3 .	. . .	. . 2	4 7 8	4 . .	. . .	. . .	1 4 6	2 . .	. . .	. . .	. . 3
Bahrain	. . .	. 1 .	. 1 1	1 1 .	. . 2	3 3 4	3 3 5	6 6 3	7 5 5	2 2 1	2 3 5	7 8 9	8 6 2	. . .	. . 2	4 7 8	7 3 .	. . .	. . .	1 4 6	4 . .	. . .	. . .	. 2 3
Cyprus	. . .	. 1 .	. 1 1	2 1 .	1 2	4 5 5	4 4 5	7 7 4	8 6 7	6 5 5	5 6 6	8 9 9	9 8 5	3 3 2	3 3 3	5 8 8	8 6 3	1 . .	. . 1	3 5 7	5 3 .	. . .	. . .	. 2 4
Aden	. . .	. 1 .	1 1 1	2 2 .	1 1	4 3 4	4 4 6	7 7 4	8 6 6	3 1 1	2 3 5	7 8 9	8 7 3	. . .	. . 2	4 7 8	7 5 1	. . .	. . .	1 4 6	4 2 .	. . .	. . .	. 2 3
OCEANIA																								
Suva (S)	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. 1 .	1 1 3	3 3 2	2 3 5	5 5 2	. . 2	3 2 1	. . 1	3 3 1	. . .	1 . .	. . .	1 1 .	. . .	. . .	. . .	. . .
Suva (L)	. . .	. . .	1 2 3	5 3 .	2 . .	3 5 3	4 6 7	8 7 3	2 2 4	6 5 3	2 2 4	6 6 4	. 3 4	2 . .	1 4 4	1 4 1	. . 1	1 . .	. . .	1 1 .	. . .	. . .	. . .	. . .
Wellington (S)	. . .	. . .	. . .	. . .	. . .	. . .	. . 1	1 1 .	2 2 4	4 4 3	2 2 4	5 6 4	1 2 4	3 2 1	. . 1	4 5 3	. . 1	1 . .	. . .	1 3 .	. . .	. . .	. . .	. . .
Wellington (L)	. . .	. 1 .	1 2 4	3 . .	2 . .	2 5 3	4 5 6	8 8 4	5 4 5	6 5 3	2 2 4	6 8 6	2 3 4	4 2 .	. . 1	4 5 3	. . 2	1 . .	. . .	1 3 1	. . .	. . .	. . .	. . .
Sydney (S)	. . .	. . .	. . .	. . .	. . 1	2 2 2	1 1 2	3 3 .	2 2 4	5 4 3	2 3 4	6 8 5	2 1 2	3 2 .	. . 2	4 7 4	. . .	1 . .	. . .	1 4 2	. . .	. . .	. . .	. . .
Sydney (L)	. . .	. . .	. . .	1 2 1	2 . .	3 3 3	2 3 4	5 7 5	5 3 3	2 2 4	2 2 4	6 8 7	2 1 2	4 2 .	. . 1	3 6 4	. . .	1 . .	. . .	1 3 1	. . .	. . .	. . .	. . .
Perth	. . .	. . .	. . .	1 1 .	. . 2	3 4 4	3 2 4	6 6 2	4 3 3	4 3 2	3 5 5	7 8 8	5 2 1	1 1 .	. . 2	4 7 8	2 . .	. . .	. . .	1 4 6	. . .	. . .	. . .	. . 3
Honolulu	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1 1 3	3 3 2	2 2 3	4 2 1	. 1 4	3 2 1	. . 1	2 . .	. . 1	1 . .	. . .	. . .	. . .	. . .	. . .	. . .
AFRICA																								
Seychelles	. . .	. . 1	1 . 1	2 2 .	1 1	4 3 4	4 4 6	7 7 4	8 6 5	3 2 2	3 5 5	7 8 9	8 6 3	. . .	. . 2	4 7 8	7 4 1	. . .	. . .	1 4 6	4 . .	. . .	. . .	. 2 3
Mauritius	. . .	. . 1	1 1 2	3 2 .	1 1	4 3 5	5 4 6	8 7 4	8 6 6	4 2 3	2 3 5	7 8 9	8 7 4	1 . .	. . 2	4 7 8	7 5 1	. . .	. . .	1 4 6	4 2 .	. . .	. . .	. 2 4
Nairobi	. . .	. . 1	1 1 2	3 2 .	2 1	4 3 4	5 5 7	8 7 5	8 7 6	4 2 2	3 4 7	8 9 8	8 8 5	1 . .	. . 1	4 7 8	7 6 2	. . .	. . .	1 4 6	4 3 .	. . .	. . .	. 2 4
Harare	. . .	. . .	1 2 3	4 2 .	2 . .	4 4 4	5 5 7	8 7 5	9 7 6	3 2 2	3 4 7	8 9 8	8 8 6	3 . .	. . 1	4 7 8	7 6 3	1 . .	. . .	1 4 6	4 3 .	. . .	. . .	. 2 4
Capetown	. . .	. . .	1 2 3	5 2 .	2 . .	3 4 4	5 6 7	8 8 4	9 7 .	6 5 3	2 3 4	6 8 9	9 8 .	3 2 .	. . 1	4 7 8	7 6 2	1 . .	. . .	1 4 6	4 4 .	. . .	. . .	. . 3
Lagos	. . .	. . .	1 2 3	5 2 .	2 . .	3 4 3	4 5 7	8 8 4	9 7 6	4 2 2	4 5 6	8 9 9	8 8 6	3 1 .	. . 1	4 7 8	7 7 4	1 . .	. . .	1 4 6	4 4 .	. . .	. . .	. . 3
Ascension Is	. . .	. 1 .	. 2 2	4 3 .	2 . .	2 5 3	4 5 6	8 8 4	9 7 5	6 5 3	2 2 4	6 8 9	8 8 6	4 2 .	. . 1	4 6 8	7 7 4	1 . .	. . .	1 4 6	4 4 .	. . .	. . .	. . 3
Dakar	. . .	. 1 .	. 1 2	4 3 .	2 . .	2 5 3	3 5 5	8 8 4	9 7 5	6 5 3	1 2 2	6 8 9	8 8 6	4 2 .	. . .	3 6 8	7 7 4	1 . .	. . .	1 4 6	4 4 .	. . .	. . .	. . 3
Las Palmas	. . .	. . .	. . .	1 2 .	2 . .	1 5 4	3 4 4	6 7 4	9 6 5	7 6 6	6 6 6	7 9 9	9 9 7	6 4 3	3 3 3	5 8 9	8 8 5	3 2 1	. 1 1	2 5 7	† 5 2	. . .	. . .	. 2 4
S AMERICA																								
South Shetland	. . .	. 1 .	. 1 2	4 3 .	2 . .	2 5 3	3 5 6	8 8 4	9 7 5	6 5 3	2 2 4	6 8 9	8 8 6	4 2 .	. . 1	3 6 8	7 7 4	1 . .	. . .	1 4 6	4 4 .	. . .	. . .	. . 3
Falkland Is	. . .	. 1 .	. 1 1	3 3 .	3 . .	1 5 3	3 3 5	8 8 5	9 7 5	6 5 3	2 2 4	6 8 9	8 8 6	4 2 .	. . 1	3 6 8	7 7 4	1 . .	. . .	1 3 6	4 4 .	. . .	. . .	. . 3
Rio de Janeiro	. . .	. . .	. 1 1	2 3 .	3 . .	1 5 3	3 5 5	7 8 5	9 7 5	6 5 3	2 2 3	5 8 9	8 8 6	4 2 .	. . .	2 5 8	7 7 4	1 . .	. . .	. 3 6	4 4 .	. . .	. . .	. . 3
Buenos Aires	. . .	. . .	. 1 1	2 3 .	3 . .	1 4 3	4 5 6	8 5 5	9 7 5	6 5 3	2 2 3	5 7 9	8 8 6	4 2 .	. . 1	2 4 8	7 7 4	1 . .	. . .	. 2 6	4 4 .	. . .	. . .	. . 3
Lima	. . .	. . .	. . .	. 1 1	3 . .	2 3 2	3 2 5	5 4 7	9 6 3	4 5 3	2 2 2	4 7 7	8 8 6	4 2 1	. . .	. 1 5	7 6 4	1 . .	. . .	. . 2	4 4 .	. . .	. . .	. . .
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Jamaica	. . .	. . .	. . .	. . .	2 . .	. 2 1	2 1 3	4 4 .	8 5 3	4 3 2	2 1 2	1 2 6	7 8 6	4 2 1	. . .	. . 3	4 6 4	1 . .	. . .	. . .	. 3 .	. . .	. . .	. . .
Bermuda	. . .	. . .	. . .	. . .	2 . .	. 2 1	2 1 3	4 4 .	8 5 2	4 3 2	2 1 2	4 6 6	7 8 6	4 2 1	. . .	. 1 4	5 6 4	1 . .	. . .	. . 1	2 3 .	. . .	. . .	. . .
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Montreal	. . .	. . .	. . .	. . .	1 . .	. 1	1 1 1	. 2 3	7 4 2	3 3 2	2 2 2	3 6 6	6 7 5	3 2 1	. . .	. 1 3	3 6 3	1 . .	. . .	. . 1	. 3 .	. . .	. . .	. . .
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Los Angeles	. . .	. . .	. . .	. . .	. . .	. . .	. 1 1	. 1 1	3 3 3	2 3 3	2 2 3	1 2 2	1 4 5	3 2 1	. 1 .	. . .	. 2 3	1 . .	. . .	. . .	. . .	. . .	. . .	. . .
Vancouver	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. 1 1	3 2 3	3 3 2	2 2 3	2 2 2	1 3 5	3 2 1	. 1 .	. . .	. 1 3	1 . .	. . .	. . .	. . .	. . .	. . .	. . .
Fairbanks	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	2 2 3	3 3 2	2 2 3	4 3 2	1 2 3	3 2 1	. 1 1	2 1 1	. 1 1	1 . .	. . .	. . .	. . .	. . .	. . .	. . .

The provisional mean sunspot number for March 1984 issued by the Sunspot Index Data Centre, Brussels, was 83·6. The maximum daily sunspot number was 117 on 16 March, and the minimum was 42 on 10 March. The predicted smoothed sunspot numbers for June, July, August and September 1984 are, respectively: (classical method) 51, 50, 48 and 47; (SIDC adjusted values) 39, 38, 37 and 37.

SWL News

*by Bob Treacher, BRS 32525**

Overseas news

John Lord, ORS46084, wrote again from 7Q7. He had received a number of QSL cards of note since his last letter—VU7WCY, KD7P/KH2, 9Q5JE and A6XYB. However, his FRG7700 had been giving him problems, which could entail a trip into ZS this month in order to have it repaired.

Another interesting letter has been received from Philip Aliband, ORS42876, from his QTH in China. He has now mastered the different propagation conditions and was hearing some quite good dx. AH3AA/KH9 and AH9AB are currently the only two stations active from Wake Is. Philip heard them both working dx together on 14MHz. Anyone who worked them both was told that they had qualified for the Worked All Wake Island Award! Both are keen dxers, and AH3AA/KH9 was heard by Philip telling KA6VBI/KH2 that they were determined to put Wake Is on the map. A number of our reporters have mentioned both callsigns, but Wake Is is still a much-needed country on 14MHz for your scribe. G3DAM was Philip's first G station heard. ZL8AAS, on Kermadec Is, had been heard on 21MHz during an expedition, while C21RK and H44IA were logged on 28MHz. KD7P/NH2 was caught on 3·5MHz during CQ WPX at the end of March. BY4AA, operated by VE7BC, was also active during CQ WPX but was having problems. VE7BC was heard to say that the rig would have to be flown back to VE for repair. Philip had received a QSL card from BY4AA, including a friendly letter, in which the operator, Xu Ru, had invited him to visit the station. He was hoping to make the necessary arrangements through the All China Sports Federation as quickly as possible, and will probably be the first "G" to see amateur radio in China —a fact that will make many envious.

LF challenge results

Thirty-six entries for this year's January lf challenge have certainly proved that many swls monitor the lower frequency bands for dx during the long winter nights. I am definitely encouraged by the response and look forward to a similar entry in 1985. This year's event provided some very big scores, the biggest from Don Field, BRS5885, who is actually G3XTT. Don's score of 844 was mainly attributable to his mastery of the 1·8MHz band. He logged 64 countries, 25 of which were outside Europe. DX included FG7AM, HH2VP, HZ1AB, JA6LCJ, TU2NW, ZS5LB, 3V8AG, 5N1ARY, 9K2BE, 9M2AX and 9Y4VU. This entry proves that a competent listener becomes a more accomplished licensed amateur, able to judge openings, and knowing the capabilities of an amateur band. Eric Carling came a very close second with a good all-round score, amassing over 250 points on each of the three bands. Third, with 697 points, was Ian le Page, BRS50134, from Guernsey. He managed to score over 200 points on each band. First-class entries were also received from Robert Small, David Whitaker, Paul Crankshaw and Martin Parry, four well-known contributors to *SWL News*.

January 1984 LF Challenge results

G-LISTINGS

Posn	Callsign	7	3·5	1·8	Points
1	BRS5885	135	139	570	844
2	Eric Carling	268	262	295	825
3	BRS50134	228	209	260	697
4	BRS8841	187	209	270	666
5	BRS25429	143	220	295	658
6	BRS48909	155	204	235	594
7	BRS52543	196	230	165	591
8	BRS32525	140	182	235	557
9	ARS53844	164	192	200	556
10	BRS44395	101	101	250	452
11	BRS31879	61	91	210	362
12	BRS18529	76	128	50	254
13	BRS52422	28	114	20	162
14	BRS85124	38	50	20	108

OVERSEAS LISTINGS

Posn	Callsign	7	3·5	1·8	Total
1	DE0AAA	180	178	475	833
2	SM0-3762	131	212	415	758
3	ONL-383	248	200	275	723
4	ONL-6866	179	201	305	685
5	DE4BAH	189	118	365	672
6	NL-692	104	180	195	479
7	NL-5463	212	194	0	406
8	NL-4483	93	102	165	360
9	SP-0022-KS	95	54	185	334
10	NL-8265	162	168	0	330
11	NL-8818	173	155	0	328
12	NL-7909	44	97	165	306
13	ONL-620	71	124	40	235
14	YU1RS-1012	30	131	0	161
15	ONL-6246	44	49	0	93
16	WDX9JFT	0	91	0	91
17	OE1-0140	14	50	0	64
18	OH9-362	28	25	0	63
19	ONL-2859	1	53	0	54
20	ONL-6945	22	30	0	52
21	ONL-6321	34	16	0	50
	ONL-6337	34	16	0	50

In the overseas listings some very fine entries were received, in particular from Hans Schwarz, DE0AAA. His 833 points made his the highest scoring overseas entry. This was largely due to his forays onto 1·8MHz—a band which he admitted he did not monitor too often. He logged 59 countries, including eight which escaped G3XTT—FC, GJ (!), OY, UO5, Y2 H44IA (31.1.84, 1805, 339), VS6DO (2.1.84, 2302, 549) and 6Y5IC (14.1.84, 0704, 44). Hans uses an FRDX500 into a groundplane and a Beverage. In second place in the overseas section was SM0-3762, better known to dxers as SM0DJZ. His 1·8MHz score of 415 was the third best. Aided by different conditions Jan managed to copy signals from JX5DW and TF3XUU. The challenge therefore provided at least 74 countries to chase on 1·8MHz. On the other bands, Eric Carling's scores of 262 on 3·5MHz, and 268 on 7MHz were the best.

Including G, GM and GU, 12 countries are represented in the results. The entries were well presented, and I would particularly single out those of DE4BAH, SM0-3762 and ONL-6866, who provided valuable multiplier check lists, which although not mandatory, made checking the entries much easier. Perhaps the inclusion of such lists will be the only rule change next year.

Thanks to all those who entered. Commiserations to those who were placed lower than they hoped they might have been, to those who misunderstood the scoring, and to those who could not take advantage of the extra points available on 1·8MHz. See you all in 1985.

28MHz set listening periods

How about a short competition for the summer months? Last year's slps on 28MHz were not too successful so I have tried to brighten them up this year. The rules are as follows: one point for each G station, two points for each European, and three points for each dx station logged in each of the 10 sessions listed below. A station can only be logged once during each session, but can be logged again during a subsequent slp. Multipliers are one for each DXCC country, except that each G county, each US/VE state/province, and each JA, VK and ZL call area, also counts as a multiplier. Final score is points multiplied by multipliers for each session (therefore 10 individual scores). Dates and times (gmt) are as follows, with the hope that there are one or two good openings:

Saturday 23 June	0800-1000	Saturday 14 July	1600-1800
Sunday 24 June	1600-1800	Sunday 15 July	0800-1000
Saturday 30 June	1000-1200	Saturday 21 July	1400-1600
Sunday 1 July	1400-1600	Sunday 22 July	1000-1200
Saturday 7 July	1200-1400	Saturday 28 July	1200-1400

Entries should reach your scribe by Saturday 25 August.

VHF news

This is the first of a regular series of news features on the habits of listeners attracted to the vhf/uhf bands during the summer months. There is not a great deal to report yet as this is being written in mid-April. Martin Parry, BRS52543, sets us on our way with the news of an auroral opening from 1707 to 1745 on 5 April at his YN QTH. He managed to copy ssb from GI, GM and EI, but no new QTH squares were added to his all-time list. On 70MHz, however, some converter troubles had been ironed out and during the early cumulative contests he was able to add ZK square.

The table is to be run on the same lines as last year, and I hope for an even healthier entry this time. The amateur bands above 30MHz certainly provide much in the way of long-distance traffic between June and September. I hope that with the dx copied last year, which was mentioned here, other listeners have been out to equip themselves in readiness for, we hope, a long and dxy summer on vhf.

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

Ray Williams, BRS6072, reported receiving a QSL card from W5LFL for a report on his signals from the shuttle *Columbia* on 4 December. Ray used an FDK TM56B and a Jaybeam groundplane in the roof space. The signals were recorded and later played to the local press, relatives and neighbours.

Phil Oakley is now G6UDY, but spent some time as RS46114. He lives in Worcester and has a difficult take off to the north, so listener reports from the north of England would be appreciated. Phil has promised to confirm YM70g for any listener prepared to send him a report.

For QTH square chasers, I can report that G1BUO will be in EA6 (Minorca) from 31 July to 26 August and will particularly be watching for sporadic-E openings back to G-land. He will monitor 144·300MHz, especially between 1500 and 1600 daily, but at the time of writing was having difficulty in locating a "portable" antenna which he could take with him. If any reader can offer assistance, perhaps they would get in touch with me and a message will be passed to G1BUO. All listener reports will be QSLd.

HF corner

As we start the decline to summer conditions let me first mention some interesting dx logged on the lower bands during April. Harold Moss, BRS18529, copied CP5RJS, J6LB and 9K2DZ on 3·5MHz. VP8ML was a new one for Robert Small, BRS8841, while TK4CW (FC) gave a new prefix. Paul Crankshaw, BRS48909, spent much time on 7MHz, and was rewarded with CE0AE, VP2KBU, VP8KF, VR6TC, YS9RVE, ZL7PA, 4K1F (South Shetlands) and 5T5CJ. On 1·8MHz, Paul had added LA, SM and YV thanks to his new rtty/cw reader—the MBA-RO.

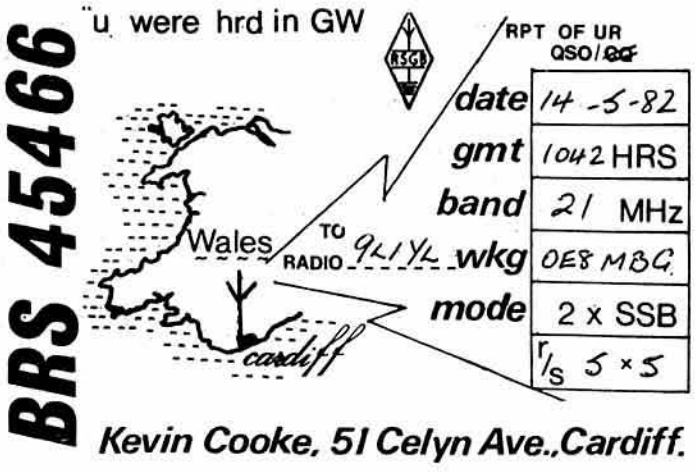
On the higher bands even Robert Small found conditions quite poor during late March and early April. ZL8BQD on 21MHz, and BY1PK and BY4AA on both 14 and 21MHz were the month's highlights. 14MHz also produced ZK1XL, OD5AO, VK9LH (ex VK2AGT/LH), 9M2CO, 9H9MHR, WB4ATV/4S7 and 6V1A (Goree Is). 21MHz provided signals from A4XYU/GFT (special suffix for the Gulf Soccer Tournament) and 4M5ARV/6, a special event station active from Churum-Vena (Angel Falls) in the heart of the Venezuelan jungle.

Portuguese Angola (CR6) was one of the few countries which had not been confirmed, but thanks to *DX News Sheet* publishing a list of old CR6 callsigns and the owner's current callsign, Robert now has a new country confirmed, courtesy of both CR6GE and CR6VA. Information was also published about old CR3-CR9 callsigns. Anyone still needing a card from any of these locations can send me a self-addressed, stamped postcard with the calls needed written on the reverse, and I will pass on the QSL route. Douglas Johnstone, BRS54163, mentioned openings on 28MHz, and PP8JJ and 8P6QR at 0145 on 14MHz. He had changed his antenna system to a 132ft long wire at a height of 35ft, which had improved his dx capabilities.

The last word this time comes from Brad Bradbury, BRS1066, who added CE0FCM/CE0Z for country number 287, while sessions on 10 and 24MHz produced ZP5XDW and 5B4PW respectively.

QSL card competition

Readers will recall the recent competition won by Kevin Cooke, BRS45466, (now GW6MHV). It is worth noting the prize which Kevin won for himself, thanks to the kind offer made by EPS Copycentre at Hove. They promised



The winning QSL submitted by Kevin Cooke, BRS45466, now GW6MHV

1984 HF Countries Table

(starting score 150)

Station	DXCC	28	21	14	7	3·5	1·8	Total
G listings								
BRS8841	—	60	126	144	116	125	40	611
BRS52543	—	74	92	126	129	123	45	589
BRS48909	193	64	114	125	119	112	38	572
BRS25429	176	46	84	99	88	114	51	472
BRS31879	162	42	103	108	64	63	36	466
BRS1066	143	61	97	85	79	53	45	420
BRS50134	149	4	8	13	106	103	36	270
BRS18529	—	1	47	25	53	85	14	227
ARS53844	—	—	—	—	88	96	30	214
RS49875	94	31	50	42	28	20	3	174
BRS44395	—	—	—	—	63	61	40	164
DX listings								
ORS45992	144	16	54	118	13	33	0	234

1984 UHF/VHF Table

Station	QTH loc	70MHz Squares	70MHz Countries	144MHz Squares	144MHz Countries	432MHz Squares	432MHz Countries	Total via*
BRS52543	YN	10	2	25	11	4	2	54a, c
RS49875	YN	—	—	13	5	2	2	22a
BRS32525	AL	—	—	4	2	—	—	6a

* a = tropo, b = Es, c = Ar, d = ms

All-time Countries List

Entry score 750

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS25429	278	311	334	250	229	82	1,484	ssb
BRS32525	267	304	317	253	253	72	1,466	ssb
BRS8841	254	291	314	218	204	56	1,337	cw/ssb
BRS48909	214	250	262	181	144	54	1,105	cw/ssb
BRS1066	192	211	264	164	108	71	1,010	cw/ssb
BRS18529	155	207	263	176	139	50	990	ssb
BRS50134	174	210	229	163	152	54	982	cw/ssb
BRS52543	149	203	206	145	143	51	897	ssb
ORS45992/7Q7	205	245	254	99	79	10	897	ssb
BRS44395	154	212	223	134	77	52	852	cw
ORS46084/7Q7	188	228	234	104	43	1	798	ssb
ARS53844	127	180	165	128	116	45	761	ssb
Average	196	237	255	168	140	50	1,046	

him 250 or 500 *free* QSL cards if he placed an order for cards with them —an offer which Kevin was only too pleased to accept. The Copycentre has recently produced new samples and price lists, and these can be obtained simply by sending an sae to 180 Portland Road, Hove BN3 5QN. In view of this very acceptable offer, I wonder whether any other commercial concern might be interested in providing a small prize for one of the challenges or competitions which are organized by this page occasionally? How about a "sponsor" for the 28MHz slps mentioned earlier?

