July 1984

RADio COMmunication

FROM HM THE QUEEN . . .

. . . A MESSAGE BY AMATEUR RADIO TO RADIO AMATEURS

Full story on page 556

Journal of the Radio Society of Great Britain

RSGB

Amcomm of London

INTEREST FREE HIRE PURCHASE ON MANY ITEMS

2 YEAR GUARANTEE on MANY PRODUCTS

01-422 9585 FOR FAST DELIVERY

ICOM KENWOOD YAESU

ICOM IC-745

AR 2001

YAESU FT-980 CAT SYSTEM

ICOM IC-751

Heil HMS Microphone

YAESU 757GX

YAESU FT-480R

ICOM ICO2E

YAESU FT-203

YAESU FT-ONE

Special prices on many items

YAESU FT-208R

Heil EQ 300

YAESU FT-102
CALL FOR SPECIAL PRICE

FAIR DEAL POLICY

At Amcomm, we believe we are here to do much more than sell boxes off the shelf. We are specialists in amateur radio equipment and our managment and staff are all amateur radio enthusiasts. We sell nothing else.

Many firms can give you a so-called fair deal, at the time of purchase, but only a handfull of companies in the U.K. are fully equipped to give you a total after-sales service. Amcomm is one, with a wide range of spares, and speedy access to factory stocks, we offer a complete service. Whether you buy now or bought 10 years ago. What's more, we pride ourselves on being able to service everything we sell ourselves.

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

Amcomm SERVICES LTD., 194 NORTHOLT ROAD, SOUTH HARROW, MIDDX. HA2 0EN. ENGLAND. (Opp. South Harrow Underground Station) TEL: 01-422 9585. TELEX: 24263

ACCESS VISA

JULY 1984

VOLUME 60 No 7

RADio COMmunication

All contributions **(including Members' Ads)** and all correspondence concerning the **content** of *Radio Communication* should be addressed to:

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

Tel 0245 84938

Office hours: 0900 to 1700

ADVERTISING

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

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

Tel 037 284 3955

Correspondence concerning the distribution of the journal and all other Society matters should be addressed to:

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

Tel 0707 (from London, 77) 59015

Business hours: 1000 to 1600

CONTENTS

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

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

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

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

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

ABC MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS 33,778 copies per issue average circulation in 1983

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

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

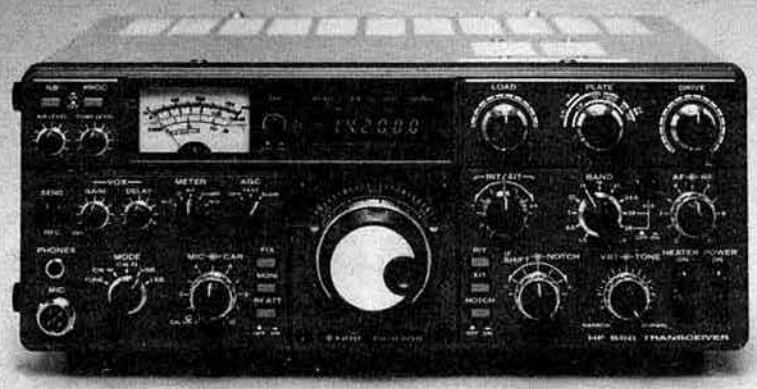
North London Radio Shack Ltd.
188 Broadhurst Gardens, London NW6 3AY
Tel: 01-624 7174

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 £758.54 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

the TRIO **TM201A** & the TRIO **TM401A** rigs that will actually fit in your car!

It has always been a major problem to find sufficient space to fit an amateur radio transceiver in a car. Today the problem is more acute with the modern car becoming more compact as a result of energy saving measures and no provision is made other than for mobile music.

With this problem in mind TRIO have concentrated on the size of the transceiver and its relationship to performance. Certain brand new concepts in mobile transceiver design have emerged. The result is not one new transceiver but two. TRIO, with their by now well known attention to the demands of the enthusiastic amateur, have simultaneously produced the TM201A two metre transceiver and its seventy centimetre version, the TM401A.

Using the transceiver is simplicity itself; VFO A steps in 25KHz steps, VFO B in 5KHz steps, controlled either from the front panel knob or the up/down mike switch. Dual function front panel switches are provided giving 5 memory channels as well as specific rig functions.

Memory 1 holds the priority frequency memories 2 and 3 are standard memories and memories 4 and 5 hold receive and transmit frequencies independently.

The rig functions set by the six switches are: memory channel recall, memory scan, MHz changing, rig switching between VFO's A and B, initiating priority channel and finally frequency insertion in memory. A system of beep tones aids memory entry. Programmable scan is available using the frequency limits as set in memory 5 thus one can scan for example simplex frequencies between 145.200 and 145.575 and so avoid the rig locking on a repeater channel.

Of course all the standard repeater functions are available; 600KHz shift, 1750Hz tone burst and a locking reverse repeater shift. Both rigs have a bright yellow frequency display thus assuring maximum readability under mobile conditions.

An optional remote frequency controller (FC10) is available which connects to the TM201A/TM401A and gives in addition to frequency readout, control of the more important rig functions. The 2 metre TRIO TM201A gives 25 watts and the 70 centimetre TM401A 12 watts, both rigs giving 1 watt when switched to low power.

What more can I say? Just this, when I opened the first box in order to use the two rigs in my shack prior to putting together what you have just read, I was amazed! I thought that TRIO had forgotten to put the transceiver in the box. The rig is small, it is unbelievably small. The transceiver's dimensions are 5.6(41)W x 1.6(39.5)H x 7.3(183)D, inches(mm) and each rig weighs only 2.8lbs(1.25Kg).

How has this been achieved? TRIO have not only removed the internal speaker and included with the rig, as standard, a separate 77mm diameter speaker, but have totally designed the transceiver with size as a major consideration, the result, modern mobile perfection. The two new rigs are outstanding, a natural result of TRIO's high technology combined with the dreams of the enthusiastic amateur.

TM201A ..... **£279.00** inc VAT (carr. £6)
TM401A ..... **£310.32** inc VAT (carr. £6)

selected VHF and UHF accessories.

				Carr.
SP230	External speaker unit with switchable audio filters and provision for separate inputs from 2 rigs	£43.47	inc VAT	£2.50
MC60A	Deluxe desk microphone with built in pre amp and up/down shift switching, ideal for TS780 and TR9130 series	£59.48	inc VAT	£2.50
MC80	Electric desk microphone with UP/DOWN facilities	£38.98	inc VAT	£0.50
MC40S	Up/down fist microphone for TR9000/TS780	£13.98	inc VAT	£1.25
MC55	NEW mobile microphone with control box (up/down, timer, mic gain, etc)	£39.96	inc VAT	£2.00
SP70	External speaker unit for all TS700 series	£24.98	inc VAT	£2.50
BU1	Backup battery case	£8.39	inc VAT	£0.75
BO9A	Base plinth for TR9130	£49.46	inc VAT	£6.00
MA4000	2m/70cm dual band antenna with diplexer, suitable for mag or gutter mount	£35.00	inc VAT	£2.00
VS1	Voice synthesiser for TW4000A speaks either English or Japanese, other languages by request	£24.50	inc VAT	£0.75
FC10	Remote display for TM201A/TM401A with frequency control functions	£42.00	inc VAT	£1.25
SP40	Mobile speaker unit for all mobile rigs, intense audio penetrates car noise	£14.98	inc VAT	£1.00
SP50	Mobile speaker as used with the TM201A, heavy enclosure gives superb audio	£14.98	inc VAT	£1.50
MB2	Mobile mount for TR2300 and VB2300	£21.22	inc VAT	£2.00
RA1	Rubber flexible antenna for TR2300 or TR2200GX	£7.51	inc VAT	£0.50
RA3	Telescopic whip antenna for TR2500 or TR2400	£9.98	inc VAT	£0.50
RA4	Rubber flexible antenna for TR3500	£9.00	inc VAT	£0.50
RA5	Telescopic whip antenna for TR2500 TR3500	£13.98	inc VAT	£0.50
ST2	Base stand and quick charger	£54.98	inc VAT	£2.50
SC4	Soft case and belt hook. Ideal protection for a valuable rig	£14.49	inc VAT	£0.75
MS1	Mobile stand and power unit	£33.97	inc VAT	£2.00
SMC25	Speaker/microphone	£17.00	inc VAT	£1.00
PB25	Spare Ni-cad battery pack	£26.30	inc VAT	£1.00
LH2	Deluxe leather case	£25.48	inc VAT	£1.00
BT1	6 piece AA size manganese battery case	£5.99	inc VAT	£0.75
DC25	DC power supply for TR2500/3500 from 12 volts	£17.00	inc VAT	£1.00
PL1	Spare power/charge lead for TR2300/3200/2200 series	£1.30	inc VAT	£0.30
VC10	VHF converter for R2000 118-174MHz Adds a new dimension to your rig	£117.00	inc VAT	£2.00
HC10	Digital station world time clock	£71.96	inc VAT	£2.50
HS7	Miniature headphones with adaptors	£11.48	inc VAT	£0.75
HS6	Ultra light deluxe headphones	£17.49	inc VAT	£1.50
HS5	Deluxe headphones for all TRIO equipment	£24.48	inc VAT	£1.50
MJ-86	8/6 pin mic adaptor. Also MJ84, MJ68, MJ64, MJ48, MJ46	£5.00	inc VAT	£0.50
SWR100A	SWR/power meter 1.8-150 MHz	£37.97	inc VAT	£2.50
SWR100B	Mobile SWR/power meter 140-450 MHz	£37.97	inc VAT	£2.50
SW200A	SWR/power/pep meter 1.8-150MHz. The finest shack meter we have seen, optional additional heads complete perfection	£81.95	inc VAT	£2.50
SW200B	SWR/power/pep meter 140-450 MHz	£81.95	inc VAT	£2.50
SWC1	Optional coupler for SW200 1.8-150 MHz	£22.50	inc VAT	£1.00
SWC2	Optional coupler for SW200 140-250 MHz	£22.50	inc VAT	£1.00
AL1	Lightning and static protector 100w SO239 connector	£23.99	inc VAT	£1.00
AL1N	Lightning and static protector 100w N connector	£28.97	inc VAT	£1.00
AL2	Lightning and static protector 1Kw SO239 connector	£28.97	inc VAT	£1.00
PG3A	Mobile transceiver DC line filter	£7.51	inc VAT	£1.50

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	**£142.98** inc VAT.
DR7500R	Round Controller	**£153.67** inc VAT.
DR7600X	Preset Controller	**£189.37** inc VAT.
DR7600R	Round Controller	**£213.41** inc VAT.

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

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

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

LS202E..... £225 inc. VAT

LOWE ELECTRONICS | Access | BARCLAYCARD VISA | LOWE ELECTRONICS | Access | BARCLAYCARD VISA

EMPORIUM NEWS

Good morning and a special and individual **good afternoon** to **Piers** G1AON who came up to me at the NEC and said that he never receives his RadCom until the afternoon.

Talking about the NEC, wasn't it a **superb** show. Full marks to Norman Miller and his committee. I was especially pleased to see ample chairs and tables provided for the eyeball QSO. Didn't hear a word of complaint. Indeed, two friends who represent entirely diverse aspects of the hobby both independently told me that they had enjoyed their day out. Our stand seemed busy for both of the two days and we met many old friends and I am sure made many new ones. **Trio's data transmitter** coupled to the **Colour Genie** and using a **TM401A** on 70 cm seemed to go down well with those who saw it sending information across hall 3A to Tony Dewsbury's stand. At least trying to when both rigs were kept on the same frequency.

As we provided an extremely low cost LS20XE FM 2 metre transceiver to the talking newspaper for the blind radio amateur raffle, it fell to Anne, Beryl and myself to select the first, second and third prize winners. The first prize, the LS20XE, was won by J. England, G8ZWQ—second prize, the "ARRL Antennae Handbook" by Howard Faleman of Leeds and the third prize "The Library Atlas" by Paul Beevers, Kirby in Ashfield. We did, in fact, pick out **Basil O'Brien** G2AMV as first prize winner but decided to throw his ticket away as he always makes a point of winning the Lowe Electronics' Open Day raffle.

Please note our **Open Day** this year is to be held on **18th August**—that's its usual position in the calendar, the first Saturday after the Derby Rally.

The **LS202E** is now **in stock** and **selling well.** One or two people have been surprised at the transceiver's compact size. Costing **£225,** inc. VAT, the LS202E is sold without nicads or battery charger. We have arranged this to enable the newcomer to the hobby to acquire a useful rig without hassle. Of course as time passes and money arrives, then accessories, nicad packs, charger, soft case and speaker microphone can all be added.


LS20XE

To make the **LS202E** mobile, **Belcom** have produced a mobile mount which provides a DC supply for the rig; (contact is made as the rig is slid in) an internal speaker and a 25 watt 2 metre linear. Armed with the combined speaker microphone and mobile mount, the **LS202E** becomes a true mobile rig. Don't misunderstand me, the **LS202E** is a perfect workable rig as it is sold. Just add batteries. Indeed, many of you will already have items in your shack which will prove compatible with the **LS202E.** Why have to pay for accessories you don't want.

The **LS20XE 2 metre FM handheld,** again from **Belcom,** is really a handy rig. Simple and at a price affordable by all—**£139.00 inc. VAT.** Carriage on either of the two Belcom rigs is £2.50. Please look at the opposite page for photographs and details of the new Belcom LS202E handheld transceivers. The price reflects a piece of equipment without frills, manufactured in quantity with care!

Don't forget our second-hand list. Now available in the shops for the second-hand browser who can't find on the shelf of the shop he is visiting the rig he wants. Indeed, if you find on the second-hand list the rig you want but it's in another shop, then we will 'phone, check on availability and reserve the rig until your money arrives. Quite simply, for second-hand equipment you send your cheque to the shop which holds the rig. Perfect! A simple system which does not require a computer or that you pay money to obtain the information. The second-hand list, brought up-to-date each week on Thursday by Debra, is also freely available to you without visiting a shop. Either send to us here at Matlock a stamped addressed envelope or, alternatively, ring Beryl on 0629 2817, 2430, 4057 or 4995 and a current copy of the list will be sent to you by the next post.

We are now beginning to receive comments of appreciation from those who have bought the **Japan Radio Company's JST100 HF amateur bands only transceiver.** I, for one, appreciate that to buy an amateur bands only transceiver at a price that you could almost buy one of the transceivers that has a general coverage receiver, takes some doing. As I have said in this column several times, it is only by operating the equipment that the superb quality of the **JST100** can be appreciated. Those fortunate to buy a **JST100** quickly find out that they own a **"professional"** piece of amateur equipment.

£168.00 inc VAT (carr. £6)

Likewise the **NRD515 general coverage receiver.** It is a fact that this one receiver has provided me with many hours of listening pleasure. Its performance is exceptional, the ease of operating immediately obvious at first glance. What more can I say? Prices of the JRC equipment are as follows:

The **JST100,** complete with power supply, costs **£998,** inc. VAT. Carriage is £6.00. The **NRD515** costs **£965.00,** inc. VAT, and again carriage is £6.00. Both rigs are on display at our shops in Glasgow, Darlington, Cambridge, London and, of course, here at Matlock. **A word of warning,** please don't try the equipment unless you are serious and have the necessary collateral. You will spend many unhappy hours musing over your inability to buy the equipment and will become more and more dissatisfied with your present rig.

LS202E

A TRIO accessory that I have not mentioned in this column is the **SW200A/B**—a SWR/power meter with remote head. Two models are available, the model A covering 1.8 to 150 MHz and model B covering from 140 to 450 MHz. As the model letter applies only to the remote head and the meter will accept up to three heads, then you will see how flexible is the system. Indeed, to have a meter on your desk top without having to run your transmission cable alongside but leave it on the floor where it belongs is a considerable advantage. Price of the **SW200** with one head, either A or B, is **£80.50. Optional remote heads,** to add to the flexibility, are **£22.50** each. Ref SWC1 1.8 to 150 MHz and SWC2 140 to 450 MHz.

Please don't forget our **Open Day** on **August 18th** and don't forget Matclock and surrounding countryside has a lot to offer the family (zoo, park and of course the new cable car.)

Anyway, that's about it for now. We have a new shop in Cardiff—Rumney to be exact, (792 Newport Road) and I must put building work in hand so back on the road.

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

David G8GIY

What price

HF Equipment		
IC–751	All band AM,FM,SSB,CW + Gen Cov Rx. 32 Memories.	1099.00
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
F1	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	565.00
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	1349.00
IC–AT100	100Watt Automatic antenna tuner	285.00
IC–AT500	500Watt Automatic antenna tuner	399.00
IC–PS30	Systems power supply, 25 amps continuous	235.80
IC–AH1	Mobile antenna, 3.5MHz–30MHz	649.00
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	499.00

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

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	179.00
IC-O2E	Synthesized hand held, keypad entry, LCD display	239.00
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	735.00
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	549.48
IC-45E	FM mobile, 10 watts, 5 memories	345.00
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	229.00
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	455.65
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.

Take advantage of these Super Prices to explore the world of 70cm!

FT-730R
10W/1W FM mobile

Dual VFO's 10 memories

£239 inc.

FT-790R
1W/200mw multimode

All the features of the FT-290R on 70cms

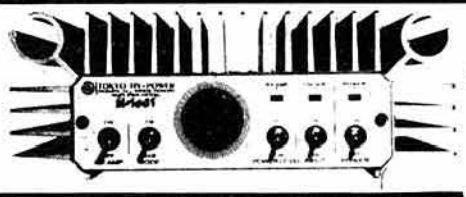
£259 inc.

FT-708R
1W/200mw FM portable

10 memories
Keyboard entry
A must at only

£189 inc.

TOKYO HY-POWER



HL-160V VHF 160W linear £244·52 inc.

FEATURE: 160W output achieved with a pair of rugged MRF247 transistors. Drive requirement as low as 10W or 3W from hand-held. Selectable hi/lo output. Newly designed effective heat sink and high reliability one board construction.

SPECIFICATION: **Freq. Band:** 144-148MHZ (or 150-160MHZ), **Mode:** FM-SSB-CW, Supply **Voltage:** DC 13.8V neg. ground, 12-23A, **Output:** 160W, **RF Input:** 1-15W(or 0.5-3W), **Receive Pre-amp:** 12 dB gain with low-noise 2SK125 JFET, **In/Out Connectors:** SO-239 (50 ohm), **Built-in Circuitry:** COX, remote-control terminal, hi/lo output select, output power meter, reverse polarity protection, **Dimension:** 218W x 82H x 299D(m/m), **Weight:** 3.5 kgs.

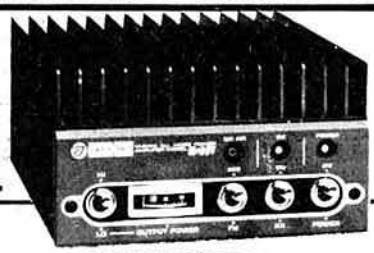
HL-82V VHF 85W linear

FEATURE: A compact 144MHZ band (or 154MHZ for commercial use) amp. with receive preamp and power output meter.

SPECIFICATION: **Freq. Band:** 144-148MHZ(or 150-160MHZ), **Mode:** FM-SSB-CW, **Supply Voltage:** DC 13.8V neg. ground, 13A max., **Output:** 35-85W, **RF Input:** 2-12W, **In/Out Connectors:** SO-239 (50 ohm), **Built-in Circuitry:** COX, remote control terminal, receive preamp (MOS FET 12dB gain), output power meter, output select (hi/lo), reverse polarity protection, **Dimension:** 152W x 92H x 217D (m/m), **Weight:** 1.8 kgs.

£144·50 inc.

HL-160V25 25W input New model now in stock £209·73 inc.



HL-90U UHF 90W linear £263·59 inc.

FEATURE: 80W output achieved with a pair of rugged 2SC2783 transistors. Drive requirement as low as 10W. Selectable hi/lo output. Newly designed effective heat sink, and state of the art low-noise GaAs FET (3SK97) RX preamp.

SPECIFICATION: **Freq. Band:** 430-440MHZ, **Mode:** FM-SSB-CW, **Supply Voltage:** DC 13.8V neg. ground, 5-17A, **Output:** 80W, **RF Input:** 10W, **Receive Preamp:** 18 dB gain with low-noise 3SK 97 FET, **In/Out Connectors:** type N (50 ohm), **Built-in Circuitry:** COX, remote-control terminal, hi/lo output select, output power meter, reverse polarity protection, **Dimension:** 218W x 82H x 299D (m/m), **Weight:** 3.5 kgs.

HL-45U UHF 45W linear £152·77 inc.

FEATURE: A compact 430MHZ band linear amp with low-noise MOS FET receive preamp.

SPECIFICATION: **Freq. Band:** 430-440MHZ (or 450-465MHZ), **Mode:** FM-SSB-CW, **Supply Voltage:** DC 13.8V neg. ground, 5-7A, **Output:** 10-45W, **RF input:** 2-15W, **In/Out Connectors:** SO-239 (50 ohm), **Built-in Circuitry:** COX, receive preamp (12dB gain min.) reverse polarity protection, **Dimension:** 124W x 68H x 170D (m/m), **Weight:** 1.25 kgs.

Access — Barclaycard VISA

NEW **HRA2 VHF mast head pre-amp** RF switched
Max. handling power 100W
Low noise GaAs FET
£71·74 inc.

NEW **HRA7 UHF mast head pre-amp** RF switched
Max. handling power 100W
Low noise GaAs FET
£86·10 inc.

BRANCHES

EAST ANGLIA
Amateur Electronics UK,
31 Cattlemarket St.,
Norwich. Tel.: 0603 667189

NORTHERN
Amateur Electronics UK/
Holdings, 45 Johnston St.,
Blackburn. Tel.: 0254 59595
(N.B.—Closed 21-28 JULY)

SOUTH WEST
Amateur Electronics UK/
Uppington,
12-14 Pennywell Rd.,
Bristol. Tel.: 0272 557732

YORKSHIRE
Amateur Electronics UK/
Hooker, 42 Nether Hall Rd.,
Doncaster.
Tel.: 0302 25690

504-516 Alum Rock Road·Birmingham 8 Telephone: 021-327 1497 or 021-327 6313
Telex:334312 PERLEC G Open: 9.30 to 5.30 Tues. to Sat. CLOSED all day Monday.

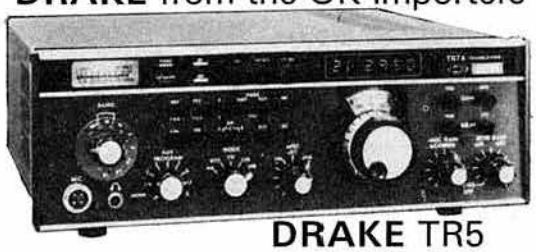
RADIO SHACK

For the best in Amateur Radio and bargains throughout the ranges

COLLINS KWM-380

NEW!
YAESU
FT-757GX

DRAKE from the UK importers



DRAKE TR5

ICOM IC-751 £1049

ICOM IC-R70 £549

TRIO—London's centre for the full range and a good deal

TRIO TS930S
HF transceiver with
General Coverage receive

TRIO TR7930
Two metres FM
mobile transceiver

TRIO R2000
General Coverage Receiver

SCANNERS

AR-2001

Realistic

PRO-2003	50 Ch. + 10Ch 89 – 108 MHz	£259.95
New . . . PRO-30	16 Ch. Handheld Programmeable. 68-88, 108-136 AM Aircraft, 138-144, 144-148, 148-174, 380-450, 450-470, 470-512MHz	£229.95

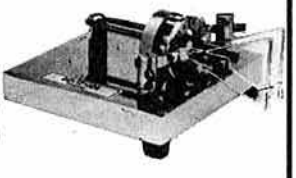
Bearcat

BC-100FB	Handheld 16 Channel	£345.00
BC-150FB	16 Channel Scan only	£159.95
BC-200FB	16 Ch. Scan & Search	£184.95
BC-20/20FB	40 Ch AM & FM	£275.00

BEARCAT
BC-20/20FB

BENCHER PADDLES

BY-1 Black Base	£49.45	ZA-1A Balun	£20.95
BY-2 Chrome Base	£62.25	ZA-2A Balun	£24.95
BY-3 Gold plated	£159.00	ZY-2 CW Audio Filter	£57.50



TONO 550 Decoder £299

Access

RADIO SHACK LTD

188 BROADHURST GARDENS,
LONDON NW6 3AY

(Just around the corner from West Hampstead Station on the Jubilee Line)

Giro Account No. 588 7151 Telephone 01-624 7174 Telex: 23718

BARCLAYCARD VISA

MICROWAVE MODULES LTD

AS IF YOU DIDN'T ALREADY KNOW . . .

Microwave Modules Ltd is a full time professional organisation, established over **15 years** ago in **1969**, and currently employs over **30 full time**, on site staff based in our two modern, purpose built factories. In addition, a similar number of "Outworkers" are involved in assembly and mechanical operations.

OUR EXTENSIVE RANGE . . .

Our Product Range now exceeds **50 individual items** in total and is the widest range available from any one manufacturing company. Our technical resources have enabled us to not only become **the largest** and **most successful** designer and manufacturer of R.F. products, such as **Linear amplifiers** and transverters, but also designers and manufacturers of **innovative** microprocessor and digital products such as **The Morsetalker**, MMSI, and the RTTY to TV Decoder, MM2001.

ALL BRITISH . . .

Every product in our range is designed and manufactured in the UK by our own employees, and wherever possible British Components are utilised.

GUARANTEED . . .

All Microwave Modules products are **fully guaranteed for 12 months.** This includes all semiconductors and **PA transistors.** We have built our reputation around our customer service and back-up which is second to none.

OUR RANGE OF LINEAR AMPLIFIERS . . .

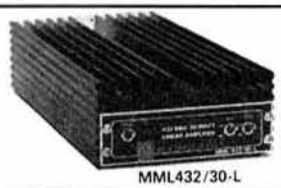

MML144/30-LS

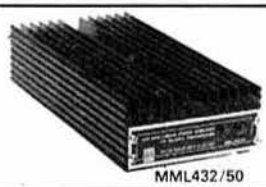

MML144/50-S


MML144/100-LS


MML144/200-S

PRODUCT	Input Power	Output Power	Modes of Operation	Preamplifier Gain	Preamplifier N.F.	Power Requirements	RF Vox*	PRICE inc VAT
MML144/30-LS	1 or 3W	30W	SSB, FM, AM, CW	12dB	<1·5dB	13·8V @ 4A	✓	**£75.00** (p&p £3.00)
MML144/50-S	10W	50W				13·8V @ 6A	✓	**£92.00** (p&p £3.00)
MML144/100-S	10W	100W				13·8V @ 12A	✓	**£149.95** (p&p £3.50)
MML144/100-HS	25W	100W				13·8V @ 12A	✓	**£149.95** (p&p £3.50)
MML144/100-LS	1 or 3W	100W				13.8V @ 14A	✓	**£169.95** (p&p £3.50)
MML144/200-S	3, 10 or 25W	200W				13·8V @ 30A	✓	**£245.00** (p&p £4.50)


MML432/30-L


MML432/50


MML432/100

PRODUCT	Input Power	Output Power	Modes of Operation	Preamplifier Gain	Preamplifier N.F.	Power Requirements	RF Vox*	PRICE inc VAT
MML432/30-L	1 or 3W	30W	SSB, FM, ATV, AM, CW	12dB	2dB	13·8V @ 6A	✓	**£139.95** (p&p £3.50)
MML432/50	10W	50W		12dB	2dB	13·8V @ 8A	✓	**£129.95** (p&p £3.50)
MML432/100	10W	100W		–	–	13·8V @ 20A	✓	**£245.00** (p&p £4.50)

* The RF VOX can be overridden and hard wired.

CONNECTORS . . .

144MHz products—Our standard connector on these products is SO239. We use a high quality PTFE socket of superior quality, but we are able to supply the choice of BNC or 'N' type at no extra charge. Please specify.

432MHz products—The MML432/30-L is fitted with BNC connectors, 'N' type available, please specify.
The MML432/50 and MML432/100 both have BNC input sockets and 'N' type output sockets. If this is not to your preference please specify when ordering.

DATA SHEETS . . . A full printed data sheet is available on each product, and is free on request.

CATALOGUE . . . A copy of our latest catalogue can be obtained by sending a large SAE (23p) or by sending 40p in stamps to the address below.

RALLIES & EXHIBITIONS . . . We shall be attending most of the 1984 rallies and exhibitions. Come and see our products for yourself.

AVAILABILITY . . . Our products are normally available from stock, either direct from ourselves or any of our 75 UK outlets.

Access BARCLAYCARD VISA
WELCOME

MICROWAVE MODULES (RC)
BROOKFIELD DRIVE, AINTREE, LIVERPOOL L9 7AN, ENGLAND
Telephone: 051-523 4011 Telex: 628608 MICRO G
CALLERS ARE WELCOME, PLEASE TELEPHONE FIRST

HOURS:
MONDAY-FRIDAY
9-12.30, 1-5.00
E. & O.E.

Communications Ltd.

AUTHORISED YAESU

TEE—MAIN DISTRIBUTOR FACTORY BACKED
FIELD, BUCKLEY, STOKE, GRIMSBY, JERSEY, EDINBURGH

'YAESU' FOR HF EQUIPMENT—'SMC' AT YOUR SERVICE

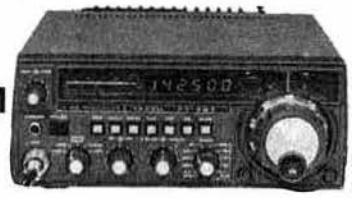
FT-ONE 'THE ULTIMATE' TRANSCEIVER

FT ONE	Transceiver HF All Mode	£1569.00
KEYT901	Curtis Keyer	£28.50
DCT1	DC Power Cable	£10.85
RAMT1	Non volatile memory	£14.49
FMUT1	FM unit	£44.99

XF8·9K* Filter 300Hz or 600Hz or 6kHz. Each £19.35

FT 707 THE BUY OF THE YEAR

‡100W. PEP
8 BAND HF
SSB/CW/AM
£425!‡



SMC SPECIAL SUPER SAVER

FT707‡	Transceiver 100W 10-80M (8 bands)	£425.00‡
FP707	Mains ext. power supply/speaker	£130.00
FV707DM	Digital VFO	£149.00
FTV707R	Transvertor (NB main frame only)	£29.35
FRB707	Relay switching box	£16.25
MMB2	Mobile mounting bracket	£18.25
WMT707	Workshop Manual FT707	£13.00

FT102 THE "WORKHOUSE" BASE

FT102	Transceiver 9 band	£719.00
SP102	External speaker	£55.00
FC102	Antenna coupler	£185.00
AMFMUT102	AM/FM unit option	£49.00

SUPER VALUE—VALVE FINALS

FT77 THE IDEAL MOBILE

Employing all the latest engineering and manufacturing techniques the FT77 is intended to offer the essential modern operating features in the most economical, reliable and compact HF transceiver available.

STUPENDOUS SIMPLICITY

FT77	8 Band Rx/Tx 100W output	£479.00
FT77S	8 Band Rx/Tx 10W output	£449.00
FP700	Matching AC PSU	£145.00
FC700	Matching antenna tuner	£103.85
FV700DM	Digital VFO unit	£209.00
MKT77	Marker unit	£10.85
FMUT77	FM unit	£28.55
AMUT77	AM unit	£24..00

FT980 "COMPUTER COMPATIBLE"

FT980	Transceiver General Coverage Rx	£1329.00
SP980	Ext. speaker with audio filter	£61.55
XF455.8MCN	300Hz CW filter (455KHz 8 pole)	£49.00
XF8.9HC	600Hz CW filter	£29.50
XF8.9GA	6kHz AM filter	£29.50
FIF**	Computer interface (see FT757GX units)	
D410004	Interconnect lead FT980-FC757AT	£26.99
TST980	Technical Supplement FT980	£8.50

FT757GX THE BIGGEST SELLER

Every item normally sold as an extra is provided as standard, including AM and FM modes, a 600Hz narrow CW filter, iambic keyer with dot-dash memory, 25KHz marker generator, IF shift and width filters, effective noise blanker and AF speech processor . . . . all at no extra charge.

SUBSTANTIVE SUPERIORITY

FT757GX	Transceiver General Coverage Rx	£719.00
FC757AT	Automatic antenna tuner	£254.00
FP757GX	Switch mode PSU (50pc duty)	£145.00
FP757HD	Heavy duty PSU (100pc duty)	£179.00
FIF80	Computer interface for PC8001 NEC	£105.00
FIF65	Computer interface for Apple II	£54.00
FIF232C	Computer interface RS232C	£59.00

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!

BARCLAYCARD VISA

SOUTHAMPTON
SMC Ltd
36/38 Rumbridge Street,
Totton, Southampton.
Southampton (0703) 867333
8-5.30 Mon-Sat

GRIMSBY
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
10-5.00 Tue-Fri (9-4 Sat)

SECONDHAND LIST

HF TRANSCEIVERS (AND ACCESSORIES)

FT77	S/S	100W 10-80M (Warc)	£525.00
FP700	S/S	20A P.S.U.	
FT-ONE	S/S	100W, 150KHz-30MHz	£1,449.00
FT980	S/S	100W, 150KHz-30MHz (Rx)	£1,199.00
FT102	S/H	100W, 160 mtrs-10 mtrs	£599.00
FT102	S/S	100W, 160 mtrs-10 mtrs	£669.00
FT901DE	NEW	6 Band 100 Watt	£679.00
FT707S	S/S	10 Watt 10-80 mtrs	£399.00
FT101EE	S/H	100W Valve PA 160-10 mtr	£299.00
FT757	S/S	100W Tx/Rx 150KHz-30MHz	£650.00
FT101ZDFM	S/H	100W Mk III Warc	£499.00

VHF TRANSCEIVERS (AND ACCESSORIES)

FTC740A	S/H	4M FM Mobile 12 Ch 40W	£175.00
FT480R	S/S	10W Multi Mode	£365.00
FT207R	S/H	2 Watt Synth. Portable	£139.00
TR3200	S/H	12 Ch 70cm Portable 1W	£125.00
FT480R	S/H	10W Mk II Multi Mode	£325.00
MMT70/144	S/H	Transverter 4M to 2M	£79.00
MMT144/28	S/H	Transverter 2M to 10M	£79.00
MMT432/28	S/H	Transverter 10M to 70cm	£109.00
MMT432/28S	S/H	Transverter 10M to 70cm	£129.00
NC7	S/H	Base Charger '208 etc	£25.00
NAG144XL	S/S	2M 10W in 200W+ out	£465.00
PA-15-160	S/S	2M 10-15 in 160 out	£149.00

RECEIVERS (AND ACCESSORIES)

FRG7700	S/H	150KHz-30MHz Dig	£259.00
DX-200	S/H	Gen. Coverage	£129.00
FRV7700E	S/H	Convertor, 3 bands	£49.00
FRV7700D	S/H	Convertor, 3 bands	£49.00
250	S/H	Scanner Bearcat	£159.00

MISCELLANEOUS

SP4	S/S	RF Speech Processor	£59.00
PC1	S/S	Datong 2 mtr to Gen. Cov	£79.00
444	S/S	Desk Microphone, Shure	£29.00
1210	S/H	12VDC PSU 10A Zetagi	£55.00
12-04-06	S/S	12VDC (Mains) PSU 4A	£13.00
SUPER 6	NEW	Calscope Oscilloscope	£179.00

KEY: S/S—Shop soiled 12 month Warranty. Ex demo.
S/H—Second Hand 3 month Warranty.
A/S—As seen nil Warranty.
inc VAT—Carriage Paid (UK) Mainland

KDK KYOKUTO DENSHI CO. LTD.

FM2033

144 MHz, 12VDC FM Transceiver.
25W/5W Hi/Lo (both adjustable).
Compact $2\frac{7}{16} \times 6\frac{3}{8}" \times 7\frac{7}{16}"$.
$12\frac{1}{2}$ KHz steps (100 KHz fast QSY).
Amber LCD 'Sunlight View', Side Lit Display.
Display; 100's of Hz or channel number.
Sensitivity $<0.2\mu V$ 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.
CW mobile mount, mic and handbook.

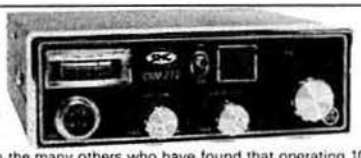
NEW **£239 inc** NEW

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 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



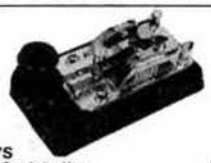
Join the many others who have found that operating 10M FM can be a pleasant alternative to the overcrowded 2M band. The SMC Oscar 2 10M gives you 40 channels, channel 1 being 29.310 MHz and channel 40 29.7 MHz, a power o/p of approximately 4 watts and a receive sensitivity of better than $0.3\mu V$ for 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	¼λ vertical with radials	£24.15	£2.65
SMCVA27	¼λ vertical no radials	£20.70	£2.65
SMC11V11S	Glass fibre shortened	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	£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
SMC3-30L	Mini SWR	£8.80	FOC
WD202	FM Deviation/SWR/Power	£13.50	FOC
SMC100LP30	Low pass filter	£6.30	FOC
12-04-06	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

MORSE EQUIPMENT



MORSE KEYS			
HK703	Straight Key	£28.00	£1.20
HK704	Straight Key	£19.25	£1.20
HK706	Straight Key	£15.90	£1.00
HK707	Straight Key	£15.00	£1.00
HK710	Straight Key	£39.70	£1.75
HK808	Straight Key	£49.70	£1.75
HK711	Key Mounting	£32.15	£1.50
BK100	Mechanical Bug	£24.25	£1.75
MK701	Single Lever Paddle	£27.50	£1.60
MK702	Single Lever Paddle	£28.85	£1.60
MK703	Squeeze Key	£28.30	£1.75
MK705	Squeeze Key	£24.65	£1.75
MK706	Squeeze Key	£21.25	£1.75
IKP60	Iambic	£9.95	FOC
HK802	de Luxe Brass Key	£85.85	£2.00
HK803	de Luxe Brass Key	£78.95	£2.00
HK804	de Luxe Brass Key	£74.25	£2.00
MHK831	Super de Luxe squeeze & straight key	£189.00	£3.00
MORSE EQUIPMENT			
KP100	Squeeze 230AC/13·8V	£77.05	£2.00
KP200	Memory 4096 Multi Ch Mem Back Up 230/13·8V	£165.62	£2.50
D70	Morse Tutor (Datong)	£56.35	FOC
MMS1	Morse Tutor (M/M)	£115.00	FOC
MMS2	Morse Tutor Advanced	£155.00	FOC
MICROWAVE MODULES—RRTY EQUIPMENT			
MM2001	RTTY to Video	£189.00	FOC
MM4001	RTTY Transceiver		FOC
MM4001KB	RTTY Tx/Rx c/w keybd	£299.00	FOC
MM1001KB	Morse Keyboard	£135.00	FOC
MM1000KB	ASCII CW conv cw keybd	£135.00	FOC

PRICES INCLUDE VAT at 15%
Carriage as shown

ROTATORS

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

FU200	Thro'	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 (AR40)	£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 9502b F4200	£19.65	Carriage £2.50
KC038	Lower Mast Clamp KR400 600 etc	£12.65	Carriage £2.50

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

Head office
Mail orders
Service & Spares

S. M. HOUSE, RUMBRIDGE STREET, TOTTON, SOUTHAMPTON SO4 4DP, ENGLAND
Tel: Totton (0703) 867333, Telex: 477351 SMCOMM G, Telegram: "Aerial" Southampton
See preceding pages for complete addresses and phone numbers of branches

POWER METERS

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

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

FS-500H

				£
HANSEN				
FS710H*	1.8-60 MHz	15/150/1500W	Pep	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		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	Rem Head	41.00
FS711V	50-150 MHz	20/200W	Rem Head	41.00
FS711U	430-440 MHz	5/20W	Rem Head	41.00
FS5E	3.5-150 MHz	20/200/(1000W	HF)	41.00
FS5S	1.8-150 MHz	20/200/(1000W	HF)	41.00
FS7	145 & 432MHz	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
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 PORTABLE ANTENNAS		£	P&P
SMC6P2T/PL	Telescopic 2M PL259 fitting ¼λ	5.75	0.85
SMCT144h	Telescopic 2M ½ wave BNC	9.20	0.85
SMC6P2T/BNC	Telescopic 2M BNC fitting ¼λ	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 ½ 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 ¾ wave fold 4.5dB 5.7'	14.95	2.50
SMC78B	2M ¾ wave ball 4.5dB 5.6'	14.95	2.59
SMC78SF	2M ¾ 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 7dB 9.7'	33.35	2.65
SMC25B	70cm 2 × ⅝ fold 5.5dB 3.1'	13.80	2.00
SMC358	70cm 3 × ⅝ 6.3dB 4.7'	18.40	2.00
SMC70N2M	Dual band 2M 2.7dB 70cm 5.1dB (⅝λ & 2⅝λ)	18.40	2.00
SMCHS770	144/432 Duplexer 50W	16.50	1.85
SMC20SE	20M 1.72M 100W PEP	19.15	2.50
SMC15SE	15M 1.72M 130W PEP	15.70	2.50
SMC10SE	10M 1.72M 200W PEP	14.95	2.50
SMC17SE	17M 1.915M 200W PEP	17.25	2.50
SMC12SE	12M 1.915M 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 antennas	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.

STOCK CARRYING AGENTS WITH DEMONSTRATING FACILITIES

Stourbridge	Andrew G4BJY	(0384)390916	
Bangor	John GI3KDR	(0247) 55162	
Neath	John GW4FOI	(0639) 52374 Day (0639) 2942 Eve	

RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY REPRESENTING ALL UK RADIO AMATEURS

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

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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

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

COUNCIL OF THE SOCIETY

PRESIDENT: R. G. Barrett, GW8HEZ

EXECUTIVE VICE-PRESIDENT
J. Heathershaw, G4CHH (Mrs)

IMMEDIATE PAST-PRESIDENT
D. E. Baptiste, CBE

HONORARY TREASURER
P. F. D. Cornish, FCA, G3COR

ORDINARY MEMBERS OF COUNCIL

D. S. Evans, PhD, FIM, CEng, G3RPE
H. M. Holmden, G4KCC
G. R. Jessop, CEng, MIERE, G6JP
T. I. Lundegard, G3GJW
B. O'Brien, G2AMV
D. M. Pratt, BEng, CEng, MIEE, MIERE, G3KEP
G. R. Smith, BSc, MBIM, G4AJJ
K. E. V. Willis, BSc, ARCS, CEng, MIEE, G8VR

ZONAL MEMBERS OF COUNCIL

Zone A	*(Regions 1, 2 and 18)*	J. Heathershaw, G4CHH (Mrs)	**Zone E**	*(Regions 10 and 11)*	D. M. Thomas, GW3RWX *(co-opted)*
Zone B	*(Regions 3, 4 and 5)*	H. S. Pinchin, BSc, MBIM, G3VPE			
Zone C	*(Regions 7, 8, 16 and 19)*	W. J. McClintock, MSc, G3VPK	**Zone F**	*(Region 15)*	J. T. Barnes, GI3USS *(co-opted)*
Zone C	*(Regions 6, 9, 17 and 20)*	L. Hawkyard, G5HD	**Zone G**	*(Regions 12, 13 and 14)*	F. Hall, GM8BZX

REGIONAL REPRESENTATIVES

Region 1	*(Cheshire, Cumbria, Gtr Manchester, Isle of Man, Lancashire, Merseyside)*	*(To be announced)*
Region 2	*(Humberside N of Humber, North, South, West Yorkshire)*	P. N. Butterfield, G4AAQ. Tel 0977 791071.
Region 3	*(Hereford and Worcester, Salop, Staffordshire, Warwickshire, West Midlands)*	*(To be announced)*
Region 4	*(Derbyshire, Humberside S of Humber, Leicestershire, Lincolnshire, Nottinghamshire)*	M. Shardlow, G3SZJ. Tel 0332 556875.
Region 5	*(Bedfordshire, Cambridgeshire, Northamptonshire)*	J. S. Allen, G3DOT. Tel 0582 21151.
Region 6	*(Berkshire, Buckinghamshire, Oxfordshire)*	F. S. G. Rose, G2DRT. Tel 0494 814240.
Region 7	*(Gtr London S of Thames, Surrey including part of London N of Thames administered by Surrey)*	R. Sykes, G3NFV
Region 8	*(Kent, East Sussex, West Sussex)*	M. Elliott, G4VEC. Tel 0795 70132.
Region 9	*(Cornwall, Devon)*	*(To be announced)*
Region 10	*(Dyfed, Gwent, Mid Glamorgan, Powys, South Glamorgan, West Glamorgan)*	E. J. Case, GW4HWR. Tel 0222 810368.
Region 11	*(Clwyd, Gwynedd)*	B. H. Green, GW2FLZ. Tel 0492 49288.
Region 12	*(Grampian, Highland, Island Authorities, Tayside)*	M. R. Hobson, GM8KPH. Tel 0796 2140.
Region 13	*(Borders, Fife, Lothian)*	*(To be announced)*
Region 14	*(Central, Dumfries and Galloway, Strathclyde)*	T. G. Wylie, GM4FDM. Tel 0505 22749.
Region 15	*(Northern Ireland)*	J. T. Barnes, GI3USS. Tel 0247 3948.
Region 16	*(Essex, Norfolk, Suffolk)*	*(To be announced)*
Region 17	*(Isle of Wight, Channel Islands, Dorset, Hampshire, Wiltshire)*	T. M. Emery, G3KWU.
Region 18	*(Cleveland, Durham, Northumberland, Tyne & Wear)*	P. Barker, G4HPS.
Region 19	*(Greater London N of Thames, Hertfordshire)*	*(To be announced)*
Region 20	*(Avon, Gloucester, Somerset)*	*(To be announced)*

HONORARY OFFICERS

Aerial Planning Panel co-ordinator: (c/o MSO, RSGB HQ)
Audio Visual Library co-ordinator: R. G. Auckland, G2PA
Awards managers. HF: P. Miles, G3KDB; **VHF:** Jack Hum, G5UM
HF manager: E. J. Allaway, G3FKM
Microwave manager: D. S. Evans, G3RPE
Observation Service organizer: D. M. Pratt, G3KEP
Slow morse practice transmissions organizer: M. A. C. MacBrayne, G3KGU
Trophies manager: P. A. Miles, G3KDB
VHF manager: K. A. M. Fisher, G3WSN

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

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.

EDITORIAL

SPECTRUM ABUSE

In any sphere of activity or human endeavour, society seems to have to face the fact that there will always be a small minority who simply wish to spoil things for others. Amateur radio is no exception to this rule.

Radio vandalism is, in one sense, a sign of the times. But with radio there is an essential difference: the conventional trouble-makers have to be on the spot, as it were, to do their deeds; the "hooligans of the air", armed with even a low-power transmitter, can cause havoc over hundreds of square miles, apparently with little fear of prosecution.

We have always had pirates in our amateur bands. However, with today's increased awareness of two-way communication, emphasized for example by the recent introduction of cb radio and illegal cordless telephones, piracy (especially in our 28MHz band), repeater jamming, and sheer vandalism on the air are now at an all-time high.

It might come as a surprise to some to learn that the identification of the culprits has never been the problem. The persistent law-breaker is well documented at many levels. The real problem is the nature of the law. When the Wireless Telegraphy Act was framed in 1949, could its authors have foreseen the mindless activities of today's vocal minority? Presumably not, for it is almost impossible to bring the law-breakers to justice because hitherto they have had literally to be caught in the act. Many, including the UK licensing authority, have tried to bring these people to justice, but have consistently failed to make any real impression on the problem.

It is beyond reason to expect the RSGB to be able to solve all the complex human behaviour problems which lie at the root of spectrum abuse; yet some members feel that the Society should be able to do just that. So what could we have done?

As a national organization, acutely aware of the damage and frustration caused by those who abuse our bands, we have always had several options open to us. First, we can co-ordinate reports on illegal activities and make sure that the UK licensing authority is under no illusions as to the extent of the problems we face. We have always accepted this role. Second, we can continue to press for action to be taken by the appropriate agencies for enforcement of the law—even though the present Government cut-backs give us little hope for positive action. Why is this? Basically because the Radio Interference Service is understaffed and simply cannot cope with all the problems it faces. One consequence is that an order of priorities has had to be determined which, in practice, means that amateur radio problems have a lower priority than we would wish. In this context there can be no doubt that the amateur service has suffered as a direct result of all the illegal operation at 27MHz. Third, the Society can continue to press for more appropriate legislation to combat the general problem of spectrum abuse: this has been our policy for many years.

It is evident that the illegal use of radio transmitters has been a problem which could never have been solved while it remained necessary to prove to a court that transmitting apparatus has been used illegally. There is a marked anomaly in the fact that it is illegal to install and use a television receiver or a cb transceiver without a licence, yet it is quite legal to possess an amateur-band transmitter without one—despite the fact that in the hands of an unqualified or ill-intentioned person the latter has a far greater potential for causing interference and thus danger to other services. As more unlicensed (unqualified) people are purchasing equipment intended for amateur-band use, it is perhaps fair to expect even greater problems of abuse if this situation is not recognized and controlled quickly.

The above has been the situation until the recent passing of the Telecommunications Act 1984. This now gives the Government additional powers to control illegal transmitting equipment for the purpose of preventing or reducing interference. Under the Act, the Secretary of State may make an order which applies restrictions to specific types of apparatus. For example, the Government may now control the manufacture, importation, sale and possession of certain transmitting equipment (among other things). In recognizing the potential dangers of continuing to allow widespread illegal operation, licensed radio amateurs must strongly back any firm Government action which would bring about a long-term solution to the problems presented by spectrum abuse. Judging from our past experience, it seems highly likely that if the Government fails to take the initiative now, it will forever be too late.

David Evans, G3OUF

TWO-WAY ROYAL TRAFFIC VIA AMATEUR RADIO

. . . . Incidentally, our community of radio amateurs in Britain was to provide an invaluable reserve, both in Signals Intelligence and in Signals proper, as well as furnishing many of the staff for our rapidly increasing number of radar stations . . . . Professor R. V. Jones, *Most Secret War.*

. . . . The British . . . were far ahead of us in high frequency technology from the start. They had lots of radio amateurs who knew radio inside out . . . we banned the radio clubs and smashed them up before the war and now we're paying for it . . . After this war's over I'm going to buy myself a British radio set, as a token of my regard for their high-frequency work . . . . Reichsmarshall Hermann Goering, Oberkommando der Luftwaffe, quoted by David Irving in *The Rise and Fall of the Luftwaffe.*

IT IS NOT INAPPROPRIATE in 1984—on the 40th anniversary of D-Day—to remember these tributes to the skill of radio amateurs and to their contribution to the electronic technology of the second world war.

The date of the anniversary, 6 June, was celebrated by several special event stations on both sides of the English Channel, but GB4DD at the London Air Traffic Control Centre, RAF West Drayton, had the very special honour of sending a message of goodwill on behalf of radio amateurs in all those countries involved in the events of 6 June 1944 to His Royal Highness Prince Philip, Duke of Edinburgh, Patron of the Radio Society of Great Britain. What may also have been the unique honour of receiving a message sent by Her Majesty the Queen in reply, was also conferred on GB4DD on the same day.

The original idea for a special event station commemorating D-Day came from Mr David Fowler, G4MDN. He approached the London Airways Amateur Radio Club at RAF West Drayton—one of the main elements in the UK's air traffic control system—which received the idea with great enthusiasm. Most of the extensive preparation work was carried out by G4MDN and Mr Steve Sharples, G4UNE, with support and assistance from senior management at the London Air Traffic Control Centre, and, after a large number of telephone calls and letters, the event rapidly took shape. The idea was of special interest to Mr J. D. Waller, G3DAV, a telecommunications information officer at LATCC, since his wife Eliane is French and he met her for the first time in France on VE-Day. She is also licensed, as G1DYI, and her bilinguality was to prove of great assistance on the day.

It was fairly late in the planning stage that operators at GB4DD realized that the Royal Yacht *Britannia*, carrying the Queen and Prince Philip would be in Caen on the anniversary day, and that a French special event station, FV6PAX, would be on the air a short distance away. GB4DD's operators then conceived the idea of sending a goodwill message by amateur radio to the Duke of Edinburgh, in his capacity as the Patron of the Radio Society of Great Britain.

The RSGB was approached and assisted in making the necessary arrangements in conjunction with the Department of Trade & Industry. All went well, and at 0900gmt on 6 June 1984 the following message was sent on 7,050kHz.

> ***Your Royal Highness—We humbly request that you convey to Her Majesty the Queen, President Mitterand, President Reagan, Their Majesties The King of the Belgians, The Queen of the Netherlands, The King of Norway and His Royal Highness The Grand Duke of Luxembourg, this message of goodwill from the amateur radio station GB4D-Day. This message is sent on behalf of the radio amateurs of all the nations involved in the events of the 6th of June 1944, to commemorate the fortieth anniversary of the Normandy landings.***
> ***Relayed between amateur radio station GB4D-Day located at the London Air Traffic Control Centre, RAF West Drayton, and FV6PAX located in Caen, Calvados, 6th June 1984.***

Receipt of the message was confirmed by FV6PAX, after which the text was then sent again in French. Mrs Eliane Waller, G1DYI, read the French text and it was confirmed as having been received by the operator at FV6PAX, F8BO.

The message received at FV6PAX from GB4DD was then passed to the Mayor of Caen for presentation to the Duke of Edinburgh. At this point, the operators of GB4DD had settled down to work the large pile-ups on 7 and 144MHz with a general sense of satisfaction at having passed their message successfully: no-one was prepared for the surprise which was shortly to occur.

A member of RSGB staff had been at RAF West Drayton for much of the morning in order to report on the events of the day and to take photographs for *Radio Communication*, and he was half-way through a cup of coffee in the LATCC canteen prior to departure when he received a message asking him to contact RSGB headquarters urgently. Staff at headquarters had been in direct contact with the Royal Yacht *Britannia* via telex, and it transpired that Her Majesty The Queen wished to reply to the message. Coffee was forgotten while urgent attempts to contact FV6PAX took place: this was successful, although signals were by no means as strong as they had been during the morning, and the following message was received on 7,070kHz.

> ***Thank you for your message of greetings sent on behalf of the radio amateurs of the nations involved in the events of 6 June 1944 as part of the commemoration of the 40th anniversary of the Normandy landings which has been relayed to me by the Duke of Edinburgh, the patron of the Radio Society of Great Britain. I appreciate your greetings on this special occasion and send my thanks and best wishes to the operators of GB4DD and the radio amateurs of those nations which are involved.***
> **Elizabeth R**

It goes without saying that both the Society and the operators at GB4DD were honoured and delighted with this reply from Her Majesty The Queen. Such a reply to a greetings message is thought to be unique in the history of amateur radio in the UK, and it reflects great honour on the standing and credibility of our hobby.

Members of London Airways ARC who manned GB4DD. Seated is Eliane Waller, G1DYI, who played a prominent part in the exchange of traffic with FV6PAX

FRONT COVER
The inset in this MoD photograph of HMY *Britannia* shows Steve Sharples, G4UNE, operating the GB4DD–FV6PAX link on 6 June 1984

Amateur Radio News

DBS i.f. update

Under the heading "RFI update" (*Rad Com* May 1984, p382) the issue of the choice of intermediate frequencies for direct broadcast satellite receivers was mentioned. BREMA has now produced some recommendations on the subject, and overall the outcome is superficially satisfactory for radio amateurs. On the matter of the first i.f., which was the principal cause for concern, the interference sub-committee of BREMA has recommended that setmakers avoid the use of frequencies below 1,410MHz for the first i.f. in domestic dbs receivers. They state that: ". . . . considerable experimental evidence has been gathered showing that UK radars . . . around 1,300MHz . . . could impair dbs reception over a wide area if the first intermediate frequency in dbs receiving installations shares the same frequencies." The radars in question use extremely high erp for military and civil aviation applications, and the spin-off is that an i.f. designed to avoid interference from them will also avoid problems from amateur transmissions in the 1,296MHz band.

In the May news item it was also stated that a working party had been tasked with examining the matter of the choice of a second i.f. with reference to the amount of screening which would be required in practice to avoid breakthrough from amateur transmissions in the 144MHz band. The working party has now reported. Originally an intermediate frequency in the range 125-149MHz had been proposed, and the terms of reference of the working group were "to recommend parameters for the second i.f. of dbs domestic receivers for consideration by the BREMA interference sub-committee". Two supplementary questions to be considered were whether the use of a frequency of 134·26MHz was practicable in the presence of 144-146MHz amateur transmissions, and, if the answer to that question was in the negative, what alternative frequencies could be considered.

The worst hypothetical case considered was that of a 400W p.e.p. transmitted output on 145MHz some 10m distant from a domestic dbs system: a typical system consists of a dish antenna at which the incoming 12GHz signal is down-converted to a first i.f. at 1,410MHz. This signal is transferred by coaxial cable to the channel selector, indoor second i.f. and demodulator unit.

The working group concluded that a frequency of 134·26MHz was a suitable choice, subject to some technical criteria and assuming that a wanted carrier power of -57dBm was available at the input of the dbs i.f. and demodulator unit. The specified criteria were as follows:

(a) The indoor second i.f. unit is contained within a totally-enclosed metal screening box.

(b) The coaxial cable between the dish and the indoor unit is correctly terminated (within limits to be finalized) at both ends in order to reduce vulnerability to spurious fields. The quality of the coaxial cable is critical.

(c) The cable immunity to 145MHz interference should be at least 50dB. This level of immunity would be likely to be achieved using cables utilizing close-weave braid or tape-braid construction as per BREMA/DBS/WG (Shelswell) 3.

(d) It is essential that the connectors used have good screen continuity and no compromise is possible. The type N connector has been found to perform satisfactorily, but neither BNC nor connectors to BS3041, part 2, are recommended.

(e) For maximum expected level of pick-up in the coaxial downlead, the second i.f. rejection at the input to the indoor unit must be at least 70dB at 145MHz relative to the first i.f.

The estimated maximum field strengths due to a 145MHz amateur transmitter in terms of the outdoor field at the downlead were taken as +152dB (μV/m – 1), ie 40V m – 1. In terms of the indoor field at the second i.f. unit, the corresponding figures were +138dB (μV/m – 1), ie 8V/m – 1. The estimated maximum spurious 145MHz power at the input of the indoor dbs unit was – 27dBm.