While on the subject of the QSL card competition, G3KSU's view is that listener reports of cw transmissions—regardless of their "usefulness"—will almost always solicit a reply. His opinion is that *real* amateur radio is hf cw, and few who practice this would deny a *real* swl a QSL card. Interesting views. Any others?

Newcomers

Geoff Curtis, BRS20104, has recently rejoined the Society after 22 years of inactivity. A battery receiver and an Eddystone 740 purchased for £35 in 1951 brought in 320 countries (95 per cent of them by cw) by the early 'sixties. As all countries had been heard at that time, apart from a few uninhabited spots, Geoff gave up the amateur game and concentrated on the bc bands. A Trio R600 has now taken the place of the trusty 740, and Geoff is back in business; 1·8MHz had provided VK6HD, while 3·5MHz came up with VU2BX. On 14MHz, ZK1XL, FO8BI, JT0DJT and KH6CF had been heard, together with FG7BT and FY7CT working each other on an otherwise dead band at 2310 on 14,070kHz on 4 April. Geoff would be particularly pleased to hear from any fellow-swls of the 'fifties who remember his BRS number appearing in *The RSGB Bulletin*. He mentions Bill Wilkinson, BRS20317, Norman Smith, D. McLean, R. Pennells, K. Parvin and H. Graham. Geoff's QTH is 45 Holyrood Avenue, South Harrow, Middx.

M. Wilcox, RS50930, wrote regarding the apparent pirating of the callsign VE7VK. He heard this station in QSO with G and GM stations on 21MHz on 4 March at 1600, but the *Callbook* listing shows him as a silent key.

Finale

Please keep the mail coming with your news, views and table scores. Copy for the August issue should reach your scribe no later than Tuesday **12 June**, with late copy by Tuesday **19 June**. □

QRP

*by Rev George Dobbs, G3RJV**

CW Novice Award to be extended

The G QRP Club CW Novice Award, offered for the period of the EUCW Year of the Novice in 1983, is being extended for a further year because of its success. The aim is to encourage new licensees to become regular cw operators on the hf bands. It is open to any newly-licensed amateur station who makes cw contacts with 50 different radio amateur stations during his or her first year on the air. The contacts may be on any band for which the licence is valid, and must be on cw. There are two classes: Class A, all contacts must have been made when the applicant was running a power not exceeding 5W dc input and 3W rf output; Class B, any legal power may be used. Applications must consist of a list of the stations contacted, including date and band used. The list must be signed by the applicant and another licensed amateur who has seen the logbook entries. For Class A the applicant must include a signed statement that no more than the permissible power was used during the contacts. UK applicants must include 50p in UK stamps, and overseas applicants three ircs. Applications to: Mr A. D. Taylor, G8PG, 37 Pickerill Road, Greasby, Merseyside L49 3ND.

Heathkit announce a new QRP cw transceiver

For many years the Heathkit HW8 has been the most popular commercial QRP cw transceiver, following the much maligned, but very popular, HW7 transceiver. Without doubt this useful little rig has been the most amateur-modified transceiver and QRP literature is full of modifications; so much material exists that Fred Bonavita, W5QJM, is preparing an anthology of HW8 modifications in booklet form.

Early this year Heathkit announced they were to cease production of the HW8 and replace it with a model HW9, and I have just received an advanced specification sheet for the new model from W5QJM. The HW9 is a cw superhet transceiver for the 3·5-21MHz bands, with an HWA9 accessory band pack to extend the range to the three new WARC bands and the 28 to 28·25MHz band. The basic HW9 is the same size as the HW8, having a continuously variable rf output up to 4W. It is broadband tuned with a four-pole crystal filter, a double-balanced mixer front-end, a built-in active audio filter, automatic agc, and receiver incremental tuning. The price has yet to be announced but is expected to be in the $250 range, which does not bode well for a reasonable UK price.

The AGCW-DL Summer QRP Contest, 21-22 July 1984

The start and finish times are 1500gmt, with only 15h total operating permitted on all bands 1·8 to 28MHz. Classes: A—single-operator below 3·5W dc input; B—single-operator below 10W input; C—multi-operator below 10W input; D—QRO stations over 10W input. Exchange RST/QSO number/input power, adding "X" if crystal-controlled. Either crystal-controlled or vfo operation is allowed on each band, but not both; crystal-controlled stations are limited to three crystals/band. Stations may be worked only once on each band. Scoring is one point/QSO with your own country, two with your own continent, and three for dx contacts. Multiplier is one for each DXCC country, and one for each DX QSO. Result for each band is QSO points × multiplier, and the total result is the sum of the band results. For crystal-controlled stations the points are doubled. Certificates for the first three stations in each class. Separate logs for each band to be sent to Siegfred Hari, DK9FN, Spessartstrasse 80, D - 6453 Seligenstadt, West Germany; to reach him not later than six weeks after the contest.

Sidetone for the OXO mini-transmitter

In *QRP, Rad Com* October 1983, p904, I described the simple OXO mini-transmitter, a good "starter circuit" for home-constructed QRP operation, and in subsequent issues I described additions to that circuit. Fig 1 shows a simple sidetone oscillator which can be used to give a monitor tone when keying the OXO. Almost any keyable audio oscillator would serve the purpose, the only real problem is that a sophisticated circuit, although elegant, might end up being more complex than the transmitter itself. One unijunction transistor provides enough audio output to monitor the keying, albeit a rather rasping sawtooth note. The device is the common TIS43, although other common types such as the UT46, 2N2160, 2N2646, 2N4891 etc could be used. The frequency of this basic relaxation oscillator is controlled by C1 and R1, and constructors may adjust R1 for the most desirable tone. The output is taken from base 1 and coupled via C2 to the headphones of the receiver in use. There is no volume control in this simple circuit, but the value of R3 can be adjusted to give the required audio injection. Not much of a circuit but it does eliminate the problem of deaf keying.

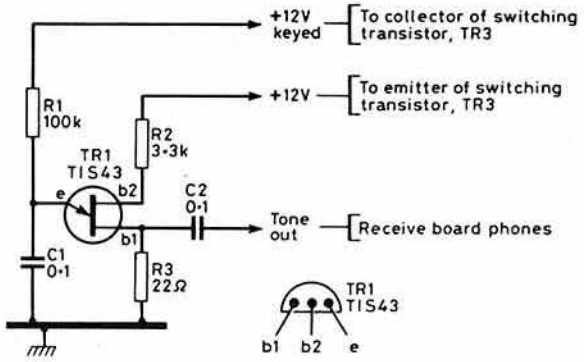


Fig 1. Sidetone circuit for the OXO mini-transmitter

BOOK REVIEWS

Foundations of Wireless and Electronics (10th edition, 1984)
by M. G. Scroggie, assisted in this edition by S. W. Amos, 551 pages + XVI (207 by 128mm), ISBN 0-408-01202-1. Published by Newnes Technical Books, available in limp and hard covers. Prices not stated by publisher.

Beginner's Guide to Radio (9th edition, 1984)
by Gordon J. King, G4VFV, 266 + VI pages (184 by 121mm). ISBN 0-408-01456-3. Published by Newnes Technical Books, soft covers. Price not stated by publisher.

These are both new editions of well-established introductory guides to the principles and practice of radio—though the "foundations" covers also the technology of television, radar, digital electronics and, in this latest edition, computers; whereas the "beginner's guide" confines itself to radio and does not attempt to go nearly as deeply into basic theory. It also eschews to a greater extent the rather more mathematical but thorough treatment traditionally associated with Marcus Scroggie, who, some 60 years ago was 5JX of Edinburgh, but who for so long contributed to *Wireless World* under the pen-name of "Cathode Ray". He has been ably assisted in this edition by Stanley Amos, for many years head of BBC engineering training.

Nevertheless the newcomer to amateur radio might find Gordon King's book easier to grasp, and possibly more helpful and practical in coming to terms with hf and vhf communications, since "foundations" is concerned more with aspects of radio broadcasting and good-quality audio than with radio communications. Both books are now based largely on semiconductor devices, though both retain something of the basics of valves, and are concerned more with reception than transmission. They can be recommended for those seeking to understand the elements of radio, though neither is an examination primer as such. The more serious student will gain more from Scroggie/Amos than King, particularly in basic electrical and electronic theory. The less dedicated may find the beginner's guide the more readable without tears—though since 1936 umpteen thousands have built their knowledge of radio on the solid "foundations"!

Foundations: general view (17pp); electricity and circuits (26pp); capacitance (12pp); inductance (13pp); alternating currents (14pp); capacitance in ac circuits (14pp); the tuned circuit (19pp); diodes (22pp); triodes (20pp); the triode at work (13pp); transistor equivalent circuits (29pp); the working point (10pp); oscillation (21pp); modulation (15pp); transmission lines (15pp); radiation and antennas (23pp); detection (24pp); af amplification (37pp); selectivity and tuning (15pp); rf and i.f. amplification (28pp); cathode-ray tubes: television and radar (34pp); non-sinusoidal signal amplification (16pp); electronic waveform generators and switches (23pp); computers (14pp); power supplies (28pp); plus five appendices.

Beginner's Guide: Electricity and magnetism (30pp); radio signals (15pp); signal propagation and reception (34pp); transmitter principles (21pp); receiver principles (34pp); radio components (38pp); valves, solid-state devices and transistors (34pp); integrated circuits (12pp); microphone, pickup and loudspeaker (8pp); radio receivers (12pp); citizen's band radio (22pp).

G3VA

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Contest News

IARU Region 1 VHF/UHF/SHF Contest rules

1. Eligible entrants. All licensed amateurs in IARU Region 1 can participate in the contests. Multi-band entries from UK groups competing in the IARU Region 1 UHF/SHF Contest, working from a single location and using one callsign on each band, will be accepted for the "all other stations" section of the contest. The contest entry should show which single callsign should be used in the final tabulation of the results. Contestants must operate within the letter and spirit of the contest and at no greater power than permitted in the ordinary licences of their country. Stations operating under special high power licences do so *hors concours* and cannot be placed in the contest proper.

2. Contest sections. The contest will comprise two sections for each band:

1. Single-operator station, operated by the owner of the licence (no club stations).

2. All other stations.

3. Dates of contests.

VHF contest: the contest will take place during the weekend of 1 and 2 September 1984 on the 144MHz band.

UHF/SHF contest: The contest will take place during the weekend of 6 and 7 October 1984 on all bands from 432MHz to 24GHz.

4. Duration of contest. The contests will commence at 1400gmt on the Saturday, and end at 1400gmt on the Sunday.

5. Contacts. Each station can be worked only once on each band, whether it is fixed, portable or mobile. If a station is worked again during the same contest, only one contact will count for points, but any duplicate contact should be logged without claim for points and clearly marked as duplicate. Contacts made via active repeaters, translators, eme or meteor scatter do not count for points. Any telephony contacts made with stations generating in the cw (A1A) sub-bands shall not count for points.

6. Type of emission. Contacts may be made on A1A, R3E, J3E, or F3E. F2A may be used above 1GHz. Only one transmitter may be used on each band at any time.

7. Contest exchanges. Code number exchanges during each contact shall consist of the RS or RST report, followed by a serial number commencing at 001 for the first contact on each band, and increasing by one for each successive contact on this band. This must immediately be followed by the QTH locator of the sending station (eg 59 003 GX24j or 579023 HG46e).

8. Scoring. Points will be scored on the basis of 1 point per kilometre. The final claimed score must be shown on the first sheet.

9. Entries. Entries should be sent to the RSGB VHF Contests Committee, c/o the adjudicator for the RSGB contest on the same date. Separate cover sheets (Form 427) should be completed for the RSGB and IARU events, but common log sheets may be used with both radial ring and points per kilometre scoring shown.

10. Awards. The winner of each section will receive a certificate. The entrants compete for the following challenge trophies:

VHF contest: (a) The IARU Region 1 VHF Trophy, for the winner of the single-operator 144MHz section. (b) The PZK Trophy for the winner of the all other stations 144MHz section.

UHF/SHF contest. (a) The Vittoria Alata Cup 1, for the winner of the single-operator 432MHz section. (b) The Vittoria Alata Cup 2, for the winner of the all other stations 432MHz section.

Overall winner: An overall winner of the IARU Region 1 UHF/SHF Contest will be declared. For this competition the scores of entrants will be combined using the following multipliers:

432MHz	× 1
1,296MHz	× 5
2,320MHz	× 10
Higher bands	× 20

The entrant with the highest score will be awarded an IARU Region 1 Medal.

The organizing society in 1984 is the RSGB.

IARU Region 1 VHF/UHF/SHF Listeners Contest rules

The IARU Region 1 VHF/UHF/SHF Contest rules should be used, with the following differences:

1. Eligible entrants. All listeners in Region 1 may take part. Licensed amateurs are not eligible to enter.

2. Contest sections. (a) There will be one section in the September 144MHz contest. (b) There will be one section for each band from 432MHz to 24GHz in the October contest.

5. Reporting. Any station may be logged only once on each band, whether it is fixed, portable, or mobile. CQ or test calls will not count for points and should not be logged. Stations heard via active repeaters, translators, eme or meteor scatter do not count for points. The callsign of the station contacted by the station heard may only appear five times, or if there are more than 100 QSOs logged, only once in every 20 logged contacts.

8. Scoring. Points will be scored on the basis of one point per kilometre between the listener and the station heard.

144MHz Trophy & SWL Contest rules

1400-1400gmt, 1-2 September 1984

The following general rules, published in the supplement to the January 1984 issue of *Radio Communication*, will apply: 1, 2, 3, 4f, 5a, 6a, 7a, 9, 10a, 11a, 12b, 13-24.

If the concurrent IARU event is also being entered, please complete an extra cover sheet (Form 427), and score contacts in accordance with both rules 7a and 7b.

The Mitchell-Milling Trophy will be awarded to the leading station in the all other stations section, and the Thorogood Trophy to the leading single-operator station.

All entries and checklogs to: VHF Contests Committee, c/o D. A. Yorke, G4JLG, 40 Edge Fold Road, Worsley, Manchester M28 4QF.

RSGB UHF/SHF Contest rules

1400-1400gmt, 6-7 October 1984
Bands: 432MHz to 24GHz

This contest coincides with the IARU Region 1 UHF/SHF Contest. Each band will be tabulated individually and no multipliers will be used. Contestants wishing to enter the IARU contest should clearly state this on the summary sheet (Form 4422). On 2·3GHz and above crossband contacts will count for half-points. Crossband contacts must be clearly marked in the logs.

The following general rules, published in the supplement to the January 1984 issue of *Radio Communication*, will apply: 1, 2, 3, 4f, 5a, 6a, 7b, 9, 10b, 11a, 12b, 13-24. All entries and check logs to: VHF Contests Committee, c/o R. W. Marshall, G4ERP, 44 Malleson Road, Gotherington, Cheltenham, Gloucestershire GL52 4ET.

144MHz Low Power & SWL Contest rules

0900-1700gmt, 5 August 1984

A multiplier system will be used in this contest. Contacts should be scored as per general rule 7a, and the final score multiplied by the total number of counties and countries worked. County code letters shown on page iv of the *Rad Com* Operating Guide 1984, or the full county name, should be included in the contest exchange and recorded in column vi (QTH received) in the log. Each new multiplier claimed should be clearly marked in the log. Transmitter output must not exceed 25W p.e.p. The following general rules, published in the supplement to the January 1984 issue of *Radio Communication*, will apply: 1, 2, 3, 4e, 5a, 6a, 7a, 9, 10a, 11a, 12b (see above), 13-24. All entries and checklogs to: VHF Contests Committee, c/o P. Suckling, G4KGC, 46 Windsor Close, Towcester, Northants NN12 7JB.

432MHz Low Power & SWL Contest rules

1700-2300gmt, 4 August 1984

A multiplier system will be used in this contest. Contacts should be scored as per general rule 7a, and the final score multiplied by the total number of counties and countries worked. County code letters shown on page iv of the *Rad Com* Operating Guide 1984, or the full county name, should be included in the contest exchange and recorded in column vi (QTH received) in .he log. Each new multiplier claimed should be clearly marked in the log. Transmitter output must not exceed 10W p.e.p. The following general rules, published in the supplement to the January 1984 issue of *Radio Communication*, will apply: 1, 2, 3, 4e, 5a, 6a, 7a, 9, 10a, 11a, 12b (see above), 13-24. All entries and checklogs to: VHF Contests Committee, c/o G. M. C. Stone, G3FZL, 11 Liphook Crescent, Forest Hill, London SE23 3BN.

1,296/2,320MHz Contest rules

0900-1700gmt, 19 August 1984

This is a new event intended to help promote activity on 2·3GHz in particular. Results will be published in the form of an overall table in accordance with general rule 8b. Other bands may be used for talkback during the contest. The following general rules, published in the supplement to the January 1984 issue of *Radio Communication*, will apply: 1, 2, 3, 4e, 5a, 6a, 7b, 8b, 9, 10b, 11a, 12b, 13-24.

All entries and checklogs to: W. J. McClintock, G3VPK, Maple Leaf, Great Braxted, Witham, Essex CM8 3EJ.

March 144/432MHz Contest

The publication of the results of this contest will be delayed due to investigations into reports of poor quality signals from some stations.

Low Power Field Day July 1984 rules

The rules have been kept the same as last year. Operation will again be on a dual band basis, using 3·5MHz in the morning period and 7MHz in the afternoon.

Introduced for the first time last year, this dual band operation is still on a trial basis. Participants are again invited to comment on the present rules as well as to suggest possible alternative formats for Low Power Field Days.

Fixed stations are encouraged to send in check logs; as detailed below, a certificate will be awarded to the fixed station who gives most points to portable stations.

Low Power Field Day, as a QRP operating event, offers the attractive combination to newcomer and oldtimer alike of relatively simple portable operation logistics, short sharp operating periods, and a day out in the fresh air! *G3TXF*

1. The general rules for RSGB hf contests, published in the supplement to the January 1984 issue of *Radio Communication*, will apply.

2. Eligible entrants. RSGB members resident in the British Isles. Multi-operator entries will be accepted.
3. Date, Operating Periods: Sunday, 15 July 1984.
1) 0900–1200gmt on 3·5MHz between 3·520 and 3·570MHz only.
2) 1300–1600gmt on 7MHz between 7·010 and 7·040MHz only.
4. Sections: A) 15W dc input maximum
B) 5W dc input maximum
5. Contest call and exchange. Call CQ FD. Exchange RST plus serial number, starting at 001, on each band, together with location (defined by a place name) and county code (see the supplement to the January 1984 issue of *Radio Communication*).
6. Scoring.
Portable or mobile stations.....15 points per QSO
Fixed stations.....5 points per QSO
A station may be worked once on each band.
7. Special conditions.
a) Power. The power for all parts of the station must be derived from dry batteries, accumulators, or "natural" sources (eg solar cells or wind-driven generators). The practice of float charging batteries from petrol, gas, or diesel driven generators is not permitted.
b) Equipment. Entrants using equipment capable of running more power than the specified input power for the section entered must specify how the power limit was adhered to.
c) Antennas. The maximum height must not exceed 35ft (11·5m) above ground level.
8. Logs. Standard RSGB hf contest log sheets (HFC1) must be used, with column (5) headed "Location and county code received".
9. Declaration. The log sheets must be accompanied by the standard RSGB hf contest summary sheet (HFC2) with the declaration signed by the operator responsible for the contest entry.
10. Address for logs. Logs should be postmarked not later than Monday 30 July 1984 and sent to RSGB HF Contests Committee, c/o N. S. Cawthorne, G3TXF, 10 Wilton Grove, New Malden, Surrey KT3 6RG.
11. Awards
a) The Houston-Fergus Trophy will be awarded to the leading station in the 15W section.
b) Certificates of merit will be sent to the first three stations in each section.
c) A certificate of merit will be awarded to the fixed station, irrespective of power, who gives most points to portable stations, and who submits a check log.

February 432MHz Fixed Station Contest 1984 results

Conditions during the contest were generally considered to be poor, although G4JLG thought them to be "rather above average", and, despite contestants comments on lack of activity from Continental stations, several were worked during the event.

A few comments were made to the effect that the lack of QTH exchange made distance calculation difficult—perhaps indicating that the large scale QTH locator map is not a standard feature in the shack of some newly-licensed stations. There were no bad signal reports from contestants and the standard of logkeeping was generally good, with few, very few, points being lost due to incorrect entries.

The single-operator section was decisively won by G8TFI with a checked score nearly double that of the runner-up G8XVJ. In the multi-operator section, the Norfolk VHF/UHF Contest Group, G4LOJ, had a clear lead over G8ZHP, operated by the Five Bells Group, who used their larger than average antenna system to advantage to hold their second position.

Congratulations and certificates go the the winner and runner-up in both sections. *G3LCH*

SINGLE-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	Ant	Best dx	Km
1	G8TFI	1,414	196	YL29	4×16e	DB2VY	704
2	G8XVJ	763	111	YN48	2×21e	ON5NY	468
3	G3JXN	557	127	ZL39	1×21e	GD2HDZ	409
4	G3XDY	535	82	AM77	4×17e	DJ9NL	418
5	G4MDZ	466	68	AL76	4×19e	G8PNN	502
6	G4JSX	396	88	ZM45	1×18epb	G8PNN	320
7	G6DER	313	59	ZN33	1×21e	G4CQR	298
8	G4JLG	307	63	YN39	1×88emb	G8FEZ	320
9	G8PNN	262	30	ZP52	2×21e	G4CQR	483
10	G4TBR	187	68	ZL27	2×19e	G4JLG	233
11	G5UM	167	39	ZM26	1×14e	G4PEC	253
12	G8XPZ	163	37	ZN74	1×48emb	G4CQR	239
13	G6HKM	162	40	AL13	1×19e	PA0EZ	327
14	G6TEP	118	26	AL47	1×17e	G3UVR	370
15	G6ZEK	67	23	YN79	1×48emb	G3BW	212
16	G4FOH	47	13	ZM60	1×21e	G6DER	160
17	G6TTW	39	17	ZL29	1×21e	G4BCQ	200
18	GM3TAL	4	4	YQ73	1×18epb	GM8NNG	25

MULTI-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	Ant	Best dx	Km
1	G4LOJ	916	99	AM37	2×27eql	DB2VY	536
2	G8ZHP	710	118	ZM29	8×21e	DB2VY	585
3	G4NUT	690	137	ZM77	2×21e	DB2VY	627
4	G3UVR	681	108	YN55	1×21e	G6JND	388
5	G6JDC	603	99	ZN54	1×88emb	GJ4ICD	462
6	G4RFR	376	66	ZK11	4×24eql	DL1EBR	577
7	G4LNV	357	77	ZL46	2×48emb	G8PNN	428
8	G6TMP	350	72	YM38	4×17e	G4MDZ	298
9	G3GJL	331	61	YM58	2×19e	GM8MNG	390
10	G4VIX	279	81	AL32	1×19e	G8YTF	340
11	G8UIL	270	88	ZL59	1×24epb	G6WZO	317
12	G8EBT	245	39	ZO75	2×48emb	G8BQX	372
13	G3SWB	184	64	ZL10	1×48emb	G3UVR	253
14	G3UCU	134	66	ZL40	1×12e	G4BCQ	217
15	G4TVI	130	38	AL24	2×88emb	PA0EZ	310
16	G6SKU	121	30	YM60	1×21e	GJ4ICD	385
17	G6WZO	109	31	YN35	1×21e	G8UIL	317
18	G8YEE	106	32	YN69	1×19e	G4VIX	255
19	G6PNB	76	20	YL38	1×19e	G3XDY	267

Check logs gratefully acknowledged from: PE1EWR, GJ4ICD, G6CSY/P and G6XSU.