Other recommendations were as follows: nominal second i.f. carrier frequency 134·26MHz, and second i.f. protection ratios of 40dB for both standard and extended mac (multiplexed analogue component). The image rejection recommendation was 40dB. The level of second oscillator power at the input socket of the indoor unit was to be finalized later.

Taken overall, the outcome from the amateur's point of view seems essentially satisfactory, since BREMA has attempted to avoid problems of breakthrough from amateur transmitters from the outset. However, the Society's position on this subject—and indeed with similar matters such as cable television systems—is that prevention is always very much better than cure. A very high proportion of the amateur population of the UK uses the 144MHz band, and it seems a matter of the greatest importance to avoid any likelihood of breakthrough problems in real life rather than simply to set high standards for the dbs system in a theoretical attempt to avoid them. In other words, laboratory tests and theoretical considerations only form part of the story; *in a real world of practical cables and connectors, where corrosion and cost-cutting are a part of life, problems are bound to occur.* Obviously the Society is pleased that the question has been taken seriously and that proper engineering solutions and recommendations have been formulated. However, it is also important to note that the problems will only be avoided in practice if manufacturers act on the BREMA recommendations, and also if installations and maintenance are given proper and careful attention. For these reasons the RSGB will continue to lobby for high standards of design and construction in domestic equipment, and will also continue to monitor the situation closely.

New bands in Eire

The Irish Department of Communications has now issued licences to existing Irish operators who have applied to use the post-WARC new amateur hf bands. The extent of the bands in Eire is 10·100-10·150MHz, 18·068-18·168MHz and 24·890-24·990MHz, and approval has been given on a secondary basis.

RFI from computers

RF radiation from personal computers appears to be causing problems for radio amateurs and also to users of Band 1 television sets. A writer for *Television* has recently written to Sinclair Research Ltd concerning radiation from the Spectrum computer: he mentions wideband interference between 35 and 75MHz which can be received at up to 200ft away from the unit and which is troublesome within 80ft. The company has been asked for their advice on the reduction of this interference, and the Society hopes to publicise any reply. From feedback received from members it appears that the problem of rf radiation from computers causing interference to amateur bands is becoming more widespread, and the Society continues to monitor the position.

PA0 in space?

It appears that the first European radio amateur in space may well come from the Netherlands. An astronaut from the European Space Agency, Huber Occolls, is due to fly on one of the 1985 Shuttle missions and, although he is not yet licensed, he has expressed interest in becoming a radio amateur and in operating during the flight. The Dutch national society VERON is reported to be likely to make an official request to NASA for him to operate.

New ICs

The house magazine of Hewlett Packard recently carried some information on new integrated circuits and devices. Some of the more interesting ones included the DONT gate, whereby no output is obtained whatever the state of the inputs, the noise emitting diode (ned) which produces a loud noise once when connected across a 1kV supply, a J(UN)K flip-flop which does not change state when clocked regardless of its input states and an inoperational amplifier: this is allegedly ". . .the linear cousin of the DONT gate. It provides no output for any input at a slew rate of 0 volts per microsecond. A mil-spec version is available at 100 times the cost of the OEM version".

RSGB NATIONAL MOBILE RALLY

SUNDAY 5 AUGUST 1984

Woburn Abbey, Beds
(Coach Park Site)

From 10am

Photograph of Woburn Abbey reproduced by kind permission of the Marquis of Tavistock

- **Large trade exhibition**
- **RSGB bookstall and enquiries stand**
- **Bring-and-buy stand (All under cover)**
- **Raynet stand**
- **BARTG stand**

Bring-and-buy this year will be charged at **£3 per hour per table**, which will enable members to sell direct. Tables will be offered on a first-come first-served basis but will not be available before 10am.

The RSGB makes no charge for entrance to the rally but all visitors must pay for entrance to Woburn Park, in which the rally takes place, at **£1.70 per car including passengers.**

All the normal Woburn attractions will be available at small extra charges. Various bars and cafés are available nearby.

HOW TO GET THERE

Via the M1—Leave the M1 from north or south at intersection 13, **not 12 as signposted.** After leaving the motorway follow signposts through Husborne Crawley to Woburn Abbey.
From the south via the A5—Turn right at Hockliffe and follow the A50 to Woburn.
From the north via the A5—Turn left at A418, five miles south of Fenny Stratford, and follow to Woburn.
From other directions make for the points indicated above and proceed as indicated.

Avoid routes signposted to "The Wild Animal Kingdom" or "Game Reserve". The rally takes place in Woburn Park and correct routes are signposted to "Woburn Park" or "The Abbey". Also watch for RSGB signs.

Usual talk-in facilities will be in operation by Dunstable Downs RC on 1·8, 70, 144 and 432MHz.

All enquiries regarding this event should be made to Norman Miller, G3MVV, 180 Warley Hill, Brentwood, Essex CM14 5HF.

Raynet election results

The result of the recent election for Raynet Zone 5 (all Greater London boroughs) was:

G. Cluer, G4AVV 46 votes
M. Jones, G6GOS 1 vote

Mr Cluer has therefore been elected to serve as the Raynet representative for Zone 5.

QSL bureau news

Mrs G. Thomas, G4JYL, is unable to continue in the post of sub-manager for the G4MAA-MZZ callsign group since she and her family will shortly be going overseas. The new sub-manager for the group will be: Mrs C. Wilding, G4SQP, 92 Ravenhill Drive, Codsall, Wolverhampton, West Midlands, WV8 1BW.

The sub-manager for Isle of Man (GD) callsigns is now Mr G. W. Ripley, GD3AHV, Cor Lea Bungalow, Ronague Road, Ballasalla, Isle of Man.

All Isle of Man amateurs are especially requested to supply him with stamped addressed envelopes by return: holiday-makers or other visitors who have occasion to use the GD prefix should also supply saes if they wish to collect their QSL cards.

Raised in the House

On 27 April 1984 Major Sir Patrick Wall asked the Secretary of State for Trade & Industry the number of land mobile radio licences and citizens band radio licences issued. In reply, Mr Alexander Fletcher stated that at the end of March 1984 there were approximately 225,000 citizens band radio licences on issue. The number of licences issued to operators of private mobile radio, common base station and message handling systems was approximately 15,000, covering 360,000 mobile stations.

On 13 April 1984 Mr Dafydd Wigley MP asked a series of questions concerning citizens band radio and the Radio Interference Service. Some points emerging from them were that views of users of cb radio concerning future developments of the service were taken into account through meetings of the Radio Regulatory Division with officials of the British CB Council and NATCOLCIBAR and that, including managerial and clerical support and part-time employees, there were over 300 full-time equivalent posts in the RIS. It was not possible to provide annual salary costs since the service was contracted out on an agency basis, but the cost of the RIS had been £9·2 million in 1983–4, and £8·6 million in 1982–3.

Mr Wigley also asked the Secretary of State for Trade & Industry whether he would publish tables by county which showed the number of complaints of persistent (sic) interference to domestic television reception. Mr Alexander Fletcher stated that the information was not available in the form requested. However, in 1983 the Radio Interference Service had completed investigations into 48,588 complaints of interference to television reception. The totals for individual British Telecom regions were as follows: London, 6,158; South-East, 5,411; South-West, 4,527; Eastern, 5,796; Midlands, 8,269; Wales, 2,876; North-East, 6,735; North-West, 4,575; Scotland, 3,784; Northern Ireland, 457.

Cost of equipment

The continuing fall in the value of the pound against the yen means that the cost of some commercial equipment continues to fluctuate. Thanet Electronics has announced price revisions to some Icom equipment, and other dealers have asked us to say that equipment prices may differ from those advertised in *Radio Communication* due to publishing lead-times. It would seem wise for members to check prices before ordering.

Planning news

The Society has played a small part in two recent planning permissions which were obtained by members. Sqn Ldr R Handley, G3GJQ, has commended the Society's Planning Panel for ". . .the excellent brief provided". He added that ". . .in my own case, on the Norfolk-Suffolk border in an area designated as an area of great scenic beauty, I can report a successful application for a 60ft Versatower. . .I should add that I now look forward to (a large beam) at 60ft which will be used mainly for hf contests. . .on cw, of course!"

In another case, a member living in

Enfield had taken the matter of his antenna to appeal after the failure of the initial application. Evidence as to the nature and scope of amateur radio was given by headquarters staff, and the Society was informed recently that the result of the appeal had been good: the Council's original enforcement notice had been quashed and G3DKR is now back on the air.

GB2RS news

Two newsreaders have unfortunately had to cease reading the GB2RS news bulletins: GI4PCY at Enniskillen and G8NNU near Bristol have both indicated their wish to retire, and the Society takes the opportunity to thank them for their services. Replacements for both are required, and any offers to the membership services department at headquarters would be most welcome.

Uosat-Oscar 11 back

As we went to press we heard that Oscar 11 is now transmitting telemetry data after some weeks of silence. Signals from the satellite command receivers were apparently detected in Greenland, and at 1101gmt on 14 May a command attempt from the University of Surrey on 438MHz resulted in the powering-up of the main beacon on 145·825MHz at 1105gmt. Signals from the spacecraft were as strong as the last ones heard from it on 1 March 1984, and the initial telemetry data was reported to be encouraging.

A full report appears in *Ephemeris* on page 593.

Sierra Leone beacon operational

The new 28MHz beacon 9L1FTN on Mount Aureol, Freetown, is now operational on 28,2725kHz, and it has been heard regularly in the UK during late afternoons and early evenings since its switch-on on 13 April.

Using the label carrier

The label carrier used for posting *Radio Communication* can now be utilized for ordering books from RSGB HQ at Potters Bar in addition to sending Members' Ads to the editorial office at Chelmsford.

However, members are asked not to use one carrier for both purposes at the same time. Please send book orders and Members' Ads separately to the respective addresses. This will avoid delays in expediting both services.

RAC Amateur Radio Group Scheme—special offer

Details of this scheme were published in our February issue, and the attraction of a discounted membership rate has resulted in many applications to join the scheme.

To enhance the discounted rate even more, the RAC is waiving the £3 joining fee for all new members whose application forms are received by the RAC before 31 August 1984. Application forms and details of the scheme can be obtained from Mr A. W. Hutchinson, 88 Broomfield Road, Chelmsford, Essex CM1 1SS.

ARRL presses for expanded bands

The American Radio Relay League has filed a "Motion for Expedited Action" for the expansion of phone segments in the 3·5(4), 21 and 28MHz bands. The process began some two years ago, when the FCC released a "Notice of Inquiry and Proposed Rulemaking" in March 1982. The ARRL suggested the phone band expansion which was later proposed by the FCC in a further "Notice of Proposed Rulemaking" about a year ago, and it is now some eight months since comments were filed in response to that notice.

Still in the USA, the Mura Corporation has filed a "Petition for Rulemaking" with the FCC which proposes the creation of a new "Consumer Radio Service" in the 900MHz band. The specific recommendation is for 935-938MHz. Mura has said that ". . .the personal communications needs of the American public are not being adequately served. . .the enormous potential that citizens band radio offered has not been realized because of well-known interference and congestion problems. . ."

MRUA Conference

The Mobile Radio User's Association recently held a conference in Oxford, and the keynote address was given by Mr John Butcher, MP. He said that the release of spectrum in Bands 1 and 3 would represent the largest-ever release of its kind in the UK and would make available over 1,000 channels for pmr. He added that the Government would have to take decisions during 1984 on how best the extra spectrum space could be used, and that it was necessary to find a balance between satisfying immediate pressures and keeping in mind the needs of those requiring access to radio frequencies in the future.

TV pioneers get together

Some 50 people, including about 15 radio amateurs, who built their own "televisors" between 1928 and 1935 to receive the Baird 30-line transmissions broadcast on medium wave, were entertained at BBC Pebble Mill on 30 March 1984. The event was organized by the Midland Centre of the Royal Television Society, and participants came from a wide area. An associated item was included in the "Pebble Mill at One" programme: it featured Leslie Mitchell, who took part in the early programmes; Baird's first assistant, Ben Clapp; and Mrs Louise Mole, who was employed in the Baird patent office.

The Royal Television Society has thanked the RSGB for publicising this event through its normal channels.

WARC-BC news

A recent World Administrative Radio Conference (HF Broadcasting) in Geneva decided among other things that, in the long-term, amplitude modulation should be replaced by some form of ssb in order to increase the number of available channels. A 20-year transition period was agreed, although a decision on when such a period should commence was adjourned until the second session of the conference in 1986. It is understood that Japanese delegates to the conference were confident that cheap mass-produced hf ssb receivers could be made available well within the transition period, assuming that it took effect from 1986.

Some broadcasters are already experimenting with ssb transmissions. Deutsche Welle is radiating its German service on 9,700kHz from 0600 on usb in addition to its usual a.m. transmission on 9,745kHz, and Radio Norway has also recently been radiating some test transmissions using reduced-carrier (H3E).

Speaking of Amtor

The British Amateur Radio Teleprinter Group, BARTG, has recently broadened the scope of its magazine to embrace topics such as Amtor, packet radio and data systems. The editor of the magazine, *Datacom*, is Ian Wade, G3NRW, and he has offered to give lectures on Amtor to clubs within a 50-mile radius of Bedford. His talk is illustrated with charts, models and tape recordings, and deals both with the problems of conventional rtty and demonstrates how Amtor overcomes some of them.

Mr Wade's home address is 7 Daubeney Close, Harlington, Dunstable, Bedfordshire, and his telephone number is 05255 4760.

Stolen equipment

On 27 March from a car in St Albans: FT7B, serial number 050297, modified for fm. Information to wpc Clayton, St Albans police station, tel 0727 54681.

On 29 April from a car in NEC car park No 6, Birmingham: Trio TS9130, serial number 4080033. Information to NEC Security Force, tel 021-780 4141, or G1FUO, tel 0977 43101.

Racal Users' Group

This group would like to make contact with all owners/operators of Racal equipment for the purpose of increasing the information available on spares, technical and historical details, availability etc. Anyone interested should send an sae and a list of the Racal equipment owned to P. Barker, G8BBZ, 8A Alwyne Place, London N1 2NL.

Caveat emptor

G4IDE Micro Systems report that a shop in Chesterfield appears to be selling pirated copies of their programs and that, to make matters worse, they are very bad copies which are giving G4IDE products a bad name. The only legal copies of G4IDE programs come direct from either G4IDE Micro Systems in Wolverhampton, or Morsen Electronics in Eastbourne.

RAMUG

The Radio Amateur Micro User Group, which held its first meeting on 20 March 1984, is primarily for owners of the BBC microcomputer, although other types may be supported if demand is apparent. It will

not be a "postal club", as it feels more can be achieved by practical use and demonstrations, and discussions on the air. It is proposed to have a net on 145·2MHz (S8) at 7.30pm on Fridays.

Meetings will be held every two months at the Design Block, Eastlea School, Hilda Road, Canning Town, London E16, from 7.30 to 9.30pm; 1984 dates are 8 May, 10 July, 11 September and 6 November. Membership costs £2 per annum, and all enquiries should be sent (with an sae) to: The Secretary, RAMUG, c/o R. A. Webb, 39 Aldworth Road, Stratford, London E15 4DN.

Ambivalent Drake

Rumours that the R. L. Drake Company was to relinquish completely the amateur market have persisted for some time, and owners of Drake equipment have been concerned about the position with regard to parts and service. In a letter to RSGB headquarters, the chairman of the company, Peter W. Drake, said that amateur radio had become a much smaller part of their business for several reasons: their inability to penetrate the Japanese domestic market; the very expensive US dollar in Europe; and the effects of the recession. However, in other areas the company was thriving. Current plans in the amateur radio market were not clear; design effort had ceased, although it might resume if the market revived in the near future. Mr Drake said that the company still had products for sale, adequate parts to service any product which it had built ". . . . for years to come", and ". . . . a love for amateur radio". he also stated that ". . . . you should know (that) at the very least parts and service are not going to disappear".

Sidebands

The Mosquito Aircraft Museum, just down the road from headquarters and well-known on the air as GB2MAM, now has a permanent exhibition of Services communications equipment covering 40ft of shelf space. The exhibits cover equipment used during the second world war, and the museum at Salisbury Hall is open between 1030 and 1700 each Sunday until the end of September.

The Dover repeater GB3KS is now back on the air after the receiver antennas were demolished by storms during November 1983. New cavities have been fitted and the unit now uses a single antenna system: it is currently operating on low power.

According to a recent BREMA report, British television sets are among the most reliable in Europe: the failure rate of UK-made integrated circuits used in colour tv was down to 1,500/million in 1982. British-made power diodes now apparently have a failure rate of some 15/million!

A radio club in the south of France, Association Genista, is interested in having contacts with British clubs, and would welcome the possibility of "twinning" with a club in southern Scotland, Cumbria, North Wales or Cornwall. Contact Guy Schaggner, F6KNN, Radio Club Genista, 4 Le Viaduc, F 34660 Cournonterral.

Amateurs in the Central Scotland area now have up to five pages of amateur radio news on Scottish Television's Oracle service. The information can be read by calling up page 353. Club secretaries and others can add news items by contacting Ronnie Cowan, GM4SRL, on 041 637 4383; or Bob Dixon, GM3ZDH, on 041 644 3876, both QTHR, before 6pm on Tuesdays.

Andrew Carter, G6XPZ, won the programme prize of a £220 portable colour television receiver at the White Rose Rally on 1 April. He is a member of the Durham University R & ES and the Darlington & D ARS, and was one of over 2,500 visitors to the rally.

At the tenth annual convention of the Narrow Bandwidth TeleVision Association held on 29 April, Mr T. H. Bridgwater, the veteran BBC television engineer and a leading figure in the Royal Television Society, was elected president of NBTVA for 1984-5.

G4VEN and G4UQA, who are both lawyers, have established a regular sked and would be pleased to hear from other radio amateur lawyers who would be interested in forming a lawyers net. Both are QTHR.

Got any pots? The Society requires a source of pcb-mount potentiometers for use in a forthcoming project. The ones we have in mind are of approx 1cm³ in size and have a 0·125in shaft. They are roughly equivalent to a Spectrol MD149. The value required is 1MΩ inverse log. Any offers to the general manager at headquarters.

Special Event Stations

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

June-20 July, GB0WKS
The station will operate from West Kent ARS Radio & Electronics Fair. Details from Dave Green, G4OTV, QTHR, tel 0892 26171, ext 277 office, 0892 28275, home.

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.

7-8 July, GB1GGD
Street & DARS will operate this station at the Glastonbury & Street Lions Club Glastonbury Gala Day. Phone and possibly rtty contacts on 144MHz. QSL cards for stations logging GB1GGD and at least one member of the Street & DARS. Details from Bill Scriven, G4EGO, tel Street 42277.

10-12 July, GB2GYS
The station will operate from the Great Yorkshire Show, Harrogate. Details from G3FTS.

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.

14-15 July, GB2SMR
The station will be operated by Brighton RC on the hf bands, 144 and 432MHz as part of the Sussex Mobile Rally being held at Brighton Racecourse. Details from P. J. S. Turner, G4IIL.

14-15 July, GB2DTS
The Barking R&ES will be operating this station at the Dagenham Town Show, Central Park. On exhibition to the public will be various displays including vhf, hf, rtty, atu and computers. A demonstration of direct broadcast satellite tv will also be on show for the first time. Details of this and other club activities from Ray Woodberry, G6YZV, c/o Barking R&ES, QTHR.

15 July, ZB2SSC
The station will operate from Gibraltar on most hf bands as part of the United Services Sailing Club Summer Fete.

16-20 July, GB4SHS
This station will be part of Shadsworth High School's Activities Week, and will also celebrate the school's silver jubilee. The station will be active on 28MHz ssb and fm, and the other hf and vhf bands on ssb. A special QSL card will be available direct (if an sae is enclosed) or via the bureau. Details from Mr F. Havard, G4VEY, Head of Physics, Shadsworth High School, Shadsworth Road, Blackburn BB1 2HT, tel Blackburn 50665/51904.

21 July 1984, GB2RCT
The Radio Club of Thanet will operate this station at the Phoenix Fair, Ellington Park, Ramsgate. QSL cards will be sent to all contacts on hf and vhf. Further details from Ken Lown, G4PTE.

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.

28 July-4 August, GB2EIJ
There will be a station at the 10th Essex International Jamboree at the Essex Showground. Operation will be on hf and vhf bands and will be mainly on or around the international Scout frequencies. It is hoped that contacts will be made with other Scout organizations around the world. For further details and skeds please contact Jeff Roberts, G6OIX, QTHR, tel 0376 47525, day, 0376 44857, evening.

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

11-12 August, GB2YFT
The station will operate from the Yeovil Festival of Transport, Barwick Park, Yeovil, Somerset. Operation on 3·5 to 432MHz by Yeovil ARC. Details from sec G3GC, tel 0935 75533.

18 August, GB2MSS
Yeovil ARS will operate the station from Mid-Somerset Show, Shepton Mallet, Somerset. Operation will be on 3·5 to 432MHz. Details from G3GC, tel 0935 75533.

RAE Courses 1984-5

Biggin Hill. Charles Darwin School, Biggin Hill, Kent. Wednesdays, starting in September. Tutor G4AVV, QTHR, from whom all details can be obtained.

Chingford. Friday Hill House, Simmons Lane, Chingford, London E4. Enrolment 13 September, 7.30pm, when course commences. Tutor Alan Foss, G8EAY. If numbers permit, a second course may be run on a different night. Details from G8EAY at Friday Hill House, tel 01-529 3380.

London. Paddington College, Dept of Engineering Technology, 25 Paddington Green, London W2 1NB. Due to the extended facilities which the college offers, courses will be twice weekly. Enrolment 10-12 September, 1-4pm and 6-8pm. If you are not able to enrol then, just turn up on the night. Fees may be subject to a special rate in the case of pensioners, school pupils etc. Course tutors D. Peace, G4KKM and D. Hunt, G6MFR. Details from David Peace, tel 01-402 6221 ext 54.

Loughborough. Loughborough Technical College, Dept of Electrical Engineering & Computing, Radmoor, Loughborough, Leics LE11 3BT. Tuesdays, commencing 11 September. 6-7pm, morse; 7-9pm, theory and regulations. Course fee: morse, £7.30; theory, £15.90. Details from course tutor Doug Doughty, G3FLS, c/o the college, tel 0509 215831.

Wigan. Wigan College of Technology, Parsons Walk, Wigan. Classes either Tuesdays or Wednesdays commencing in September. Classes will also be offered during the day to cater for retired or unemployed people etc. Further details from Roy Hesford, G4UAE, c/o the college, tel Wigan 494911.

Mobile Rallies Calendar

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

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. Camborne 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 (RB0). Mammoth surplus equipment sale. Further details from sec N. Lill, G6CXK, QTHR, tel 0723 360587.
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—RAIBC and Flight Refuelling Amateur Radio Society Hamfest '84, Flight Refuelling Social Club and Sports Ground, Merley, Wimborne, Dorset. Open 11am–5pm. Talk-in on 144 and 432MHz, callsign GB2FRH. Junk stall, bring & buy, tombola, creche etc. Parking available free. Details from E. K. Howard, 11B Chester Road, Poole, Dorset, or Bob Burrows, tel 0202 762828, daytime.
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 on campus. Leave M6 at junction 33 and proceed north on A6 for two miles. Opens 11am, early admission for the disabled. Trade stands, bring & buy, licensed bar, cafeteria. RSGB stand and bookstall. Entry 50p by programme, with free prize draw. Talk-in on 144MHz S22 fm. 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—Vange Mobile Rally. St Nicholas School, Nicholas Lane, Basildon, Essex. Open 10am to 5pm. Talk-in on 144MHz by GB4VMR. Details from G4IFD, 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.
18 November—Carmarthen ARS Rally. The West Wales Hospital Club, The Quay, Carmarthen. Open 11am to 5pm. Admission 50p. Trade stands, bookstall, bring & buy, craft and bric-a-brac, licensed bar, full catering. Ample space for visitors. Talk-in on S22. Free car parking. Details from M. Meredith, 50 Caecoed, Llandybie, Ammanford, Dyfed, tel 0269 850803.

Other Events

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

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.
14 October—QRP Convention, Preston School, Monks Dale, Yeovil, Soms. Details from G3GC, QTHR.
20–21 October—27th Jamboree on the Air.
8 December—RSGB AGM, IEE, Savoy Place, London.
1985
13-14 April—RSGB National Convention, National Exhibition Centre, Birmingham.

COUNCIL PROCEEDINGS

A brief report of the Council meeting held on 22 March 1984

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

The President welcomed Mr Thomas to his first meeting of this year's Council.

Apologies for absence were received from Messrs Cornish and McClintock.

Financial report

Mr O'Brien introduced the half-yearly accounts for the 1983-4 financial year on behalf of the hon treasurer. He reviewed the accounts with particular reference to advertising, trade sales, bank interest, bank deposits, the cost of sales, HQ payroll, repairs and maintenance, bank charges, bad debts, administration, staff at rallies, publication cost of *Radio Communication*, the IARU Region 1 levy and the stock situation; and concluded by saying that he considered that the financial position of the Society remained healthy.

Mr O'Brien then introduced the Finance & Staff Committee recommendation that subscription rates be raised by £2 per annum for home corporate members from 1 July 1984. During the discussion which followed, a number of options for fee increases were considered. At the end of the discussion it was proposed, seconded and approved that the home corporate subscription rate be increased by £2 per annum as from 1 July 1984. Also that other rates would rise pro-rata, with the exception of the rates for student and associate members, which would rise by less than the pro-rata increase. This was agreed.

Secretary's report

(a) The latest membership statistics showed a continuing net increase, amounting to approximately 6·6 per cent in the present financial year. The actual membership figure on 1 March 1984 was 35,362.
(b) The VHF Convention had been a success, with the highest attendance to date of some 2,500.
(c) Arrangements for the RSGB National Convention at the NEC continued to go well.

Hall 3A at the NEC would not be available for next year's convention, so Hall 3 would be utilised instead. The dates arranged were 13/14 April 1985.
(d) Mr Evans referred to the case of a member in Somerset who was experiencing some difficulties with regard to breakthrough, and said that this case was quite typical of many and raised some very basic questions. One was who should pay for the modification of the television/radio/hi-fi if breakthrough was being experienced?
(e) Information on the activity of a small number of amateurs who were clearly against any participation by Raynet in civil defence activities had been passed to the Raynet Committee chairman so that Council could be further advised.
(f) A survey had shown that normally more than 100,000 QSL cards were uncollected each year. A considerable amount of postage was thus wasted in passing such cards between the main bureau and sub-managers.

With regard to the legal aspects of the disposal of uncollected QSL cards, the law of contract applied. The contract was set out in the RSGB leaflet on the QSL Bureau, which stated that cards would be disposed of if they remained uncollected for a period of three months. After some discussion, Council agreed that this period of three months should be retained. The general manager discussed further improvements to the operation of the bureau which were agreed by Council.
(g) Work was now taking place to complete the HQ station facilities. When finalized this would enable the Society to make multiband news broadcasts on ssb, rtty, Amtor, cw etc.
(h) The 1984 agm had been provisionally set for 8 December at the IEE in London.
(i) A silver salver had been purchased by the Society for presentation to ARI, the Italian Society, at the end of the Cefalu IARU Region 1 Conference.
(j) On DTI matters, one item of particular interest was the intention to seek publication of the new schedule by the DTI within the next few months.

Recommendations arising from committee minutes
IARU. That Council defer its decision with regard to the proposed new IARU Constitution.

Dr Evans explained that the subject would be discussed at the IARU Region 1 Conference in April. One of the main objections to the document was that the leadership of IARU would be contained within one region. The committee's recommendation was approved.

Membership and representation
(i) Mr Holmden stated that reduced subscriptions were not covered under Article 19. Mr Baptiste thought that the wording of this Article was incorrect in that it referred to *corporate* members, and he suggested that the word "corporate" should strictly be omitted.

Reduced subscriptions in respect of a further eight members were noted.
(ii) The subject of waived subscriptions was discussed in detail as a result of Mr Holmden objecting to the procedure for the granting of reduced and waived subscriptions. At the end of the discussion, it was proposed, seconded and carried by 12 votes to 2 with 1 abstention, that the list be considered under the previously accepted procedure. The President said that the views expressed during the discussion would be considered by the Finance & Staff Committee, which would review both concessionary categories. Mr O'Brien, chairman of the Finance & Staff Committee, requested that for purely practical reasons, the existing system be continued until a review could be made.

Waived subscriptions were granted to a further 24 members on the grounds of health or disability.
(iii) Life membership was granted to Mr P. Barker, G4HPS.
(iv) Council noted that the following had been granted affiliation:
Abingdon Contest Club;
Bishop Auckland RAC, Darlington;
Bristol Channel Rep Group, Newport;
Bromsgrove ARS;
Buxton ARS;
Caithness ARS;
Carmarthen ARS;
Cwmcynon ARS, Glamorgan;
Dragon RC, Anglesey;
Dukeries ARS, Ollerton, Notts;
Easter Ross RC, Invergordon;
Fanny Hill RC, Orpington;
Galashiels & DARS;
Leiston ARC, Suffolk;
Lymington & DARS, Hants;
Plymouth College of Further Education;
QTI Talking Newspaper Assoc, Sheffield;
South Cotswold ARS, Stroud;
Todmorden & DARS;
Triple B Contest Group, Worcs;
University of Kent RC;
Wells-Krautkramer ARC, Warks;
Winstanley College RC, Wigan;
Worcester Moonbounce Society;
Wythall RC, Worcs;
Wordsley RC, West Midlands.

Mr Evans described the proposed new procedure for processing affiliations, whereby the appropriate zonal Council member would be required to complete the proposal section of the application form before it was submitted to HQ. This would enable vetting to be undertaken locally, if required, before the application was passed to HQ for processing. Once the new procedure was operational, the affiliations noted on the agenda would be purely for Council's information.

Acceptance of the new scheme was proposed, seconded and approved unanimously.
(v) Council noted results of the recent ballots for representatives in Regions 2 and 14.
(vi) It was noted that the following area representatives had been appointed:
B. P. Sherrif, GM4SEH—Forfar & District;
D. S. Smith, G4DAX—Scarborough.

Observation Service
Mr Pratt, hon organizer of this service, reported that he was seeking a successor because business and other commitments necessitated his resignation from the post later this year.

Some debate followed, and Dr Evans compared the Observation Service with that of the Intruder Watch, the future of which was currently under consideration by the IARU Committee.

The President said that the Licensing Advisory Committee and the Forward Planning Group would look at the Observation Service and liaise with the DTI over action to be taken with abusers of the radio spectrum.

Raynet
The latest draft rules, which had been revised following comments from Council, had been circulated, and some discussion followed on the general organization of Raynet. Mr Evans voiced what seemed to be a widely-held view that Raynet must be seen to operate correctly, and that for this reason Council had previously agreed to strengthen the Raynet/RSGB link. It seemed that there was everything to gain by Raynet remaining firmly within the RSGB, because Raynet dealt with the police and other public-orientated organizations and needed to negotiate with Government departments, such as the DTI.

There was general agreement with these remarks. The draft rules were accepted by 11 votes to 2, with 1 abstention.

A discussion on Raynet Ltd took place. Mr O'Brien stated that the Finance & Staff Committee was considering this matter again as a result of recent correspondence.

Morse tests
Mr Evans gave the background leading up to this agenda item, which he said was vital enough to have a bearing on the future of amateur radio. Some 18 months ago the DTI had indicated British Telecom's need to increase the morse test fee to £15, and has asked whether the Society was prepared to consider taking over the responsibility for morse tests. The RSGB's Licensing Advisory Committee had submitted a discussion paper to the DTI in 1982 expressing its willingness to become involved, and the DTI had recently requested an up-date on the paper and stated that the responsibility would be passed either to the Society or to the City & Guilds of London Institute. Mr Evans outlined the format being proposed and said that in his opinion it would be beneficial to amateur radio if the Society conducted morse tests in the UK.

Much discussion ensued, from which it was apparent that there was considerable enthusiasm and strong support for the proposal that the Society should handle morse testing. Council unanimously agreed that it was considered essential to press ahead with a revised input to the DTI, and asked the Forward Planning Group and the Licensing Advisory Committee to work towards achieving this objective.

IARU proposals 177 and 178
Approval was given to the admission into IARU of the Chinese Radio Sports Association and the Vanuatu ARS.

Spectrum managers' reports
HF. Dr Allaway had reported that the IARU Region 1 Conference did not produce many changes affecting frequencies below 30MHz.

The further fragmentation of the bands into small segments was looked upon with some disfavour. The RSGB's proposal that the 3,775–3,800kHz segment should be reserved for inter-continental working (it was previously 3,790–3,800kHz) was accepted.

The RSGB's suggestion of frequencies for channelized fm and/or repeaters on 29MHz was defeated. A proposal that member societies should advise fm and other operators not to transmit on frequencies between 29·3 and 29·55MHz in order to avoid interference to amateur satellite downlinks was accepted.

On contests, a recommendation that all organizers of contests should include QRP categories in their rules was accepted. A proposal that the IARU HF Phone Field Day be moved to another date was agreed by a large majority, and the problem of a clash with the RSGB CW National Field Day was referred to the HF Working Group to work out details. "Contest preferred" segments for 3·5 and 14MHz were approved, but action on 21MHz was deferred.
Microwave. Dr Evans reported that Dr Suckling, G3WDG, who had contributed the Microwave column to *Radio Communication* for the past seven years, was relinquishing this appointment. He wished to place on record his appreciation of the great service Dr Suckling had given to the Society. Dr M. Dixon, G3PFR, would be the new contributor of this column.

On the subject of direct broadcasting by satellite and i.f. breakthrough, the RSGB had been represented by Dr J. Gannaway, G3YGF, at a BREMA working group meeting where the matter was discussed.

Supply of previous year's Council minutes to new Council members
Council agreed that copies of the previous year's Council minutes should be made available to all new Council members on request after the first meeting of each year, for briefing purposes.

Correspondence
The President reported receipt of a letter from Dr E. J. Allaway concerning the position of IARU Region 1 Secretary. Council confirmed its support of Dr Allaway, in the event of his election to this office.

Mrs "Taff" Crane
Council expressed its sorrow at the recent death of Mrs Crane. The President had written to Mr Crane, G3PED, acknowledging the work Mrs Crane had undertaken for the Society as the Raynet registrations secretary.

OBITUARIES

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

Mr L. Bailey, GW4NNF
Lionel Bailey died on 12 April. He took his RAE in 1966 but did not apply for his licence for some years. When he originally joined the RSGB he was BRS28285. Although confined to a wheelchair, he was a very active member of a number of organizations, including Chepstow & DARS, G-QRP, RAFARS, and RAIBC. He was active on all bands and modes. He will be remembered by the members of the Chepstow RC for his wit, advice and encouragement.

Mr M. Dry, G4CSW
Mac Dry died on 17 April. He served in the RN as a radio operator, and later as a radio operator with the British Antarctic Survey Team, both in South Orkney and South Georgia, where he was well known as VP8PL. Mac was very keen on WAB, had been a member of RNARS since 1974, and was a member of RSGB.

Mr P. J. Fay, G3AKG
Peter Fay died on 31 March, aged 80. He had been a member of the Society for many years. Since his retirement as an engineer at the Post Office Radio Station at Bearley, he had been active in many nets including RAOTA, the post-RSGB News, and the Catholic net. While living in Derby he was a member of the Derby & D ARS and a part-time lecturer for the RAE at Derby College of Technology for three years, until he left the area in 1973.

Mr H. B. Pepper, MBE, G4IDN
"Bill" Pepper died on 16 January. Although he became a radio amateur late in life he was well known on both the hf and vhf bands.

Mr J. Taplin, G3HRI
John Taplin died on 11 May, aged 52. Blind after the age of 10 months, he nevertheless overcame this disability to a remarkable degree; becoming one of only two blind persons to be accepted for a Marconi EMI course in radio engineering, and passing out from this training fully qualified. He devised many instruments and gadgets to help him build, test, and operate his station.

First licensed in mid-1951, G3HRI was one of the founder members of the post-war Hastings ARC, and served for many years on its committee. He was an active and enthusiastic member of a small club team which toured the rarer counties of the UK in 1956 to operate with the call G6HH/P on the hf bands. He taught himself to speak German and had many friends in that country whom he had "met" originally over the air. G3HRI will be missed on the Hastings Top Band Net, where for years he had taken on the role of "father" and controlled things efficiently and with humour; always offering good advice to newcomers or even to old timers!

Also:
Mr S. Scrag, G3FXL, on 25 February;
Mr A Wood, G5AW.

Members' Mailbag

QUALITY VERSUS QUANTITY

Sir—Having just read the letter from D. J. Walters, G4FDV, *Rad Com* May, I feel I must write in reply to it.

First I agree whole-heartedly with him about novice licences. However, I feel his motives are in doubt. Just because a person started on the "first rung of the ladder", so to speak, by using cb radio, I do not feel he should be persecuted because of this but, providing he shows willing, he should be encouraged to take the next step up the ladder by gaining a bona-fide callsign. The number of people who have entered amateur radio through this door are many, and we can only gain from their experience, and it is up to us registered callsigns to inculcate into them the "correct" ways of amateur radio.

This brings me to the second point I wish to raise. Just because a person has a late G6 or a G1 call, it doesn't mean they are indolent or illiterate because they have taken and passed the new-type "vote for Joe" exam. Reading D. J. Walters letter gives the impression that because he passed the old-type RAE exam paper he has a sense of being superior in some way. Good luck to him and my congratulations; but let's be honest, does it make him a better person or operator because of it? I have been interested in amateur radio for many years, but because of my job and the travelling involved, and professional studies for my career, I only took the exam in May 1983. Also, I have in excess of 14 years' experience in maintaining radar and communication systems, but I still regard myself as a novice in my chosen hobby.

However, having said that, I feel he ought to reflect somewhat on his attitude to these new calls. My own experience of this is that if you have a callsign your chances of establishing a QSO with one of the many "mastadons" who sit listening to the band are just about nil. They just cannot be bothered to answer a new callsign. Don't they remember their sense of excitement when they were first licensed all those years ago? Thank goodness that some G3, G4 and G6 calls can be bothered to answer. I, like many other new calls, can only benefit from their experiences if only they would give us the benefit of the doubt and answer our "CQ" calls.

As for not identifying ourselves correctly. It took me three weeks to identify a G3 and a G4 callsign who have a regular net on vhf. So as far as the new calls not identifying themselves properly; I think that the older and more experienced operators ought to put their own houses in order before they start to criticise the younger and sometimes more enthusiastic callsigns. Do they possibly think that because they have been licensed for so many years that they no longer need to bother with callsigns anymore because they can tell whom they are talking to by the sound of the voice?

I do enjoy my hobby but I, like all new callsigns, can only become better at it by tapping on the vast reserves of knowledge and experience that have been accrued over the decades by the more senior callsigns. So please before tearing us "youngsters" off a strip, give us the benefit of the doubt and your experience.

A. L. Poore, G1CAC

Sir—After reading the comments of G4DFV in the May issue, there are several points I would like to make.

In the area in which I live (Aldershot) it is very unusual to hear any station not give his or her callsign both before and after each over. As for "CQ" calls, once again in my own area one can hear G6 and G1 stations along with the others calling and answering.

G4DFV also mentioned the RAE. Surely the fact that we have all taken this exam in one form or another shows that we want to learn about this very interesting hobby. The type of exam is not the fault of the newer stations, but having passed the RAE I thought I had joined a fellowship of radio amateurs, not a "them and us brigade" as the G4 station makes it sound.

I passed my exam in December, and I am pleased to say that I have found all the contacts I have had to be both friendly and helpful, especially the older more experienced stations. I feel quite sure that Nottingham cannot be as dismal for radio amateurs as G4DFV makes it sound.

The only point I feel I must agree on is the novice licence. After taking the RAE with friends, some who passed first time and some the second, I do feel that anyone with enough interest can make the grade.

D. Murray, G1DGI

Sir—I feel I must write to you to fully endorse the comments by G4DFV. For the last three years the amateur bands have had to cope with a massive increase in numbers, but the result is, to say the least, "not very good". In particular the 144MHz band suffers the worst; it is a very good band but I can only put up with it for very limited periods due to the very poor operating standards. It is the band with more "licensed listeners" than any other band, and is more like cb than any other, plus all the other points raised by G4DFV.

Regarding the novice licence proposal by G3ZHI, I consider that this is no more than a charter for "wimps", and I cannot believe that the RSGB is not fighting this proposal tooth and nail, if the amateur bands are not to decline to much lower levels, or even survive as true amateur bands.

A. Leaver, G4ECB

The above letters represent a reasonable cross-section of those received in response to Mr Walters' letter. We are not sure whether the various novice licence proposals are necessarily a ". . . charter for wimps", but it is quite clear that any proposals of this type require a very great deal of careful consideration before they can be safely said to be good for the credibility and positive future development of amateur radio. The Society also strongly suspects that Mr Murray is quite correct when he states that ". . . anyone with enough interest can make the grade".

WHAT'S IN A NAME

Sir—From time to time I have been in social situations where I have found myself among quite a number of cbers. Often when I am introduced to them as a licensed amateur, with at least the basic interest of communication by radio in common with them, I have to suffer initial hostility. This is due to well published views, such as those expressed by D. J. Walters, *Rad Com* May, which stigmatise us en masse as bigotted snobs. Often I manage to reverse their opinion of myself, but I am left with the feeling that they regard me as an exception.

I was going to attempt a lengthy reasoned reply to colleague Walters' letter, but frankly all I feel like saying is: "Oh no, not again!"

So may I change direction and add my thoughts to the new debate on the use of the word "amateur", following Peter Mackrell's letter in the same issue. Whereas competition is not the be-all and end-all of amateur radio, we would do well to consider what the term "amateur" really means in sport. Rugby Union, the Olympic Games, Torvill and Dean—who could feel justified in using the world amateur in anything other than praise when talking about these? Should we aspire to "professional" standards? The professional foul, footballing prima donnas rolling in thespian agony to force a penalty, so-called sportsmen accepting bribes to tour some countries—need I continue?

The answer is not to change the name, but to continue and to improve our high standards, and to educate newcomers and outsiders in what amateur radio is all about. Make your first move a positive move, colleagues, by throttling at birth any traces we may have of a holier-than-thou attitude!

P. Thompson, G6MEN

Certainly the Society would endorse the need to ". . . continue to improve our high standards and to educate newcomers and outsiders in what amateur radio is all about": quite a high proportion of the work of headquarters is taken up with precisely these matters. As we have said previously, it is the credibility of amateur radio which is enormously important because without it there is a grave danger of the loss of spectrum allocations. It cannot be said too often that the pressure on the radio spectrum is intense and increasing and that amateur radio does not have a divine right to any of it: it must be earned and seen to be constructively used.

Sir—I think we are all becoming too preoccupied with what name amateur radio should have. To the world at large we will always be radio amateurs. It is the good name of amateur radio that we should be concerned with. We should aim to improve the standard of our hobby by polite and courteous conduct on the air.

Over the years we have seen a slow decline in standards in operating. This is not due to the two favourite "kicking sticks", namely the ex-cb operator and the multi-choice RAE, but rather to the current use of excessive power and the selfish operation by an increasing number of people. It is up to all of us to curb this tendency.

I include QSL exchange in the subject of courtesy. People who don't intend to QSL should say so, and the stations who take two or more ircs and don't return a card, should mend their ways.

The proposed novice licence would do nothing to improve standards. An easy ride onto the air is no way to encourage pride in the hobby. A local amateur recently asked the Home Office if they could try to remove pirates from 28MHz. The Home Office said "What do you expect us to do, we've got enough problems with tvi". QED. It's clearly down to us to improve standards of operating and discourage or educate the "lids".

Let's have no more talk of names but strive to improve the present name, because if the space-shuttle fiasco is anything to go by, amateur radio will soon be thought of as no better than up-market cb.

I'm sure my sentiments are shared by many an amateur and swl.

Peter Lewis, G4VFG

Sir—May I offer the following definition, given in the *Concise Oxford Dictionary*, of the slang form of the word "ham": *"An amateur (radio operator of an amateur radio station), an inexpert performer, an inexperienced or ineffictive actor, one who rants and overacts; heavy-handed, clumsy."*

Certainly food for thought!

Anthony Mayers, GW6ZHY

SATISFACTION

Sir—Often over the air we hear and occasionally we see in print, complaints of dealers' after-sales service. The general consensus of opinion is that a "couldn't care less" attitude appears to exist with a large percentage of dealers in amateur radio equipment.

My personal experience in dealing with Dewsbury Electronics of Stourbridge, West Midlands, deserves the widest publicity. I phoned them at 0930 on a Monday and I was immediately assured that the FT980 which had developed a fault would be collected that day, and at approximately 1130 a van arrived to collect the rig. At about the same time on the Thursday my FT980 was returned to me after service.

Service of this nature cannot do other than inspire complete confidence in dealing with a dealer who is a long distance away, and Dewsbury Electronics certainly deserve congratulations in providing such a fast after-sales service.

W. H. G. Metcalfe, G6VS (Ex-VU2EU)

WORLD AMATEUR RADIO DAY

The Trio TS930S which was generously donated by Lowe Electronics and which was used for 7MHz operation

World Amateur Radio Day took place on 18 April 1984 and appears to have been a great success. The headquarters station GB3RS was on the air virtually continuously throughout the day on 3·5 and 7MHz, 144MHz fm, and with some activity on 144MHz ssb and cw, and 430MHz. Some 500 contacts were made with one of the highlights being a contact between the respective general managers of the RSGB and the ARRL. This took place in the 21MHz band during the afternoon, and David Evans, G3OUF, and Dave Sumner, K1ZZ, were able to have a very solid contact for some 20min. It is believed that this is the first time the two national societies have made contact in this way.

It appears that the day was also very successful from the publicity point of view. Some 30 BBC and independent local radio stations made contact with amateur radio clubs and local groups in their coverage areas, and many of them conducted interviews with headquarters staff by telephone. Indeed, two stations followed up the day by making feature programmes about amateur radio with the assistance of headquarters. Local newspapers also carried features on the day, and some useful publicity was obtained by local clubs.

The headquarters station GB3RS is now becoming very well equipped, largely due to the generosity shown by amateur radio dealers and importers. The main station equipment, all kindly donated by the companies shown, comprises a Trio TS-930S hf transceiver by Lowe Electronics; an Icom IC730 hf transceiver by Thanet Electronics; and, for the vhf and uhf bands, a Yaesu FT726R by the Yaesu Musen Corporation in conjunction with South Midlands Communications Ltd; and a 100W linear amplifier for the 430MHz band by Microwave Modules Ltd, which will be used in conjunction with the FT726R. Another kind donation to the vhf/uhf station was a GBFA 144e low-noise GaAsfet masthead preamplifier for the 144MHz band from Mutek. The antennas currently in use for vhf and uhf working comprise a crossed nine-element pair for 144MHz, and a crossed 12-element pair for 430MHz, by Jaybeam Ltd; and some Tonna antennas, which will be used later, supplied by Randam Electronics. At present the antennas in use for the hf bands consist of a W3DZZ trap dipole and a 3·5MHz dipole, and it is hoped to equip GB3RS with an hf beam at a later date.

Various national bodies have also been generous with material such as low-loss coaxial cable for the uhf array, connectors, test equipment, components and other accessories: their kindness is gratefully acknowledged.

Thanks to the generosity of the BBC and the IBA, GB3RS is in the unique position of owning enough equipment to set up a fair-sized Band I and

Cassandra Davies, 9L1YL, in the GB3RS shack during World Amateur Radio Day

Kristjan Benediktsson, TF3KB, (r) the president of the Icelandic national society, at GB3RS with the RSGB's general manager, David Evans, G3OUF

Janet Attfield, G1DAW, and David Gough, G6EFQ, of the membership services department, operating the 144MHz station on World Amateur Radio Day. An FT225RD was used during the event

Band 3 television transmitting station! With the imminent cessation of television broadcasting in these bands, some surplus transmitting and ancillary equipment became available and was donated to the Society in a fully serviceable state. The intention is to convert some of the existing transmitter equipment for use as vhf and uhf power amplifiers in amateur bands, with the eventual intention of running the full licensed power in style —much of the remainder will be used for power supplies and other items constructed in-house. The eventual aim is for part of GB3RS to be completely "home-brewed", as it were, for demonstration to the media and to other bodies.

Cassandra Davies, 9L1YL, returned from the Region 1 Conference in Cefalu via London: this meant that she was able to participate in World Amateur Radio Day by visiting RSGB Headquarters and also attending a meeting of the builders of the 9L1FTN beacon, the Cheshunt & District Radio Club. Cassandra was returning a visit made by Roger Frisby, G4OAA, the club's honorary secretary, in 1981.

RSGB NATIONAL CONVENTION 1984

The second RSGB National Amateur Radio Convention to be held at the National Exhibition Centre, in Birmingham, took place on 28/29 April and proved to be even more successful than the 1983 event. As a result of experience in 1983, several changes were made, and these all contributed to this year's success.

Although the convention was not due to open until 10am, by 9.40am over 2,000 people were waiting to enter, and by 10am the number had grown by nearly another 1,000—but the new arrangement of ticket purchase in advance and more box offices allowed this large number of visitors to pass into the hall in 15min. Once inside Hall 3a, which provided more space than last year, the visitors—and there were over 10,000 during the two days—were able to visit some 70 modular stands, and a flea market area of 160 tables. The improved seating and catering facilities this year were obviously appreciated by this large number of visitors, as was the shuttle bus service between the car parks and the entrance.

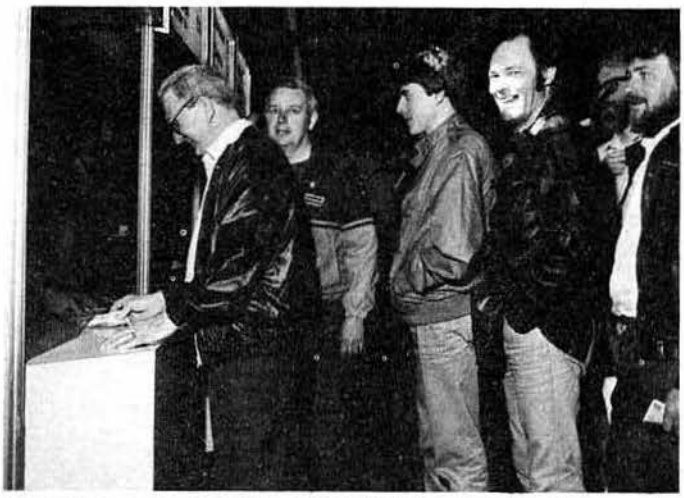
Forty-five companies were represented, and it was noted that among the main importers of equipment into the UK showing their new wares, there was a growing number of British-built equipment manufacturers coming into the field. This display gave many visitors their first look at a number of different items, including antennas, masts, linear amplifiers and kits.

As usual, the RSGB stand was very busy; a completely new design of layout being used this year, with the publications displayed behind a glass screen and with two video screens showing films of interest. Headquarters' staff were on hand to answer all those questions from visitors which crop up at convention times. Two interesting statistics were that over 3,000 copies of the new 1984 *RSGB Amateur Radio Call Book* were sold, and some 200 new members were enrolled.

A large number of affiliated societies, groups, and RSGB committees also occupied various stands in the hall, some for the first time. Among them were RNARS, RAFARS, BARTG, BATC, Scouts, ISWL, AMSAT-UK, QTI, QRP Club, and RAIBC.

While the traders in Hall 3a were achieving record sales above last year's figures, the lectures were also better attended than they were last year, and proved to be so popular that it was difficult at times to get in. Alongside the lectures, the again very popular HF Convention was taking place, and a separate report on this will be published next month.

Excellent talk-in facilities were provided by Chelmsley Wood Raynet Group, which assured many motorway drivers that they were travelling in the correct direction; a vhf link was used from the organizer's office to a nearby hotel, where the talk-in station was located. The Solihull ARS was responsible for the hf demonstration station which operated on all bands, and a large number of contacts was made on ssb and cw with the special callsign GB4NEC.



Early arrivals queue at one of the advance ticket booths before the convention opened

The Society would like to thank all those who visited and who made the show a great success. It was especially pleasing to note the increase in the number of visitors from overseas, many of whom stated that the RSGB National Convention was the best event of its type which they had ever visited.

A vast amount of organization and hard effort lies behind a major event such as this, and the Society is especially grateful to all those who were involved: RSGB staff and members, and particularly to the members of the Exhibition & Rally Committee led by chairman Norman Miller, G3MVV.

Next year's convention will take place on 13/14 April, and as it appears from its popularity this year that it will be an even larger event, Hall 3 has been booked.

Editorial note. ***We regret that as a result of a camera fault, it is not possible to publish an illustrated account of this event.***

A TRANSCEIVER FOR THE HF BANDS

by Lorin Knight, MIEE, G2DXK*

Part Two

PART 1 gave the basic outline of the transceiver project, and looked in detail at the circuits of the 4,433kHz filter and the vfo. Part 2 looks at the remaining circuitry required for the basic receiver, starting with Fig 7, which shows the vfo converters, the bandpass filters, the double-balanced modulator and all the associated switching.

VFO converters—standard version

The standard vfo converter (PCB3) has a crystal oscillator stage, TR301, and a dual-gate mosfet, TR302, which mixes the output of the crystal oscillator with the output of the vfo amplifier. The tuned transformers, T301 and T302, select the required mixer output.

The output circuit of the vfo converter is designed to meet the rather special requirements of the dbm, the local oscillator port of which (pins 7 and 8) has a nominal impedance of 50Ω and requires an input of the order of 5mW from a 50Ω source. At the output frequency of the vfo converter, L301 and C314 are resonant and together look like a resistance of about 20Ω, making the total resistance seen by the dbm something like 50Ω. At any other frequency L301 and C314 present a much higher impedance, and the converter does not put any significant load on the dbm. This means that the outputs of the vfo converters do not have to be switched; they can all be left permanently connected to the dbm. Switching between vfo converters is achieved merely by switching the +12V supply via S1102a. The other two sectors of the switch S1102 select the appropriate bandpass filter.

*177 Baldock Road, Letchworth, Herts SG6 2EJ.

For simplicity, standard Toko coils are used for the tuned circuits in the vfo converters—and elsewhere in the transceiver. It is cheaper to buy these coils ready made than it is to buy the bits and pieces to make one's own. Furthermore the use of these coils makes it easier to reproduce the results of the prototype. Details of these coils are given in Fig 8. Note that in some instances, in order to reduce the inductance, it is necessary to remove the ferrite cup which is inside the coil can. This is a very simple operation, and needs to be done if an asterisk is shown against the coil type number in the components list.

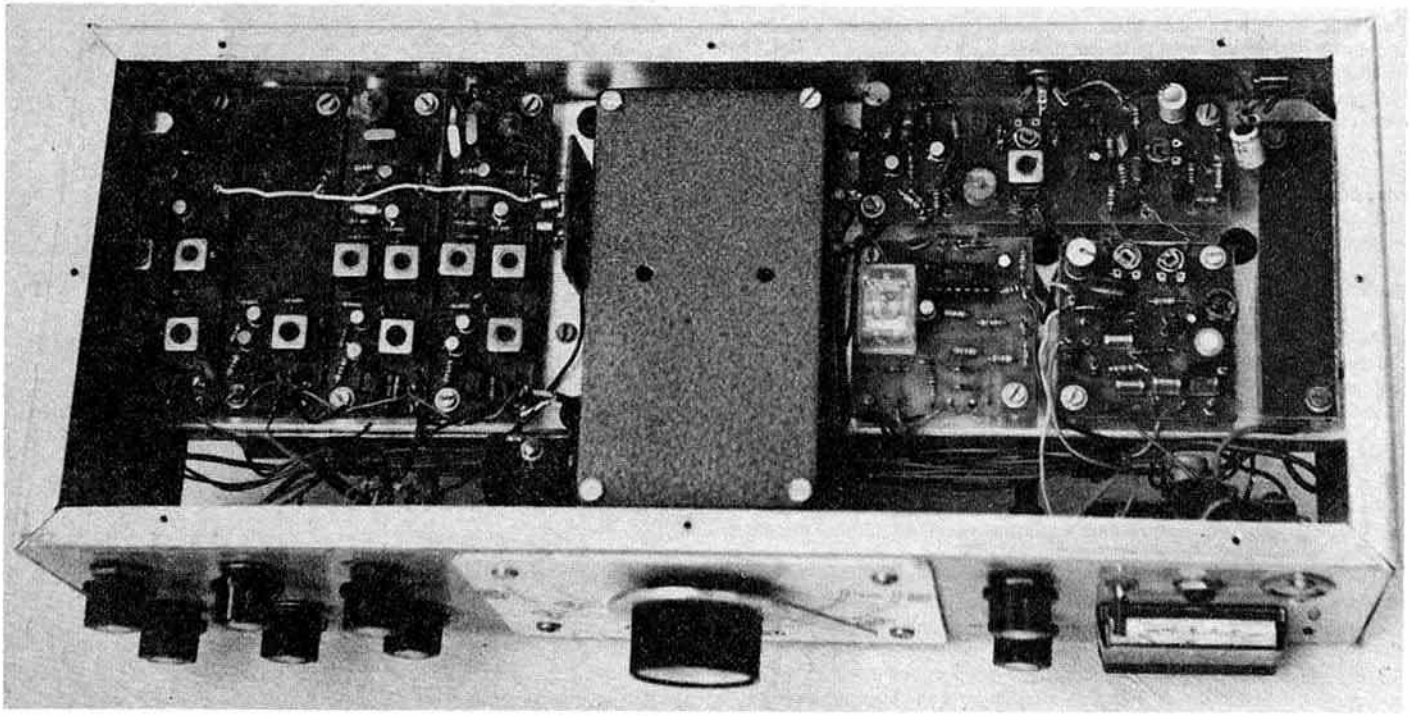
VFO converters—special versions

Non-standard vfo converters are required for the 14 and 28MHz bands. In the case of the 14MHz band no frequency conversion is required but the driver circuit for the dbm is still needed. Fig 9 shows the circuit of the 14MHz vfo converter (PCB3/14).