Affiliated Societies Team Contest 1984 results

This year's AFS saw a slight drop in entries, from 97 down to 91, but an increase in the total of logs received to 375, suggesting that those clubs which did enter managed to get more support from their members. Entrants in the south commented on the poor conditions for the first hour and a half.

The first six club positions remain unchanged despite exhaustive checking, and the East Barnet club is to be congratulated on winning the Edgware Trophy for the fourth time, particularly in view of the sad loss of Ed, G3XTJ. A solid performance from the Leicester Poly group, with great strength in depth, raises it into second place ahead of Stockport. Behind these three traditional leaders Addiscombe, Hereford, Verulam and White Rose improved on last year's performance in the top ten. Stockport, Leicester Poly, East Barnet, Govt Comms, Conwy Valley, RNARS Belfast and Glenrothes will receive certificates as the leading clubs in each RSGB zone.

Top individual scores are down on last year, reflecting somewhat worse conditions. Here again the traditional leaders repeated their performances (new stars needed!). The first three positions reflect the claimed order, although all three lost points in checking. G3PEK rose from last year's second place to win the individual certificate.

Logs were very variable in quality. Most lost points were due to callsign errors, although heavy losses were largely caused by unmarked duplicates, of which there were 114 in all. The amount of checking to be done is now so great that G4BUO, G3TXF and BRS20249 formed a team to share the burden: an estimated 20,000 QSOs took place, which works out at about 1·2 QSOs per kHz per minute—that sounds like QRM!

The HF Contests Committee realises that many entrants are not regular contesters, and is very pleased that they are prepared to help their clubs in this event. However, the large number of non-standard log sheets makes checking more difficult than it need be. Perhaps the contest afficionados within each club could ensure that all their team members are issued with a supply of hf contest log sheets before the contest starts. The particular hates of all three adjudicators were the sheets torn from station logbooks and therefore presenting the contest details sideways, and on both sides of the paper. Serial number in and out columns were frequently reversed on this type of log, and in one case missed out altogether. It *is* possible to achieve a correctly formatted computer log: G3UJV submitted a superb log generated on a BBC micro and printed on standard RSGB log sheets, but most computer logs had other than 40 contacts per page, and columns transposed or missing. The adjudicator had to make reduced photocopies of two logs before they would fit in the pile for checking, but will definitely not be so generous next time.

Once again the committee thanks all entrants for making AFS the most hectic four hours of the contest year, and looks forward to a big turnout in 1985. *G4BUO*

TEAM SCORES

Posn	Society	Total points	Stations contributing to score					No of entries
1	East Barnet ARCC	9,701	G3RPB	G3RTE	G3XTT	G3POI	G3RFS	6
2	Leicester Poly ARS A	9,258	G3SJJ	G3RIR	G4BCA	G3ORY	G3SDC	5
3	Stockport RS A	8,947	G3PEK	G3NOM	G4MCC	G4MUL	G3HQH	5
4	Addiscombe ARC	8,157	G3UFY	G3SJX	G3ROZ	G4ALE	G3VYI	5
5	Hereford ARS A	8,018	G4CNY	G3HVX	G3FKH	G4FAD	GW3MPB	5
6	Thames Valley ARTS A	7,608	G3TXF	G3SXW	G3JEQ	G3OGP	G3JNB	5
7	Verulam ARC A	7,529	G3VER/A	G4DJX/A	G4DUS	G3UJV	G4BOU	5
8	Govt Comms ARC A	7,326	G3SSO	G3FXA	G3JTG	G3COQ	G3AGF	5
9	White Rose ARS A	6,984	G3VMW	G3VTY/A	G3PSM	G3WSZ	G4IUF	5
10	Crawley ARC	6,404	G3GRO	G3YVR	G3JKF	G4IQM	G3KAU	5
11	Leicester Poly ARS B	6,288	G4ARI	G4FPH	G4GLC	G4KRS	G4CZB	5
12	Surrey RCC	5,791	G3IAS	G6LX	G3BFP	G3EUE	G3KXT	6
13	Edgware & DRS A	5,724	G3ASR	G3SHY	G3PSP	G4IUZ	G4HMD	5
14	Farnborough & DRS	5,567	G3OLB	G3VAA	G4ISK	G4HZV	G4BJQ	6
15	Preston ARS A	5,464	G4QBK	G3SYA	G4RFA	G4RNF	G3NKL	5
16	Wirral ARS	5,251	G3CSG	G3UVR	G4EWJ	G2FOS	G4KPY	5
17	Stockport RS B	5,118	G4FAS	G4ECI	G4IXF	G3KAF	G3RUG	5
18	Worthing & DRC	5,117	G3FXB	G4FNL	G4LGK	G3LQI	G4OAY	6
19	RNARS Portsmouth	5,070	G3JFF	G3LIK	G3TZL	G3LPN	G3BZU	6
20	Maidenhead & DARC A	4,994	G3WYK	G3VCT	G3FVC	G3TWG	G3LVW	5
21	Glenrothes & DARC A	4,911	GM3OLK	GM3YOR	GM3ZSP	GM4EJI	GM4SJL	5
22	Grimsby ARS A	4,807	G3RSD	G4EBK	G3HTI	G3PJS	G3RXP	5
23	Gravesend RS	4,770	G4BUO	G3GRS	G4FJW	G4CHL	G3BPE	5
24	Echelford ARS	4,607	G3KKQ	G3MCK	G3VFB	G4NNS	G4GSC	6
25	Scunthorpe ARC	4,581	G3PDL	G4JJY	G4OGB	G4OCU	G4NFX	5
26	RNARS London	4,504	G4HMS	G3LCS	G4FRN	G3AQM	G3OZY	6
27	Leicester RS A	4,331	G4OOS	G4CWY	G4ITP	G4MJZ	G4GVC	5
28	Leicester Poly ARS C	4,240	G4EOF	G3AAQ	G4NOV	G4ABX	G4OOR	5
29	Crawley Court ARG	4,201	G4IBA	G4DBL	G4DZS	G3OGY	G4EZC	5
30	W of Scotland ARS	4,037	GM4FDM	GM4CXM	GM4LGM/A	GM4LCP	GM4FVQ	5
31	Aberdeen ARS	4,027	GM3WTA	GM3OXC	GM4SID	GM3DZB	GM3VEY	5
32	RSARS	3,921	G3EJF	G3ASM	G3IBB	G4RS	G4KIC	7
33	Gloucester ARS	3,904	G5BM	G3MA	G4HFT	G4CIB	G4SHB	5
34	Newark & DARC	3,690	G3ZOA	G3TBK	G4HVC	G4BPE	G4SDZ	5
35	Torbay ARS	3,674	G3TIR	G3NJA	G3LHJ	G4OYC	G3UFZ	6
36	Verulam ARC B	3,650	G4JKS	G4JBD	G4KLQ	G4HKA	G4FUB	7
37	Southgate ARC	3,640	G3RWL	G3KTZ	G4KZD	G4GYP	—	4
38	Ariel RG	3,580	G3COJ	G3AYC	G3TDL	G3CIK	G2BCI	5
39	Colchester RA Leeds & DARS	3,551 3,551	G3YAJ	G3CCZ	G3FIJ	G4HKC	G4LZB	5 4
			G4FIM	G4LYA/P	G4IDC	G4KKQ	—	
41	Halifax & DRS	3,391	G3IGW	G4MH	G4GLL	G4SDX	G3ONQ	5
42	Plymouth ARC	3,344	G3ZYY/A	G3ULN	G4HTD	G4PZI	G4SCH	5
43	Yeovil ARC	3,304	G4UPS	G3ATK	G4JBH	G3GC	G3BEC	5
44	Sutton & Cheam RS	3,251	G4CWH/A	G2DMR	G3CDK	G3LCH	G3CWL	6
45	RNARS Nottingham	3,250	G4ERT	G4SFO	G3TZM/A	G4MQM	—	4
46	Bury RS A	3,138	G3VNQ	G3IVG	G3BRS	G4FOT	G4TBT	5
47	Stockport RS C	3,114	G3KRG	G3GMM	G4FFW	G4TQM	G4RHB	5
48	RAFARS	3,088	G2FIX	G3ICH	G3GNS	G3YRM	—	4
49	Govt Comms ARC B	3,060	G3SNN	G3IFB	G4MEM	G3MZV	G8DV/A	5
50	Bromsgrove & DARC	3,047	G4AAL	G4IUX	G4NTK	G2CLN	G4PKW	5
51	Cheltenham ARA	2,890	G3BZR	G3ZKN	G3BCC	G4PDQ/A	G4VXE	5
52	Cray Valley RS	2,810	G3XRX	G3SXE	G3DCC	G4BWV	—	4
53	Bishops Stortford ARS	2,550	G3TVW	G5ZG/A	—	—	—	2
54	W Kent ARS	2,520	G4FDC	G3AIO	G4OTV	G3ZZD	G4DRV	5
55	Preston ARS B	2,458	G4NBD	G3DWQ	G4DBU	G3KCC	G4OTN	5
56	White Rose ARS B	2,417	G4NXY	G4FKS	G4UZN	G4VRW	G3KWT	5
57	RNARS Stockton	2,337	G4MVA/A	G3AWR	G4FCH	—	—	3
58	Worcester & DARC	2,220	G3TOD/A	G4RMV	—	—	—	2
59	Shefford & DRS	2,217	G3FJE	G3DOT	—	—	—	2

Posn	Society	Total points	Stations contributing to score					No of entries
60	Hereford ARS B	2,138	G4FFD	G3WRQ	G4JSN	—	—	3
61	Reading ARC	1,957	G3AKF	G3SCZ	—	—	—	2
62	RNARS Liverpool	1,850	G3SGO	G4FMI	G4HWK	—	—	3
63	RNARS Rosyth	1,707	GM3UM	GM3HUN	GM4FGD	—	—	3
64	Aberdeen ARS B	1,690	GM4SZA/P	GM3HGA	GM3UU	GM3ZBE	GM4TEF	6
65	Conwy Valley ARC	1,647	GW3JI	GW3MDK	GW3QN	—	—	3
66	RNARS Harrogate	1,630	G4JRE	G4ODS	G3FBP	—	—	3
67	S Birmingham RS	1,627	G4EYD	G4FCO	G3KKB	G3OXL	—	4
68	S E Kent ARC	1,477	G4IMP	G3VSU	G4EGO	G4SAU	G4MPA	5
69	Leicester RS B	1,427	G4JDT	G3TOF	G4LRO	G4KKS	G4EPA	5
70	Hornsea RC	1,350	G4IGY	G3TLI	—	—	—	2
71	E Cleveland ARC	1,320	G4EVS	—	—	—	—	1
72	S Manchester RC	1,317	G3SVW	G4MYB	G4ROM	—	—	3
73	Maidenhead & DARC B	1,300	G4GGV	G4OTR	—	—	—	2
74	RNARS Plymouth	1,200	G4KKZ	G3VNG	G3HIS	G8AV	—	4
75	RNARS Culdrose	1,190	G4AMT	G4KNM	—	—	—	2
76	RNARS Cardiff	1,020	GW4KVJ	GW4HDB	G4COI	—	—	3
77	Thames Valley ARTS B	997	G3BPM	G8SM	—	—	—	2
78	RNARS Wisbech	960	G3UOF	—	—	—	—	1
79	Stockport RS D	954	G3SNX	G4GRU	G4HXB	G4IAL	G4GOC	5
80	RNARS Medway	940	G3WP	G4CZD	G6SX	—	—	3
81	Lowestoft & DRC	917	G4KDL	G3JRM	—	—	—	2
82	Grimsby ARS B	880	G4HZF	G4PYD	G4CFO	—	—	3
83	Edgware & DARS B	790	G3ZDJ	—	—	—	—	1
84	Glenrothes & DARC B	730	GM3PFO	GM3YBQ	—	—	—	2
85	Preston ARS C	584	G4KMC	G4RPW	—	—	—	2
86	Leicester Poly ARS D	490	G4EWT	—	—	—	—	1
87	RNARS Copenhagen	380	OZ3QN	—	—	—	—	1
88	RNARS Belfast	270	GI3VQ	—	—	—	—	1
89	Yeovil ARC B	250	G3KSK	G3COR	—	—	—	2
90	Plymouth ARC B	140	G4KXZ	G4FJZ	G4GWK	—	—	3
91	Bury RS B	110	G2DWB	—	—	—	—	1

INDIVIDUAL SCORES

Posn	Callsign	Score	Society
1	G3PEK	2,371	Stockport A
2	G3SSO	2,252	Govt Comms A
3	G3NOM	2,146	Stockport A
4	G4CNY	2,127	Hereford A
5	G3RPB	2,122	E Barnet
6	G3RTE	2,092	E Barnet
7	G3FXB	2,030	Worthing
8	G3SJJ	2,007	Leicester Poly A
9	G3TXF	1,996	Thames Valley A
10	G3RIR	1,980	Leicester Poly A
11	G3SXW	1,954	Thames Valley A
12	G4MCC	1,930	Stockport A
13	G4BCA	1,924	Leicester Poly A
14	G3VER/A	1,920	Verulam A
15	G3XTT	1,890	E Barnet
	G4BUO	1,890	Gravesend
17	G3UFY	1,870	Addiscombe
18	G3ORY	1,830	Leicester Poly A
19	G3VMW	1,810	White Rose A
20	G3POI	1,797	E Barnet
	G3RFS	1,797	E Barnet
22	G3FXA	1,790	Govt. Comms A
	G3GRO	1,790	Crawley
24	G3VTY/A	1,780	White Rose A
25	G3HVX	1,737	Hereford A
26	G3SJX	1,717	Addiscombe
27	G3WYK	1,700	Maidenhead A
28	G3RQZ	1,690	Addiscombe
29	G3FKH	1,680	Hereford A
30	G3PDL	1,650	Scunthorpe
31	G4DJX/A	1,630	Verulam A
32	G3YVR	1,584	Crawley
33	G3OLB	1,540	Farnborough
34	G3PSM	1,524	White Rose A
35	G3SDC	1,517	Leicester Poly A
36	G4DUS	1,494	Verulam A
37	G3JKF	1,490	Crawley
38	G4ALE	1,480	Addiscombe
39	G3ASR	1,467	Edgware A
40	G3IAS	1,457	SRCC
41	G3TQD/A	1,450	Worcester
42	G4OBK	1,447	Preston A
43	G4ARI	1,417	Leicester Poly B
44	G4FPH	1,414	Leicester Poly B
45	G3JFF	1,410	RNARS Portsmouth
46	G3CSG	1,407	Wirral
47	G3VYI	1,400	Addiscombe
48	G4FAD	1,384	Hereford A
49	G3YAJ	1,380	Colchester
	G6LX	1,380	SRCC
51	G4HMS	1,374	RNARS London
52	G3LIK	1,370	RNARS Portsmouth
53	G3JEQ	1,364	Thames Valley A
54	G3TVW	1,360	Bishops Stortford
55	G3SYA	1,350	Preston A
	G3XRX	1,350	Cray Valley
	G3KKQ	1,340	Echelford
57	G3OGP	1,340	Thames Valley A
	G3ZYY/A	1,340	Plymouth A
	G3BFP	1,320	SRCC
60	G4EVS	1,320	E Cleveland
	G4FIM	1,320	Leeds
63	G3UJV	1,310	Verulam A
	G4UPS	1,310	Yeovil A
65	G4FNL	1,307	Worthing
66	G3RSD	1,300	Grimsby A
	G3VAA	1,300	Farnborough
68	G4MVA/A	1,290	RNARS Stockton
	GM3OLK	1,290	Glenrothes A
70	G3IGW	1,254	Halifax
71	G3UVR	1,250	Wirral
	G4MUL	1,250	Stockport A
	G3HQH	1,240	Stockport A
73	G4AAL	1,240	Bromsgrove
	G5BM	1,240	Gloucester
76	G3COJ	1,230	Ariel
	G3RWL	1,230	Southgate
78	G4GLC	1,227	Leicester Poly B
79	G3BZR	1,220	Cheltenham
80	GM3YOR	1,210	Glenrothes
81	G3SHY	1,207	Edgware A
82	G3CCZ	1,200	Colchester
83	G4LYA/P	1,197	Leeds
84	G3MCK	1,190	Echelford
	G4ERT	1,190	RNARS Nottingham
	G4EWJ	1,190	Wirral
	G5ZG/A	1,190	Bishops Stortford
88	G3JTG	1,187	Govt Comms A
89	G4BOU	1,175	Verulam A
90	G3PSP	1,170	Edgware A
91	G3KTZ	1,140	Southgate
	G3TZL	1,140	RNARS Portsmouth
93	G4CWH/A	1,137	Sutton & Cheam
94	G4JKS	1,130	Verulam B
	G4KRS	1,130	Leicester Poly B
96	G3FJE	1,127	Shefford
97	G4IBA	1,120	Ariel
98	G4CZB	1,100	Leicester Poly B
	G4DBL	1,100	Crawley Court
100	G4FAS	1,091	Stockport B
101	G3DOT	1,090	Shefford
	GW3MPB	1,090	Hereford A
103	G3COQ	1,080	Govt Comms A
	G4FFD	1,080	Hereford B
	G4OOS	1,080	Leicester A
106	G3ULN	1,077	Plymouth A
107	G2FIX	1,070	RAFARS
	G4IUZ	1,070	Edgware A
109	G3TIR	1,060	Torbay
110	G3GRS	1,050	Gravesend
111	G3AKF	1,047	Reading
112	G3ICH	1,040	RAFARS
	G3MA	1,040	Gloucester
	G4ECI	1,040	Stockport B
115	G2DMR	1,027	Sutton & Cheam
116	G4JJY	1,020	Scunthorpe
117	G3AGF	1,017	Govt Comms A
	G4IXF	1,017	Stockport B
119	G3KAF	1,010	Stockport B
	G3LCS	1,010	RNARS London
	G3ZOA	1,010	Newark
122	G3EUE	997	SRCC
123	G3KOX	990	E Barnet
	G3WSZ	990	White Rose A
	G4EOF	990	Leicester Poly C
	G4FJW	990	Gravesend
	G4IQM	990	Crawley
128	G3SNN	984	Govt Comms B
129	G3TBK	980	Newark
	G4HVC	980	Newark
	G4ISK	980	Farnborough
132	G3AYC	970	Ariel
	G4CWY	970	Leicester A
134	G4MH	967	Halifax
	G4OGB	967	Scunthorpe
136	G3RUG	960	Stockport B
	G3UOF	960	RNARS Wisbech
	G4HZV	960	Farnborough
	GM4FDM	960	W of Scotland
140	G3JNB	954	Thames Valley A
141	G4FRN	950	RNARS London
	G4SFO	950	RNARS Nottingham
143	G3IFB	949	Gort Comms B
144	G3SXE	940	Cray Valley
	G4JBD	940	Verulam B
	GM3WTA	940	Aberdeen A
	GM3ZSP	940	Glenrothes A
148	G4ITP	931	Leicester A
149	G3AAQ	930	Leicester Poly C
	G3TZM/A	930	RNARS Nottingham
151	G4KRG	920	Stockport C
	G4RFA	920	Preston A
	GM4CXM	920	W of Scotland
	GM4LGM/A	920	W of Scotland
155	G3SCZ	910	Reading
	G4JRE	910	RNARS Harrogate
	G4NOV	910	Leicester Poly C
158	G4RNF	907	Preston A
159	G4EBK	900	Grimsby A
	GM3OXC	900	Aberdeen A
161	G3EJF	897	RSARS
162	GW3JI	890	Conwy Valley
163	G3HTI	880	Grimsby A
	G3WRQ	880	Hereford B
	G4IUF	880	White Rose A
	G4MJZ	880	Leicester A
167	G3VCT	874	Maidenhead A
168	G3PJS	870	Grimsby A
169	G3RXP	857	Grimsby A
170	G4ABX	850	Leicester Poly C
	G4GLL	850	Halifax
	GM3UM	850	RNARS Rosyth
173	G3NKL	840	Preston A
	G4FDC	840	W Kent
	G4IGY	840	Hornsea
176	G3NJA	830	Torbay
177	G3FVC	820	Maidenhead A
178	G3BPM	817	Thames Valley B
	G3VFB	817	Echelford
180	G4DZS	811	Crawley Court
181	G3SVW	810	S Manchester
	G3TWG	810	Maidenhead A
	G4HMD	810	Edgware A
184	G3ASM	800	RSARS
	G3IBB	800	RSARS
186	G2FOS	790	Wirral
	G3LVW	790	Maidenhead A
	G3VNQ	790	Bury A
	G3ZDJ	790	Edgware B
	G4KZD	790	Southgate
191	G4BJQ	787	Farnborough
192	G4INI	784	Farnborough
193	G3AQM	780	RNARS London
	G3IVG	780	Sutton & Cheam
195	G3SGQ	770	RNARS Liverpool
	G4KDL	770	Lowestoft
	G4RMV	770	Worcester
198	G4RS	760	RSARS
199	GM4SID	757	Aberdeen A
200	GM4EJI	747	Glenrothes
201	GM3DZB	740	Aberdeen A
202	G3LHJ	730	Torbay
203	G4IDC	724	Leeds
	GM4SJL	724	Glenrothes A
205	GM4LCP	707	W of Scotland
206	G4IUX	700	Bromsgrove
207	G3BRS	697	Bury A
	G3GMM	697	Stockport C
	G4HFT	690	Gloucester
209	GM3VEY	690	Aberdeen A
211	G3AWR	687	RNARS Stockton
	GW3MDK	687	Conwy Valley
213	G3AIO	670	W Kent
	G3TDL	670	Ariel
	G4AMT	670	RNARS Culdrose
	G4CHL	670	Gravesend
	G4GGV	670	Maidenhead B
	G4NNS	670	Echelford
219	G4KIC	664	RSARS
220	G3LPN	660	RNARS Portsmouth
	G4KLQ	660	Verulam B
	G4LGK	660	Worthing
223	G4EYD	657	S Birmingham
224	G4OTV	650	W Kent
225	G4NBD	640	Preston B
226	G3KXT	637	SRCC
227	G3OGY	630	Crawley Court
	G4NXY	630	White Rose B
	G4OTR	630	Maidenhead B
230	G3MCX	620	SRCC
	G4FMI	620	RNARS Liverpool
232	G4KPY	614	Wirral
233	G4FKS	610	White Rose B
	G4ODS	610	RNARS Harrogate
235	GM3HUN	607	RNARS Rosyth
236	G3ATK	590	Yeovil A
237	G3LQI	580	Worthing
	G4GSC	580	Echelford
	G4FFW	580	Stockport C
240	G4BPE	570	Newark
241	G4OYC	564	Torbay
242	G3ZKN	560	Cheltenham
	G4HKA	560	Verulam B
	G4OQR	560	Leicester Poly C
245	G4MEM	557	Govt Comms B
	G4TQM	557	Stockport C
247	G3KAU	550	Crawley
248	G3BCC	540	Cheltenham
	G3DWQ	540	Preston B
	G3FIJ	540	Colchester
	G4EZC	540	Crawley Court
	G4OAY	540	Worthing
253	G3CDK	537	Sutton & Cheam
	G4CIB	537	Gloucester
255	G3GNS	530	RAFARS
	GM4FVQ	530	W of Scotland
257	G4IMP	527	SE Kent
258	G4GPX	520	Worthing
	G4KKZ	520	RNARS Plymouth
	G4KNM	520	RNARS Culdrose
261	G3MZV	510	Govt Comms B
	G3TLI	510	Hornsea
	G4JBH	510	Yeovil A
	G4OCU	510	Scunthorpe
265	G3GC	497	Yeovil A
266	G3BZU	490	RNARS Portsmouth
	G3UFZ	490	Torbay
	G4EWT	490	Leicester Poly D
269	G3CIK	480	Ariel
	G3CWW	480	RSARS
	G4GYP	480	Southgate
	GW4KVJ	480	RNARS Cardiff
273	G3DOR	477	Echelford
274	G4GVC	470	Leicester A
275	G4HWK	460	RNARS Liverpool
	G4NTK	460	Bromsgrove
	GM4SZA/P	460	Aberdeen B
	GW4HDB	460	RNARS Cardiff