For 28MHz a switched crystal oscillator is needed. The circuit is shown in Fig 10, where it will be seen that the switching is done by the diodes D501 and D502. The particular diodes used are designed for rf switching and were found to be preferable to general-purpose types, such as the 1N4148, which did not give reliable switching.

The crystals require a capacitance of somewhere around 30pF to tune them to the exact frequency required. Because of shortage of space on the 28MHz converter pcb, it is only possible to fit trimmers with a maximum of 22pF. Consequently additional fixed capacitors are shunted across the trimmers; 22pF is given as a starting value but it may sometimes be necessary to deviate from this.

C519 and R514 provide some negative feedback to counteract a tendency for TR504 to go into self-oscillation. This tendency was not observed on the converters for any other bands.



Underside view of the basic transreceiver chassis

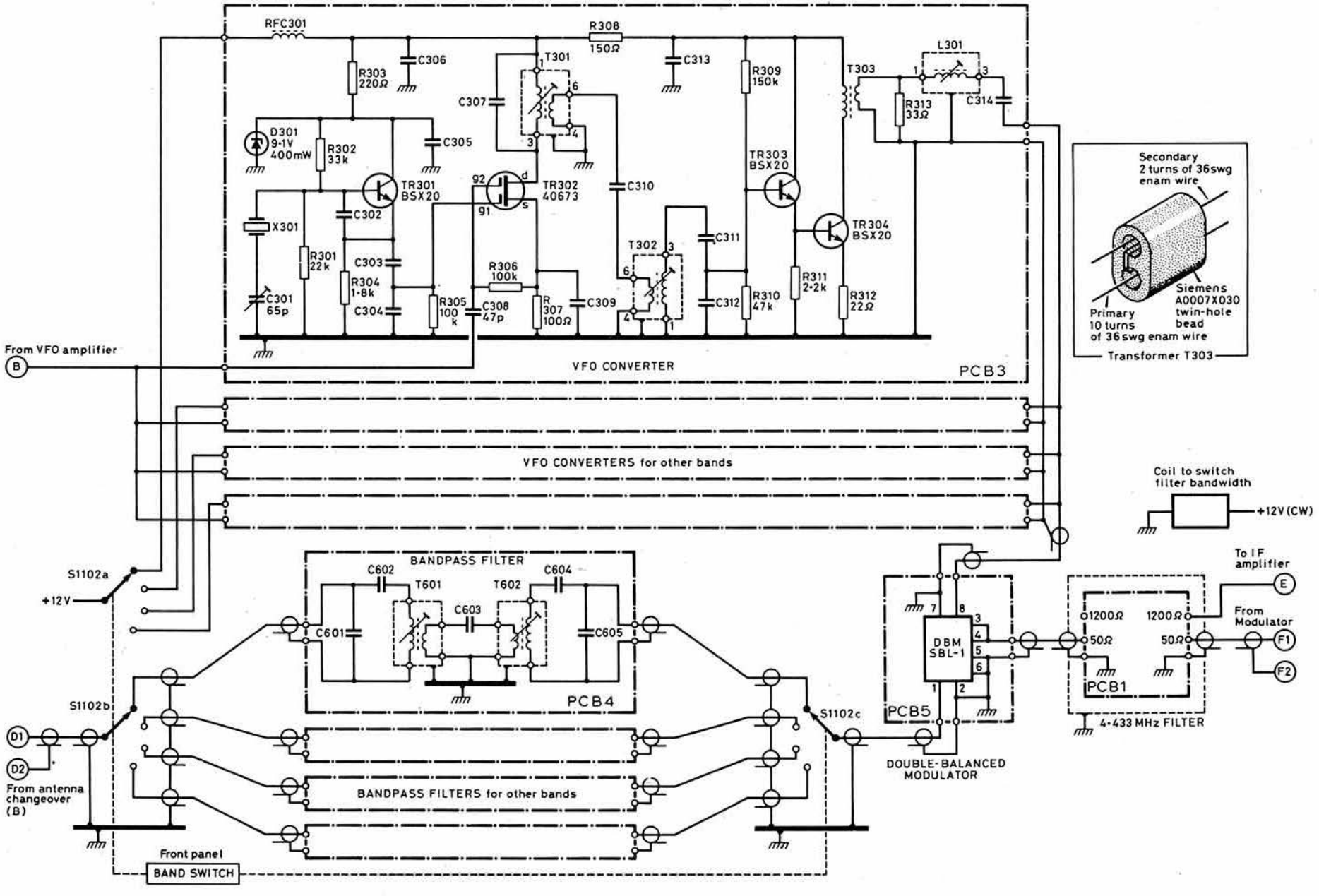


Fig 7. Circuit of the vfo converter, bandpass filter and dbm modules, showing the interconnections between these, the associated switching and the connections to the 4,433kHz filter

COMPONENTS LIST FOR BASIC RECEIVER

PCB1

C101, 105, 107, 109,114	27pF scp
C102, 113	82pF scp
C103, 111	22pF scp
C104, 112	120pF scp
C106, 108, 110	150pF scp
R101	1·2kΩ
R102	10kΩ sp(h)
T101, 102	Wound with 36swg enam wire on Siemens A0007X030 twin-hole bead (Electrovalue)
L101	3R, see Fig 8
X101-107	4·433619MHz colour-tv crystals, HC18U base, spec 128 (Cirkit Holdings plc), see Table 2
S101-109	Reed switches, length of glass pod not exceeding 28mm (C.R. Supply Co)

PCB2 and PCB2A

C201	150pF sm
C202	220pF sm
C203-204	2-20pF min air-spaced trimmer (see text)
C205	2-22pF Mullard min film dielectric trimmer (nominal temp coeff −350ppm/°C) (Maplin Electronic Supplies)
C206	6·8pF scp
C207	22pF scp
C208	47pF scp
C209, 211, 213, 214, 215	10nF mylar
C210	680pF polystyrene
C212	1nF mylar
R201, 210	47kΩ
R202, 205	100kΩ
R203	1kΩ sp(h)
R204	330Ω
R206	1kΩ
R207	12kΩ
R208	820Ω
R209	150Ω
R211	270Ω
D201	BA102
D202	6·8V 400mW zener
TR201, 202	2N3819
TR203, 204	BSX20
L201	15t 28swg enam wire on 0·25in dia former with 6mm core (eg former type 351 from Maplin Electronic Supplies)
RFC201	470μH, Toko 283AS-471 (Cirkit Holdings plc)

PCB3

	1·8 MHz	3·5 MHz	7 MHz	10 MHz	18 MHz	21 MHz	24 MHz	
C301	65	65	65	65	65	65	65pF	Mullard min film dielectric trimmer (Maplin Electronic Supplies, Electrovalue)
C302	150	330	330	150	150	150	150pF	scp
C303	220	330	330	220	220	220	220pF	scp
C304	1,500	4,700	2,200	1,000	1,000	1,000	680pF	polystyrene
C305	10	68	68	10	10	10	10nF	mylar
C306	10	10	10	10	10	10	10nF	mylar
C307	120	82	150	150	100	68	47pF	scp
C308	47	47	47	47	47	47	47pF	scp
C309	10	68	68	10	10	10	10nF	mylar
C310	100	47	22	150	47	39	22pF	scp
C311	270	150	1,000	330	1,000	1,000	1,000pF	scp
C312	220	180	150	220	100	68	47pF	scp
C313	10	10	10	10	10	10	10nF	mylar
C314	120	68	82	150	47	33	22pF	scp
X301	3,535	1,635	1,865	4,000	4,000	7,000	10,700kHz	HC18U or HC33U
L301	4R	4R	4R*	4R	4R*	4R*	4R*	See Fig 8. Pins 2, 4 and 6 cut off
T301, 302	4R	4R	5R	4R	5R	5R	5R	See Fig 8

T303	Wound with 36swg enam wire on Siemens A0007X030 twin-hole bead (Electrovalue)
RFC301	2·5t 34swg enam wire on ferrite antiparasitic bead
R301	22kΩ
R302	33kΩ
R303	220Ω
R304	1·8kΩ
R305, 306	100kΩ
R307	100Ω
R308	150Ω
R309	150kΩ
R310	47kΩ
R311	2·2kΩ
R312	22Ω
R313	33Ω
D301	9·1V 400mW zener
TR301, 303, 304	BSX20
TR302	40673

PCB3/14

C401	10nF mylar
C402,403	47pF scp
R401	150Ω
R402	150kΩ
R403	47kΩ
R404	2·2kΩ
R405	22Ω
R406	33Ω
L401	4R (see Fig 8). Pins 2, 4 and 6 cut off
T401	As T3 on PCB3
TR401, 402	BSX20

PCB3/28

C501, 504	22pF scp
C502, 505, 510, 511, 514, 516, 519	10nF mylar
C503, 506	2-22pF Mullard mini film dielectric trimmer (Maplin Electronic Supplies, Electrovalue)
C507	150pF scp
C508, 509	330pF scp
C512, 518	39pF scp
C513	47pF scp
C515	15pF scp
C517	1nF scp
C520	33pF scp
R501, 502, 513, 514	2·2kΩ
R503	33kΩ
R504	22kΩ
R505	1·8kΩ
R506	220Ω
R507, 508	100kΩ
R509	100Ω
R510	150Ω
R511	150kΩ
R512	47kΩ
R515	22Ω
R516	33Ω
D501, 502	BA243
D503	9·1V 400mW zener
TR501, 503, 504	BSX20
TR502	40673
L501	5R (see Fig 8). Pins 2, 4 and 6 cut off
T501, 502	5R (see Fig 8)
T503	as for PCB3
RFC501	2·5t 34swg enam wire on ferrite antiparasitic bead
RFC502, 503	6t 34swg enam wire on ferrite antiparasitic bead
X501, 502	Frequencies dependent on band sectors required, see Table 1. Can type HC18U

PCB4

	1·8 MHz	3·5 MHz	7 MHz	10 MHz	14 MHz	18 MHz	21 MHz	24 MHz	28 MHz	
C601, 605	1,500	330	1,200	680	470	1,000	680	470	470pF	polystyrene
C602, 604	180	47	100	56	22	68	56	27	39pF	scp
C603	1,000	470	100	39	47	39	39	22	39pF	scp
T601, 602	3R	3R	4R	4R	4R	5R	5R	5R	5R	See Fig 8

PCB5

DBM	SBL-1 (Cirkit Holdings Ltd)

PCB6

C701	56pF scp
C702	33pF scp
C703, 704, 705, 706, 709, 710, 711, 714, 719, 722	10nF mylar
C707, 712	270pF scp
C708, 713	100pF scp
C715	47μF 16V s/ee
C716	10pF scp
C717	33pF scp
C718	10μF 16V s/ee
C720	68nF mylar
C721	22nF mylar
R701, 711	2·2kΩ
R702, 706, 708, 713, 717, 719	100Ω
R703, 710, 715	10kΩ
R704, 709	47kΩ
R705, 712	3·3kΩ
R707, 714	220Ω
R716	100kΩ
R718	1·5kΩ
R720	1kΩ
L701	3R (see Fig 8)
L702, 703	4R (see Fig 8)
D701, 702	2·7V 400mW zener
TR701, 702, 703	40673

PCB7

C801	33nF mylar
C802	180pF scp
C803, 804, 806	68nF mylar
C805	100pF scp
C807, 809	47μF 16V s/ee
C808	10μF 16V low-leakage s/ee (or tantalum)
R801, 806	10kΩ

R802	330kΩ	R813	1·5kΩ
R803, 812	1kΩ	R814	2·2kΩ
R804	100kΩ	R815	22kΩ
R805	100kΩ sp(h)	D801, D802	OA47
R807, 809	1MΩ	D803	5·6V 400mW zener
R808	3·3kΩ	TR801, 802, 805	BC549C
R810	100Ω	TR803	2N3189
R811	680Ω	TR804	BC558C

PCB8

C901	10nF mylar	R901	10kΩ
C902	4·7μF 50V s/ee	R902	2·7Ω
C903	100nF mylar	IC901	LM380
C904	470μF 16V s/ee		

PCB9

C1001, 1002	5·5-65pF Mullard mini film dielectric trimmer (Maplin Electronic Supplies, Electrovalue etc)
C1003, 1006, 1007	10nF mylar
C1004	150pF scp
C1005	220pF scp
R1001	220Ω
R1002	47kΩ
R1003	33kΩ
R1004	100Ω
R1005	1·8kΩ
R1006	470Ω
D1001	9·1V 400mW zener
TR1001, 1002	BC549C
L1001	47μH, Toko 283AS-470 (Cirkit Holdings plc)
X1001	4·433619MHz tv-colour crystal (see Table 2)

Front panel controls

R1101 (RF GAIN)	10kΩ lin potentiometer
R1102 (AF GAIN)	10kΩ log potentiometer
R1103 (FINE TUNE)	22kΩ lin potentiometer
R1104* (RIT)	100kΩ log potentiometer
R1105* (TX OUTPUT)	10kΩ lin potentiometer
S1101 (SECTOR)	Three-pole four-way rotary
S1102 (BAND)	Three-pole four-way rotary
S1103 (MODE)	Six-pole two-way rotary

Other components not on pcbs

C1102	56pF sm
C1102	75pF tuning capacitor. See text
C1103, 1104, 1105, 1106, 1107	1nF feedthrough
C1108	100μF 16V single-ended electrolytic
R1106*	100kΩ (connected across outer terminals of R1104)
RLA	Reed relay, 1 make contact, 12V coil. See text of Part 3
S-meter	100μA, approximately 50 by 45mm
L.e.ds, sockets, spare switch	See text of Part 3

Notes on components specified

10nF capacitors. For simplicity mylar types are used for both af and rf applications. If required, ceramic capacitors of suitably small dimensions could be used in the rf decoupling applications, where they would be marginally superior.

40673 dual-gate mosfet. The following alternatives were found to be cheaper, but perfectly satisfactory: (a) 3SK51 (Cirkit Holdings plc); (b) "dual-gate mosfets like 40673" (J. Birkett).

Capacitor types: scp = sub-min ceramic plate; sm = silvered mica; s/ee = single-ended electrolytic.

Resistors: All 0·25W unless otherwise stated; sp(h) = sub-min preset (horizontal).

*These items are not used until the transmitting facilities are added

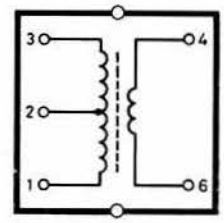


Fig 8. Details of the Toko coils used. Pin connections are shown looking at base of coil

Code used by author	Toko Type No	Nominal inductance (μH) pin 1-pin 3
3R	KANK3333R	45
4R	KANK3334R	5·5
5R *	KANK3335R	1·2

Internal ferrite cup removed (to reduce inductance by approximately 50 per cent)

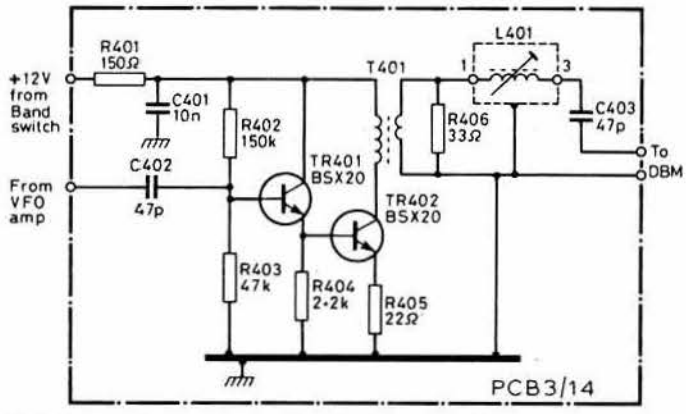


Fig 9. Special vfo converter for the 14MHz band. No frequency conversion is required and there is just the amplifier to drive the dbm

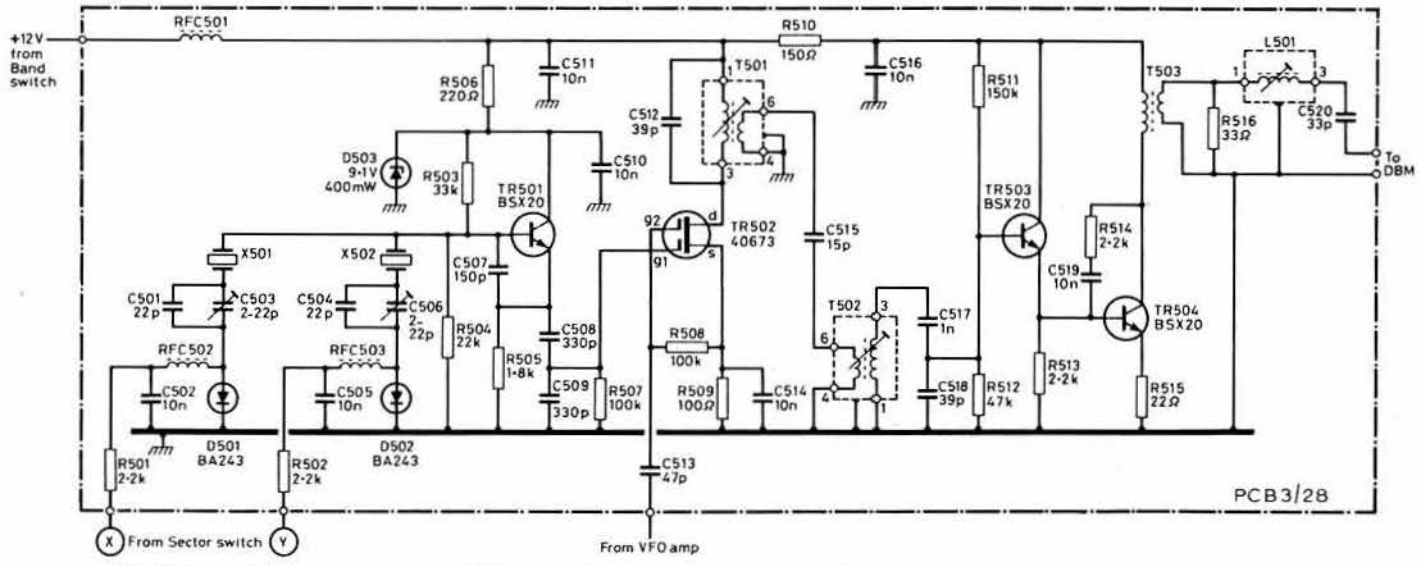
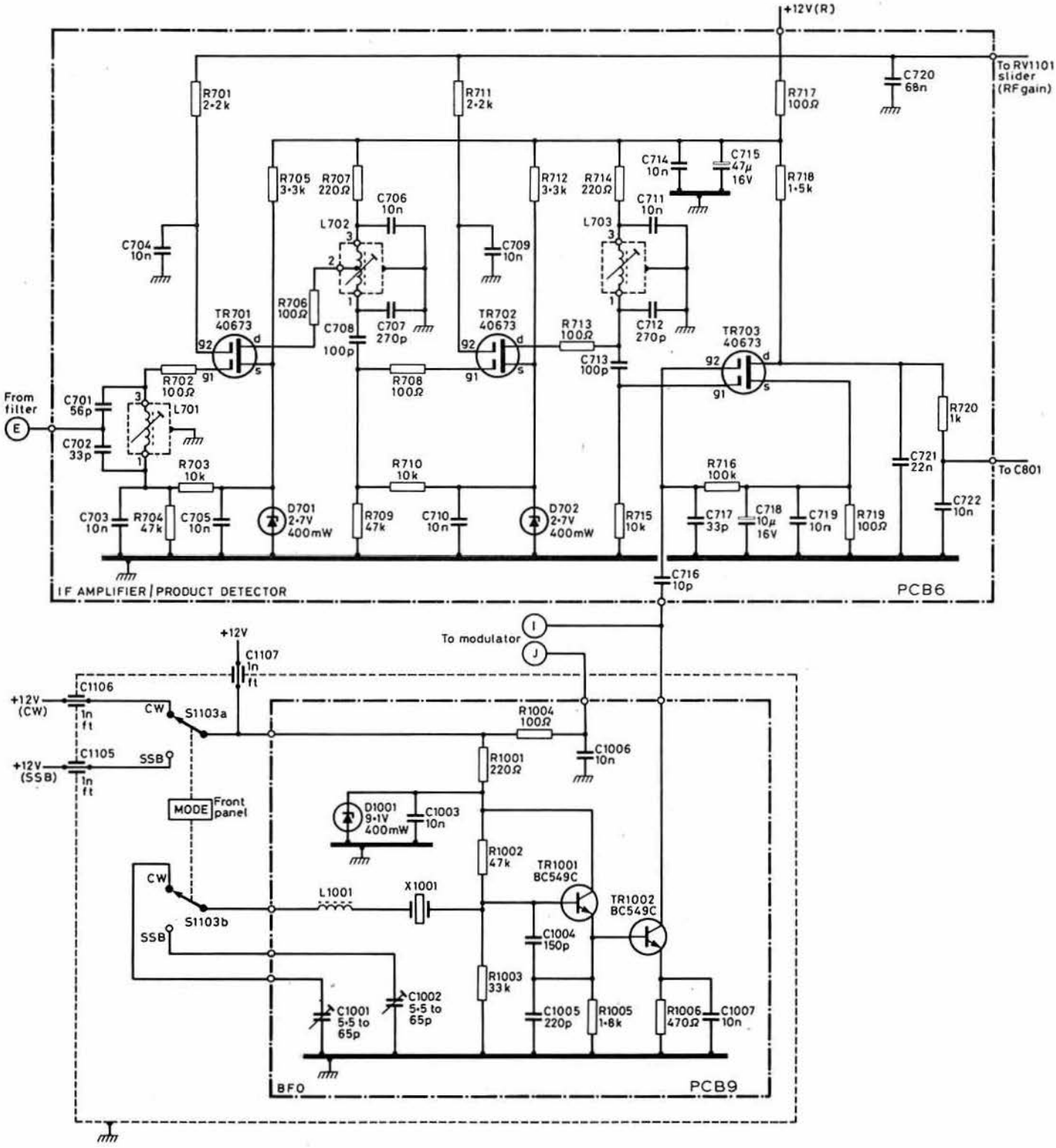


Fig 10. Special vfo converter for the 28MHz band. The crystal oscillator is switched to give an additional 400kHz frequency coverage



Suppression of unwanted mixer products

One difficulty often encountered with rf mixers, particularly unbalanced ones, is the rejection of unwanted mixer products. In general, satisfactory rejection has been obtained in the vfo converters. The exception is the converter for the 24MHz band. Here the second harmonics of the two mixer inputs are only about 1MHz from the wanted sum frequency, and are not really attenuated sufficiently by T301, T302 and L301. Some further unwanted signal rejection is given after the dbm by the bandpass filter, and this, together with a suitable antenna tuner and/or a tuned linear amplifier, can give an acceptable, if not exceptional, suppression of the unwanted signals. However, I intend later to consider an alternative improved design for the 24MHz vfo converter.

It will be seen from Table 1 that, in the vfo converters for 21MHz and 28MHz(a), a harmonic of the crystal oscillator frequency falls at the lower band edge. This gives an audible spurious input to the receiver (which can be used as a calibration check) but it does not result in any significant spurious emission from the transmitter.

I.F. amplifier and product detector

Fig 11 shows the remaining modules needed to complete the basic receiver. The i.f. amplifier (PCB6) uses two dual-gate mosfets and is followed by a third which is used as a product detector. TR701 and TR702 both have the source at +2·7V and gate 1 at +2·2V (ie −0·5V with respect to the source). The i.f. gain is controlled by varying the gate-2 potential from

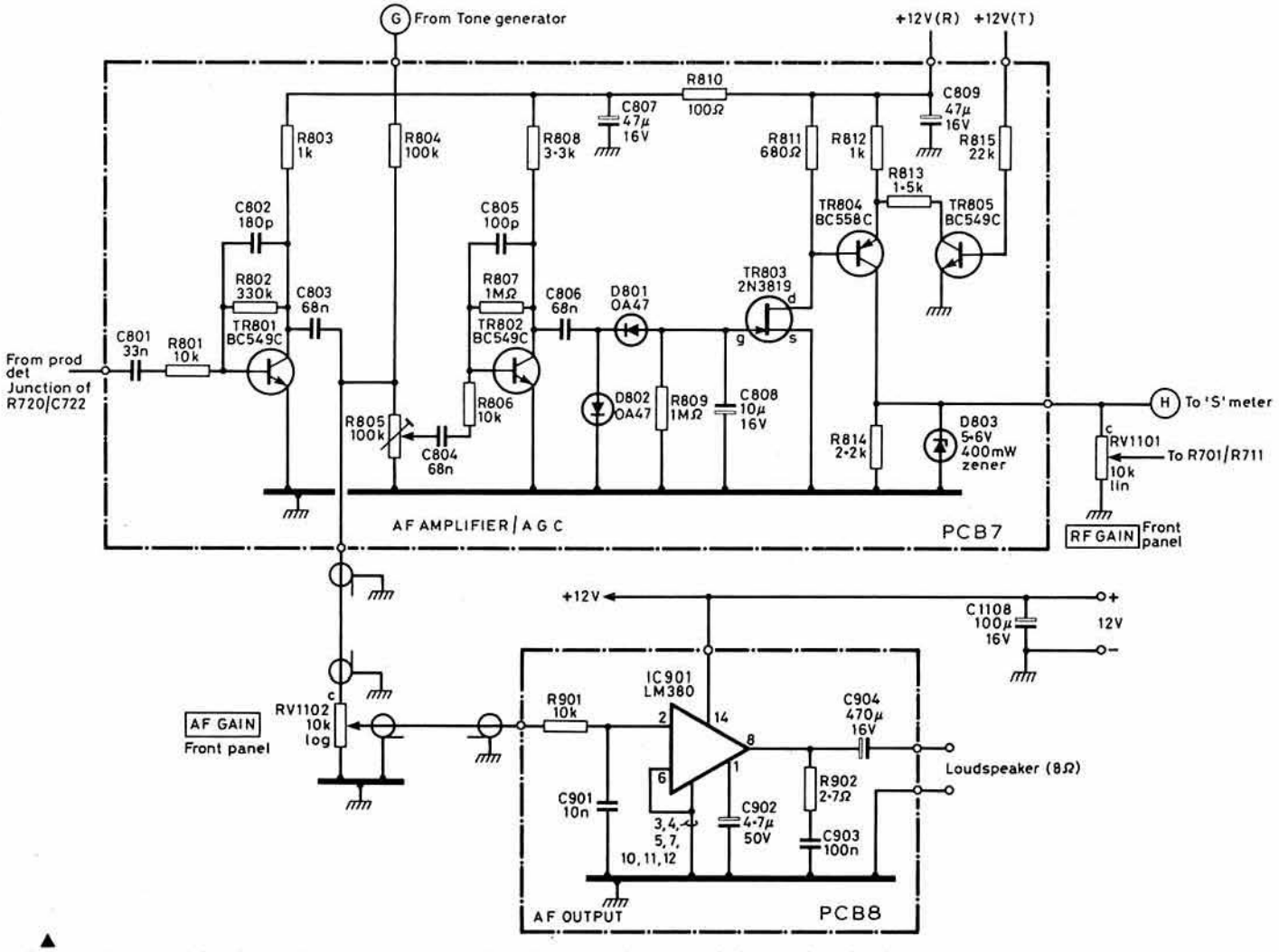


Fig 11. Circuits of the i.f. amplifier/product detector, af amplifier/agc, af output and bfo modules, showing interconnections. The "c" on a potentiometer indicates the terminal which is connected to the slider when the control is turned fully clockwise

+5·6V to 0V (ie from +2·9V to −2·7V with respect to the source). It would be possible to achieve a slightly higher gain by taking gate 2 up to +4V with respect to the source. However, the increase in gain would not be very significant, and the agc characteristic would suffer because it would then require a change of over 1V on the agc line before any appreciable reduction in gain started to take place.

BFO

The 4,433kHz input to gate 2 of the product detector comes from the bfo (PCB9). In the completed transceiver points (I) and (J) go to an rf transformer in the modulator. With the modulator not fitted, it is necessary to connect an rf choke between (I) and (J).

The bfo consists of a crystal oscillator, TR1001, and an amplifier stage, TR1002. The required bfo frequencies are approximately 4,432·7kHz for ssb and 4,432·3kHz for cw. These frequencies are close to, or slightly below, the series resonant frequency of the crystal, and in order to obtain them it is necessary to add some inductance (L1001) in series with the crystal.

AF stages and agc

The af amplifier/agc module (PCB7) contains one stage of af amplification, TR801, and the agc circuitry, TR802, TR803, TR804. With no signal being received TR803 conducts and keeps TR804 conducting. Thus the voltage across R814 is maintained at 5·6V by the zener diode. D803, and provided that the RF GAIN control is set at maximum, the agc line is maintained at +5·6V. TR802 amplifies any af output from TR801, and the rectifier circuit, D801 and D802, produces a proportional negative voltage at the gate of TR803. This reduces the drain current of TR803 and hence the collector current of TR804. Once the collector current of TR804 falls below a certain threshold value, the zener diode stops conducting and the agc voltage starts to fall below +5·6V, thus reducing the gain of the i.f. amplifier. R805 controls the amplitude of the af signal presented to the agc stage, and thus has the effect of controlling the threshold at which the agc starts to operate. The RF GAIN control gives an over-riding control of the agc line. The capacitor C808 gives the agc a slow decay.

TR805 has been added to provide fast muting of the receiver when switching to TRANSMIT. Immediately the "+12V(T)" line is energized, TR805 is switched into conduction, cutting off TR804 and bringing the agc line down smartly to 0V. Point (G) is only used when transmitting cw. It allows the af sidetone to be fed in from the cw tone generator.

An inexpensive ic which requires little external circuitry, the LM380, is used for the output stage (PCB8). The components C902, C903 and R902 are added to ensure stable operation, but they may not always be found necessary.

Some tailoring of the af response has been included. C721 on PCB6, C802 on PCB7, and C901 on PCB8 provide a high frequency cut-off above about 3kHz. C801 and C803 on PCB7 provide a low frequency cut-off below about 300Hz. When receiving cw it would give some advantage to have a somewhat narrower af bandwidth—but this can be a later refinement.

On/off switch

No specific provision has been made in the basic transceiver for an on/off switch, the intention being that eventually the switch on the linear amplifier unit will also switch the dc input to the transceiver. However, there is a spare switch provided for possible future enhancements. This switch could be used if desired or a potentiometer with a switch could be used for the AF GAIN control.

To be continued

Part 3 will give constructional details necessary to build the basic receiver.

G5RV MULTIBAND ANTENNA... UP-TO-DATE

by Louis Varney, CEng, MIEE, AIL, G5RV*

Louis Varney became interested in "wireless" in 1922 when 11 years old. Obtained "artificial aerial" licence 2ARV in 1928, then G5RV in 1929. DXCC No 64 in 1932. Founder member, FOC, 1947. Founder member, RAOTA (UK). Member RAOTC (Australia). Member of RSGB Council mid-'sixties. Author of many articles published by RSGB on tvi suppression, transmitter design and antenna systems. Designed G5RV multi-band antenna 1946. Joined Marconi W T Co Ltd, 1930. Served in Royal Corps of Signals during second world war. Consulting engineer (telecoms), 1960-76. Speaks and writes French, Spanish, Italian and Portuguese. Hobbies: amateur radio, oil painting, horse riding and haute cuisine (learned while working in Paris). Has visited or lived in some 75 countries and has held licences or operated as guest operator in 55. President-for-life, Mid-Sussex ARS.

THE G5RV ANTENNA, with its special feeder arrangement, is a multiband centre-fed antenna capable of very efficient operation on all hf bands from 3·5 to 28MHz, specifically designed with dimensions which allow it to be installed in gardens which can accommodate a reasonably-straight run of about 102ft (31·1m) for the "flat-top". However, because the most useful radiation from a horizontal or inverted-V resonant antenna takes place from the centre two-thirds of its total length, up to one-sixth of this total length at each end of the antenna may be dropped vertically, semi-vertically, or bent at some convenient angle to the main body of the antenna without significant loss of effective radiation efficiency. For installation in a very limited space, the dimensions of both the "flat-top" and the matching section can be divided by a factor of two to make the half-size G5RV, which is a very efficient antenna from 7 to 28MHz. The full-size G5RV will also function on the 1·8MHz band if the station end of the feeder (either balanced or coaxial-type) is strapped and fed by a suitable astu using a good earth connection or a counterpoise wire. Similarly, the half-size version may be used thus on the 3·5 and 1·8MHz bands.

In contradistinction to multiband antennas in general, the full-size G5RV antenna was *not* designed as a λ/2 dipole on the lowest frequency of operation, but as a 3λ/2 centre-fed long-wire antenna on 14MHz, where the 34ft (10·36m) open-wire matching section functions as a 1:1 impedance transformer, enabling the 75Ω twinlead or 50/80Ω coaxial cable feeder to "see" a close impedance match on that band with a consequently low vswr on the feeder. However, on all the other hf bands the function of this section is to act as a "make-up" section to accommodate that part of the standing-wave (current and voltage components) which, on certain of the operating frequencies, cannot be completely accommodated on the "flat-top" (or inverted-V) radiating portion. The design centre frequency for the full-size version is 14,150kHz, and the dimension of 102ft (31·1m) is derived from the formula for long-wire antennas which is:

$$\text{Length (ft)} = \frac{492\ (n - 0{\cdot}05)}{f\text{MHz}} = \frac{492 \times 2{\cdot}95}{14{\cdot}15} = 102{\cdot}57\text{ft}\ (31{\cdot}27\text{m})$$

where n = number of half-wavelengths of the wire (flat-top).
In practice, since the whole system will be brought to resonance by the use of an astu, the antenna is cut to 102ft (31·1m).

As it does not make use of traps or ferrite beads, the "dipole" portion becomes progressively longer in electrical length with increasing frequency. This effect confers certain advantages over a trap or ferrite-bead loaded dipole because, with increasing electrical length, the major lobes of the vertical component of the polar diagram tend to be lowered as the operating frequency is increased. Thus, from 14MHz up, most of the energy radiated in the vertical plane is at angles suitable for dx working. Furthermore, the polar diagram changes with increasing frequency from a typical λ/2 dipole pattern at 3·5MHz and a 2 × λ/2 in-phase pattern at 7 and 10MHz to that of a "long-wire" antenna at 14, 18, 21, 24 and 28MHz.

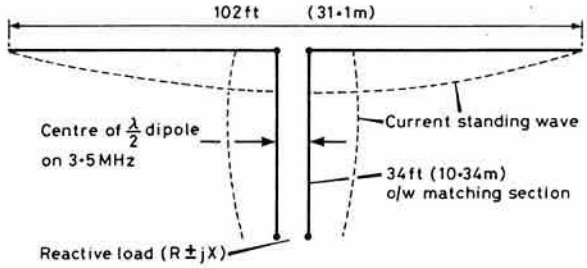


Fig 1. Current standing-wave distribution on the G5RV antenna and matching section at 3·5MHz. The antenna functions as a λ/2 dipole partially folded up at the centre

Although the impedance match for 75Ω twinlead or 80Ω coaxial cable at the base of the matching-section is very good on 14MHz, and even the use of 50Ω coaxial cable results in only about a 1·8:1 vswr on this band, the use of a suitable astu is necessary on all the other hf bands because, on those bands, the antenna plus the matching-section will present a *reactive* load to the feeder. Thus, the use of the correct type of astu (unbalanced input to balanced output if twin-wire feeder is used, or unbalanced to unbalanced if coaxial feeder is used) is essential in order to ensure the maximum transfer of power to the antenna from a typical transceiver having a 50Ω coaxial (unbalanced) output. Also to satisfy the stringent load conditions demanded by such modern equipment employing an alc system which "senses" the vswr condition presented to the solidstate transmitter output

*82 Folders Lane, Burgess Hill, W Sussex RH15 0DX.

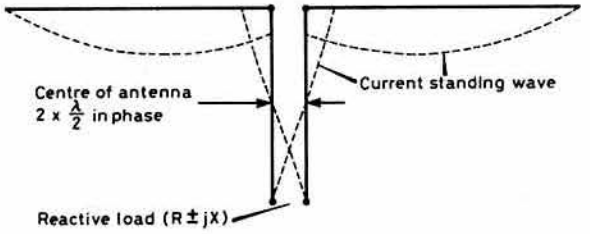


Fig 2. Current distribution on the antenna and matching section on 7MHz. The antenna now functions as a colinear array with two half-waves fed in phase

stage so as to protect it from damage which could be caused by a reactive load having a vswr of more than about 2:1[1].

The above reasoning does not apply to the use of the fullsize G5RV antenna on 1·8MHz, or to the use of the half-size version on 3·5 and 1·8MHz. In these cases the station end of the feeder conductors should be "strapped" and the system tuned to resonance by a suitable series-connected inductance and capacitance circuit connected to a good earth or counterpoise wire. Alternatively, an "unbalanced-to-unbalanced" type of astu such as a "T" or "L" matching circuit can be used[2]. Under these conditions the "flat-top" (or inverted-V) portion of the antenna plus the matching section and feeder function as a "Marconi" or "T" antenna, with most of the effective radiation taking place from the vertical, or near vertical, portion of the system; the "flat-top" acting as a top-capacitance loading element. However, with the system fed as described above, very effective radiation on these two bands is obtainable even when the "flat-top" is as low as 25ft (7·6m) above ground.

Theory of operation

The general theory of operation has been explained above; the detailed theory of operation on each band from 3·5 to 28MHz follows, aided by figures showing the current standing wave conditions on the "flat-top" and the matching (or make-up) section. The relevant theoretical horizontal plane polar diagrams for each band may be found in any of the specialized antenna handbooks. However, it must be borne in mind that: (a) the polar diagrams generally shown in two dimensional form are, in fact, three dimensional (ie solid) figures around the plane of the antenna; and (b) all theoretical polar diagrams are modified by reflection and absorption effects of near-by conducting objects such as wire fences, metal house guttering, overhead electric power and telephone wires, house electric wiring systems, house plumbing systems, metal masts and guy wires, and large trees. Also the local earth conductivity will materially affect the actual polar radiation pattern produced by an antenna. Theoretical polar diagrams are based on the assumptions that an antenna is supported in "free space" above a perfectly conducting ground. Such conditions are obviously impossible of attainment in the case of typical amateur installations. What this means in practice is that the reader should not be surprised if *any* particular antenna in a typical amateur location produces contacts in directions where a null is indicated in the theoretical polar diagram and perhaps not sucn effective radiation in the directions of the major lobes as theory would indicate.

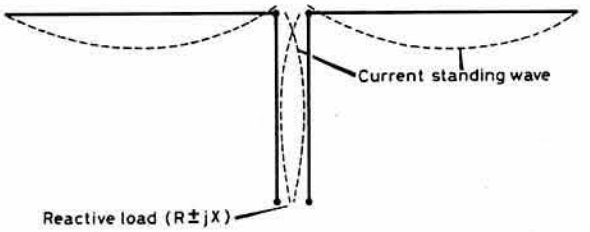


Fig 3. Current standing-wave distribution on the antenna and matching section on 10MHz. The antenna functions as a colinear array with two half-waves fed in phase

3·5MHz. On this band each half of the "flat-top" plus about 17ft (5·18m) of each leg of the matching-section forms a fore-shortened or slightly folded up λ/2 dipole. The remainder of the matching-section acts as an unwanted but unavoidable reactance between the *electrical* centre of the dipole and the feeder to the astu. The polar diagram is effectively that of a λ/2 antenna. See Fig 1.

7MHz. The "flat-top" plus 16ft (4·87m) of the matching section now functions as a partially-folded-up "two half-waves in phase" antenna producing a polar diagram with a somewhat sharper lobe pattern than a λ/2 dipole due to its colinear characteristics. Again, the matching to a 75Ω twinlead or 50/80Ω coaxial feeder at the base of the matching section is degraded somewhat by the unwanted reactance of the lower half of the matching section but, despite this, by using a suitable astu the system loads well and radiates very effectively on this band. See Fig 2.

10MHz. On this band the antenna functions as a two half-wave in-phase colinear array, producing a polar diagram virtually the same as on 7MHz. A reactive load is presented to the feeder at the base of the matching section but, as for 7MHz, the performance is very effective. See Fig 3.

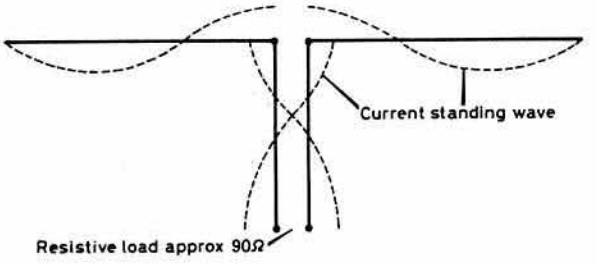


Fig 4. Current standing-wave distribution on the antenna and matching section on 14MHz. In this case the antenna functions as a centre-fed long-wire of three half-waves *out of phase*. The matching section now functions as a 1:1 impedance transformer, presenting a resistive load of approximately 90Ω at the lower end

14MHz. At this frequency the conditions are ideal. The "flat-top" forms a 3λ/2 long centre-fed antenna which produces a multi-lobe polar diagram with most of its radiated energy in the vertical plane at an angle of about 14°, which is very effective for dx working. Since the radiation resistance at the centre of a 3λ/2 long-wire antenna supported at a height of λ/2 above ground of average conductivity is about 90Ω, and the 34ft (10·36m) matching section now functions as a 1:1 impedance transformer, a feeder of anything between 75 and 80Ω characteristic impedance will "see" a non-reactive (ie resistive) load of about this value at the base of the matching section, so that the vswr on the feeder will be very nearly 1:1. Even the use of 50Ω coaxial feeder will result in a vswr of only about 1·8:1. It is here assumed that 34ft (10·36m) is a reasonable average antenna height in amateur installations. See Fig 4.

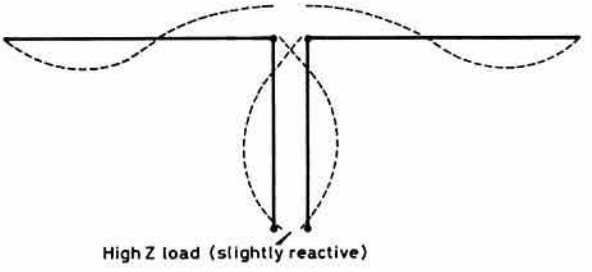


Fig 5. Current standing-wave distribution on the antenna and matching section on 18MHz. The antenna functions as two full-wave antennas, slightly folded up at the centre, fed in phase

18MHz. The antenna functions as two full-wave antennas fed in phase; combining the broadside gain of a two-element colinear array with somewhat lower zenithal angle radiation than a λ/2 dipole due to its long-wire characteristic. See Fig 5.

21MHz. On this band the antenna works as a "long-wire" of five half-waves, producing a multilobe polar diagram with very effective low zenithal angle radiation. Although a high resistive load is presented to the feeder at the base of the make-up section, the system loads very well when used in conjunction with a suitable astu and radiates very effectively for dx contacts. See Fig 6.

24MHz. The antenna again functions effectively as a 5λ/2 "long-wire" but, because of the shift in the positions of the current anti-nodes on the flat-top and the matching section, as may be seen from Fig 7, the matching or "make-up" section now presents a much lower resistive load condition to the feeder connected to its lower end than it does on 21MHz. Again, the polar diagram is multilobed with low zenithal angle radiation.

28MHz. On this band, the antenna functions as two "long-wire" antennas, each of three half-waves, fed in-phase. The polar diagram is similar to that of a 3λ/2 "long-wire" but with even more gain over a λ/2 dipole due to the colinear effect obtained by feeding two 3λ/2 antennas, in line and in close proximity, in-phase. See Fig 8.

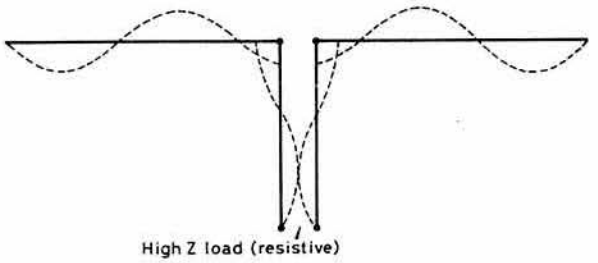


Fig 6. Current standing-wave distribution on the antenna and matching section on 21MHz. On this band the antenna works as a long-wire of five half-waves. The base of the matching section presents a virtually non-reactive high impedance load to the feeder

Construction

The antenna

The dimensions of the antenna and its matching section are shown in Fig 9. The "flat-top" should, if possible, be horizontal and run in a straight line, and should be erected as high as possible above ground. In describing the theory of operation, it has been assumed that it is generally possible to erect the antenna at an average height of about 34ft (10·36m), which happens to be the optimum height for the antenna at 14MHz. Although this is too low for optimum radiation efficiency on 1·8, 3·5 and 7MHz for *any* horizontal type of antenna, in practice few amateurs can install masts of the optimum height of half a wavelength at 3·5 or 7MHz, and certainly not at 1·8MHz.

If, due to limited space available, or to the shape of the garden, it is not possible to accommodate the 102ft (31·1m) top in a straight line, up to about 10ft (3m) of the antenna wire at each end may be allowed to hang vertically or at some convenient angle, or be bent in the horizontal plane, with little practical effect upon performance. This is because, for any resonant dipole antenna, most of the effective radiation takes place from the centre two-thirds of its length where the current antinodes are situated. Near to each end of such an antenna, the amplitude of the current standing wave falls rapidly to zero at the outer extremities; consequently, the effective radiation from these parts of the antenna is minimal.

The antenna may also be used in the form of an inverted-V. However, it should be borne in mind that, for such a configuration to radiate at maximum efficiency, the included angle at the apex of the V should not be less than about 120°[3]. The use of 14swg enamelled copper wire is recommended for the flat-top or V, although thinner gauges such as 16 or even 18swg can be used.

The matching section

This should be, preferably, of open-wire feeder construction for minimum loss. Since this section *always* carries a standing-wave of current (and voltage) its actual impedance is unimportant. A typical, and very satisfactory, form of construction is shown in Fig 10. The feeder spreaders may be made of any high-grade plastic strips or tubing; the clear plastic tubing sold for beer or wine syphoning is ideal.

If it is desired to use 300Ω ribbon type feeder for this section, it is strongly recommended that the type with "windows" be used because of its much lower loss than that with solid insulation throughout its length, and its relative freedom from the "detuning" effect caused by rain or snow. If this type of feeder is used for the matching section, allowance must be made for its velocity factor (vf) in calculating the mechanical length required to resonate as a half-wave section *electrically* at 14·15MHz. Since the vf of standard 300Ω ribbon feeder is 0·82, the *mechanical* length should be 28ft (8·5m). However, if 300Ω ribbon with "windows" is used, its vf will be almost that of open-wire feeder, say 0·90, so its *mechanical* length should be 30·6ft (9·3m). (300Ω ribbon feeder with "windows" is available from W. H. Westlake, Clawton, Holsworthy, Devon; Type BOFA GMP6.)

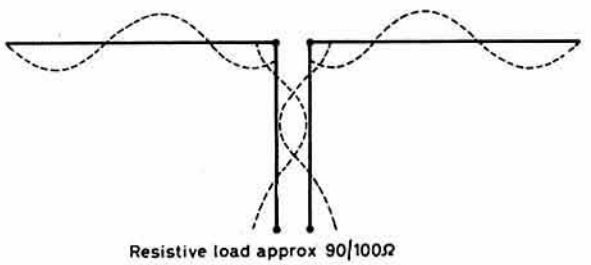


Fig 7. Current standing-wave distribution on the antenna and matching section on 24MHz. The antenna functions as a long-wire of five half-waves

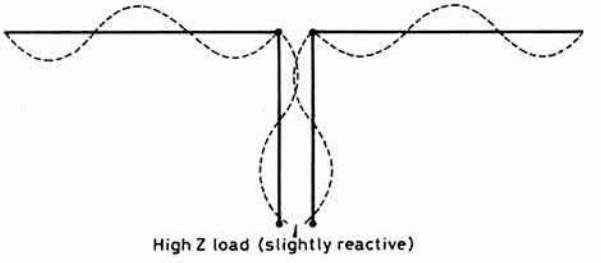


Fig 8. Current standing-wave distribution on the antenna and matching section on 28MHz. The antenna functions as two long-wire antennas each of three half-waves long, fed in phase. A very effective form of antenna giving good multi-lobe, low zenithal angle, radiation

This section should hang vertically from the centre of the antenna for at least 20ft (6·1m) or more if possible. It can then be bent and tied off to a suitable post with a length of nylon or terylene cord so as to be supported at above head-height to the point where, supported by a second post, its lower end is connected to the feeder.

The feeder

The antenna can be fed by any convenient type of feeder *provided always that a suitable type of astu is used.* In the original article describing the G5RV antenna, published in the, then, *RSGB Bulletin* November 1966, it was suggested that if a coaxial cable feeder was used, a balun might be employed to provide the necessary unbalanced-to-balanced transformation at the base of the matching section. This was because the antenna and its matching section constitute a *balanced* system, whereas a coaxial cable is an *unbalanced* type of feeder. However, later experiments and a better understanding of the theory of operation of the balun indicated that such a device was unsuitable because of the highly reactive load it would "see" at the base of the matching or "make-up" section on most hf bands.

It is now known that if a balun is connected to a reactive load presenting a vswr of more than about 2:1, its internal losses increase, resulting in heating of the windings and saturation of its core (if used). In extreme cases, with relatively high power operation, the heat generated due to the power dissipated in the device can cause it to burn out. However, the main reason for not employing a balun in the case of the G5RV antenna is that, unlike an astu which employs a *tuned circuit*, the balun cannot compensate for the reactive load condition presented to it by the antenna on most of the hf bands, whereas a suitable type of astu can do this most effectively and efficiently.

Recent experiments by the author to determine the importance or otherwise of "unbalance" effects caused by the direct connection of a coaxial feeder to the base of the matching section had a rather surprising result. They proved that, in fact, the hf currents measured at the junction of the inner conductor of the coaxial cable with one side of the (balanced) matching section and at the junction of the outer coaxial conductor (the sheath) with the other side of this section are virtually *identical* on all bands up to 28MHz, where a slight but inconsequential difference in these currents has been observed. There is, therefore, no need to provide an unbalanced-to-balanced device at this junction when using a coaxial feeder.

However, the use of an *unbalanced-to-unbalanced* type of astu between the coaxial output of a modern transmitter (or transceiver) and the coaxial feeder is essential because of the reactive condition presented at the station end of this feeder which, on all but the 14MHz band, will have a fairly high to high vswr on it. This vswr, however, will result in insignificant losses on a good-quality coaxial feeder of reasonable length; say, up to about 70ft (21·3m). Because it will, inevitably, have standing waves on it, the actual characteristic impedance of the coaxial cable is unimportant, so that either 50Ω or 80Ω type can be used.

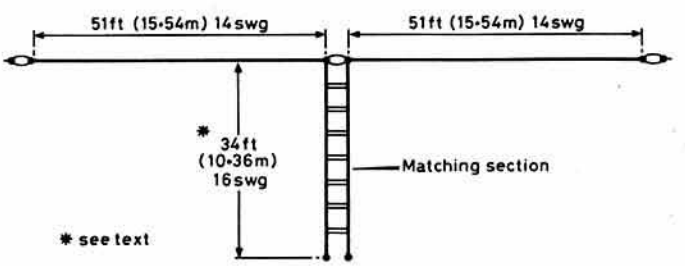


Fig 9. Construction dimensions of the G5RV antenna and matching section

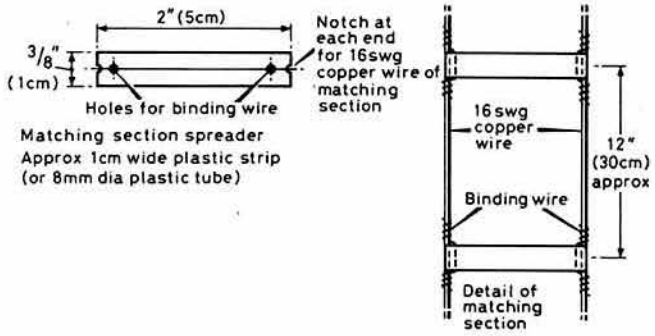


Fig 10. Constructional details of the matching section. Also suitable for open-wire feeder construction

Another very convenient type of feeder that may be used is 75Ω twinlead. However, because of the relatively high loss in this type of feeder at frequencies above about 7MHz, especially when it has a high vswr on it, it is recommended that not more than about 50 to 60ft (15·2 to 18·3m) of this type of feeder be used between the base of the matching section and the astu. Unfortunately the 75Ω twinlead available in the UK is the *receiver* type; the much less lossy *transmitter* type is available in the USA.

By far the most efficient feeder is the "open wire" type. A suitable length of such feeder can be constructed in exactly the same way as that described for the open-wire matching section. If this form of feeder is employed, almost any convenient length may be used from the centre of the antenna right to the astu (balanced) output terminals. In this case, of course, the matching section becomes an integral part of the feeder. A particularly convenient length of open-wire feeder is 84ft (25·6m), because such a length permits parallel tuning of the astu circuit on all bands from 3·5 to 28MHz with conveniently located coil taps in the astu coils for each band, or, where the alternative form of astu employing a three-gang 500pF/section variable coupling capacitor is used [4] the optimum loading condition can be achieved for each band. However, this is not a rigid feeder length requirement and almost any length that is mechanically convenient may be used. Since this type of feeder will always carry a standing wave, its characteristic impedance is unimportant, and sharp bends, if necessary, may be used without detriment to its efficiency. It is only when this type of feeder is correctly terminated by a resistive load equal to its characteristic impedance that such bends must be avoided.

Coaxial cable hf choke

Under certain conditions, either due to the inherent "unbalanced-to-balanced" effect caused by the direct connection of a coaxial feeder to the base of the (balanced) matching section, or to pick-up of energy radiated by the antenna, a current may flow on the *outside* of the coaxial *outer conductor*. This is an undesirable condition and may increase chances of tvi to nearby tv receivers. This effect may be considerably reduced, or eliminated, by winding the coaxial cable feeder into a coil of 8 to 10 turns about 6in in diameter immediately below the point of connection of the coaxial cable to the base of the matching section. The turns may be taped together or secured by nylon cord.

It is important, of course, that the junction of the coaxial cable to the matching section be made thoroughly water-proof by any of the accepted methods; binding with several layers of plastic insulating tape or self-amalgamating tape and then applying two or three coats of polyurethane varnish, or totally enclosing the end of the coaxial cable and the connections to the base of the matching section in a sealant such as epoxy resin.

References

[1], [2], [4] "ATU or astu?", by Louis Varney, G5RV. *Rad Com* August 1983.

[3] "HF antennas in theory and practice—a philosophical approach." Louis Varney, G5RV. *Rad Com* September 1981. □

Things to come—A cautionary tale

by LES MITCHELL, G3BHK*

OUR LITTLE GROUP of local ex-service G3 types often meets for a drink in the snug of the old coaching inn down by the riverside. Discussion ranges far and wide, but as one might expect revolves mainly around our wartime experiences and, of course, amateur radio.

Recently someone pointed out that he had not heard Bill on the bands for some time. Bill had obtained his licence immediately after the war and had spent every available moment chasing dx or chatting to his friends on 3·5MHz. Since he retired a few years ago he had spent even more time on the air, and it was very unusual not to hear him working on some band whenever one listened. When we compared notes we suddenly realized that no-one had heard Bill's signal for over six months.

"You live nearest to him," said Joe, "why don't you drop in and see what has happened. Let's hope he is not a silent key, but I am sure we would have heard something if he had passed on."

A few days later I knocked at Bill's door, rather worried that I might be faced by a tearful and grieving widow. The door swung open to reveal Bill with a big grin on his face, and looking fitter than I had ever seen him. Within a short time I was sitting in an armchair with a full glass in my hand and explaining why I had called.

"Well," said Bill, "it is a long story. You see just after I retired a relative of mine died and left me a useful sum of money. As you know, all my rigs were getting quite old, so I jumped at the chance to completely renew all my station equipment.

"First of all I purchased one of those Sky-Gain automatic aperiodic multi-band beams plus the computer controller. This array works on all bands and the computer turns the array to the maximum signal path without any effort on the part of the operator. I mounted this on my old 100ft tower and it was fantastic!

"Then I invested in the very latest transceiver, the Fuji Yama FJ 20,001, which covers all bands 1·8MHz to uhf with full legal power and no tuning whatsoever. To supplement this I also bought two computerized attachments—one which enables you to enter all the call prefixes of the countries you have worked already on each band, and then commands the transceiver to hunt each band in turn and only stops when it hears a new prefix. This unit also allows one to program automatic replies—callsign, signal reports, handle, location and requests to QSL etc. It had an additional program which made automatic calls to any of my friends' callsigns it heard on 3·5 and 7MHz. I had to keep these replies updated with the latest news: you know the sort of thing—the car has gone wrong again, I have just mown the lawn, the rheumatism is painful, the income tax people have overcharged me again, etc.

"The second computer unit was the printout attachment which automatically printed the log entries and produced fully-completed QSL cards. So you see I could just leave the rig on 24h/day and it would work the rare dx and also chat to my mates on 3·5MHz without me going near it except to add more printout paper and blank QSL cards. Apart from a trip to the post office every day to post the QSLs, it left me time for decorating, car cleaning, gardening and after-meal naps.

After it had been on the air continuously for about a month I discovered I had worked every dx station which existed, and even my friends on 3·5MHz were not replying to my calls—I expect they did not like the impersonal touch. Then I suddenly realized that this new rig had utterly and completely destroyed my interest in amateur radio. Even the walk to the post office was boring me, and the parcel post costs were also becoming a strain. So I then made the decision that after nearly 40 years on the air it was time to give up my hobby. I sold the rig, and with the money bought the xyl all the labour saving gadgets I could find—a washing machine, a microwave oven, a food processor, a dishwasher etc. Now she has as much spare time as me so we have taken up golf. It's very relaxing and gets us out in the fresh air. In fact we are spending more time together than we have done since we were courting!"