Posn	Callsign	Score	Society
279	G4FOT	454	Bury A
280	G3YRM	448	RAFARS
281	GM3PFQ	440	Glenrothes B
282	G4DBU	434	Preston B
	G4NFX	434	Scunthorpe
284	G3FMW	430	RSARS
	G4HZF	430	Grimsby B
287	G4UZN	430	White Rose B
	G3KCC	424	Preston B
288	G3DCC	420	Cray Valley
	G4FCO	420	S. Birmingham
	G4HTD	420	Plymouth A
292	G4OTN	420	Preston B
293	G4TBT	417	Bury A
294	G4KMC	407	Preston B
	G3WP	400	RNARS Medway
296	G4PDQ/A	400	Cheltenham
	G3BEC	397	Yeovil A
298	G4SHB	397	Gloucester
	G3OZY	390	RNARS London
300	GM3HGA	390	Aberdeen B
	G3KKB	380	S Birmingham
	G4CZD	380	RNARS Medway
	G4PZI	380	Plymouth A
	G8IB	380	RNARS London
305	OZ3QN	380	RNARS Copenhagen
	G4VRW	377	White Rose B
306	G3KWT	370	White Rose B
	G4JDI	370	Leicester B
309	GM3UU	370	Aberdeen B
	G3VNG	360	RNARS Plymouth
	G3VSU	360	SE Kent
	G4FCH	360	RNARS Stockton
	G4FUB	360	Verulam B
	G4RHB	360	Stockport C

Posn	Callsign	Score	Society
314	G3TQF	350	Leicester B
	GM3ZBE	350	Aberdeen B
316	G4HKC	347	Colchester
317	G4MYB	337	S Manchester
318	G4EGQ	330	SE Kent
319	G2CLN	327	Bromsgrove
320	G4PKW	320	Bromsgrove
	G4SDX	320	Halifax
322	G3LCH	310	Sutton & Cheam
	G3SNX	310	Stockport D
	G4KKQ	310	Leeds
	G4LGD	310	RNARS Portsmouth
326	GM3YBQ	290	Glenrothes B
327	G4LRO	277	Leicester B
328	GI3VQ	270	RNARS Belfast
329	G4PUR	267	Verulam B
330	G4GRU	264	Stockport D
331	G3HIS	250	RNARS Plymouth
	GM4FGD	250	RNARS Rosyth
333	G3CWL	240	Sutton & Cheam
	G3HSK	240	Sutton & Cheam
	G4PYD	240	Grimsby B
336	G2BCI	230	Ariel
	G4KKS	230	Leicester B
338	G4HXB	220	Stockport D
339	G4CFO	210	Grimsby B
	G4SAU	210	SE Kent
341	G3ZZD	200	W Kent
	G4EPA	200	Leicester B
343	G4MQM	180	RNARS Nottingham
	G8SM	180	Thames Valley B
345	G4JSN	178	Hereford B
346	G4RPW	177	Preston C

Posn	Callsign	Score	Society
347	G3BPE	170	Gravesend
	G3OXL	170	S Birmingham
	G4ROM	170	S Manchester
	G4VXE	170	Cheltenham
351	G4DRV	160	W Kent
	G6SX	160	RNARS Medway
353	G4IAL	150	Stockport D
	G4SDZ	150	Newark
355	G3JRM	147	Lowestoft
356	G3KSK	140	Yeovil B
357	G4SCH	127	Plymouth A
358	G4FKU	120	Torbay
	GM4TEF	120	Aberdeen B
360	G2DWB	110	Bury B
	G3CQR	110	Yeovil B
363	G3FBP	110	RNARS Harrogate
	G4BWV	100	Cray Valley
	GM4BKV	100	Aberdeen B
365	G4LZB	84	Colchester
366	G4CQI	80	RNARS Cardiff
367	G8AV	70	RNARS Plymouth
	GW3QN	70	Conwy Valley
369	G8DV/A	60	Govt Comms B
370	G4FJZ	50	Plymouth B
	G4KXZ	50	Plymouth B
	G4MPA	50	SE Kent
373	G2PA	40	Verulam B
	G4GWK	40	Plymouth B
375	G4GQC	10	Stockport D

Check logs: G3MXZ, G3ONQ, G3RZP, G4AXD, G4FNC, G8GF

DF Qualifying Event Northampton

Date: 24 June 1984
Map: OS sheet 152, 1: 50,000 series, Northampton & Milton Keynes.
Assembly: 1300bst for start at 1320bst.
Location: Bucknell Wood, ngr 658 448.

Competitors requiring tea should notify Mr D. Newman, Haynes House, 78 High Street, Whittlebury, Towcester, Northants NN12 8XJ, tel 0327 857350, not later than 17 June.

DF Qualifying Event Mid-Thames

Date: 15 July 1984
Map: OS sheet 165, 1: 50,000, Aylesbury & Leighton Buzzard.
Assembly: 1300bst for start at 1320bst.
Location: Coombe Hill, ngr 852 063.

Competitors requiring tea should notify Mr R. Shepherd, 299 West Wycombe Road, High Wycombe HP12 4AA, tel 0494 21063, not later than 8 July.

RSGB Region 1 VHF Contest rules

10-1800gmt 23 September 1984

Rules for this contest are the same as those for previous years. Entries should be sent within 15 days of the contest to G4OOT, GTHR. Details of the rules etc may also be obtained from G4OOT on receipt of an sae.

Swale ARC 432MHz Contest results

The first six positions in each section were as follows:

	OPEN SECTION			LOW POWER SECTION	
Posn	Callsign	Points	Posn	Callsign	Points
1	GW8TFI/P	4,712	1	G4PSX	1,325
2	G4CQR	3,488	2	G6SNO	1,276
3	G8FUO	2,752	3	G8JAY	1,000
4	G4VIX/P	2,336	4	G6HKM	935
5	G3GJL	1,302	5	G6DIH/P	731
6	G6WVC	1,216	6	G6CSY/P	689

The first three places in each section will receive a certificate of merit, and a trophy will be presented to the winner.

First BYLARA Contest results

The first six positions in each section were as follows:

	SECTION 1-144MHz			SECTION 2-3·5/7MHz	
Posn	Callsign	Points	Posn	Callsign	Points
1	G6YFT/A	120	1	GW4SUE	200
2	GM1AEN	91	2	G4EZI	168
3	GM6KAY	87	3	G4JMT	164
4	G6XHP	83	4	G4GAJ	148
	G4SKY	83		G4OAT	148
6	G6HKM	78	6	G4KFP	147

White Rose 4th Lower Frequency Bands SWL Contest results

The first six positions in each section were as follows

	PHONE SECTION					
Posn	Station	1·8MHz	3·5MHz	7MHz	Mult	Total points
1	R. Smit, NL8297	35	737	353	121	136,125
2	D. A. Whitaker, BRS25429	265	527	43	127	106,045
3	A. Miller, G-SWL	66	497	227	124	97,960
4	R. A. Treacher, BRS32525	108	392	213	123	87,699
5	N. Hembry, BRS28198	97	466	159	120	86,640
6	R. Binet, ONL6866	40	519	176	104	76,440

	CW SECTION					
Posn	Station	1·8MHz	3·5MHz	7MHz	Mult	Total points
1	D. C. Piccimillo, BRS52868	137	241	288	122	74,592
2	J. Goodrick, BRS44395	40	194	264	91	45,318
3	A. Todd, BRS48178	38	175	93	67	20,502
4	Y. Jean-Jacques, ONL383	46	91	178	62	19,530
5	E. Trebilcock, VK3-5948	1	12	263	43	11,911
6	F. Melger, NL7798	8	34	35	52	4,004

Contests Calendar

2-3 June	HF NFD *(Rules in February issue)*
2-3 June	VI Diploma Guide Dog Competition *(Rules in May* MOTA*)*
3 June	70MHz & SWL *(Rules in May issue)*
9 June	1,296MHz Trophy *(Rules in May issue)*
10 June	432MHz Trophy & SWL *(Rules in May issue)*
10 June	DF Qualifying Event Dartford Heath *(Details in May issue)*
16-17 June	All Asian (Phone) *(Rules in June* MOTA*)*
23-24 June	Summer 1·8MHz *(Rules in May issue)*
24 June	VHF 144/432MHz Phone WAB*
24 June	DF Qualifying Event Northampton *(Details in June issue)*
7-8 July	VHF NFD & SWL *(Rules in April issue)*
15 July	Low Power Field Day *(Rules in June issue)*
15 July	DF Qualifying Event Mid-Thames *(Details in June issue)*
4 August	432MHz Low Power & SWL *(Rules in June issue)*
5 August	144MHz Low Power & SWL *(Rules in June issue)*
5 August	DF Qualifying Event South Manchester
19 August	DF Qualifying Event Salisbury
19 August	1,296/2,320MHz *(Rules in June issue)*
25-26 August	All Asian (CW) *(Rules in June* MOTA*)*
26 August	ROPOCO 2
1-2 September (prov)	SSB FD *(Rules in May issue)*
1-2 September	144MHz Trophy and IARU VHF & SWL *(Rules in June issue)*
9 September	DF Qualifying Event Chelmsford/Colchester
16 September	70MHz Trophy & SWL
October-December	432MHz Cumulative
October-December	1,296MHz Cumulative
6 October	DF Double Night Event Slade
6-7 October	432MHz-24GHz & IARU UHF *(Rules in June issue)*
14 October	21/28MHz Phone *(Rules in May issue)*
21 October	21MHz CW *(Rules in May issue)*
27 October	DF Treble Night Event Mid-Thames
28 October	70MHz Fixed
3-4 November	144MHz CW & Marconi Memorial
4 November	LF CW WAB*
10-11 November	2nd 1·8MHz
12, 20, 28 November 6-14, December	28MHz Cumulatives
2 December	144MHz Fixed
16 December	70MHz CW

* Rules, logsheets and other information from Steve Lawrence, 7 Ashfield Road, Market Harborough, Leics.

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, plus basic unchanged information on other affiliated organizations which was last published in the June issue.

RSGB affiliated organizations are requested to report all programmes and news items to their regional representatives regularly. Information for inclusion in the **August** issue should reach them by **12 June** and for the **September** issue by **10 July.**

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 W. R. Parkinson, G3FNM, 141 Norris Road, Sale, Cheshire M33 3JR. Tel 061 973 1472.

Ainsdale (AARC)—2, 3 June (HF Field Day), 5, 19 June (normal meetings), 12, 26 June (DF hunts, 7.30pm start), 8pm. Scout HQ, Marine Drive, nr pier, Southport. Sec David Norris, G8TUP.

Bury (BRS)—12 June (Lecture to be announced), 3 July (Surplus equipment sale). Informal meeting on 15, 19, 26 June, 8pm. Mosses Community Centre, Cecil Street, Bury. Pro Malcolm Pritchard, G3VNQ.

Chester (C&DRS)—12 June (Surplus sale), 19 June (Outside activity near Helsby), 26 June (Pre-VHF NFD), 8pm. Chester Rugby Union Football Club, Hare Lane, Vicars Cross, Chester. Morse classes, 7.30pm. Chairman Alan Warne, G4EZO, tel 0244 40055.

Fylde (FARS)—5 June (Top band fox hunting, final arrangements for participants), 17 June (Top band fox hunt in the Fylde), 19 June (Review of activities on 17 June and morse class), 7.45pm. Kite Club, Blackpool Airport. H. Fenton, G8GG, tel 0253 725717.

Manchester (SMRC)—8 June (Club quiz), 15 June (Latest developments in df including a demonstration by David Holland, G3WFT), 22 June (Midsummer df and barbecue), 29 June (A talk on operational amplifiers by Chris Ward, G4HON), 8pm. Sale Moor Community Centre, Norris Road, Sale. Informal meetings Mondays, in the club shack. Sec David Holland, G3WFT, tel 061-973 1837.

Oldham (OARC)—Mondays, 8.30pm. Devonshire Arms, Elliott Street, Lees, nr Oldham. Further details from sec Mrs F. Butterworth, G4SPX, PO Box 29, Oldham, tel 061 652 8862.

Penrith (Eden Valley RS)—Third Thursday in each month, 7.30pm. The Kings Arms, Temple Sowerby, Penrith. Club net, 7pm, Thursdays, 3·650MHz. Further details from sec Alison Ashcroft, G1FBO, tel 0768 88260.

Preston (PARS)—7, 21 June (Details from sec), 5 July (Preparation for VHF NFD), 8pm. Lonsdale Club, Fullwood Hall Lane, Fullwood, Preston. Sec George Earnshaw, G3ZXC, tel 0772 718175.

Wirral (WARS)—6 June (Demonstration of equipment by Lowe Electronics Ltd), 20 June (DF hunt), 4 July (Sale of surplus equipment), 7.45pm. Guide Hut, Westbourne Road, West Kirby, Wirral. Sec Cedric Cawthorne, G4KPY, tel 051-625 7311.

Wirral (W&D ARC)—3 June (70MHz cw contest), 10 June (432MHz contest), 17 June (Second Sunday df hunt),, 27 June (The Eileen Madley Challenge Cup DF Event). D & Ws on 6, 20 June. Club venue, 8pm. Irby Cricket Club, Irby, Wirral. Sec Gerry Scott, G8TRY, tel 051-630 1393.

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

Goole (GR&ES)—5 June (Natter night), 12 June (Visit to Scunthorpe DARS), 17 June (Beach party (Bring a rig & bottle)), 19 June (Treasure hunt), 26 June (VHF NFD discussions), 7.30pm. Junior Chambers Building, Boothferry Road, Goole. Details from sec Richard Sugden, G8IOH.

Keighley (KARS)—26 June (2m foxhunt), 31 July (HF/2m outside portable station held on Whorls Plantation). Details from Gerry Fuller, G3TFF, tel Keighley 42977, or J. Birse, G1BOD, tel Keighley 663203.

Mirfield (Spen Valley ARS)—7 June (Surplus sale), 21 June (Summer social evening). Old Bank Working Mens Club, Mirfield. Sec I. Jones, G4MLW, tel Heckmondwike 409739.

Pontefract (P&DARS)—Thursdays, 8pm. Preparations in hand for two special event stations: 7 July (Darrington Fayre demonstration station), 8 July (RAFFA gala demonstration station). The club now has an 80ft mobile tower for use on field events. Informal meetings and cw class on Monday nights. Carleton Community Centre, Carleton, Pontefract. Details from sec Ron Tams, G4TCG.

Wakefield (W&DARS)—12 June (On the air/ natter night), 10 July (144MHz df foxhunt with Pontefract ARS). Alternate Tuesdays, 8pm. The club has two 16-el. 2m Tonna beams and a Datong morse tutor available to members. Note new venue: Ossett Community Centre, Prospect Road, Ossett. Details from sec Walter Parkin, G8PBE, tel Wakefield 378727.

York (YARS)—Fridays, 7.30pm. The club is busy preparing for the Great Yorkshire Show in Harrogate on 10 to 12 July, Stand 591, with special event station GB2GYS. United Services Club Room, 61 Micklegate, York. Details from sec Keith Cass, G3MVO, tel York 36230.

As many clubs are preparing special event stations for summer functions, please contact RR or HQ for details of RSGB publicity material that is available.

REGION 3—L. W. Craven, G4EQI, Grass Moor, Radford Road, Alvechurch, Birmingham B48 7DT. Tel 021-445 1347.

Birmingham (Castle Vale-Wells Krautkramer ARC, G4WKK)—Newly affiliated—no information available.

Birmingham (Midland ARS)—19 June ("Car interference"), 7.30pm. 294a Broad Street, Birmingham B1 2DS. Sec G8BHE, tel 021-422 9787.

Birmingham (South Birmingham RS)—13 June (Talk and demonstration of new equipment, by local trader), 7.30pm. 10 June (Elvaston Castle Mobile Rally). The Pastoral Centre of St Lawrence, Church Hill, off Bunbury Road, Northfield, Birmingham. Sec G8RGQ, tel 021-459 8312.

Bromsgrove (BARS) (G4TUI)—3 June (Entry in 70MHz contest), 10 June (432MHz contest), 12 June (Main June meeting, tba), 23 June (Display station at Finstall School), 26 June (Informal meeting), 8pm. Bromsgrove British Legion Club. Sec G4LVK, tel 021-445 2088.

Bromsgrove (B&DARC) (G3VGG)—15 June ("Amateur radio in the USA", by Fran, G5AER, Avoncroft Art Centre, 8pm. 23 June (Bromsgrove Carnival, demonstration station in Sander Park). New sec Jim Calder, G6EAM, tel Kingswinford (549) 8580.

Dudley (DARC)—4 June (Committee meeting/ natter night), 11 June ("Computer data transmission demo", by Phil Cadman, G4JCP), 25 June ("Radio and sun", by David Harris), 7.45pm. New meeting place, Allied Centre, Greenman Alley, off Tower Street, Dudley. Sec G4SQP, tel Codsall (209) 5636.

Halesowen (MEB Sports & Social Club)—12 June ("Repeaters", by Longbridge Group), 26 June (General meeting), 8pm. MEB HQ Social Club, Mucklow Hill, Halesowen. Sec Bob, tel 021-747 8784.

Hereford (HARS)—1 June (Final arrangements for NFD), 2/3 June (NFD), 15 June (To be announced on GB2RS), 8pm. Civil Defence HQ, Gaol Street, Hereford. Sec G3WRQ, tel Hereford (0432) 54064.

Malvern (MHRAC)—12 June ("QRP", by Rev Dobbs), 7.30pm. Red Lion Inn, St Ann's Road, Malvern. Sec Nic, G4TGX, tel Malvern (06845) 65802.

Much Wenlock (Wenlock ARES)—New sec, Phil Parton, G6JMG, tel Highley (0746) 862103.

Redditch (RRC)—14 June (Film of Japanese amateur radio visit to China in 1982. English commentary) 8pm. WRVS Centre, Ludlow Road, Redditch. Sec Ray, G3EVT, tel Alcester (078976) 2041.

Shrewsbury (Salop ARS)—7 June (Visit to Madley), 14 and 28 June (Natter nights), 21 June (To be announced on GB2RS), 8pm. Albert Hotel, Smithfield Road, Shrewsbury. Sec G4XBI (ex-G6UDB), tel Shrewsbury (0743) 62737.

Solihull (SARS)—19 June (HF night on the air), 7.30pm. Manor House, High Street, Solihull. Sec G6HSZ, tel 021-742 3378.

Stourbridge (StARS)—4 June (Morse class, construction, club station on the air), 18 June (TBA on GB2RS), 8pm. The Robin Woods Centre, School Street, off Enville Street, Stourbridge. Sec Malcolm, G8JTL, tel Lye (593) 4019.

Stratford-upon-Avon (S-upon-A&DARC)—11 June (Activity night on the air and equipment checking), 25 June ("Travels in Paradise with a handy talkie", by Paul Edwards, G8KGJ). 7.30pm. Control Tower, Bearley Radio Station, Bearley, nr Stratford. Sec Ian, G6CWK, tel Stratford (0789) 68863.

Telford (T&DARS)—2/3 June (HF Field Day), 10 June (432MHz and swl contest), also 10 June (Elvaston Castle Mobile Rally, nr Derby). Meetings at Dawley Bank Community Centre, 8pm. Sec Deryck, G6ECA, tel Telford (0952) 503758.

Warwick (Mid-Warwickshire ARS)—12 June (Fox hunt and barbeque), 26 June (QRP speaker, to be confirmed on GB2RS), 8pm. 61 Emscote Road, Warwick. Details from sec G4TIL, tel Southam (092681) 4765.

Wolverhampton (WARS)—5 June (Surplus equipment sale), 19 June ("Electronic music", by Roy Jeavons of Music Ltd), 12 and 26 June (Natter nights). MEB Club, St Marks Road, off Chapel Ash, Wolverhampton. Sec Martin, G6ZHV, tel Wolverhampton (0902) 763387.

Worcester (W&DARC)—4 June ("RTTY and Amtor", by G3WHO, P. Harris-BBC computer). Oddfellows Club, New Street. 18 June (Informal evening and pre-Droitwich Rally), 1 July (Meeting), 8pm. Old Pheasant Inn, New Street, Worcester. Details from sec Alasdair, G4NRD, tel Evesham (0386) 41508.

Leo, G4EQI, will be retiring as RR3 on 30 June and wishes to thank all club secretaries and rally organizers for their helpful co-operation during the last two years. The new RR will be announced on GB2RS and subsequently in *Radio Communication.* All club files will be handed over to him at the end of June. I also wish to thank Henry, G3VPE, our Zonal member, for his long suffering patience with my many problems!

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

Buxton (BARS)—3 June (Combined Field Day with Macclesfield ARS at Cat & Fiddle Inn, 9am), 26 June (Open forum), 8pm. Egerton Hotel, St Johns Road, Buxton. Sec Dave Cooper, G6MIF, tel Buxton 6174.

Derby (D&DARS)—6 June (Junk sale, members only), 13 June (144MHz df practice), 20 June (Rude shock night), 27 June (Bar-BQ at Drum Hill), 4 July (Junk sale), 7.30pm. Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.

Grantham (GRC)—19 June ("Worked All Britain Award", by Del Roberts, G4FQO), 8pm. Shirley Croft Hotel, Harrowby Road, Grantham. Sec John Kirton, G8WWJ, tel Grantham 63369.

Lincoln (LSWC)—13 June (Activity night on the air), 27 June (Junk sale), 8pm. City Engineers Club, Waterside South, Lincoln. Sec Pam Rose, G4STO, tel Gainsborough 788356.

Melton Mowbray (MMARS)—15 June (2m fox hunt, G8RBY), 7.30pm. St John Ambulance Hall, Ashfordby Hill, Melton Mowbray. Sec Richard Winters, G3NVK, 8 Epping Drive, Melton Mowbray, tel Melton Mowbray 63369.

Newark (N&DARS)—7 June ("The Secret War", by G4MHB), 19 June (Natter and noggin at The Fox, Kelham), 7.30pm. Palace Theatre, Appleton Gate, Newark. Sec Roger Hiscock, G4MDV, tel East Stoke 539.

Spalding (S&DARS)—3 June (Rally at Springfields), 8 June (Rally report and df techniques), 8pm. Maple Room, White Hart Hotel, Market Place, Spalding. Sec Betty Whitlet, G6YBL, tel Spalding 2781.

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

Dunstable Downs (DDRC)—8 June (Summer barbeque at Old Warden), 22 June (Planning for VHF NFD), 8pm. Chews House, Dunstable Downs. Sec P. G. Seaford, G8XTW.

Leighton Linslade (LLRC)—4 June (Quiz, part two. The club plays host to Aylesbury Vale and Milton Keynes RCs in the second round of a three-round quiz contest), 10 June (432MHz contest), 18 June (Talk on packet radio by G8ELA), 7-10pm. Vandyke Community College, Room A64, Vandyke Road, Leighton Buzzard. Sec Peter Brazier, G6JFN.

Luton (Kent Process Controls Ltd ARC)—6 June (Planning for Kent's Gala Day), 8pm. Club House, Tenby Drive, Luton. Sec G3DOT. Club open to employees only.

Milton Keynes (MK&DARS)—11 June (Meeting, subject to be announced). Details from RR5.

Northampton (NRC)—7 June (Pre-Elvaston bring & buy sale), 14 June (Discussion evening), 21 June ("PCB layout and manufacture—the professional way", by Steve, G6XZE), 24 June (Top band df event of the NRC. Further information from Keith, G6MFS), 8pm. Kingsthorpe Community Centre. Sec Keith Howell, G6MFS, 9 Pytchley Way, Brixworth, Northampton, tel Northampton 881464.

Peterborough (GPARC)—28 June ("QRP working", by Rev George Dobbs, G3RJV), 7.30pm. Southfields Junior School, Stanground, Peterborough. Sec Frank Brisley, G4NRJ, tel 0733 231848.

Shefford (S&DRS)—7 June (Post-mortem on the RSGB HF NFD and natter night), 14 June ("Decoding satellites", by Alan, G4PSO), 21 June (DF hunt), 8pm. Church Hall, Shefford. Sec Alan, G4PSO.

Wellingborough (Nene Valley RC)—6 June (Natter night), 13 June (Lecture, rtty and Amtor, by Ian Wade, G3NRW), 20 June (Natter night), 27 June (Lecture, microwaves, with the Microwave Society). Dolben Arms, Finedon. Details from Lionel, G4PLJ.

Wisbech (WR&EC)—This club has recently been reformed and meets every other Thursday evening at the Five Bells, Parsons Drove, Wisbech, Cambs. Details from sec Ken, G4UQN, tel 0945 61029.

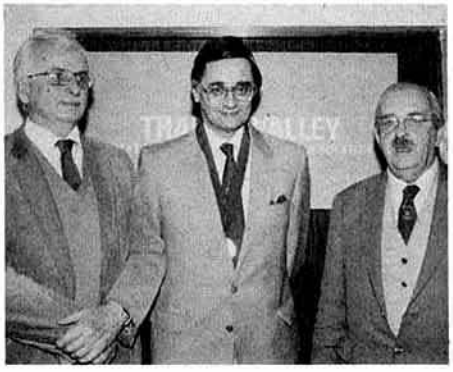
REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HA3 7EA. Tel Penn (049 481) 4240.

Aylesbury (AVARS)—Tuesdays, fortnightly, 10 July (TBA), 8pm. Haydon Hall Community Hall, Aylesbury. Club net other Tuesdays, S22 around 3·6MHz. Details from Cathy Clark, tel 0844 51461.

Chiltern (CARC)—27 June (A visit by Wood & Douglas), 8pm. Sir William Ramsay School, Hazlemere, High Wycombe. The club runs a morse class every Monday evening at Sir William Ramsay School Science Block. All speeds and skills catered for. Details from sec, G3NCL.

Iver (Home Counties ATV Group)—25 July (Slow scan operating evening, all welcome). Richings Park Sport & Social Club, Iver, Bucks. Talk-in on 145·200MHz. Details from P.W. Andrews, G6MNJ.

Club secs, please send me your news. *RR6.*



Victor Brand, G3JNB, was recently installed as the third president of Thames Valley ARTS. He is shown with the club's new chairman, David Foster, G3KQR (l), and Alan Mears, G8SM, the retiring president of the club (r)

Chesham & DARS recently held a very successful construction contest. The guest judge, Reg, G6XO, had a difficult time deciding on the winner, eventually awarding the prize to Robin, G4IWS, for his 14/3·5MHz transceiver. Reg is shown here with the winning project. *Photo:* J. Alldridge, G4UXA

REGION 7—RR to be appointed

Coulsdon (CATS)—11 June (Rescheduled lecture from previous cancelled evening, details on GB2RS), 7.30 for 8pm. St Swithins Church Hall, Groveland Road, Purley, Surrey. The club now has a regular morse tuition and club project night on last Thursday in each month. Details from Alan, G6HC, tel 01-684 0610.

Crystal Palace (CP&DRC)—16 June ("Amateur rtty", by Alan Hobbs, G8GOJ), 8pm. All Saints Parish Room, Upper Norwood SE19. Details from sec G.M.C. Stone, 11 Liphook Crescent, SE23, tel 01-699 6940.

Sutton & Cheam (S&CRS)—1 June (TBA, at Downs), 2-3 June (HF NFD, at Legal & General), 15 June (TBA, at Scola), 24 June (Longleat Rally), 6 July (TBA, at Scola). Downs Lawn Tennis Club, Holland Avenue, Cheam, and Sutton College of Liberal Arts. Details from acting sec Jack Korndorffer, G2DMR.

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

Crawley (CARC)—13 June (Informal meeting with John Wolfson, BRS31548), 20 June (Committee meeting), 27 June (RTTY and Amtor Lecture/demonstration), 8pm. Trinity Church Hall, Ifield, Crawley. Details from David Hill, G4IQM, tel Crawley 882641.

Hastings (HERC)—Wednesdays, 8pm. Ashdown Farm Community Centre. Details from new sec Dave Shirley, G4NVQ, tel Hastings 420608.

Margate (RC of Thanet)—Tuesdays, 12 June (To be arranged), 26 June (To be arranged), 8pm. Grosvenor Club, Grosvenor Place, Margate. Details from K. Lown, G4PTE, tel Thanet 32198.

Swale (SARC)—Mondays, 11 June (Talk by the Royal Lifeboat Institution). The Ivy Leaf Club, Sittingbourne. Details from Brian Hancock, G4NPM.

Tunbridge Wells, (West Kent ARS)—1 June (Junk sale), 15 June (Talk on the role of the RAF), 29 June (Amtor "It must be right", by Dave Green, G4OTV). Adult Education Centre, Monson Road, Tunbridge Wells. 5, 19 June (Informal meetings), Victoria Road Drill Hall, Tunbridge Wells. Details from Brian Guinnessy, G4MXL, tel 0892 32877.

REGION 9—RR W.J. Colclough, G3XC, Highview, Indian Queens, St Columb, Cornwall TR9 6LL. Tel 0726 860485.

Axe Vale (AVARC)—11 June ("The entertaining electron"), 7.30pm. Cavaliers Inn, Axminster,

Radio Amateur Invalid and Blind Club

Find out how you can obtain help or how you can help others by sending a sae to the hon secretary, Mrs Frances Woolley, G3LWY, 9 Rannoch Court, Adelaide Road, Surbiton, Surrey KT6 4TE.

Devon. Membership is still increasing, six new members joined during April. Details from sec Bob Newland, Ham House, Lyme Road, Uplyme, Lyme Regis, Dorset DT7 3XA, tel 02974 5282.

Camelford (North Cornwall ARC)—6 June (TBA), 7.30pm. RAOB Club, Fore Street, Camelford, Cornwall. Details from G4WAV, QTHR as G6LUX.

Exeter (EARS)—11 June (Inter-club quiz, hosted by Exmouth ARS, full details from pro Roger Tipper, G4KXR), 7.30pm. Community Centre, St Davids Hill, Exeter. Informal meetings other Mondays, Emmanuel Scout Hall, Okehampton Road, Exeter. Longleat Rally: the club is organizing a coach to take members to this event, departing from Exeter coach station at 0800 on 24 June. Pick-ups will also be made at the Granada Service Station. Cost will depend on numbers, but will not exceed £3.50. For further details and bookings contact G6FAK, QTHR, asap. Pro G4KXR, tel 0392 68065.

Exmouth (EARC)—Alternate Wednesdays, 7.30pm. 6th Exmouth Scout Hut, Marpool Hill, Exmouth, Devon. Sec Des Thompson, G8SBU.

Newquay (N&DARC)—6 June (Visit to Royal Observer Corps station), 20 June (Field Day organization), 21 June (Visit to Radio Cornwall). Details from sec, 22 Bramble Close, Newquay, tel Newquay 4285.

Penzance (Cornish RAC)—Computer Section: 18 June ("Software transportability", a guided discussion by Des, G3CZZ). At the recent agm the following officers were elected. President, A. H. Hammett, G3VWK; chairman, D. W. Blackford, G3NPB; vice-chairman, P. Locke, G4STB; sec, S. W. Rodda, G4PEM; treasurer, A. Oliver, G6JFX; and contest manager, P. Hocking, G8ZDS. On 15 July the club will be holding a rally. Details from G4PEM, tel Penzance 3948, home, or Helston 4141, work.

REGION 10—RR E. J. Case, GW4HWR, 2 Abbey Close, Tyrhiw, Taffswell, Mid-Glam CF4 7RS. Tel 0222 810368.

Abergavenny & Nevill Hall (A&NHARC)—Thursdays, 7.30pm. Pen-y-fal Hospital, Abergavenny, above Male Ward 10. There will be a special event station, GB2NHF (Nevill Hall Fete) operating on 2 June. 16 June (A Midsummer dinner/buffet at Llanwenarth Arms, Crickhowell). Further information from sec Dave Jones, GW3SSY, tel 0873 78674.

Aberystwyth (ARSGBG)—12 June (Junk sale (bring small items only please)). Bay Hotel, on the sea front, opposite the bandstand. Sec J.M. Pryse, GW4JXB, tel 0970 828446.

Bristol Channel Repeater Group (GB3BC)—The address of the membership sec, Roy Selleck, was incorrectly quoted in the April news: it is GW6MBU, 12 Norseman Close, Rhoose, tel Barry 711146.

Cardiff (CRSGBG)—11 June ("The earth beneath", a talk by Ken Sheldon, GW4NIJ), 7.30pm. Pantmawr Hotel, Tyla Teg, Pantmawr Estate, Whitchurch, Cardiff. Sec Cyril Laws, GW6ZHP, tel Cowbridge 3212.

Newport (NARS)—Mondays, 18 June (RSGB film), 2 July (HF group and natter night), 7pm. Brynglas House, Brynglas Road, Newport. Sec Robert Johns, GW4NXD.

Swansea (SARS)—21 June. (There will be a visit to Cardiff (Wales) Airport, Rhoose, for a conducted tour of air traffic control and communications. Numbers will be very limited, so please let GW4HSH know as soon as possible). GW4HSH, tel Swansea 404422.

Swansea (USARS)—College exams finish after 12 June and so the club hopes to contact as many

stations as possible, especially the other universities. Morse code classes will then be held every day at 7pm, in A12, Nenadd Lewis Jones, until the end of term. Contact R. B. Hughes, GW6KHQ, or H. Williams, GW6FVO, Dept Elec Eng. The society has been very active in getting new members despite having had its antenna system down for the past year owing to roof repairs. Hopefully, by the time you read this, the antennas will be back up.

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

Colwyn Bay (Conwy Valley ARC) (GW6TM)—14 June (AGM), 7.45pm. 17 June (A talk by Datong Ltd on products and aspects of their design), 2.30pm. Green Lawns Hotel, Bay View Road. Sec Mr J. N. Wright, GW4KGI, 46 The Dale, Woodlands, Abergele, Clwyd LL28 7DS, tel 0745 823674.

Dolgellau (Meirion ARS) (GW4LZP)—First Thursday in each month. Dolserau Hall Hotel, one mile east of Dolgellau. Details from pro, c/o PO Box 2, Barmouth, Gwynedd.

Hawarden (Alyn & Deeside ARS) (GW3TZR)—First Thursday in each month, 8pm. Hawarden Castle. Sec Ivor G. Rees, GW3VKZ, tel 0244 535537.

Rhyl (R&DARC) (GW4ARC)—4 June (Talk by Cedric Cawthorne, G4KPY, "Switch mode power supplies"), 18 June (Activity night), 7.30pm. 1st Rhyl Scout HQ, Tynewydd Road, Rhyl. Sec Mr J. McCann, GW4PFC, 67 Ashley Court, St Asaph, Clwyd LL17 0PL, tel 0745 583467.

Upper Bangor (Dragon RC) (GW4TTA)—First and third Mondays of each month, 8pm. Bangor Rugby Club, Caernarfon Road, Bangor. Sec Mr D. N. F. Whitehouse, GW4URY, Pendyffryn, Pentraeth, Anglesey, tel Pentraeth 224.

REGION 13—RR A. Givens, GM3YOR, 41 Veronica Crescent, Kirkaldy, Fife KY1 2LH. Tel 0592 200335.

Dunfermline (DARS) (GM3IDS)—The club has recently changed the venue of their meetings. Details from Neil, GM8IID, tel 728778.

Edinburgh (Lothians RS) (GM3HAM)—13 June (AGM), 27 June (Forward planning meeting), 7.30pm. Harwell House Hotel, Ettrick Road, Edinburgh EH10 5TJ. There will be no meetings during July. A top band hf hunt is being arranged for August and meetings resume in September. Details from Colin, GM4HWO, tel 031-332 5502 (not QTHR).

REGION 14—RR T. G. Wylie, "Torranmhor", 3 Kings Crescent, Elderslie, Strathclyde PA5 9AD. Tel Johnstone 22749.

Central Scotland FM Group—The group held its agm on 1 April 1984 at Bathgate, when the following committee members were elected: chairman, GM3EDZ; treasurer, GM8CUS; sec GM3AXX; membership secretary, GM8JYJ; committee members, GM4COX, GM3KJF and GM4LFA. CSFMG produces a quarterly magazine, and membership, open to all, costs £3. Further details from GM3AXX.

Dunoon (D&DARS)—The club has now found a home in The Community Centre, Edward Street, Dunoon. The club meets on Wednesdays, 7.30pm, and is looking for new members. Details from GM4PSW, tel Dunoon 6334.

Glasgow (West of Scotland ARS)—Fridays, 8pm. 22 Robertson Street, Glasgow. Further details from Ray, GM4CXM, tel 041-942 6657.

Irvine (Cunninghame & D ARC)—Tuesdays (RAE class), and Thursdays, 7.30pm. The Community House, 1 Bonnyton Row, Girdle Toll, Irvine, Ayrshire. Further details from Norrie, GM4VHZ, 48 Crummock Gardens, Beith, Ayrshire, tel 05055 2052.

Kilmarnock (K & Loudon ARC)—Tuesdays, 7.30pm. The Broomhill Hotel, London Road, Kilmarnock. Further details from Barry, GM3YEH, 17 Church Lane, Glaston, Ayrshire, tel 0563 820615.

Motherwell (Mid-Lanark ARS)—Fridays, 7.30pm. The Wrangholm Hall Community Centre, Jerviston Street, Motherwell. The club holds it annual Birthday Party Rally and Open Day on Sunday 10 June 1984. Trade stalls etc. Talk-in by club call GM3PXK. Further details from Tom, GM4PRO, 187 Main Street, Chapelhall, Airdrie, Lanarkshire.

Would all club secretaries who have not yet done so please contact the RR with updated information on your club.

George Jessop, G6JP, is seen here (l) with Frank Claytonsmith, G3JKS, after giving the annual G3PAO Memorial Lecture at the Verulam ARC. *Photo:* G3PZF

All members please note that Scottish amateurs have access to five pages of radio news by calling up the Oracle on Scottish Television, page 353. Details for inclusion should go to Ronnie, GM4SRL, tel 041-637 4383, or Bob, GM3ZDH, tel 041-644 3876.

REGION 16—RR T. D. Howe, G3PLF, 18 Vange Hill Drive, Basildon, Essex SS16 4DD. Tel 0268 24453.

Chelmsford (CARS)—5 June (Constructors' competition), 3 July (High power transmitters), 7.30pm. Marconi College, Arbour Lane. Details from Andrew Mead, G4KQE, tel Silver End 83094.

Colchester (CRA)—14 June ("How banks talk to each other", by Richard de la Rue), 28 June ("What next in space?" by Frank Howe, G3FIJ), 7.30pm. Colchester Institute, Sheepen Road. Details from Frank Howe, G3FIJ, tel Colchester 851189.

Vange (VARS)—7 June (Junk sale), 7.30pm. Main Hall, Barstable Tenants' Community Association, Long Ridings, Basildon. Details from Mrs D. Thompson, 10 Feering Row, Basildon SS14 1TE.

REGION 17—RR H. G. Cunningham, G8FG, 235 Station Road, West Moors, Wimborne, Dorset BH22 0HZ. Tel Ferndown (0202) 876018.

Andover (ARAC)—21 June (Discussion on the techniques needed to win the VHF NFD, by G8OPR), 8pm. The Wolversdene Club. Sec G8OPR.

Basingstoke (BARC)—12 June ("EME", by G3YGF), 7.30pm. The Swan, Sherborne St John, Basingstoke. Chairman G4WIZ, tel (07356) 5185.

Fareham (F&DARC)—6 June (PSU—club project), 13 June and 27 June (OTA natter night), 20 June (Two metre dx, by G3VXM), 7.30pm. Portchester Community Centre, Westlands Grove, Portchester. Sec G4ITG, tel Fareham 234904.

Farnborough (F&DRS)—13 June ("Racal equipment", by G3VCX), 27 June (VHF Field Day preview by G8SRL and G6WWU), 7.30pm. Railway Enthusiasts Club, Access Road, off Hawley Lane, Farnborough. Pro G4MBZ, tel Farnborough 837581.

Horndean (H&DARC)—4 June (RR's visit and talk), 9pm. Merchiston Hall, London Road, Horndean. Sec G4DIU.

Liphook (Three Counties ARC)—6 June (Natter night), 20 June (Reading commercial radio station—how it works), 30 June (Barbecue, check with sec for venue), 8pm. The Railway Hotel, Liphook. Sec G4WUV, tel Bordon 3395.

Winchester (WARC)—16 June (Quiz with Andover Club—return match), 7.30pm. The Log Cabin, Stockbridge Road, Winchester. Sec G3SHQ, tel Twyford (0962) 713003.

REGION 19—RR R. J. C. Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ. Tel 01-989 6741.

Cheshunt (C&DARC)—6 June (Natter night), 13 June (Junk sort), 20 June (2m portable on Baas Hill Common), 27 June (Natter night), 8.15pm. The Church Room, Church Lane, Wormley, nr Cheshunt, Herts. Details from Roger Frisby, G4OAA, tel 09924 64795.

Chiswick (ABCARC)—19 June (The RAE review), 7.30pm. Committee Room, Chiswick Town Hall, High Road, London W4. Sec W. G. Dyer, G3GEH, tel 01-992 3778.

Edgware (E&DRS)—14 June (Electronic music demo, Peter, G4BZY). 28 June (Informal and VHF Field Day briefing). The Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. Sec John Cobley, G4RMD, tel Hatfield 64342.

Harrow (RSH)—1 June (HF NFD briefing), 8 June (Talk, "Constructing antennas"), 15 June (Informal), 22 June (Talk, "Special event stations"), 29 June (Informal). Morse classes are held on informal nights. Harrow Arts Centre, High Road, Harrow Weald, opposite the Alma Pub. Talk-in on GB3HR. Details from publicity officer G8XBZ, tel Rickmansworth 779942.

Havering (H&DARC)—6 June (Informal), 13 June (Talk on the RSGB QSL Bureau), 20 June (Pre-contest briefing, VHF NFD, then informal), 27 June (Weather permitting, a df hunt). Fairkytes Art Centre, Billet Lane, Hornchurch, Essex. Details from J. R. Gibbs, G4UQR, 40 Bridge Avenue, Upminster, Essex, tel Upminster 26904.

Southgate (SARC)—7 June ((Please note date) "Receiver techniques", by Brian, G4AEZ), 8pm. St Thomas's Church Hall, Prince George Avenue, London N14. Acting pro R. Snary, G4OBE.

St Albans (Verulam ARC)—12 June (Informal/workshop), 26 June ("Technical publications policy", by Dain Evans, G3RPE), 8pm. RAFA HQ, New Kent Road, St Albans. Details from Hilary, G4JKS, tel St Albans 59318. Would visitors to this club please note that you should remove *all* your mobile equipment from your car while at any meeting. There have been a few thefts at this car park.

Wanstead (ELGRSGB)—Sundays, 19 June (There is a df hunt on this date and members are asked to turn out for this event. Information can be obtained from Clive, tel 01 539-7590). This group needs your support. Wanstead House Community Centre, The Green, Wanstead, London E11. The Green is right opposite Wanstead underground station and Wanstead House is very near to the station. Details from Julian, tel 01-550 7013. Sheila, G3HCQ, chairman of this group for a

number of years has recently retired. Many thanks for her services.

Watford (WRC)—6 June ("Infra-bass hifi", by Graham Holliman), 20 June (Informal), 4 July ("10m fm", by Peter, G3YPZ), 8pm. Tudor Arms, Bushey Mill Lane, North Watford. Details from sec, Gordon, G8XXV, tel 01-950 3611.

REGION 20—RR B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, Bristol BS20 1NQ. Tel 0272 848140.

Bristol (BARC)—5 June (Computer night/club projects), 12, 19 June (Preparation of BARC involvement with Longleat Rally), 26 June (Preparation for contests), 7.30pm. YMCA, Park Road, Kingswood, Bristol. Information from Trevor Cockram, G8GFZ, or Allan Williams, G3ZKI, tel 0272 553020.

Bristol (BRSGBG)—25 June (Bob Barrett, GW8HEZ, President of the RSGB, will be talking about the RSGB—come and make your President welcome in Bristol), 7.30pm. Small Lecture Theatre, Queens Building, Bristol University. Details from Brian Goddard, G4FRG, sec, tel 0272 848140.

Bristol (South Bristol ARC)—6 June ("Radio interference", by Mike, G3OUK), 13 June ("Preparation for Longleat", by Mark, G4KUQ, Len G4RZY), 20 June ("Final briefing for Longleat", by Mark, G4KUQ, and Len, G4RZY), 27 June ("Rig tweeking night", by Mark, G4SDR), 7.30pm. Whitchurch Folk House, East Dundry Road, Whitchurch, Bristol BS14 0LN. Details from Len, G4RZY, tel 0272 834282.

Bristol 432MHz Repeater Group (GB3BS)—The agm of the Group was held on 12 April at the Earl Russell, Lawrence Hill, Bristol. Mark, G4KUQ, was elected chairman. Steve, G4MCQ, sec, and Terry, G8NNU, treasurer. The prospective rtty/data repeater project to cover Bristol and Bath was discussed. Information about this project or GB3BS from Steve, G4MCQ. The group will also have an information stand at Longleat Rally on 24 June.

Cheltenham (CARA)—1 June (Trip to Madley Satellite Communication Station (to be confirmed)), 2, 3 June (HF NFD), 15 June (Natter night), 6 July ("Communications in Africa", by G3KKN), 7.30pm. Stanton Room, Charlton Kings Library, Cheltenham. Details from Gill Harmsworth, G6COH, tel Cheltenham 525162.

Gloucester (GARS)—6 June (NFD post-mortem —NFD at Gordon League Rugby Ground), informal meetings other Wednesdays, 7.30pm. 16, 17 June (Picnic weekend). Sec requests that all members please note that the new venue for meetings is St John Ambulance Brigade HQ, London Road, Gloucester. Details from Tony Martin, G4HBV.

Street (S&DARS)—5 June (Construction competition and slow morse class). Strode College, Church Road, Street. Details from Bill Scrivens, tel Street 42277.