Bill and his xyl smiled at each other as she refilled the glasses. When I related this story to the others later there were sad faces all around. "But," I added, "Bill did tell me that he intends to renew his licence every year, so perhaps at some time in the future we shall hear him on again." But remembering just how those two smiled at each other I have my doubts. □

*28 Darwall Drive, Ascot, Berks SL5 8NB

Technical Topics

by Pat Hawker, G3VA

"IT IS INCONTROVERTIBLE that the word ('ham') has contained an element of denigration ever since Tony Hancock did his worst with the subject". So ran the Society's writ in the June *Members' Mailbag*. Dear me, no! The Society deprecated the word "ham" many years before Tony Hancock cut his brilliantly funny disc. It was the association with "ham acting" that caused Clarry, G6CL, as RSGB editor, to eschew the word!

Hancock's "The Radio Ham" surely remains a source of innocent enjoyment to every licensed amateur. Far from bringing the hobby into disrepute, many of us still regard it as an affectionate work of comic-genius that, over the years, has encouraged many to swell our ranks.

There are times, one feels, that we are in danger of taking ourselves and our hobby a little too seriously, standing on our collective "scientific contributions" or "value to the community" dignity, and shutting our eyes to the fact that our neighbours often have valid reasons to regret that they live next door to a "radio fanatic". To us, a tall mast or tower is almost an object of reverence; to others, massive hf antennas overshadowing their gardens are truly eyesores. Persistent emc problems may legally be the fault of the manufacturers of consumer electronics, but we all know how difficult it is to convince the old lady next door of this, if she has had no problems with her cherished tv, vcr, unit audio, telephone etc until a licence came through our letter box! To someone snoozing in a garden chair, even the sounds emanating from an amateur shack in the next garden can be an irritant.

It should perhaps be a mandatory condition of the amateur licence that, at least once each year, we should be obliged to listen to a complete playing of "The Radio Ham", if only to appreciate the strength of the "social pressures" surrounding emc problems, to learn something about the "do's and don'ts" of hf operating, and to appreciate a little more clearly how our hobby can appear to "outsiders".

One hopes nobody considers that Hancock's "The Blood Donor" denigrates the National Blood Transfusion Service!

THIS MONTH

Measuring rf power

Accurate measurement of the output power of a transmitter is one of those subjects still liable to raise smiles among those of us who came to the conclusion, in the days of a.m./cw transmitters, that an electric light bulb, a neon tube and a few shunted torch bulbs provide just about all that is needed to ascertain that the power amplifier is giving out the necessary watts, at least on modes other than ssb. I was interested to note in 1967, on a brief visit to a Cable & Wireless hf installation on Ascension Island, a fluorescent light was across the open-wire transmission line to serve as an output monitor. But one has to admit that these days there is a mysterious desire on the part of many amateurs to know whether the output of their rig is 21W or only 19W.

For cw and fm transmitters, the measurement of current flowing into, or voltage across, a known value of resistive dummy load remains perhaps the simplest and most cost-effective technique (Fig 1). This approach is well covered in an article by Doug De Maw, W1FB/8 ("A beginner's look at rf power measurement", *QST* August 1983, pp35–9). W1FB also covers the classic rf-power bridge originally described in 1959 by Warren Bruene, W5OLY, of Collins Radio, which uses a toroidal current transformer. This remains the standard approach (Fig 2) used in many of the commercially-manufactured directional wattmeters for amateur radio. The article further includes constructional details of an inexpensive resistive power bridge suitable for checking the output of low-power hf transmitters of up to about 20W output.

This seems a suitable opportunity to raise a matter that has been diligently pursued by Bill Omer, G3DOJ, and to stress that ac, af or rf power should *not* be defined as an rms quantity. The term rms watts has been creeping into magazines and journals over the past 20 years, stemming largely from the audio field where it first came to be used to differentiate between "continuous output power" and "music power" ratings. The term music power has been displaced by "dynamic headroom" but the practice continues. Now rms watts is increasingly used to distinguish between watts p.e.p. and continuous output power of transmitters and linear amplifiers. G3DOJ points out that the definitions of rms voltage and rms current are themselves derived from power, so that "rms watts" is as ludicrous as "average feet".

Which brings us to the thorny problem of measuring the p.e.p. output of a linear amplifier without the aid of a cro. Many people do this with a conventional power meter, hoping that a prolonged whistle will prove

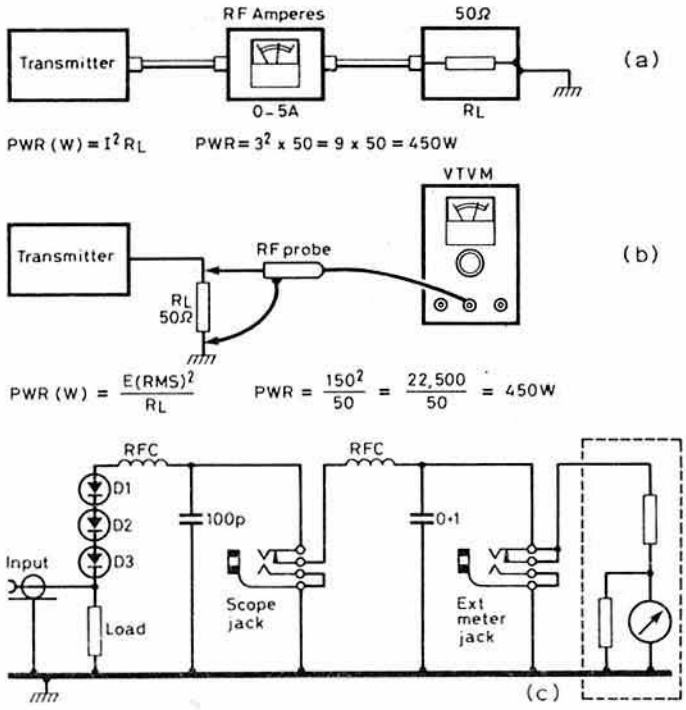


Fig 1. Power measurement using a dummy load of known (resistive) impedance (a) by measuring current into the load with an rf ammeter; (b) by measuring voltage across the load with a probe and electronic voltmeter; (c) a practical arrangement suggested by G3EIW in 1972 (further details in several editions of *ART*) including jack for use of oscilloscope for ssb, etc.

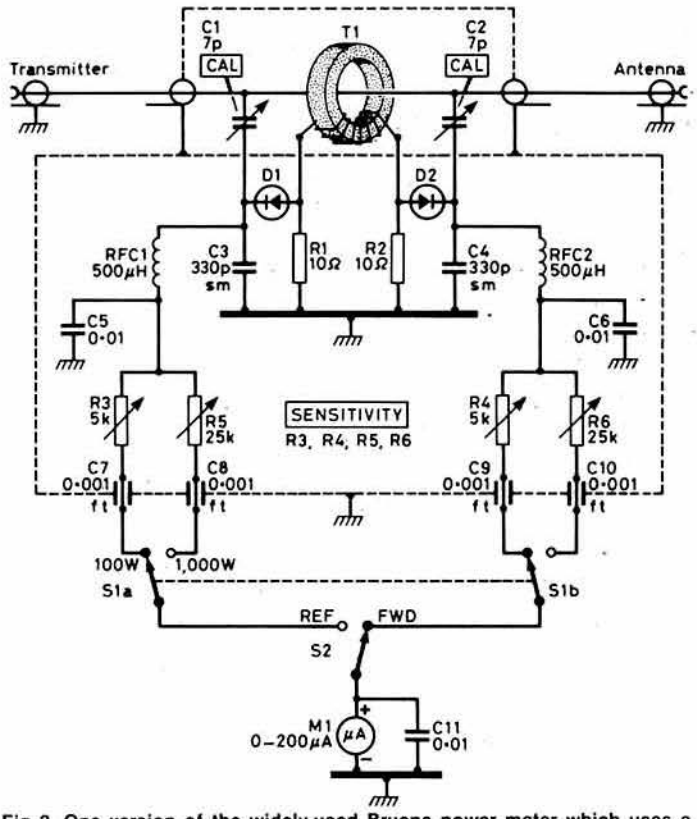


Fig 2. One version of the widely-used Bruene power meter which uses a toroidal current transformer. This circuit is from W1FB's article. R3 to R6 thumbwheel pots inside instrument case. D1 and D3 1N914 or similar

sufficiently accurate. Undoubtedly a better solution is to use a good peak-reading power meter, although the purist would point out that the vital characteristic of a linear amplifier is not really a question of setting it up to provide maximum possible p.e.p. output, unless you also have some means of determining the level of intermodulation distortion and associated flat-topping.

Derek Gilbert, GW3OYL, of Amateur Accessories Ltd (Church Street, Glan Conwy, Colwyn Bay, Clwyd LL28 5LS) recently sent along a sample of a new p.e.p. conversion module which is being marketed by the firm and which can be fitted to existing forward power meters of the type used by most amateurs. The p.e.p. module is pre-assembled and tested, and is supplied with detailed instructions for fitting and final adjustment.

Two of my work colleagues, G4RAA and G8MYO, tried out the module, and both are reasonably satisfied with the results. They report that it does seem to provide a valid indication of p.e.p. output on all except the briefest transient af inputs.

The firm is convinced that the usual "whistle" with a conventional meter gives only a poor approximation of p.e.p. output and that many amateurs' transmitters produce ssb "splatter" because, in the absence of any knowledge of the actual peak output, the operator turns up the audio gain too far or speaks too close to the microphone etc, in his attempt to produce a reasonable deflection on his meter; often he has little idea of the high-power pulses (or splatter) that may come from, for example, tapping a microphone or the noisy operation of a ptt switch.

Anything that can bring about a reduction in splatter is to be praised. Certainly the AA p.e.p. conversion module (£12 plus 60p p&p) is to be welcomed, except possibly by G3DOJ who may spot the reference to rms power in their leaflet. For the module to reduce splatter, it is unfortunately still necessary for the user to have a good idea of what is the maximum output of his amplifier before the onset of distortion. No power meter can truly show him that.

Testing electrolytic capacitors

Kurt U. Grey, VE2UG, was recently faced with a piece of professional test gear that did not meet its specification yet did not appear to have any obviously faulty components. He decided to take the slow but usually sure route of evaluating each component in turn.

His first tests showed all components apparently within acceptable tolerances. But then he noticed that some of the electrolytic capacitors which he had already tested had a little white deposit on the seals. So he went back again to square one and concentrated on these using four different test equipments: (1) Sprague TO-6 capacitor tester; (2) General Radio 650-A bridge; (3) IEC digital capacitor tester; and (4) BECO bridge. He carefully checked about 50 electrolytic capacitors on each of these instruments in turn.

He describes the results as "truly astonishing". He sent along his detailed measurements but the general drift of these can be shown by just a single example:

A 25μF, 15V electrolytic capacitor measured 24μF, 22 per cent power factor on (1); 13·2μF DQ > 1 on (2); 24·4μF on (3); and 12·5μF, DQ > 1·1 on (4). The D factor is the ratio of series resistance to series reactance; on the TO-6 tester power factor is shown as a percentage.

In this case two of the instruments showed the capacitance as roughly 24μF, very close to the nominal 25μF; but two others put the value at approximately half the nominal value. Similar wide variations in the measurements were taken on other capacitors, a variation of more than 2:1 being by no means uncommon on these measuring instruments.

One reason for this remarkable difference, VE2UG quickly realised, is that the TO-6 uses 60Hz as the bridge frequency; the BECO and the 650-A use 1kHz; and the IEC an unknown pulse method that does not include indication of the power factor.

The moral to be drawn is clear. *Ergo*, testing coupling or decoupling capacitors with 60Hz or 50Hz ac can give misleading results unless the power factor is checked. VE2UG's original component-by-component check on the 60Hz tester had failed to tell him the whole story. The high power factor of many of the electrolytic capacitors, up to and over 50 per cent, was the key to his problem.

As J.W.N. Sullivan put it in 1928: "It is much easier to make measurements than to know exactly what you are measuring"—an apt quotation in respect not only of this story but for other myth-making measurements, for example with an swr meter! Thanks to Rod Beavon, G3PPR, for unearthing it.

Another "kiss" approach to 12V

Brian Kendal, G3GDU, recently wanted a mains-supply power unit for his Swann 100MX, a 100W hf mobile transceiver. In designing this he considered two factors paramount: first, a belief in "kiss" techniques; secondly, Kendal's Law on home construction which states that: "the most valuable item in the junk box is cheaper to use than the cheapest item at the rally, emporium or radio club surplus sale." He writes:

"The 100MX should be well capable of operating on anything from about 11·5V to nearly 16V so that a high level of stabilization in the psu should not be necessary. Looking through the junk box I found a 12V rms, 10A (continuous rating) transformer; a 25A rectifier; and a couple of 68,000μF electrolytics. These I determined would form the basis for the psu.

"I appreciated that without some form of in-rush protection, the large-value capacitors would look like a short-circuit at switch-on. To prevent damage to the rectifier a 3Ω resistor was inserted to limit in-rush current. After switch-on, the presence of such a resistor is clearly undesirable. Initially the coil of an hd relay was placed across the output, with the contacts short-circuiting the resistor when energized.

"This worked fine on switch-on, but on switch-off hysteresis held the relay 'in' down to 2V, and an immediate re-switching-on of the psu could cause distress to the rectifiers. A 6V zener diode was placed in series with the energizing coil. With this in circuit the relay comes 'in' at around 10V across the capacitors, and drops 'out' at around 7–8V, thus solving my problem.

"The next consideration was that the output was around 16V. Although this was within the range acceptable to the 100MX it was just a little too

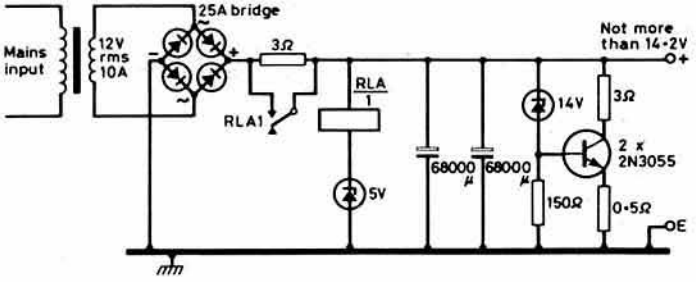


Fig 3. G3GDU's psu for 100W mobile transceiver using shunt voltage limiter and relay-switched in-rush protection. Suitable for use with equipment having built-in voltage regulation and providing over-voltage protection (main switches, fuse etc not shown on diagram)

close for comfort. I did not have enough spare volts for the conventional series regulator. I used instead a parallel circuit which is more of an 'automatic bleed' than a true stabilizer—but entirely satisfactory in such applications where the requirement is to limit maximum voltage output rather than stabilize it at a specific value: see Fig 3.

"I use two 2N3055 power transistors, and this is a bit of an overkill because with the circuit as shown the output steadies at about 14·2V off-load with the 2N3055 devices taking about 2A between them. When the external load increases to the point that the output voltage drops below about 14V, the transistors cut off entirely; but when the load decreases they again pass current and pull output volts down to just over 14V.

"The 3Ω resistor in the collector circuit of the 2N3055s is to reduce the power dissipated in these transistors and consequently reduce the heatsink requirement. The psu appears to work just as well without it, but with it the devices run cooler."

The Scart Euroconnector

In *TT* (February 1984, p136) mention was made of the new 20 + 1 pin Euroconnector plug and socket, also known as the Scart or Peri-television system, which is now being fitted on some brands of television set. This makes the domestic tv receiver more suitable for use as a visual display unit for electronic rtty, computerized morse or data transmission, as well as its intended use for home computers, video games, video cassette machines etc. The socket makes it possible to eliminate the uhf modulators that are at present used to connect external peripheral appliances to the antenna socket of a tv set. The system, originally proposed by French manufacturers, also makes it much easier to use an external hi-fi audio system for tv sound, and will be needed in future if full advantage is to be taken of the C-MAC/packet transmission system chosen for use on British dbs (direct broadcasting from satellite). There are also possibilities in providing monitoring and control of domestic lighting and heating appliances etc through the tv set.

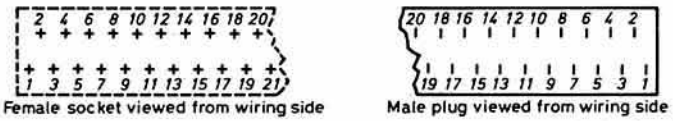


Fig 4. Pin numbering for the Euroconnector plug and socket now being fitted in an increasing number of television receivers

Table 1, and Fig 4, show the layout of the 20 pins (the 21st "earth" connection is made via the shield) together with nominal impedances and signal levels. Although most tv models are expected eventually to incorporate a Euroconnector socket, it is likely that not all pins will be wired internally on all models, as would be necessary to provide for all possible applications.

The radio amateur will be able to use the system to get significantly "cleaner" alpha-numerical displays without the degradation of low-cost modulators and encoders. It may also prove useful to have a note of Euroconnector pins etc when dealing with questions of rfi, tvi, emc etc. The use of a screened multiway cable should help minimize problems of this type, but experience suggests that any external unit connected to a tv set can result in emc problems.

The following are some notes on the Euroconnector system, based on a 1983 article by Eric Dowdeswell, G4AR, in *Electrical & Radio Trading* (4 August 1983):

"In order to stress the importance of the Euroconnector it may be as well to outline the many advantages claimed for it:

(1) All audio and video inputs and outputs go via the single connector.

(2) The composite video blanking signal input bypasses the rf/i.f./demodulator stages of the tv set so that a uhf modulator in the video peripherals is no longer necessary, reducing the cost of peripherals and improving picture quality when using them.

(3) With a simple switchbox, it is possible to use two video peripherals through the tv simultaneously. A tv programme could be recorded on a vcr machine via the tuner of the tv set while watching a video disc.

(4) The status system (av/tv) of the tv set can operate automatically whether watching live tv or playback from vcr or video disc machines.

(5) Output from an external teletext decoder, home-computer, electronic video camera etc may be fed directly to the red-green-blue (rgb) section of the tv set, often making redundant the usual external video amplifier as well as the uhf modulator.

(6) It opens the way to monitoring and control of domestic heating and lighting via the tv set."

Table 1. Pin identification of the Euroconnector

Purpose	Impedance/signal level/impedance
1 Audio out (right)	500mV/1000Ω
2 Audio in (right)	500mV/1000Ω
3 Audio out (left)	500mV/1000Ω
4 Audio earth	—
5 Blue earth	—
6 Audio in (left)	500mV/1000Ω
7 Blue in	700mV/75Ω
8 Status CVBS	0·2V/12V 10 to 10,000Ω
9 Green earth	
10 Intercommunication line domestic heating/lighting control (DDB)	
11 Green in	700mV/75Ω
12 Intercom.	
13 Red earth	
14 DDB earth	
15 Red in	700mV/75Ω
16 Status RGB (fast blanking)	0 -0·4/1·3V
17 CVBS earth	
18 RGB status earth	
19 CVBS out	1V/75Ω
20 CVBS in	1V/75Ω
21 Socket earth	

Note CVBS is composite video blanking signal.

More about eti

The item in the April *TT* on the unfortunate susceptibility of many of the new electronic telephones resulted in an interesting conversation with a BT telephone engineer working in the London area. He confirmed that the "Statesman" design mentioned by G3TSO has resulted in a considerable number of complaints of rf interference, particularly from telephone subscribers living close to high-power broadcasting transmitters, mf and vhf.

The following is a series of "unofficial" procedures that have been found to overcome most problems, although, like the short-circuiting of R4 that proved successful for G3TSO, one runs into the problem that they have some slight effect on the transmission characteristics of the installation. For such reasons they are not regarded as official procedures, even though usually not only effective but fully acceptable to the subscribers:

(1) For vhf breakthrough a 0·1μF capacitor is fitted between pins 7 and 10 of the ic amplifier (note the Statesman clearly does not use an eight-pin device of the type illustrated in the April notes).

(2) For mf breakthrough a 0·01μF capacitor is fitted across R4 (this has much the same effect on rfi as shorting-out R4, as found to work empirically by G3TSO, and illustrated in Fig 1, p314 of the April issue).

(3) If rfi is still troublesome, a 0·01μF capacitor is fitted between pins 10 and 11 of the ic amplifier.

(4) As a final suggestion, a 0·022μF capacitor can be fitted between pins 1 and 5 of the main telephone socket.

Capacitors need to be types suitable for rfi suppression work. Capacitors generally found suitable for rfi suppression include mica, ceramic disc, polycarbonate and mylar types. However, regard has to be made to the frequencies involved. In this connection a useful table of impedance versus frequency measurements on a variety of such capacitors was included, with other rfi suppression and shielding information, in *TT* April 1983, pp326-8. Electrolytic capacitors are particularly unsuitable for this type of application due to their relatively poor power factor and the wide tolerances etc. This point is explored further in the item from VE2UG.

Amplified telephones are used for many other purposes than the public switched network. A large number, for example, are used for "talkback" and similar communications in television production. A note from Mike Kinnersly-Taylor, GM3WTA, who is with Grampian Television, mentions that he has frequently encountered eti on telephones and headsets on outside broadcasts or, as the Americans call them, "remotes". He adds: "In every case a total cure has been effected by using one or two ferrite beads on the input (and often the output) connections to the microphone ic amplifier. The chip I use most at present is the TCA980. This device enables me to use a wide range of microphones on my amateur rig—using the magic beads of course. Selection of the correct ferrite bead material for the frequency bands concerned makes the cure more effective."

Dan Glover, G6RMA, writing from Canterbury University, draws attention to another emc problem that can arise with the newer types of telephones now being provided by BT and industry. He worked over the Easter vacation in an office where a "Sceptre" telephone was installed. This model is designed primarily for business users, having a digital clock to time calls, 10 "memories" and the facility of redialling a number.

One morning the clock, for no apparent reason, reset itself. G6RMA soon discovered that a couple of watts rf from a 435MHz handheld transceiver, if operated within about 4ft of the Sceptre, can clear the memories and reset the clock. As he was using the office only temporarily he did not get round to finding out if similar effects could occur when using other frequency bands etc. But he wonders if firms and organizations having mobile-radio base stations in the same room as the telephone experience this problem (possibly not if the antenna is sited well away from the base transmitter). He also mentions that the printing calculator in the same office similarly suffered from "amnesia" if exposed to high levels of rf, but hesitates to open a whole new can of emc worms!

Mobile operating—safe not sorry

The May *TT* included an item drawing attention to a RoSPA article on possible driving hazards arising from listening to overloud or mentally-demanding material, or from drivers or cyclists wearing stereo headphones etc. A number of comments have been received on this subject, including some making the point that provided a boom microphone is used and contacts are immediately suspended whenever driving demands undivided attention, then two-way mobile operation need be no more distracting than a passenger's conversation. But others feel there can be a hazard. For example, Andy Talbot, G4JNT, writes:

"I have always considered mobile operating in any form extremely dangerous for precisely the reasons quoted in the May *TT* from the RoSPA article, and I will never install a mobile rig. All the driver's attention should be on the road. I have found that in some cases even a conversation with a passenger can be distracting. Car radios for music-only please, at reasonable volume. I may be passing you!"

Many years ago the RSGB endorsed a series of mobile safety recommendations. As included, for example, in *A Guide to Amateur Radio* these are:

(1) All equipment should be so constructed and installed that in the event of accident or sudden braking it cannot injure the occupants of the car.

(2) Mobile antennas should be soundly constructed, taking into account flexing at speed and possible danger to other vehicles or pedestrians. The maximum height must not exceed 14ft above ground.

(3) Wiring should not constitute a hazard, either electrical or mechanical, to driver or passengers.

(4) All equipment should be adequately fused, and a battery isolation switch is desirable.

(5) The transmit/receive switch should be within easy access of the operator and one changeover switch should perform all functions.

(6) The microphone should be attached to the vehicle so that it does not impair the vision or movement of the driver.

(7) A driver/operator should not use a hand microphone or double headphone.

(8) All major adjustments, eg band change by a driver/operator, should be carried out while the vehicle is stationary.

(9) Essential equipment controls should be adequately illuminated during the hours of darkness.

(10) Logging must not be attempted by the driver while the vehicle is in motion.

(11) All equipment must be switched off when *(a)* fuelling, *(b)* in close proximity to petrol tanks, and *(c)* near quarries where charges are detonated electrically.

(12) A suitable fire extinguisher should be carried and be readily accessible.

I have the impression that the important recommendations **6** and **7** are still sometimes disregarded and that hand microphones are used by a few amateurs, and many cb and pmr mobile operators. Hand microphones with overhead suspension, that can be immediately let go of without their being damaged, as often used for cb by truck drivers, are preferable to the conventional push-to-talk hand unit, though even this type does not meet entirely the RSGB safety recommendations. Not being a /M operator (or even for many years a driver), this is a debate into which I cannot enter fully. However, I do agree with Jack Maling, G5JL, when he comments:

"Some modern car radios are played so loudly that they certainly distract me—and I'm a mere pedestrian." He draws attention to a recent advertisement for a high-power car-radio stereo system that boasts no less than 2 × 20W audio output, yet is proclaimed "the perfect travelling companion". With 40W of audio in the confined space of a car, this must surely be a hazard to the ears of the occupants—not to mention a safety hazard.

The RoSPA article (*Care on the Roads,* April 1984) made it clear that: "legally motorists are permitted to use car radios while driving but it is an offence to drive without proper control of the vehicle, or, more seriously, without due care and attention. So there is an anomalous situation in the UK whereby a driver is permitted to use a telephone in the car but risks prosecution if he shaves with an electric razor."

It also draws attention to EEC regulations in respect of radio equipment in vehicles intended to ensure that a driver will not be cut by any part of a radio, will not get his hands stuck nor receive any electric shocks. Equipment must be reasonably easy to operate and with rounded, recessed controls—though I am uncertain to what extent these EEC regulations apply to amateur radio equipment or the extent to which they are enforced in the UK.

G5JL points out that police drivers do not normally operate the radio, and that the death of at least one lady cb operator was attributed by the police and coroner to her having been distracted by operating her cb rig. He also notes that touring coaches often carry prominent notices on the dashboard forbidding the use of the microphone while the vehicle is moving —but in his experience this is seldom if ever observed in practice.

When one considers that over 6,000 people per annum are killed on the roads in the UK alone, it behoves all mobile operators to take all reasonable steps to ensure that their own safety and that of other drivers, passengers, cyclists or pedestrians is in no way impaired by the presence or use of amateur radio equipment in their cars. For a good driver, the risk is probably very small. The trouble is that nobody thinks of themselves as a poor driver or a poor radio operator. It is only other people who fall into those categories!

Tree-supported dx antennas

A massive beam array is undoubtedly an aid for long-distance hf operation but, as suggested frequently in *TT*, it is surprising what can be done with unobtrusive wire antennas supported by trees or attached to convenient buildings. Laurie Margolis, G3UML, who figures prominently in the DXCC Honor Roll, recently erected what he calls a 3·5MHz top-loaded vertical after reading an article by G3ZZD in *Ham Radio Today* and discussing his site problems with G4GED. The antenna shown in Fig 5 was the result. This has a 45ft vertical section using fairly heavy gauge wire supported from the branch of a tree, with a 16ft bent-back section at an angle of about 45° to the horizontal eventually tied off to his house with a light nylon cord. The antenna is fed with about 60ft of RG8U coaxial cable, and there are two bent λ/4 radials about 1ft off the ground, stapled to the garden fence and each making a 90° turn about a third of the way round.

At resonance (3,775kHz) swr is virtually unity, and it remains below 1·8:1 to the lower band edge. According to G3UML it provides "terrific" performance on 3·5MHz dx, putting good signals into VK, ZL, AP, Caribbean area, North America etc.

G3UML describes his technique for getting lines over high branches as follows: "There is a public park backing my garden, so bow-and-arrow or throwing rocks are not on. I took a tennis ball and screwed into it a toggle screw; this is a Rawlplug-type device for fixing things to thin surfaces and has a form of alligator clip on the end of the screw. These can be bought

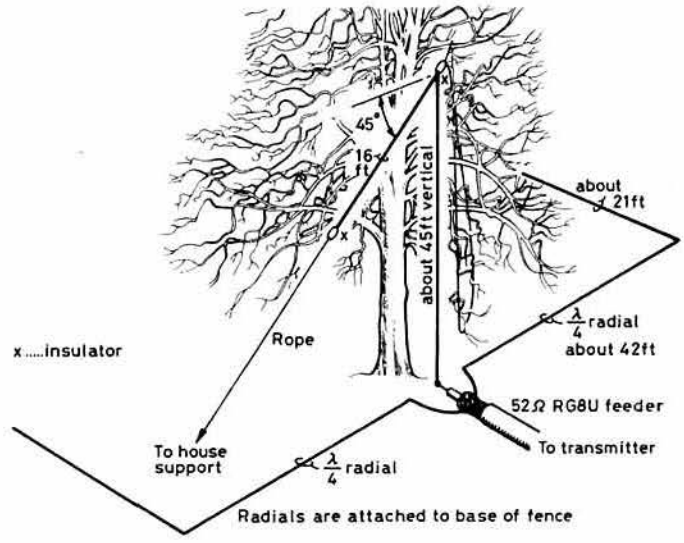


Fig 5. G3UML's tree-aided 3·5MHz "top-loaded" vertical with two bent radials —an exercise in fitting relatively inconspicuous antennas into available spaces with existing supports. Described by G3UML as "simple, old-fashioned and very effective!"

at almost any hardware shop. To the protruding screw I tied about 150ft of fishing line which is unrolled and left loose and untangled (fortunately the line tends not to tangle) at the feet of the server, with the far end tied firmly to a suitable mooring.