Weston-super-Mare (W-s-MRS)—11 June (RSGB video evening), 9 July (DF hunt—open to all interested amateurs), 7.30pm. The Rugby Club (off Drove Road), Weston-super-Mare. Details of times, frequencies etc will be given on GB2RS. Details from Dave Restrick, G4/KA0NGP, 4 Ashcombe Road, Weston-super-Mare, tel Weston-super-Mare 28482.

Yeovil (Y&DARC)—7 June ("How the ionosphere bends a radio wave", part 1, by G3MYM), 14 June ("How the ionosphere bends a radio wave", part 2, by G3MYM), 21 June ("The changing face of amateur radio", by G3GC), 28 June (Natter night), 7.30pm. Recreation Centre, Chilton Grove, Yeovil. Details from Eric H. Godfrey, G3GC, Dorset Reach, 60 Chilton Grove, Yeovil, Somerset BA21 4AW, tel 0935 75533.

Members' Ads

CONDITIONS OF ACCEPTANCE

These subsidized flat-rate advertisements are accepted as a service to members of the RSGB only. They must be submitted on the Members' Ad form printed on the back of a *recent* address label carrier used to mail *Rad Com* to the advertiser: this will automatically provide proof of membership and should not be more than two months old. No acknowledgement of receipt will be sent, and advertisements not clearly worded or punctuated, or which do not comply with the conditions of acceptance, will be returned. No correspondence concerning this service will be entered into.

Trade or business advertisements, even from members, will not be accepted for "Members' Ads" but should be submitted as classified or display advertisements in the usual way. Traders who are members must enclose a signed declaration that the items for sale or wanted are part of, or intended for, their own personal amateur station.

The RSGB reserves the right to refuse advertisements, and accepts no responsibility for errors or omissions, or for the quality of goods offered for sale. Advertisements for citizens band equipment will not be accepted.

Warning. Members are advised that they should, as far as possible, ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The "purchase" of goods legally owned by a finance company could result in the "purchaser" losing both the goods and the cash paid.

The current rate is £1 for 40 words or less: advertisements containing more than 40 words will cost an additional £1 for every additional 40 or less words. Each advertisement must be accompanied by the correct remittance, either as a cheque or postal order made payable to Radio Society of Great Britain.

Closing dates in 1984 for issues in brackets, are **14 June** (August); **12 July** (September); **23 August** (October); **20 September** (November); **25 October** (December); **22 November** (January 1985).

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS
Do not post to RSGB HQ or Advertising officer.

FOR SALE

Satellit 2100, Grundig, 120-11m, bandspread, normal exc cond, orig cost £400, will sell or exchange for Yaesu/Icom tx/rx, with psu. Setting up station. C. T. Curtis, 554 Middle Park Avenue, Eltham, London SE9 5QS. Tel 01-859 1191.

FDK M700AX 2m 25W fm mobile, exc cond, £150. G4SWE. Tel 077 784 769 (north Notts area).

Surplus gear: 2m, Liner 2 ssb, £70. Uniden 2030 fm, £70. Ampres 80W linear, £60. QM70 transverter, £60. Weston 30ft mast, wu to, £200. Pendulum 30ft tubular guys, cables, rotar, £100, or sited approx 410 sq yd land, 100yd from sea, AN sq (Mablethorpe), three sheds, one brick, fruit trees (room for caravan), services, (masts have pp), £5,000 ovno. Buyers collect and dismantle masts. G6LYZ, 107 Hanson Lane, Halifax HX1 4SD, West Yorks.

Comp station: Yaesu FT101E, XF30C cw filter, FV101B external vfo, YD844 deluxe desk mic, £350. Shipping extra. Delivery possible dependent on QTH. G3OLU, QTHR. Tel Braintree (Essex) (0376) 23429.

Yaesu FT301D six-band solidstate tx/rx, recently overhauled by Amateur Electronics, good cond, cw filter, £350. Mutek front end for FT290, £20. Tel Mark, G4UVQ, Letchworth 5023.

DEC PDP8L teletype, on stand, £75 ono. *Wanted:* KW2000B, a good unmodded one please. Circuit diagram for Racal RA17. G4RBR. Tel Chris, 01-979 1798, daytime, 01-398 8172, evenings.

FT225RD, Yaesu memory bank module, no soldering required, just plug-in, cost in excess of £100, but never used, accept £45. G4VCT. Tel 0524 410700.

88mH coils, secondhand, 3AF type, £1 each, inc p&p. T. Sherman, G8XAJ, 23 Tylecote Close, Marston Mortaine, Beds MK43 0QA.

55ft telescopic tower, hinged base, £125. Diawa 7600R heavy duty rotator, £125. Diawa CN620A pwr/swr meter, £40. Europa valve type 2m transverter, £50. Old centre spider quad, £25. Buyers collect. *Wanted:* Datong FL1/2. FT101B ws manual. Tel Brookwood 6670.

Yaesu FRG7700M gen cov rx, mint, FRT7700 atu, 150kHz-29·99MHz, 12 memories, clock, timer, digital readout, a.m., ssb, fm, three-position selectivity, many other facilities, used little, £300. G3HKH, QTHR. Tel Weybridge 47112.

Dentron 1kW linear amplifier, ideal solidstate rigs, £250. KW109 atu, £85. SMC KW monitorscope, matches KW atu, £75. All vgc, orig packing. G4ICC, QTHR. Tel Northampton (0604) 52601, after 6pm.

Trio TS700G multimode tx/rx, Vox 3 unit, exc cond, £250. Sony bw video camera, AVC3250CE, electronic viewfinder, 12·5-75mm zoom lens, £75. Hitachi 9in bw video monitor, model VM910E/K, £60. G4BWU, QTHR. Tel 0438 354261.

Jaybeam 10XY Yagi, £15. Rotator, similar to KR600, £80. Frequency counter, Davis 600MHz, xtal oven, £100. Coaxial relay, £10. Quad 33 control unit, £45. Homebrew 303 amp, £45. G4OQG, QTHR. Tel 0249 650880, after 7pm.

Trio TR2400, charger, ST1 base stand (quick charger), in orig boxes, vgc, used little, £130. Eddystone EC10 rx Mk 1, mains adapter, gen cov, £40. GM3LCP, QTHR. Tel Dundee (0382) 79665.

Daiwa electronic keyer, AEA keyboard, button pad keyer, both boxed and as new, £25 each. SEM touch paddle, Heathkit morse oscillator, £5 each, plus postage. Garner, G2BGG, QTHR. Tel 051-427 1903.

R600 gen cov rx, two years old, vgc, £200 ono. Newman, G4GLT, Newhaven, Beveridge Lane, Bardon Hill, Leics LE6 2TB. Tel Coalville 35835.

Trio 520SE, vgc, no mods, MC50 mic, £340. *Wanted:* ARRL antenna book, and antenna anthology. D70 morse tutor. Navy morse key. Jackson. Tel Lowick (Cumbria) (0229) 85669.

IC2E, comp with BC25E charger, spare ICBP3 battery, ICHM9 spkr, mic, one year old, exc cond, £130 post paid. GD3ESV, QTHR. Tel 0624 5026, evenings.

FT290 2·2AH nicads, case, charger, helical whip, good cond, still under guarantee, £220. *Wanted:* hf accessories suit TS520, test equipment. G8GKH NOT QTHR. Tel Cheltenham 514701.

Trio TR9130 2m multimode, incl mobile mount, swr meter, swan neck car mic, remote, exc cond, only nine months old, worth over £480, need cash for hf gear, accept £395. London area delivery possible. G1AUI. Tel 01-328 3238.

Sommerkamp FLDX500, FRDX500 separates, good cond, fully operational, manuals, many spares, first sensible offer accepted. Chadwick, 32 Churchill Avenue, Kenton, Harrow, Middx. Tel 01-907 2079.

Microdot self-contained rtty/cw terminal unit, just connect to tx/rx and you are on the air, unmarked, British made, comprehensive manual, £350 ono. G4HKY, QTHR. Tel Huddersfield (0484) 862773.

Yaesu FRDX400 rx, as new, £100. Codar preselector PR40, £20 ono. Microwave Modules, 10m in, 4m out, 10m in, 2m out, 10m in, 70cm out, all Microwave Modules, £20 each. G6VDL. Tel 0925 62208.

Yaesu FRG7, used little, fm mod fitted, large 2m five-el Yagi, £120 ono, or swap for Commodore 64. Tel Atherton 896116.

Pye W15AM single channel on 70MHz, £25. G4AKD. Tel 0954 211189.

FT480R Yaesu 2m multimode mobile/base station, exchange for FT290R, or similar (cash adjustment), need portable operation. In mint cond, no mods, no mobile use, comp in original packing, offers? Straight sale also considered. G6IEH. Tel Reading (0734) 26272, evenings.

3cm professional dish, 30 in, £25. 5in cone, £7. Wayne Kerr wavemeter, £25. Variable attenuator, 0-40dB, £18. Circulator, £15. Gunn oscillator, voltage tunable, £18. RX mixer, £7. Klystron assy, £5. Round to square adaptor, £3. Other parts available. G8JAI, QTHR.

Commodore 64, C2N recorder, £150. 1541 disk drive, £150. CBM 1701 colour monitor, £150. AMT1 plus cw, £230. CBM 64 software, interface, £35. G3KNJ, QTHR. Tel Watford 44069, after 6pm, or Watford 28566, ext 288, daytime.

MM 2m linear, £100. CX520D coaxial relay, £20. Commander rotator and controller, £55. Icom 290E 2m multimode tx/rx, £275. Marconi morse key, collector's item, £20. Muirhead sig gen, 1Hz-111kHz, xtal marker, internal oscilloscope, £50. Yaesu psu, 12V/20A, £60. G3VWE, QTHR. Tel 0272 656783.

G2DAF rx, tx, Philpotts cabinets, grey stove enamel, as new, chassis, fitted B98 dial, lots of

components for both, £100. AVO 8 Mk2, leather carrying case, leads, £50. Bound volumes, 1961, 1973 *RSGB Bulletins,* offers. G3YRB, QTHR. Tel 01-684 3974.

10m fm Bremi BRL40, solidstate 50W amp, £25. Audio filter FL8A, £5. (See p801 Sept 1983 *Rad Com.*) Postage extra. G3KZU, QTHR. Tel Oxford (0865) 63000.

TS120S, 100W, MB100 mounting bracket, Daiwa 620 meter G-whip 10-80 extender rod, two telescopic whips, SST2 antenna tuner, all boxed, in immac order, rig not been used mobile, £385, will separate. G4GPX, QTHR. Tel Lancing (0903) 753893.

Mini beam G4MH, unused, £75, incl carriage. G4UNM. Tel 0983 402273.

Sony ICF2001 sw rx, 150kHz-30MHz, a.m./ssb, £85 ono. Roy Bailey, G6WLE. Tel Great Shefford 441.

Rotator, model Emoto 103LBX, metered control unit, antenna weight 150kg max, hardly ever used, surplus to requirements, as new, £45. Buyer collects. G4JPT, QTHR. Tel Gloucester 67670.

FT902DM hf rig, vgc, FC902 atu, FV901DM scanning vfo, SP901P external spkr, phone patch, all with orig packaging, connecting leads, handbooks, cost new £1,245, will accept £775. G4PUP, QTHR, as G6AFD. Tel 01-641 2516, anytime.

Heathkit equip rf sig gen, £10. Capacitor checker, £10. Transistor f.e.t. checker, £15. Valve voltmeter, requires new meter, £7. Oscilloscope, requires new fet on input, £15 ono. All with manuals, working unless stated. Tel Atherton (0942) 891140.

Nascom 2, £100. WW SC80 computer, single step, disassembler, cased, £90. Tektronix sampling scope, needs some attention, £100. Paul Record. Tel 021-558 3232, ext 240, office hours only.

Computer, Texas Instruments model TI99/A4, 16-bit micro, 16k ram (expandable to 48k), cond excellent, £60, no offers. G3SSJ, QTHR. Tel Alresford (096273) 3816.

FT290R, incl nicads, 25W amp, 5λ/8 gutter mount whip, £200. G8IGY. Tel 0203 664783.

Trio TS515 ssb/cw tx/rx, 180W input, matching psu/spkr, in good cond, £160. 30ft galvanised steel triangular lattice mast in three sections, £60. G3YNA, QTHR. Tel Hastings (0424) 753145.

UHF 432MHz ssb/cw tx/rx type IC402, as new cond, £100. Uher tape recorder, ideal for meteor scatter etc, type Report 4000L, offers? Please tel Tim, 0908 368707, evenings only.

Yaesu FRG7700 communications rx, matching Yaesu FRT7700 atu, as new, boxed, manuals, £220. Kenwood TR8400 70cm 10W fm mobile, matching Kenwood PS10 psu, never used mobile, as new, boxed, manuals, £195. S. Clifton, G4WBT, 97 Redland Drive, Northampton NN2 8UG.

Icom IC24G, two mobile mounts, power lead, Bantex 5λ/8 whip, perfect cond, £120, or would exchange any 40-track single disc drive for BBC micro. Paul Martin, 3 Birch Close, Broadstairs, Thanet, Kent. Tel 0843 61448, home, or 20592, work.

Trio TS120V, incl 600Hz cw filter, TL120 matching 100W linear amp, all vgc, handbooks, cables, orig packing, £380 ono. Microwave Modules 432/28 transverter, £50 ono. Pye Westminster, lb, fm, £30. HB a.m., £30. GM4EZJ. Tel 0875 53450, evenings.

Collaro Conquest four-speed autochange, Collaro three-speed, three-motor tape deck, mains transformer crt, for Solartron CD1014 oscilloscope, various Cossor 4in crt Marconi 600Ω attenuator, quantity WW text from 1970, offers. C. A. Cooper, 11 Radical Ride, Wokingham, Berks. Tel 0734 734312.

Rotator cable, 150ft of eight-core colour-coded screened cable, rubber covered, 36-strand each core, Cannon plug one end, loose plug, best offer, collected. G3EJA, QTHR. Tel Reading 588503.

Adonis boom safety mic, new, £23. Jaybeam MBM48/70, 48-el multibeam, new, £28. Prefer buyer collects but can deliver reasonable distance. G6UPQ, QTHR (West Oxon). Tel 0993 75241, evenings or weekends.

FDK Multi 700EX, 2m, fm, 25W, bargain, £155. G4EXZ. Tel Bristol 573985.

SMC five-band vertical antenna model HF5V, comp with radial kit, HF5R, £50 ono plus carriage. Maxcell hf linear, all solidstate, a.m./fm, ssb four settings, 25-100W, a.m. as new, £55. G4WLD. Tel John, 01-857 8096.

New 4CX1500B, £50. 4CX1500B, ex-equipment, boxed, £15. Two new SK600A bases, £15 each. Three 4 400B, ex-equipment, £10 each. 4CX250B, ex-equipment, boxed, £5 each. All Eimac. Money returned if dissatisfied. Tel Godalming 29757, evenings.

FL2100Z linear amp, as new, boxed, £350, or exchange hf rig. FT7B mobile rig, G-whip, bumper mount, coils, £325. G4LJN NOT QTHR. Tel 0202 309954, evenings.

FT221 with Mutek board, Datong speech clipper, perfect, £340. Hansen swr/power meter FS710V, £50. FRG7 rx, £125. Yaesu desk mic, £15. Tel Clows Top (Worcs) (029-922) 279, anytime.

Open-spool Philips N4414 stereo 7in tape recorder, immaculate cond, new recording/playing heads, replacement speaker, 20 unused 7in tapes, eight used, three 5in tapes, £250. Buyer collects or arranges carriage. Oates, G4MOU. Tel Chester 22039, evenings.

Yaesu FT101ZDFM/FTV901 2m transverter, Heathkit monitorscope, Diamond eight-band multi-trap vertical antenna, all exc cond, £550 buys you complete hf and vhf station. G6TVG, QTHR. Tel 0787 78762, office hours, 0787 280273, evenings.

Bearcat 220 scanner rx, 32-512MHz, mains, 12V, £135. *Wanted:* Realistic PRO2002 50ch scanner, or Gemscan 70. G8RHU, QTHR. Tel Newhaven (0273) 516801.

FT101Z fm, nine bands, cw fan, mic, headphones, orig packing, exc cond, £400. Can deliver reasonable distance. G4LIO, QTHR. Tel Cosham 373320.

Offers invited for genuine 400 Robot sstv converter, two W9NTP memories, seperate psu for three rgb colour, b&w and colour monitors if required, updating. Richard Thurlow, G3WW, QTHR. Tel March 740255.

Marconi Atalanta rx, £50. HRO 5T rx, cw coils, psu, requires slight attention, £20. LS102L Belcom, 26-30MHz multimode tx/rx, boxed, used little, £200. Buyer collects or delivery extra. G4XBL NOT QTHR. Tel John Bell, Aspatria 21553.

Alda 103 250W mobile rig, 20, 40, 80m, £220. Datong asp, Shure 201 mic, £60. G-whip multimobile, 10-80m, base slightly damaged, £30. KP202, S20-21, R3, nicads, no charger, offers. GW4GNY, QTHR. Tel 0938 75441.

Yaesu FT101EE hf tx/rx, good cond, fitted 10MHz, exchange for good ukulele, banjo, two preferred (banjulele), cash adjustment, or sell best offer if no exchange possible. G4EVP, QTHR. Tel Stafford (0785) 840872.

KDK 2m fm tx/rx, model 2015, digital 5kHz step, 144-148·995, four memories, scanner, high 15W, low 1W, £115. VIC20 3k ram pack, £12. Both ono. G3XMA, QTHR. Tel Coventry (0203) 410208.

Sota 144MHz 100W linear, 10W input, preamp, £75. LAR hf omni-atu, new, £50. Heathkit hf 2kW linear, SB220 (pair 3-500Zs), £450. Bird model 43 in-line wattmeter, elements 1,000H, 250H, 50H, 25C, offers. G3TSL. Tel Mike, Preston (0772) 635560, anytime.

BBC memories, ex-eqpt, tested 2118, 16k × 1 dynamic, eight for £10. Erased eproms 2716 (5V), £1; 2732, £2. Xtals, 5 and 6MHz (HC24U), £1. Please add 50p p&p. G8EGG, QTHR.

FT707 100W hf rig, matching FP707 psu, FC707 atu, all boxed, manuals, used rx only, exc cond, £425. Acorn Atom 12k + 12k, FP and Watford roms, psu, rtty program, interface, books, software, etc, £100. G6JUI. Tel Reading (0734) 507137.

Multi 700EX 25W fm mobile, bracket, safety mic, mint, £145. 400Ω, 80W non-inductive resistors, eight make a 1600W dummy load, £2 each, carriage extra. Tel 0202 522796, after 6pm.

Icom IC24G 2m tx/rx, 25 or 12·5kHz synth tuning, to sell with Marconi 35W pa, £150. Two Pye Bantam portables, one mid-band and wkg, £10 pair. Tel G4WTE, Medway (Kent) (0634) 221061, evenings.

Philips N1700/15 video recorder, service manual, 12 tapes, head cleaning tape, needs some attention, believed to have i.f. fault but does record and play back, £50. Buyer collects (Bedfordshire). G3OXG, QTHR. Tel 0767 260462.

CR100 rx in lovely cond, comp, wkg, no mods, handbook, £45, or will swop for Datong D70 morse tutor and key. Dave Davis, G6YQD, QTHR. Tel 01-399 5487.

Trio TR9000 multimode mobile tx/rx for 2m, 10W, red display, £275. G6JXA. Tel 01-648 0028, Morden, Surrey, after 7pm.

SX200N vhf/uhf scanning rx, used little, perfect cond, discone type antenna to suit, £230 ono the lot, or would consider exchange for hf/vhf equipment. GM1CPY. Tel 0294 822848 (West Kilbride, Ayrshire, evenings.

Yaesu FL110, 100W output, 12V, solidstate mobile/base station, linear amplifier, hf bands 160-10m, very compact, ideal for FT75, FT7, TS120V etc, mint cond, handbook, owners interest QRP, £110 (list £156). Eric Elsley, G3YUQ, QTHR. Tel Bedford (0234) 768120.

SSB filters, YF90F, 9MHz, 2·4kHz carrier xtals, £14. 1246AC 5·2MHz, 2·05kHz, £6. Johnstone transmitting, 100pF, 3kV, two, £5 each. Roller coil, 19 turns, 1·5in dia, silver wire, ceramic insulation, unused, £6. G2MA, QTHR. Tel 0709 542708.

FT290R, 2m multimode, nicads, charger, mobile mount, case etc, unmodified, 2m linear/preamp to suit above, eight-el cross Yagi, all in exc cond, £255 the lot, or split. G4ULZ, QTHR. Tel Burgess Hill (04446) 5641.

Drake SP75 speech processor, £75. Autek QF1A audio filter, both as new with instructions, £50. *Wanted:* stamp collection or accumulation. G3AAE, QTHR. Tel 01-508 3669.

Avo valve characteristic meter, (valve tester) exc cond, handbook, £30. Comp Codar station, a.m., cw, 160m, 80m, tx, rx, mains psu, control gear, exc cond, £60. G2LXJ, QTHR. Tel Hornchurch 42148.

Swan PSU5 power supply, regulated 12V 25A, £85. Tech TE20D sig gen, £30. Eagle swr meter, dual impedance, £15. Shure hand mic 401A, £8. K30 power mic, £20. Hioki AS100D test meter, £15. Valradio dc/ac converter. G3MIN. Tel Shoreham (Sussex) 3552.

RTTY, ASCII, MM4001 kb tx/rx unit, used little, one year old, all plugs, leads, keyboard, booklet, up to 1200 baud ASCII or 100 rtty, auto cq, ry, four stores etc, perfect, £230. G3UKV, QTHR. Tel 0952 55416.

Nascom 2, 32k, cased, fan, recorder, manuals, bargain, £145. G3WXW, QTHR. Tel 0279 815414, after 5pm.

Open reel hi-fi recording tapes, large quantity, std, 1p, 7in, 10·5in reels, from 50p per reel. Transformers, mains to 500V 350mA, 310V 150mA, 50V 50mA, 6·3V 9A, £5.50 each. Simon SP2 tape recorder vgc, 10W internal amp, £20. G3LGK, QTHR. Tel 0773 833142.

Pye Whitehall a.m./fm, £55. Pye fm hb 10ch mc Westminster, £25. Pye PF8, £60. Pye PF9, £50. Pye LW15FM 10ch hb boot set only, £30. Pye PF6 car adaptor, £25. Pye W15FMB lb, £25. W15AMD, P band, 10ch, £30. G8EPR, QTHR. Tel Bewdley 403773.

Tubular filters, 50Ω, 50W, lopass 55MHz cut-off, 60dB attenuation at 74MHz, vswr less than 1·5/1·0, tnc connectors, spec sheet, £10 each, post paid. 2in square panel meters. Tel or write for details. Many types. G8ZGK, QTHR. Tel 0608 810126.

Icom SP3 extension spkr, brand new, superb sound, for use on any rig, normal price £45, bargain at only £35. Tel Wombourne (Staffs) 896625, after 6pm.

HF Antennas for All Locations, by L. A. Moxon, G6XN, 264 pages hardback, £3. G5KC, QTHR.

Versatower Strumech P40 telescopic tiltover, galvanized, standard ground post, head unit, two winches, CDR rotor model TR44, control unit, £120 lot, ono. G3UVS, QTHR.

Mains to 9V at 3A transformers, 18V ct, short leads, £2 each, incl p&p. Ideal for bench psu. G3WBC, QTHR.

Exchange Video Genie, 16k comp, wealth of books, assembler, monitor, programs, for hf rig, mobile or base station. Details G4GZZ, QTHR. Tel 021-422 6440.

Bermuda Contest winning tx/rx, TR7A, RV7, PS7, in mint cond, offers please. 70ft Westower with planning permission, £60,000. Will throw in sd country cottage, three beds, nr Reading, excellent hf location. Details G3UKS, QTHR. Tel 073-529 2672.

Datong equipment: FL2, £55; ASP, £60; or exchange one or both for versatile high power atu suitable for open wire balanced feeders. Good hombrew considered. Cash adjustment either way. G3PCG, QTHR. Tel Mells 812158, evenings/weekends.

Yaesu FT200, FP200, hf tx/rx, vgc, boxed, £200 ovno. Yaesu FT708R, 70cm fm tx/rx, YM24A spkr/mic, NC8 base charger, dc supply, PA3 adapter, mint, boxed, £190 ono. Trio 120V hf tx/rx, mic, vgc, boxed, £275 ono. Tel 0305 786930.

FT101EX cw filter, vgc, £275. FT290R, nicads, charger, case, £190. AR40 eight-el Yagi, £40. PSU, 0-15V, 10A, £20. SMC 2m 7λ/8 whip, brand new, £10. DX100V, £25. MML linear 140/30LS, £40. B. Taylor, G3ZAG, 7 Eagle Drive, Flitwick, Bedford MK45 1RH. Tel 0525 715277.

TS120V hf tx/rx, WARC, new, unused, offers. FT230R, gwo, £150. FTDX401 hf tx/rx, new pas, £200. Going QRT. G4FQS. Tel John, 01-253 0661, ext 129. daytime, 01-459 2543, evenings.

Racal Digideck, new, unused, £60 ono. Jaybeam D82M eight-over-eight, £17.50. Advance digital multimeter, £78 ono. Solidstate relays, 240V ac, 10A, 3-32V dc control, new, £5 each. *Wanted:* retirement QTH, elevated position, with tower, preferably isolated, might part exchange. Tel 04867 6670.

Dutch Safira electronic organ, all modes, 40W, rhythm, two keyboards, Leslie spkr, remote control, swap for 70cm multimode, will haggle. Peter Connor, G8XTE, QTHR. Tel Cornwood (Devon) 319, after 6pm please.

Drake R7A rx, SL4000 fitted, as new, £725. Write only for details. P. J. Willars, RS44155, 22 Vernon Terrace, Northampton NN1 5HE.

Tono 9000E rtty/cw word processor, Centronics interface for printer, six months, boxed, as new, £475. Would exchange BBC with disk to link with Ant 1 terminal unit. GM4RSJ NOT QTHR. Tel 0292 76365.

Standard C7800, uhf, fm, 10W synth mobile, mint cond, £185 ono. G6APB, QTHR. Tel Medway 681213.

Standard C58, mobile mount, nicads, charger, soft case, vgc, £200. G6XDM. Tel Newport Pagnell 613739.

Yaesu FRG7 communications rx, 500kHz--29·9MHz, immac cond, boxed, £120. GI3OJO. Tel 0232 63598.

Brand new Kenwood DF180, £30. RAF type P4A aircraft compass, exc cond, offers. Many boxed RCA Sylvania brand new octal valves, not ex-WD, many other types, no rubbish, £1 each incl postage. G3JDK, QTHR. Tel Wickersley 541606.

MM tx/rx, 144/28, all modes, £70. MM tx/rx, 432/28 atten, £110. Both used little with manuals. MM S2 talking morse tutor, now G4 so surplus, £140. G4WGO NOT QTHR. Tel 026470 305 evenings.

Metron A1000 solidstate linear amp, as new, by Magnus Corporation, Chicago, 160-10m, 1000W p.e.p. input for 60W drive, output 400W, inbuilt psu, 14V dc, peak current up to 75A, large panel meter, 100A fsd to monitor collector current, mains requirement 115/230 ac. Size 44cm W, 20cm H, 33cm D, 21kg, installation service manual, cost £1000 plus, £525. Eddystone 680X rx, 480kHz-30MHz, orig cond, manual, £55. G3PRS, QTHR. Tel Cuffley 874110.

Ham tower, 26ft, top housing, rotator fittings, £100 ovno, buyer collects. Tandy CGP115 four-colour pen printer/plotter, as new, extras to the basic machine, open to reasonable offers. GM4UKG NOT QTHR. Tel Inverkeithing (0383) 416688.

Trio 700A 2m all mode, 144-148MHz, four-over-four ant, £190. Tel 0253 885893.

Realistic DX300 communications rx, 10kHz-30MHz, digital display, absolutely mint cond, boxed, cost £289, sell £150. SEM 2m 50W linear, preamp, £48. Ikegami cctv camera, f1·4 lens, exc cond, £60. Eight-digit 600MHz frequency counter, £55. RF sig gen, 120kHz-500MHz, £30. Tel Kings Langley 63773.

Microwave Modules 10m transverter, used little, still under guarantee, £75. 50W amp to suit, £25. G4VXU. Tel Hitchin (0462) 53097.

Eddystone EA12 amateur bands rx, in good cond, handbook, spare valves, £115. G3AIO, QTHR. Tel Pembury 2836.

Fourteen-core screened cable, each core 150V, 1A flex, grey pvc outer sheath, 7mm dia, 30p/m. KT66 valves, new, boxed, £3. QQVO3-10, £1 each. 5in equipment fans, £2 each. Buyers collect or pay carriage. G8ZGK, QTHR. Tel 0608 810126.

FDK 700AX 2m fm, mobile or base station, 1-25W, six months old, mint cond, £135. G1BAR. Tel Billericay (02774) 53653, daytime only.

Yaesu FT480R, used little, mint cond, £300. MML 144/50S Microwave Modules linear, boxed, £65. £350 the pair. G6UEZ NOT QTHR. Tel Ashington (0670) 811950.

BBC 32k morse programs: 70 cw abbreviations/punctuation, 500 words in store; 100 3min plain language tests; save and load your own texts; random all sorts; choose internal speaker/external oscillator; learn really fast! £4.75. D. Brandon, G4UXD, 1 Woodlands Road, Chester CH4 8LB.

Swap Hammerlund BC794B, 1300kHz-46MHz, manual, works, needs power supply for HRO, any cond. G6XNC, QTHR. Tel 01-462 4461.

Three 6146W Sylvania valves, unused, £6 each. Valerie, G4BML, 6 St Stephens Close, Caversham, Reading, Berks RG4 8BX. Tel Reading 475142.

Trio 930S, new cond, boxed, user and workshop manuals, £950. KW1000 linear, boxed, manual, vgc, £220. G3ACB, QTHR. Tel Seaford (0323) 890310, or 897145.

Icom 271E, only three months old, 1-25W all modes, 32 memories, storing frequency/mode, many useful features, exc base station, bargain, £475 (£625 new). Hirschmann rotator, £25. Nine-el Tonna, £10. G4ULQ, QTHR. Tel Bournemouth (0202) 875065, weekends/evenings.

Mirage B1016 linear amp, preamp, 10W in, 160W out, cond as new, £85. Roller coaster for atu, vgc, £10. Variable capacitors, 1000pF, 1-3kW, £5. G6ACK, G4OOW, QTHR. Tel Hinckley (0455) 612091.

RO390 teletype, £40. Ferranti vdu, £35. Multirate psu, £10. Nascom computer, £190. Apple 2, disk drive, Pascal, £450. Zenith ttl camera, £20. Television tx, pa, £65. Microwave Modules MM600/435, £25. Tel Phil, Guildford 573871. Viewing in Orpington possible.

Heath model HR1680 ssb/cw rx, 80-10m, spkr, earphones, manual, exc cond, £110 ono. W. Fleming, 54 Calder Grove, Motherwell ML1 1ER. Tel 54066.

VIC 20 computer, cassette unit, joystick, games cassettes, Superlander cartridge, four books incl *Programmers Advanced Reference Guide,* £90 ono. G6HGL. Tel Woking 73656, after 6pm.

Yaesu FT730, 1-10W fm tx/rx, comp with mobile mounting bracket, never used mobile, mint cond, still under guarantee, £170. Jaybeam D8/70 antenna, £15. G4FLY, QTHR. Tel Reading (0734) 594495.

Pair of PF1s, perfect cond, on RB6, auto toneburst, spare nicads, charger, £40. TR8400, mobile mount, good cond, MML432/100 amp, £350. No split, Tel Martin, Flitwick 712743, after 5pm.

Daiwa CN520, 1·8-60MHz, 200-2kW, new, £30. Icom IC1050, 29 fm, frequency readout, repeater shift, boxed, mint, less mobile mount, £30. Codar AT5, needs work, £15. Telford TC7 Mk2, £20. G4WBW. Tel Alsager 3879, after 6.30pm.

FDK Multi 750E, 2m, fm, ssb, cw, all mode tx/rx, £225. GW4TYB NOT QTHR. Tanycoed, Afonwen, Pwllheli. Tel Chwilog 601.

Icom IC701, solidstate 100W hf rig, IC701PS power supply, ICSM2 desk mic. 160 to 10m, usb, lsb, cw, rtty, only 10h use from new, £500. G8VPE. Tel Great Yarmouth 728194.

Icom IC202, mint cond, orig packing, £85. Eddystone 730/4 hf rx, manual, spare valves, £65. G8JAI, QTHR.

IC1050 10m fm, Ratec modified, 29·310-29·700 incl rev/rep, used few times only, £32 ono. Daiwa SR9 2m monitor, incl five xtals, £25 ono. Consider exchanges. TR2200 or similar wanted. Electronic keyer, cash adjustment where needed. G4VLB, QTHR. Tel 061-480 1549.

Trio base/mobile station TS120V, £275. Linear TL120, £65. ATU AT120, £60. PSU PS30, £75, or £450 lot. Original clean operating manuals and packaging. Purchaser arranges transport. GM4GXD, QTHR. Tel Pitcaple 251 (Grampian region near Inverurie).

Pye Whitehall, 10ch control, head, speaker, mic, all transistor solidstate, handbook, excellent value, only £60. G1DRR NOT QTHR. Tel Doncaster (South Yorks) (0302) 835280.

FDK 700EX, 2m fm mobile, 25W, vgc, £120. Jaybeam 10XY/2M, £25. Would exchange for MMT 432/144R transverter, and Jaybeam MBM48/70CM or similar. G6YBF. Tel Gravesend (0474) 59346.

TS130V tx/rx, less than one year old, in pristine cond, £360. Hansen swr and power meter SWR35, 3·5 to 150MHz, £22. G4BBR, QTHR. Tel 0242 527588.

Yaesu FT201 80-10m ssb/cw tx/rx, valve pa, fan, dynamic mic, vgc, base station, mains or mobile, manual, £230. G3KTH, QTHR. Tel 0905 774624.

FT107M tx/rx, 160-10m solidstate, memory, scanning mic, 100W out, FP107E psu, exc, £545. TS802 80ch 2W handheld, case, nicads, charger, mic, £100. Eddystone 830/9 15-valve nine bands, gc rx, double superhet, xtal control facilities, very good, £125. GM3TBV, QTHR. Tel 0250 2520.

Trio TS700G, vox unit, hardly used, mint cond, no mods, £320 or exchange for C58 with cash adjustment. Need mobile rig. G8OCE, QTHR. Tel 0742 393217.

Morse tuition program tapes for Commodore 64, Vic 20, Dragon, Spectrum, ZX81-16k, with full operating and learning instructions. Characters introduced in stages for easy, fast learning from complete beginner to test standard and beyond. Sends any amount at any speed of random character groups for learning or a typed-in text for plain language practice and then checks your copy. The best program to get you that A licence, £6. GW3RRI, QTHR. Tel 0286 881886.

Liner 2 preamp, pip-tone, £65. Cossor 1035 scope, second for spares, £10. Pye tx, part-converted to 2m linear, £5. Burroughs paper tape punches and readers, £2 each. Approx 250 ex-computer pcbs, £1 per 10, or £15 the lot. Jaybeam 2m two-way phasing harness, new, £5. G4SUO, QTHR. Tel Ashford 56935.

KW2000B, ac psu, £195 ono. remote VFO4B, immac, no mods, £45 ono. Various spares for KW2000. *Wanted:* Collins noise blanker and accessories for KWM2. GI4GNZ, QTHR. Tel 0266 880740.

Icom 720A (incl fm), ICPS15, £925. MM 4000KB rtty tx/rx, £195. DFM 1kHz-30MHz, £45. CBM3016 computer, £245. 10m minibeam, 3m sq, £49. 100m UR43, £12.50. Green 9in monitor, £85. *Wanted:* 70cm linear, mast etc. W.H.Y? Tel Rayleigh (0268) 774089, after 3pm.

TS520S, xtal filter, FT707, FV707DM, FP707, all units in exc cond, Daiwa RF670 speech processor, sensible offers. G3XHK, QTHR. Tel 01-941 5250, or 01-430 7358.

RAE practice program tapes for Commodore 64, Vic 20 (needs memory expansion), Spectrum, ZX81-16k. Tests and gives unlimited practice in all RAE calculations. Don't let your maths let you fail the exam. Pass with this program, £6. GW3RRI, QTHR. Tel 0286 881886.

Big linears! 2m with two 4CX250Bs, 2W in, 400W out, £165. 70cm K2RIW, two 4CX250Bs, £160. Complete psu to drive both. Variable eht, 800-2000V, 0·5A, £155. All professionally built and can be rack mounted. G4BBR, QTHR. Tel 0242 527588.

QTH locator program tapes for Commodore 64, Vic 20, Spectrum, ZX81-16k. Input locator (coverage extends to 13 large squares) or lat/long, gives lat/long of locator, distance, beam heading, contest score and total, easy, accurate, £6. GW3RRI, QTHR. Tel 0286 881886.

Scope, all transistor hb, designed F. G. Rayer, wkg order, circuit, handbook, £7.50. Monitorscope, ex-Government tube, ht supply, focus, brightness, all ok, no amps, suitable rtty monitor etc, £5. Bendix steering compass, suitable small boat, £20. G3BDK, QTHR. Tel Towcester 52309.

Middlesbrough: large terraced family house, built early 1900s, good cond, four bedrooms, three living, large kitchen, extra toilet, shower, full gas central heating, 50ft mast, shed with bench and light, park two cars backyard, £27,250. Tel 0642 819922.

Omec 150W guitar amp, integral McKenzie speaker, nicely cased, £75. Similar amplifier, uses separate speaker, not supplied, £45. Icom IC225, synthesized, 80ch, 10W 144/146 fm tx/rx, very dependable, £90. All items first class cond. Carriage extra. G3WWL, QTHR. Tel 021-353 8874.

Drake TR7, PS7 psu. This equipment is for sale solely because I now have a TR7A. It is in first class order. For details contact G4PIP, QTHR as G8ZFE. Tel 05642 3200.

Sinclair Microvision personal television, 2in screen, covers all tv channels, super picture, uses four type AA batteries, exc cond, comp with case, £45 ono. Eric Elsley, G3YUQ, QTHR. Tel Bedford (0234) 768120, evenings.

Liner 2, Mutek preamp, Belcom psu, £90. FDK Quartz 16, cw mobile mount, hb synth, £90. ITT M5 starphone, SU20, SU18, RB14, RB13, RB11, £80. Trio JR500 hf rec, amateur bands only, £40. Ness cctv mono camera, wkg, £50. Kenwood TR7625, cw RM76 microprocessor, handbook, mobile mount, £175. Sony ST80F tuner, TA88 amp, bookshelf size, as new, £50. Goldring GL75 turntable, £15. Ron, G8NVT, QTHR. Tel Ottery St Mary 2361.

FRDX400, £100. FL200B tx, £100. GEC411 rx, 10kHz-31MHz synthesized, £350. DX40U hf tx, Geloso vfo, £40. Storno CQM12 fm highband rx, not wkg, hb a.m./cw top band tx, Colins TCS tx, 1·5-12MHz, psu variable, 0-500V, 250mA, stabilized, offers. Buyer arranges collection but some delivery may be arranged within reasonable distance. All items above, offers considered G4BXI, QTHR. Tel Thanet (0843) 595811, after 6pm.

FDK Multi 725X, 2m fm, 1-25W pll tx/rx, less than three months since new, only moderate home based use, £165. Microwave Modules 144/28 converter, £20. G1DQM. Tel Bedford (0234) 711904.

Icom 25E 2m fm scanning mic, 25W, five memories, £185. Standard C78 70cm fm portable, nicads, mobile bracket, case, £160. Orig packing, both as new. G4IOF, QTHR. Tel 01-486 8286, daytime, 01-722 7040, evenings.

FT101ZD, fm, FV101Z, SP101, £475. KW Vespa Mk1, £50. HRO coils, gc, £5 each. BS, £7 each. MM converters, 2m, 4m, 70cm, £15 each. G3RKZ, QTHR. Tel Derby 515212.

ZX81, built into console, tv stands on top, Maplin keyboard, case, 16k ram, Scarab rtty interface, hard wired to computer out'et port, still available for printer or other periferal, Scarab rtty tape, £60 ono. G3BDK, QTHR. Tel Towcester 52309.

Icom IC720 hf tx/rx, a.m. filter, ICSM5 base mic, PS20 psu, internal spkr, £575. Yaesu FT230R 2m fm mobile, 25W op, £180. All above mint cond. G4LYB, QTHR. Tel Haverhill 702852, after 7pm.

FRG7, vgc, used little, comp with handbook etc, £130, or would exchange for handheld or portable tx/rx, 2m or 70cm, in similar cond. G4RHV. Tel Ilkley (0943) 609888.

Icom 290E 10W multimode, good cond, packing, extra mobile mount, reason for sale want later model, £290 ono, still in warranty. G6GGU. Tel Stonehouse (045382) 5150, after 8.15pm most evenings.

Attention National HRO fans! Six HROs, three comp, three chassis, psu, many coils, spares, info, £65 lot. Four 5V 100A switchmode psus, £45 lot. Panda Explorer tx chassis, £15. 2m fm tx, 60W out, £20. G8LIU, QTHR. Tel Uxbridge 30006.

Free 16k ram board if you give me £200 for my S100 computer system and terminal (value over £500). Shibaden SV700 vtr, working, £50. Pair RCA813s, bases, (new), offers? Wanted: 9MHz valve ifts. G8POO, QTHR. Tel Simon, 0661 843449.

Trio R820, transceives with TS820, the ultimate rx, covers bc bands, notch filter, vbt, i.f. shift, four filters, digital readout, orig packing, cost over £600, mint cond, £375. Prefer buyer collects. G4LW, QTHR. Tel Trowbridge 3166.

Microwave Modules 144MHz double conversion mosfet converter, 4-6MHz i.f., good performance, £12.50. Vibroplex standard mechanical bug key, cond as new, £35. Shure 520SL desk mic, exc audio, £25. G3WLX, QTHR. Tel Gt Milton 643 (nr Oxford).

Ham 4 rotator, £170. Moseley TA33JR, £60. 813s heater transformer, £10. 28ft ali mast, £15. Pair 6JS6C NEC valves, new, £15. Hundreds of valves, components, etc. G3PYP, QTHR. Tel 0225 708816 (Wilts).

Icom IC740, IC251E, used little, less than one year old, £495, £395. SEM Tranzmatch, £45. 600W dummy load, £25. 144-432 transverter, £125. 88-el 70cm, £30. Can deliver for half fuel cost. GW4RDO. Tel 0443 476695.

2300 Trio 2m fm tx/rx, nicads, charger, handbook, etc, vgc, £105. UC1 up-converter, Datong, covers 90kHz-31MHz, i.f. 28-30, or 144-146MHz, £55. G3UKV, QTHR. Tel 0952 55416.

TS120V, psu, Shure mic, mobile mount, G-whip, multi-mobile, 10-40m, £280. Dragon 32 computer, £125. HF linear amp, hb, 10W in, 400W out, quality comps used throughout, offers. GW4KWV, QTHR. Tel 0656 880723, after 6pm.

Yaesu FT101ZD Mk3, fm fitted, mint cond, pas used for about 1h from new, matching FC902 atu, orig packing for both, £595, might split. G4GZS, QTHR. Tel Rugby 815506.

Double current key, orig cond, comp with glass top cover, best offer secures. Tel 0495 270900, evenings.

FL110 200W hf linear, nine-band, solidstate, rf or ptt switched, swr protected, ideal for use with any QRP rig, vgc, handbook, mobile bracket, never used mobile, £100. G4GED, QTHR. Tel 01-578 4484, evenings.

HF5V trap vertical antenna, comp with radial kit, £60. SEM Tranzmatch, fitted Eezitune, new, £70. Sinclair Spectrum, morse tapes, exc cond, £75. G6YWP. Tel 0392 59754.

MMT 432/144R 70cm transverter, ssb/fm, 15dB attenuator, repeater shift, 10W output, vgc, £125 ono. G4ABF, QTHR. Tel Malvern (06845) 66202.

KW202 rx, £110, with KW204 tx, £120. Manuals, *Rad Coms*, offers. PKW trap dipole, £15. Buyer collects. G4NOO, QTHR. Tel Mike, Romford 44515.

2m 100W linear, preamp, model MML 144/100S, hardly used, in good cond, reason for sale, prefer hf bands. G4NGW. Tel Ron, 0332 513394, after 6pm.

Sharp MZ80K computer, £250. Trio TS130S, fitted narrow cw, ssb filters, VFO120, DFC230, up/down mic, £600. TS8400, PS10, up/down mic, £200. TS700S, VFO700S, SP70, £450. NRD515, fitted 300CS, 600CS filters, NDH515 24ch memory, NCM515, remote control, NVA515 spkr, £1,000. NSD515 tx, NBD515 psu, £1000, £1,900 complete station. All the above mint, in orig boxes, handbooks. Rohde Schwarz ESM180 vhf tx, 30-180MHz, £125. Hatfield multicoupler type 3401, 75Ω, new, handbook, £40. Collins uhf units, rf tuners, TN137/ULR, 300-600kHz, TN138/ULR, 550-1,100MHz, £15 each. CV70/ULR mix/amp, £15. IPO/10/ULR indicator, PP312/ULR psu, no cables, £75, £100 the lot. All equipment carriage extra. GW3JAZ, QTHR. Tel Gresford (097 883) 2584.

Eddystone EC10 Mk1 mains pack, battery holder, works fb, £35. Standard, C7900, latest ultra slimline, 10W, five memories, full scanning, £185, or exchange for FT708R with nicads etc, in mint cond. G2ATK, QTHR. Tel Pershore 553735.

Trio TS700G tx/rx, vox unit, eight-el Yagi, antenna rotator, comp, £325. Transformers: 350-0-350V, 0·2A, £5. 350-0-350V, 0·25A, £6. 470-0-470V, 0·2A, £7. All with heater windings. 10H 225mA choke, £3. Buyer collects. G3OIC, QTHR. Tel 0564 826124.

Western Electronics 70TV 70cm transverter, leads for FT101, £75. Datong PC1 gen cov converter, £75. FT101ZD Mk3, used very little, cw fm board, mic, fan, £450. FT225D, modified for repeaters, with mic, £400. Carriage extra. G3IDW. Tel Swindon 822055.

Trio TS830S hf tx/rx, AT230, SC230, boxed, hardly used, £650. G4FVN NOT QTHR. Tel 051-427 1949 (Liverpool), evenings.

FT101ZFM, nine-band, perfect cond, £420. FT208R, perfect cond, 144-148MHz, £160. TH3JNR triband beam, £120. CD45 heavy duty rotator, cable, £95. GI4MCV, QTHR. Tel Belfast (0232) 623985.

Oscilloscope, Solartron db, manual, £55. Liner 2, £50. FT250, psu, buyer collects, £145. Old Avo 8, £15. Airlite mic/headset, £5. Pye tulip mic, £5. 813, 7360, 829B, 832A, 4CX250B, £5. TCS spkr, £5. Carriage extra. GW3EJR, QTHR. Tel 0239 612331.

Transformer, 240V to 3·5-40-0-40-3·5V, 10A, 20lb, £5. Collins lfc 100mA, 200Ω, 8H, £3. Stancor modulation transformer, similar Collins, £3. Modulator on small chassis, pair 6L6M, 20W, Stancor transformer, requires p&p, £5. G3MBL, QTHR. Tel 01-445 4321, not 4-18 June.

Rodenstock Apo-Ronar 600mm process lens, f1:9, cost £673, would make super portrait or macro lens or fb telescope, £300 ono, or swap BBC B computer or Racal rx. G3RFN, QTHR. Tel 07744 21885.

Icom 255E, one owner from new, exc cond, two vfos, band scan etc, £145 ono. Two Trio low pass filters, LF30A, £15 each. G8WTM, QTHR. Tel Chelmsford 466915.

FDK Multi 2700 2m all mode tx/rx, 100W linear, preamp, nine-el beam, comp with rotator, feeder cable, control cable, £480 ono. Can deliver within 50 miles. G8SXK, QTHR. Tel 01-599 6677.

Eddystone 880/2 communications rx, open to offers, or will swop for radio controlled model car, comp. Anyone require FRDX400 instruction manual? Tel Chris, Nottingham 877206.

Lattice tower, 45ft rotator, 2m, six-el quad, hinged base, cable, £100. G8WSU, c/o Latimer School, Kettering, Northants NN15 6SW.

Eddystone 840C gen cov rx, £60. Tel Swindon 751760.

FT101E Mk3, cw filter, 12V converter, rf processor, fan, spare valves, Holdings fm tx/rx conversion (not fitted), £275. Hirschman RO250 rotator, £25. Two 11ft 1·5in square aluminium booms, approx 40ft 0·5in tube, suitable hf/vhf beams, £10 the lot. G4RSY. Tel 01-651 0633 (Croydon).

TX/rx, homebrew, 160-10m, solidstate, 2×6146Bs, see *Rad Com* 9/74, XF9B, 2·4kHz at 9MHz i.f., vox, rit, cw, usb, lsb, attractive case, 4·5 by 10 by 9in, matching psu, mobile dc converter, sae details, offers around £125. TA33JNR three-el, vgc, £70. Yaesu 227R mobile mounts, mic, manual, no mods, £140. Pair TT100 valves, 400W p.e.p. to 30MHz, data, £30 (now over £200!). Double sided glass pcb, 4 by 12in, £1. MMT 144/28, mint, guaranteed, £70. Buyer collects, G3XKA, QTHR. Tel Woking 73620.

EA12, Eddystone amateur bands only rx in exc cond, comp with matching plinth spkr, £135 ono. KW Vespa tx Mk2, 6LQ6 in pa, comp with KW EZeeMatch atu, Shure 444 mic, £150 ono. Geoff, G4MVS, QTHR (Surrey).

FT101E, vgc, £350. YP150 dummy load wattmeter, £60. FT227R, £120. Stolle Multimatic rotator, beam, £40. Sabtronics 600MHz freq counter, cw nicads, etc, £100. CR100, £15. G4IEK, 36 Yealmpstone Drive, Plympton, Plymouth, Devon.

FT101 Mk1, SMC fitted, 160m, exc cond, fan, mic, £250 ono. Heathkit SB104A, 10-80m, solidstate, 100W digital readout, tx/rx, matching psu, speaker, ext vfo, immac, a super rig, £290. G3CDE, QTHR. Tel 0483 575236.

Datong filter FL3, £90. Datong rf clipper, manual type, £30. *Wanted:* KW109. 444 Shure mic. G2UZ, QTHR. Tel Leeds 784074.

Tono 09000E cw/rtty/ASCII, tu, wp, vgc, used little, £400. Would consider exchange for FT790R, pa, or IC451 or similar. Sony ICF7600A fm/mw/sw bc rx, only nine months old, £55. Khee Chan. G5MUR, QTHR. Tel 061-225 5202.

Generator, portable Honda E800E, 220V ac, 800W or 12V dc, 100W, used once, so new cond, £220 ono. Ferrograph 631, offers. Mirror dinghy, 49215, sound boat with main, jib, oars, cover, trailer, £330 ono. W.H.Y? Boating part exchange? G4FQR, QTHR. Tel Horsham (0403) 66800.

Microwave Modules MMC70/28LO, £22. MMC1296/28, £22. 23cm varactor tripler, £10. Both 1,296MHz items in weatherproof box with relay, £33, or will split. DC ps, 12V in, 800V, 260V, -100V out, £20. Shack clearance. Buyer collects. G3LCH, QTHR. Tel 01-672 7066.

FL200B, FR100B, Sommerkamp ssb tx and rx, 200W p.e.p. split and transceive operation, comp cables, manuals, £175. Station monitor, Heathkit OS2 scope, £22. BC221, mains psu, £15. G3FWA, QTHR. Tel 0234 48272.

FT290R, many accessories, exc cond, £225 ono. Palm 2 6ch handheld, incl charger, £50. *Wanted:* FT221, IC211, either modified or not. Will consider FT290R plus cash in exchange. G6XVV. Tel Haydn, Rotherham (0709) 813042, weekends or Monday evenings only.

Microwave Modules 100LS 2m linear amplifier, 1-3W input, £100. Garrard DD400 direct drive record deck, mint, £35. Sony TC252D rr tape recorder, exc cond, £35. G4UGV. Tel 0732 823662 (Kent).

ZX Spectrum 48k, tapes, printer, rtty, cw rx, terminal unit, £200 ono, or part exchange dx tx rx station. W.H.Y? Tel Plymouth 880674.

Swan 350, external vfo, vox, spare valves, £300. 204BA, £110. Mosley Mustang, £90. All ono. G3JEC, QTHR. Tel 04853 2378.

Eddystone 770R, needs slight realignment, otherwise works well, £40. Buyer collects. Bob McHenry, G3NSM, QTHR. Tel Oxford (0865) 56321.

Linear FL2100, 80-10m, spare valve, rarely used, £250 ono. Heathkit SB101 tx/rx, external psu/spkr, well maintained, £150. Telemast 30ft telescopic tubular mast, guys, £25. Shure 401A hand mic, high impedance, £5. G4CHD, QTHR. Tel Cheltenham (0242) 513178.

Yaesu FT101E, late model, cw filter, YC601B digital display, 30MHz counter, good cond, new spare valves, £350. Buyer collects by arrangement. Chris Cleverly, 32 Cornwall Crescent, Devizes, Wilts SN10 5HG.

Sparkrite Voyager microprocessor-controlled car computer, 12 functions, new, unused sensors, all boxed, £45. *Wanted:* five-band trap vertical, pref with radials if required. G6NCN. Tel Eddie, 061-748 5660.

Trio TS130S, rarely used, £425. PS30, as new, £70. Yaesu FT290R, incl nicads, case, charger, helical, vgc, £210. Wisi four-el crossed Yagi, never used, £15. New 9502A rotator, incl thrust bearing, £60. G4LQT NOT QTHR. Tel 0785 52604.

TS430S, MC42 mic, mint cond, £590. G4MDR, QTHR. Tel 0908 613215.

FT101E, cw filter, in vgc, spare pa valves, £300 ono. Homebrew QRO linear, offers around £150. RTTY terminal ST5, as in *RTTY The Easy Way*, £25. Various other equipment. List available. G4FIE, QTHR. Tel Leicester 773870.

Never been in one place long enough to have used following equipment: TS430S, PS430, spkr, £695. IC720A, PS15 psu, cw and a.m. filters, £695. SB104A and matching spkr, still as kits, £295. Barry, G3RJS NOT QTHR. Tel West Wellow 23032, or Barry, CRO, MV Sea Princess, P&O Cruises, 10 Briton Street, Southampton.

Robot 400, sstv/fstv converter, homebuilt on genuine Robot pcb, all ics socket mounted, manual, graphics generator, four page memory, three selected sizes, all again on pcbs (ics socket mounted), direct access from QWERTY full-size keyboard, manual. The above all mounted in specially-built professional housing (requires external power supplies). Pye Lynx camera, with manual, £285. Buyer inspects, tests and collects. G4AWJ, QTHR. Tel 04352 4803.

Trio TS700G 144MHz multimode tx/rx, 240/12V, fitted mosfet preamp, cw sidetone, variable power control, vox unit, mic, leads, manual, orig packing, £295 ono. Coutant 5-6V 5A psu, £10. ITT Powercard, 5-6V 1·5A psu, £4. G4BLT, QTHR. Tel Wakefield 255515.

Yaesu FT208R, NC9C charger, case, manual, boxed, £165. G6XDC. Tel 061-437 3952.

Daiwa CNA2002, 2·5kW automatic antenna tuner, almost new, £155. NRD NDH515 24ch memory unit, £125. Datong vlf converter, brand new, £25. Racal dual diversity unit, MA168B, manual, £45. G3HWX, QTHR. Tel Halsall (0704) 840328.

FT101ZD Mk3, fm board fitted, a.m. board for same, 902 atu, spkr, all in orig boxes, £550 ono. 160 Goldsworthy Way, Burnham, Berks SL1 6AY. Tel Burnham 64567.

KW108 monitorscope, £55. Bencher lever, £30. Eddystone chrome 840A, £55. Buyers collect. G4KQG. Tel 0602 257396.

FT101ZD fan, new bands fitted, used twice only on tx only, as new, boxed, £400. G8VHK, QTHR. Tel 0903 763571.

Hygain TH3 Mk3 beam, good cond, £155. HW32A 20m 100W ssb tx/rx, homebrew psu, £50. Antenna

vector processor for use with triband beams, as new, £60. Four Gem quad arms, new £40. MM144/40 with preamp, £40. Jaybeam six-el quad, £20. HP uhf sig gen, 616B, good cond, two spare klystrons, manual, £75. HP shf sig gen, 620A, good cond, no case, manual, £65. GM4CNF, QTHR.

Icom IC251E 144MHz multimode tx/rx, IC-EX1 extension terminal, £380 ono. This is a fully operational rig in vgc with no mods. Jaybeam UGP/2M 144MHz groundplate antenna, as new, £3. G8GZZ, QTHR. Tel Ned, Woking 23506.

WANTED

Trio TS120V or TS130V hf tx/rx, cash waiting. Xtals for Yaesu FT2F. Dual trace pen chart recorders for use in teaching laboratory (must be in perfect working order). A. Stone, G4OJR, c/o 122 Stradbrooke Road, Lowestoft, Suffolk NR33 7HX.

RAF valves to fill gaps in display of unusual and important valves, RAFARS stand, Lancaster University Rally, August. 10cm/3cm klystrons, magnetrons. VT25, VT62, VT76, VT30, VT31. Collection arranged. Electrical condition unimportant. G2PB, QTHR. Tel 0254 33785, evenings.

MZ80K disc system, will exchange Yaesu FL2100B linear amplifier, in mint cond, had very little use. GW3KLU, QTHR. Tel 0352 56745, anytime.

KW107 Supermatch, cash waiting. Can collect or pay carriage. Speaker plug for KW202 rx. Two pins of different sizes, can anyone help? Please tel Barrie, Herne Bay (02273) 3511, evenings or weekends.

QSTs for 1981, April, Aug, Sept, Oct, Dec, 1983, May, June, Sept, Dec. Required to make up collection for society therefore grateful for donation or anything. GM4GXD, QTHR. Tel Pitcaple 251.

Yaesu FT290R, mint cond, to exchange for Arado IBA95 vlf metal detector, as new, worth £290. AT230 atu, best cond for cash. G4SVY. Tel Tony, Isle of Wight (0983) 405190.

Manual or circuit diagram for ILS/VOR test set type STC QA8A. Parts and modules etc. Aircraft instruments, visual "alt", "speed" and radio for moding to flight simulator or flight simulator bits. W.H.Y? G8BGU, QTHR. Tel Prudhoe (0661) 32020.

Alpha 77DX lin amp. Tel Derby 557705.

Info on BRT400. Valve line-up, circuit diagram or any relevant data. Would appreciate loan of manual if possible. G3MBQ, QTHR. Tel Poynton (0625) 873708.

Morse key, older the better, top price paid for double current c.1915 and similar, for own use by dedicated telegraphist. G3BEX, QTHR. Tel 04946 5097.

For the Wireless Museum: old radio books, magazines, catalogues, manuals, QSL cards, service sheets, valves, speakers, components, morse keys, knobs (urgent!), phonogram cylinder, tv record, letter neon, car radio, wire recorder. Details please to hon curator, G3KPO, QTHR. Tel Ryde 62513.

Brown Bros twin lever paddles. PKW inverted-V trap dipole, 80-10, ex PM Electronics. Tel David, 061-427 1983, day, 061-449 8938, evenings.

Urgently wanted: P8271 disc controller chip for BBC computer. £30 cash waiting. Paul Martin, 3 Birch Close, Broadstairs, Thanet, Kent. Tel Thanet (0843) 61448 or 20592.

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Thruline 250H element, 25 and 50W vhf/uhf elements available. Defunct in-ear deaf aid. X-Y plotter. *For sale*: rtty decoder-encoder for mechanical teletype with details, easy conversion for computer use, £35. G3AZI, QTHR. Tel 0772 37815.

Manual/handbook for type 13A scope, to buy, borrow, or copy. G3ZD, QTHR. Tel Nottingham 634352.

For mountain rescue team: manual for Pye AM10B. G3REO. Tel Coniston (0966) 41329.

Amateur Radio Handbook (RSGB) 1st and 2nd editions, £5 plus postage offered for 2nd edition (1940-1946); £10 plus postage for 1st edition (1938/9). G4LQF, 14 Regent Road, Harbourne, Birmingham 17. Tel 021-426 3663.

2m rig (IC202, Liner) will exchange/sell for Apple 2 software. Have over 200 business and games programs (100 discs)—Visicall, Wordstar, home acct etc, all professionally written. Have Pye Bantam and uhf handhelds for sale. Contact with Apple 2 users would be appreciated. Also require interface or language cards to suit Apple 2. For more information, please send 30p in stamps or PO for my extensive lists, to cover postage from Germany, or tel 01049 7034 21766, evenings, weekends. J. Richardson, G8KJI, Grabenstr 63C, 7031, Gartringen, West Germany.

Digital readout for FRG7 and instructions for fitting. G6BCG, QTHR. Tel 0325-482983, (answering machine—24h).

YC221 display unit. Extender board for FT221R. G2HNO, QTHR. Tel 0202 708405.

For Commodore 64: programs for rtty, cw, log, details for interface and connections. Any gen appreciated by pensioner. G3KPW, 78 Tregrea, Beacon, Camborne, Cornwall. Tel 717612.

UW3DI Russian hf tx/rx, have you got one? Or circuit diagram or construction details. Wanted for project, bored with grey boxes. Info on Telco 215. All replies answered. Terry, G4VKV, 69 Elizabeth Road, Liverpool L10 4XL. Tel 051-525 7105.

Datong D70 morse tutor for Air Training Corps Squadron, around £30. Struan, BRS18981. Tel 0834 811186, anytime, or Jack, 0834 3935, after 6pm.

Heathkit SB401 or SB400. Must include handbook. Will collect 50 miles Surrey. G3DVV, QTHR. Tel 073 781 2164.

Automatic antenna tuning unit. Any information or references on construction of such a unit. G4AKL, QTHR. Tel 0327 857350.

Grundig Satellit 1400, must be mint, have mint Yaesu Musen FR101S rx, sell or part exchange. L. D. Ireland, Carnhell Green, Camborne, Cornwall. Tel Praze 831236.

KW204 tx. Top price paid for fb unit. G4WOI. Tel Roger, Portishead (0272) 843108, evenings and weekends.

Telequipment oscilloscope S51, D51 or similar. G4AYG, QTHR.

Circuit or technical handbook for tx/rx BCC30P, power amp type 1P, BCC ATU30, by BCC Ltd, London. E. Chicken, 21 Townsend Crescent, Kirkhill, Morpeth, Northumberland. Tel Morpeth 513994.

Manual or circuit diagram for Cossor oscillograph model 1049 Mk4, to buy or borrow for copying. All costs refunded. Valves, all old radio types, AC/VP1, PX4, EF39, EF37A etc, SU42, 12E1, G237. G6ACK, QTHR. Tel Hinckley (0455) 612091.

FP707 psu, FC707 antenna tuner for FT707. G4HMU NOT QTHR. Tel Mildenhall (0638) 713089.

Buy or swap T1083, mo coils, amplifier coils, anything T1083. Meter unit 10A/8475. Coils for R1082, ht plug, resistance unit, plugs for antenna switch, sprung mounts, all for T1154. Controller type 4, RAF cast metal W plugs, mic with cord and plug 10/A14381, flying helmet type. Muirhead brown dial knob, as on RF26 units. Generator type C. Smoothing unit type A. D. Parsonage, 52 Bramble Lane, Mansfield, Notts NG18 3NR.

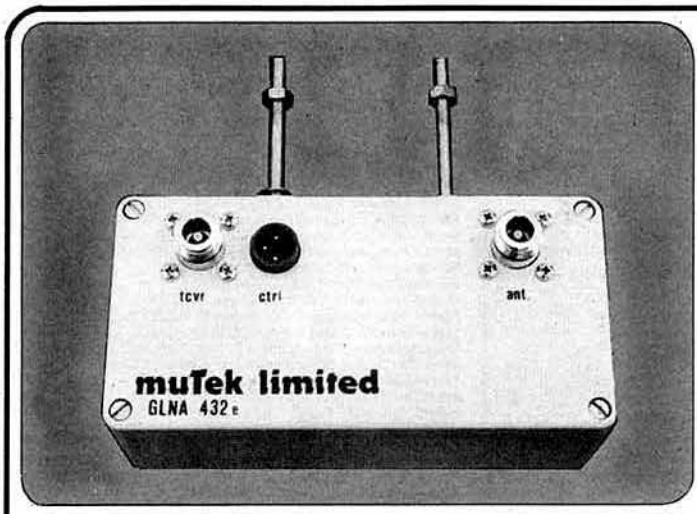
Hallicrafters HT33A, any cond, must have valve base. G3JEC, QTHR. Tel 04853 2378.

Circuit diagram, service manual, for Koyo KTR1770 11-band rx. I can photocopy. D. Smith, G8OMC, 20 Corsock Drive, Wigan WN1 3YY. Tel Wigan (0942) 39576.

Copy of instruction book for Avo electronic test unit. This has four control knobs, ie CX1, CX2, −10pF, +10pF, QLC, 10-20MHz, 5-10MHz, 2-5MHz, 50-2MHz and large scale 50/500 to 500/50 μF, μH. Sockets for L, C and V/V with two more on side with on/off switch contains SP61 valve. Replies to EI1DA, H. Graepel, Catholic Walk, Kinsale, Eire.

Collins TCS equipment, rx, tx, power unit, remote unit, atu cables, any cond but prefer good to excellent. Good price paid for good units. Anything considered from single item to complete set-up. S. A. Wright, G4LBY, QTHR. Tel Mansfield (0623) 29473, evenings or weekends.

German second world war equipment, accessories, manuals for collection. Offering WS19 etc or cash in return. Have old tubes. Transportation no problem. R. Otterstad, OZ8RO, Vejdammen 5, DK2840 Holte, Denmark. Tel 02-801875.



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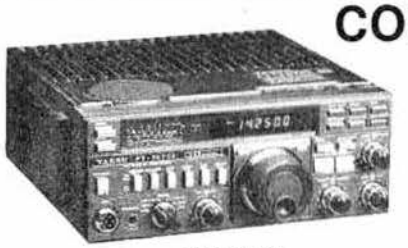

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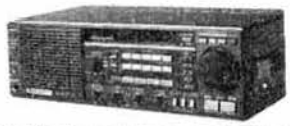

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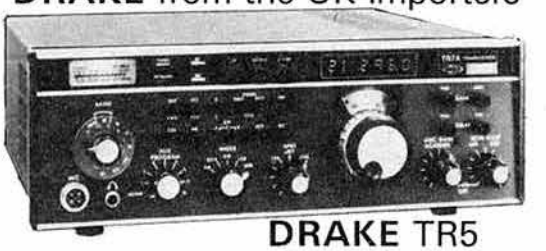

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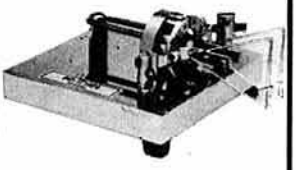

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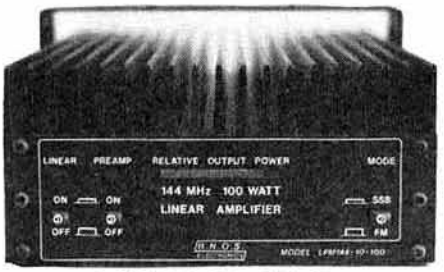

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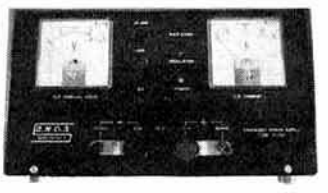

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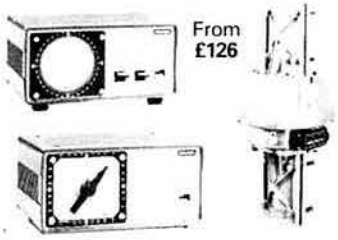

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G3E (FM)*	**12dB SINAD; 0·7μV (12KHz)**

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SELECTIVITY (all @ −6dB & −60dB)

J3E/A1A (SSB/CWW);	**2·4-5·0KHz,**	2.08:1 SF
A1A (CWN)*	**; 0·6-1·3KHz,**	2.17:1 SF
G3E (FM)*	**; 12-24KHz,**	2.00:1 SF

SPURIOUS REJECTIONS
Better than; −70dB image, −50dB IF

AUDIO
4W-16 Ohms, 3W in 4 ohms (@ 10% THD)

TRANSMITTER

POWER OUTPUT
J3E/A1A (SSB/CW): 100W PEP (80-12m)
: 85W PEP (10m)
G3E (FM)* : 50 Watts

AUDIO RESPONSE
350-2700Hz (@ −6dB)

SPURIOUS SUPRESSIONS
Carrier; Better than −40dB
General; Better than −40dB
Sideband; Better than −50dB (W/R 1KHz)

MICROPHONE IMPEDANCE
600 Ohms Nominal

OUTPUT IMPEDANCE
50 Ohms Nominal, Unbalanced

ACCESSORIES

FC700	*Antenna; tuner, load, SWR etc*
FP700	*Power Supply (mains to 12VDC)*
FV700DM	*Synthesized external VFO/memory*
MMB16	*Mobile bracket (accepts FT & FV &/or FC)*
MR7	*Rack Unit*
FTV700	*VHF/UHF monoband transvertor frame*
**TV*	*6m, 4m, 2m, 70cms module*

INTERNAL OPTIONS*

D3000277	*AM Board (Tx & Rx)*
D3000233	*FM Board (Tx & Rx)*
D3000234	*Crystal Marker (25KHz)*
XF8·9KC	*Crystal Filter (600Hz)*

ADDITIONAL ACCESSORIES
The FT77 (FT77S) is electrically compatible with the FT707 accessories eg. FC707, FP707, FV707DM, FTV707 etc.

MICROPHONES

MD1B8	*Desk, 'Lift Out', c/w scanning*
YM38	*Desk, 'Swan neck' c/w scanning*
YM34	*Desk 'Swan neck'*
MH1B8	*Hand, 'Tone switch' c/w scanning*
YM35	*Hand, 'Standard' c/w scanning*
YM36	*Hand, 'Noise cancel'*
YM37	*Hand, 'Economy'*

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