"With the tennis racket, the ball with line attached is simply clouted as high and as hard as possible. I managed my 45ft high branch at only the third attempt. Provided the ball returns obediently to ground level a more substantial rope can be hauled up and turned into a continuous loop so that any antenna can be raised: in my case both the 3·5MHz vertical and the 7MHz delta loop described in *TT* May 1982.

In those locations where it is quite safe to use a bow and arrow to put a line over a high branch, heights of up to 60ft were achieved by G. I. Turner, G3DGN, who reported his experiences of this technique in the *RSGB Bulletin* November 1965. He used a 38lb, 59in wooden bow with a 27in wooden arrow which he described as standard archery equipment for beginners. G3DGN warned that "inexperienced archers should be very cautious, as even blunt arrows can break windows, bruise people and disturb neighbours". The arrow *must* have a blunted arrow-head, not only for safety reasons but also to prevent the arrow from entering a branch etc, and thus failing to return to earth. He also suggested that local archery club members might be willing to exercise their skills when the antenna is needed for temporary outside events such as NFD. However, many of us would be very happy with a line over a 60ft high branch to provide an antenna support for fixed operation!

"Invisible" two-element array

As mentioned in the April *TT*, Les Moxon, G6XN, has been trying out an "invisible" two-element fixed hf array for 14/21/28MHz based on his delta folded elements. His array, Fig 6, comprises a pair of the 14MHz elements moored for the north–south direction, and made from 21swg wire. The boom is 0·5in diameter tubing that could easily be replaced by a conventional tv antenna to provide a near-perfect "disguise".

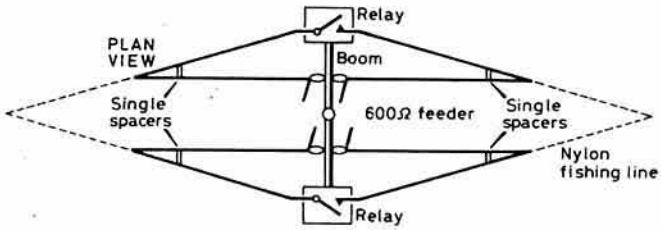


Fig 6. G6XN's inconspicuous two-element fixed array for 14/21/28MHz using thin wire elements and a boom that can be provided by a normal tv antenna when put up across a roof

The front–back ratio is very good on 14MHz but rather poor on 21MHz (about 7dB). On 28MHz, relays are used to open-circuit the elements. G6XN suspects that better results might be achieved on 21MHz with the elements in the 28MHz open-circuit condition, but feels his relays might not stand this.

One indoors, one outside

It is a long-established hf and vhf practice to use the same antenna for receiving and transmitting. In the vast majority of cases this is a logical and cost-effective system: it takes advantage of the reciprocity theorem which states that an antenna will have similar directivity characteristics on reception and transmission, so that one receives distant signals from the same area to which the antenna should transmit signals, so avoiding wasted calls and frustration.

But there are, as Brian Johnson, G3LOX, recently reminded me, some exceptions to this rule. For example, it is possible to make effective use of frame receiving antennas on 1·8 and 3·5MHz to provide sharp minima in order to null-out strong local signals while retaining a long-wire or vertical antenna for transmission. It may also be useful to have a horizontally-polarized receiving antenna in locations where the main vertically-polarized antenna is effective for transmission, but picks up altogether too much local electrical interference to permit reception of weak signals.

It is a variation of this second example to which G3LOX draws attention. He points out that roof-space, attic, window-pane mounted antennas, or even wires draped round the room, can prove surprisingly effective for *transmission* in locations where it is impossible or inadvisable to put up good outdoor antennas. But such indoor antennas tend to be extremely vulnerable to all forms of electrical interference, time-base and switched-mode psu interference from tv sets, home-computer hash etc, all of which tends to be strongest close to domestic electricity mains wiring. However, in many locations it is possible to put up an outdoor receiving antenna that is too short or too low for effective transmission, but which can bring in signals far less contaminated by electrical interference than the indoor transmitting antenna.

A further variation of this theme is to use a very short broadband *active antenna* for reception, provided always that this is located where it does not pick up excessive electrical interference.

More compact transmitting loops

A few years ago the firm Technology for Communications International (TCI) marketed a Model 629 professional loop transmitting antenna intended to provide an unobtrusive hf system for such applications as diplomatic communications. In fact, one of these can be seen edging above the parapet of the roof of the US Embassy in Grosvenor Square, London. Like most other compact transmitting loops, this is made from large diameter copper pipe and requires a substantial copper ground screen. A motorized vacuum-type capacitor in the centre of the upper member of the trapezium-shaped loop is used to remote-tune the antenna over the range 3 to 24MHz. It is claimed to provide a directive gain, both vertically overhead and in the horizontal plane, of the order of 5dBi; making it suitable for short-, medium- and long-distance paths. However, it should be noted that "directive gain" is not necessarily the same thing as "power gain", and the efficiency of compact loops inevitably falls off at the lower end of the frequency range. The TCI loop is about 70in long by 39in high.

Ron Row, G3HAZ, has noted a brief description in *Microwaves & RF* March 1984 of a "Miniloop" antenna system made by Antenna Research Associates. This is a pedestal-mounted loop 5ft high by 7ft wide (12ft high with pedestal mast and rotator) covering either 2·3 to 16MHz, 1·8 to 14·5MHz or 3 to 24MHz. It has a fat section at the centre of the top section that, presumably like the TCI model, contains a tuning capacitor. At 14MHz, efficiency is claimed as 98 per cent.

All compact transmitting loops depend on achieving reasonable efficiency by using materials presenting very little rf ohmic resistance. As J. R. Killeen, G3KPV, indicated in *Radio Communication* September 1983, pp796–7, it is possible for amateurs to make transmitting loops of reasonable efficiency both for base or portable operation. His unit covered 3·4 to 15·2MHz, although he stressed that one should not expect to obtain equivalent performance to a dipole mounted at 60ft. Radiation resistance of a loop increases very rapidly as the circumference approaches a wavelength and one enters the familiar territory of the quad and delta loop antenna.

Spark gaps and a homemade electroscope

The survey of the nature of thunderstorms and the anatomy of lightning by Alan Martindale, G3MYA (*RadCom*, January 1984, pp28–31, 36) included a full-size drawing of a home-constructed spark discharger intended to overcome the problem of static build-up on antenna systems. Brian Johnson, G3LOX, recalls that when using kite-supported antennas a few years ago, he found that a most effective spark-gap for this purpose can be made from a discarded ignition spark plug, particularly one of the older type that can be unscrewed to permit adjustment of the gap. The plug is simply fitted into an aluminium holder forming part of an earth rod and forms a static discharge system suitable for either fixed or portable operation.

Andrew Churchley, G4EAQ, has also noted the current interest in protective devices for the electromagnetic pulses (emp) stemming from near lightning strikes or, potentially, from high-altitude nuclear explosions. He describes the construction of a low-cost instrument that can explore the extent of this problem and can be used also for testing high-voltage insulation etc.

This is a simple electroscope; an "infinite-impedance" extra-high voltage indicating device which is often encountered during school physics lessons, but which has been largely forgotten as a practical and useful instrument, capable of doing a number of things impracticable with a conventional moving coil meter and much cheaper than an electrostatic voltmeter.

G4EAQ writes: "I think the reason why so little use is made of the electroscope principle is that this type of instrument is traditionally associated with brass discs, gold foil, glass cases, cast sulphur or paraffin-wax insulation, mahogany-wood bases etc, thus ensuring difficult and expensive construction, and a place in dusty school textbooks.

"In practice a simple, low-cost electroscope of the form shown in Fig 7 can fulfil a useful role in an amateur shack; for example, it can:

(1) Indicate a static charge on an antenna which has no static-discharge resistors or spark-gap and is thus floating with respect to earth.

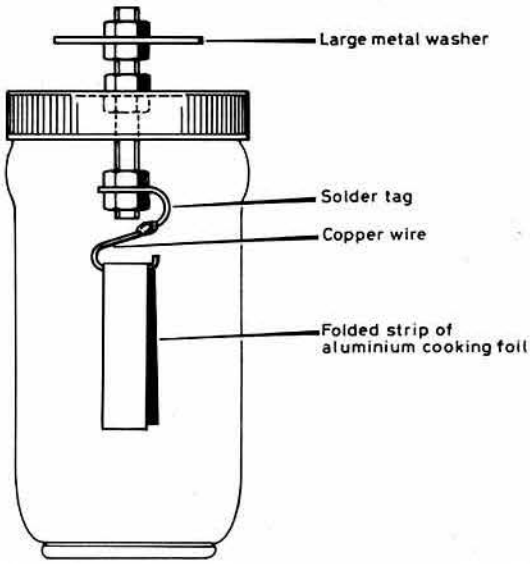


Fig 7. G4EAQ's low-cost Nescafé-jar electroscope for observing static-charged antennas, lightning emp and for testing the effectiveness of insulation at high voltages

(2) Check, by implication, that all the antenna insulators are good for many kilovolts.

(3) Check that eht is present in a visual display unit, tv set or other eht circuitry without "loading" the circuit.

(4) Permit observation of the emp resulting from local lightning strikes.

(5) Check high-voltage insulation generally, including that of high-voltage capacitors.

"Fig 7 shows a low-cost form of construction in which the traditional gold-leaf is replaced by a strip of cooking foil. The Nescafé or similar glass jar and lid (minus the cardboard insert) are thoroughly washed to prevent later leakage of charges through dirt deposits. The other odds and ends come from almost any junk box.

"When completed I connected my electroscope to the antenna while thunder was about, and was immediately rewarded by a slow, steady opening of the aluminium foil leaves. Evidently a charged cloud was overhead. When a nearby lightning strike occurred the leaves gave a sudden violent kick, registering the pulse.

"During rain, the ability of an antenna to hold a static charge is reduced. Although I use ribbed glass insulators for the antenna, it can be shown that they are not really good insulators at high voltage when covered with a film of water.

"For those experimenting with an electroscope I would recommend the use of a protective spark gap outside the building as shown in Fig 8. Benjamin Franklin may have got away with it when conducting his famous experiments with a kite in a thunderstorm, but that is no guarantee that you will be equally lucky unless precautions are taken!

"To check an insulator for conductive surface film, first charge the electroscope on its own. This can be done conveniently simply by combing your hair with a plastic comb; this works well provided your hair is clean and dry. Bring the comb up to the top disc of the electroscope, and the leaves of foil should diverge under the influence of the electric field. Touch the disc using your other hand, with the comb in position on the disc. Take your free hand away and, lastly, remove the comb. This sequence is necessary to charge the electroscope since the comb is an insulator. When you take the comb away the leaves should again diverge and remain so until the charge leaks away.

"Now touch the disc with the insulator you wish to test. Poor insulation will cause the leaves to collapse quickly and completely. However, if the leaves diverge back to their original 'charged' position when you remove the insulator, you can be certain that it provides effective high-voltage insulation.

"This is a very sensitive test indeed. Interestingly, if you bring a lighted match or candle near to the electroscope, enough free ions are produced to cause the charge to leak away quickly. Radioactivity will also cause this effect, and is indeed the principle used by the pocket dosemeters advertised in the electronics press."

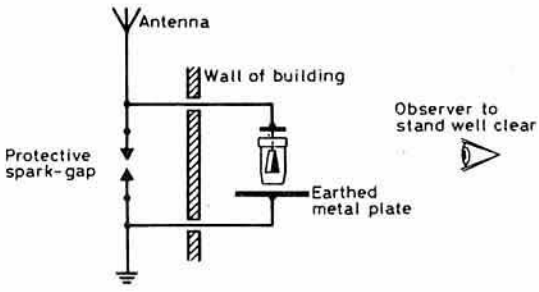


Fig 8. Recommended safety precautions when using an electroscope to observe static build up on non-earthed antennas

Another look at coaxial cables

The May *TT* included a section on coaxial cables, stemming from notes on this subject by W6SAI in *Ham Radio*. I pointed out that the Americans are less wedded to coaxial cable than we are for domestic tv feeders. Since then I have had the opportunity to look round the annual London exhibition of the Confederation of Aerial Industries (CAI) and noted the wide selection of coaxial cables of all types, including 75Ω tv feeder cables, on the stands of Raydex International Ltd and Delta Enfield Cables Ltd, two firms that supply much of the cable used in tv downleads and wired distribution systems in this country.

Several points emerged. The very wide variation of cable performance, even in the standard ranges: for example, attenuation in decibels/100m at, say, 600MHz can vary from over 20dB to under 8dB for distribution (relay) cables and from about 17·5dB to around 20dB for "low-loss" downlead cables, and up to 30dB for lower-cost cables. The per cent coverage of the outer conductor of standard downlead cables now tends to be between 40 and 60 per cent. Recently introduced cables tend to have finer braid wires in the outer conductor to cut costs. Delta cables intended for buried use have the addition of a moisture barrier under the outer polythene sheath; Raydex semi-air-spaced tv distribution cables include pvc-sheathed cables; polyethylene-sheathed cables; and various forms of bonded shield cables, including some having an aluminium barrier as part of the outer sheath. This is an indication that the outer sheath of standard feeder cables must be considered as providing only limited protection against moisture ingress, as mentioned in the May *TT*. Raydex suggests that "ingress of water in all types of trunk and distribution cables is the primary problem, resulting from sheath damage during installation or as the result of cables being inadequately sealed". Their distribution cables have both ends heat-sealed for protection against water ingress during storage and installation, and additional heat seals are supplied with each cable drum. The firms also make 50Ω rf cables and 93Ω "data transmission cable" for video display units etc.

Tips and topics

A high-speed quad op-amp (MC34074 family) has recently been introduced by Motorola having the advantage of working from a single +5V supply line, a facility not presently available with jfet (bifet) op-amps of comparable performance. The new 14-pin devices are based on standard

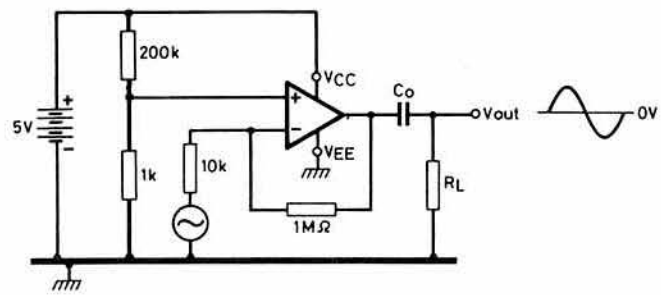


Fig 9. Motorola high-speed quad op-amp ic has the advantage of working from a single positive supply line

bipolar technology coupled with what Motorola call "input pole zero cancellation and Miller loop compensation at the all-npn output" and claimed to provide excellent high-frequency performance with a single polarity supply which can be from 3 to 44V (presumably with different members of the family). □

Amtor spins a time-warp around Oscar 10

by COLIN RICHARDS, 9M2CR*

THE FIRST-EVER Amtor ARQ QSO via satellite was made by 9M2CR in Port Dickson, Malaysia, to DC8AM in Hannover, West Germany, at 0140gmt on 2 March 1984. Oscar 10 was near its apogee in orbit No 540 at a sub-satellite point of 23°N and 267°W. The Amtor mode A QSO was an astonishing success—with perfect message accuracy, easy synchronization, and the usual automatic changeover between sending and receiving stations. But it posed some mystifying questions. How could it possibly work?

Amtor mode A (ARQ) uses a time-frame of 450ms, during which the sending station at that particular moment (known as the information sending station or iss) transmits a block of three seven-bit characters from its buffer memory. Each bit occupies a 10ms slot, so that the three-character block takes 210ms to send. The iss then switches from "transmit" to "receive" and waits for a control signal from the distant station (known as the information receiving station or irs). This control signal will tell the iss whether the three-character block has been accurately received. This is done by counting the bits in the received characters and checking that they conform to the three-mark four-space error-detecting code that is used for Amtor. The control signal sent back by the irs is a seven-bit character of 70ms duration.

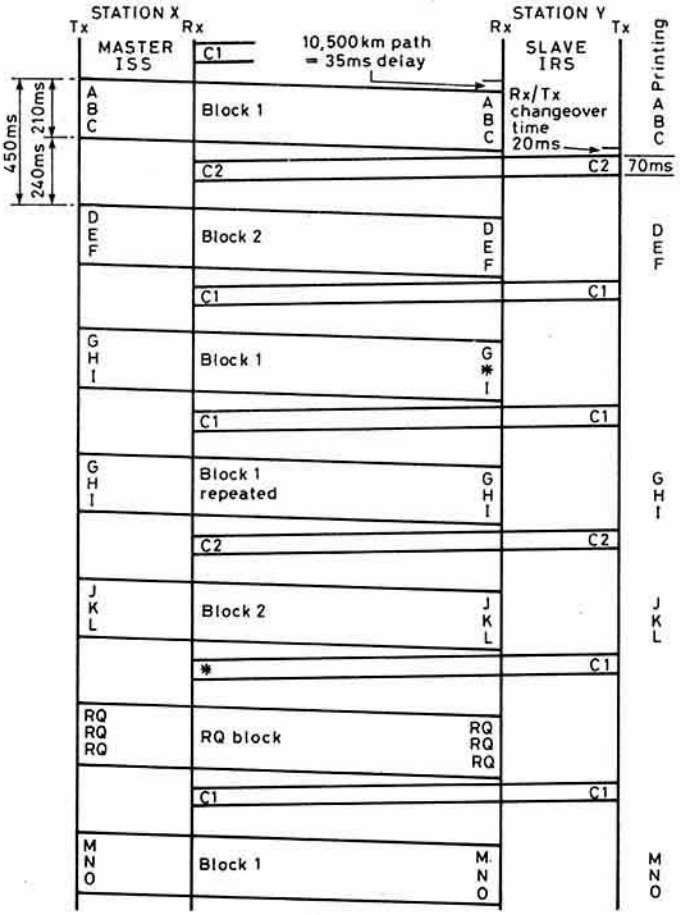


Fig 1. Amtor mode A under error-receiving conditions. Terrestrial path of 10,500km (35ms delay)

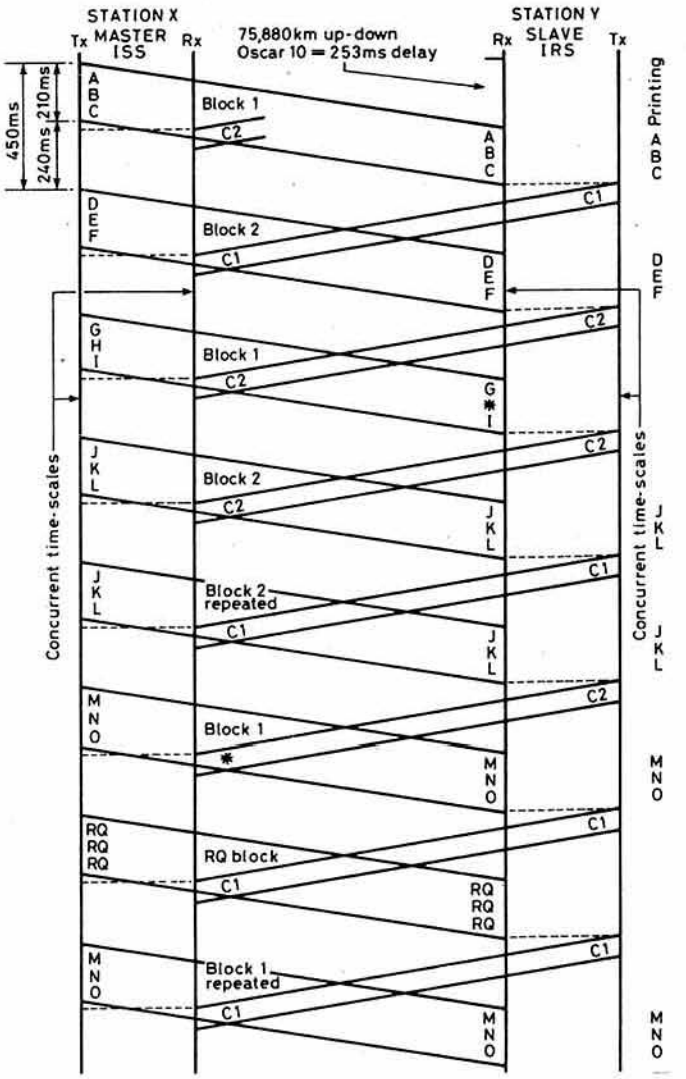


Fig 2. Amtor mode A under error-receiving conditions. Up-down Oscar 10 path of 75,880km (253ms delay)

If the three-character block is correctly received, it is printed out at the distant end (the irs), which sends a control signal signifying "OK". The iss then sends the next three-character block. If a three-character block from the iss is mutilated in transit, the irs sends back a control signal which asks "repeat"—nothing being printed at that time. The iss repeats the same block of three characters and awaits yet another control signal; if this one says "OK" then the distant end prints out and the iss moves on to the next three-character block.

Only two kinds of control signal are used for this "handshake"—C1 and C2. The elegance of the logic may be seen by examining Fig 1, showing a timing chart for two terrestrial Amtor stations in QSO at a range of 10,500km. In the example, the QSO was initiated by station X, which is therefore termed the "master". At the moment it is also the iss and the distant station Y is the irs; but observe that when the transmission is passed over from X to Y, Station Y becomes the iss and Station X the irs. Throughout the QSO started by station X, station X remains as "master" and Station Y as "slave".

In Fig 1, the stations are already locked in sync and the first three-character block is being sent from X to Y. Radio waves travel at 300km/ms so that the 10,500km journey takes 35ms. If this block is correctly received at Y, the letters ABC are printed out and the system at Y changes over from receive to transmit (a process that might take, say, 20ms. Station Y now sends a C2 control signal which again takes 35ms to get back to X. It arrives comfortably near the middle of the 240ms waiting period during which X is in fact listening for it. This C2 indicates "OK" to station X, which now sends the next three-character block DEF.

This reaches Y safely and is printed out. Y changes over to transmit and sends another control signal—this time C1. When this is correctly

*73 Jalan Pantai, Port Dickson, Malaysia.

2100gmt, round-trip path 77,948km, azimuth 63, elevation 24

2130gmt, round-trip path 77,492km, azimuth 62, elevation 25

2200gmt, round-trip path 76,176km, azimuth 60, elevation 28

2230gmt, round-trip path 74,000km, azimuth 59, elevation 29

2300gmt, round-trip path 70,952km, azimuth 58, elevation 30

330gmt, round-trip path 67,488km, azimuth 58, elevation 31

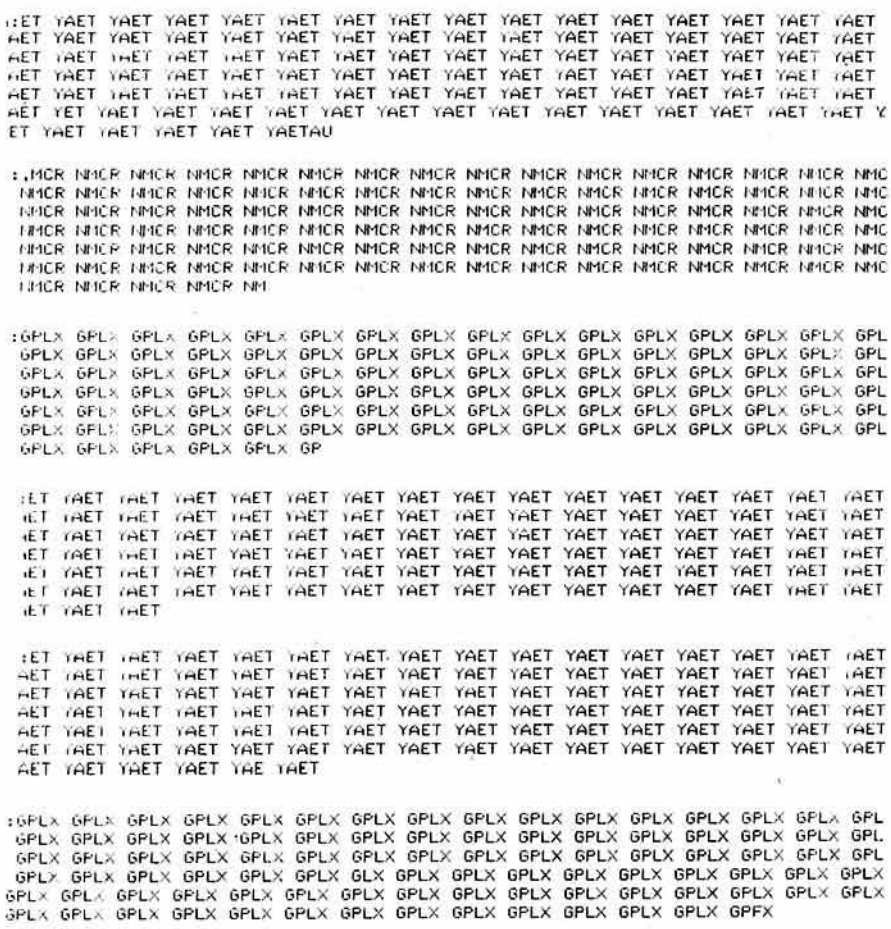


Fig 3. Uncorrected print-out of downlink signal after up/down transmission from 9M2CR to Oscar 10 during orbit No 544 on 8 March 1984

received at X, the next three-character block GHI is sent. This time, one character has been mutilated—let's say H. The system at station Y registers it as incorrect, does not print out, and sends back the *same* control signal C1 as it did last time! There lies the secret: station X knows that getting the same control signal back as for the previous block means incorrect reception of the block just transmitted, so it repeats GHI. This gets through to Y unmutilated and is printed out, so Y sends back C2 this time. This gives the "OK" to Station X which goes on to the next three-character block JKL. This is correctly received at Y and printed out; but let's see what happens if C1 gets mutilated on its way back to X. X refuses to accept the invalid control signal and sends back a special RQ block (RQ is a special seven-bit code—*not* a combination of letters R and Q). When Y receives this RQ block it knows it must repeat the control signal, so once again it sends C1. When correctly received at X, the QSO continues with the transmission of the next three-character block MNO.

In this near-magic way, Amtor produces perfect copy at the distant end —with mutilations resulting only in a momentary pause in the traffic flow from X to Y. To those who have graduated from classic "steam" rtty the improvement is miraculous.

Fig 1 tells us something else, as well as the way the elegant error-detecting/correcting system works. Just look at that first C2 control signal at the top of the chart, as it gets back to station X. As long as it gets back there some 20ms before the end of the block time-frame (450ms) station X still has time to change over from receive to transmit and then send Block 2(DEF). More precisely, if we allow 70ms for the duration of the control signal, then 20ms for changeovers at each end, we have already "consumed" 110ms in that 240ms listening gap. The difference, 130ms, is available to cater for path delay from X to Y—and back! Half of 130ms gives an ultimate path length of 65 by 300, or 19,500km. With a path-delay greater than 65ms one-way, the control signal will not get back within the 450ms block time-frame—and this is fixed and immutable. Unlike "steam" rtty, Amtor is synchronous, and the 450ms block timing is accurately controlled by microprocessor in the Amtor terminal unit. This 450ms block time (as set out in ITU(CCIR) Recommendation 476) is designed specifically so that Amtor-like systems may interface with national inland telex networks using 50baud teleprinters and the five-unit code (yes, our rtty code). Five units of 20ms duration each, a start unit of 20ms and a stop unit of 30ms gives 150ms for each character—or 450ms for three characters; hence our 450ms three-character block in Amtor.

So . . . back to our ultimate limit on path length. Experience has shown that Amtor works splendidly over antipodean paths; it fails to lock in sync only when long-path working is attempted. But . . . how is it that Amtor mode A worked perfectly over the giant haul up to Oscar 10 and back? Up and down totalled 75,880km! A path delay of 253ms! And another 253ms back, of course.

To get at the answer we need to look at Fig 2—a timing chart for the satellite path. It should be mentioned that these charts show the Amtor system when locked in sync, and that the system is brought into sync by the "master" sending a characteristic sync block repeatedly. The sync block also contains the four characters of the selcal—in this case, with 9M2CR calling DC8AM, the selcal DCAM was embedded in the two special sync blocks. The "slave" scans the incoming data stream until it recognizes this sync pattern in a run of 21 successive received bits, checks again, locks on and sends back its first control signal. The 9M2CR/DC8AM Amtor-Oscar QSO showed that sync was achieved amazingly quickly, bringing us to the top of the Fig 2 chart again.

Block 1 (ABC) now starts its journey up to Oscar 10 and down to station Y, taking 253ms to cover the distance. Meantime control signals have been getting back to station X right from the moment that sync was achieved, so that a control signal arrives just after the start of the 240ms listening gap after Block 1 has been sent. Block 1 prints out at station Y, and Y sends back a C1 control. Station X has already sent out Block 2 (DEF) because the control signals are now leap-frogging the 450ms time-frames. DEF is printed out at Y and C2 is sent back. Now—this is the point to be emphasized: given perfect propagation Amtor mode A will continue merrily sending perfect traffic, oblivious of the fact that it is getting back control signals one frame late. It's a measure of the integrity of the Oscar 10 link that copy between 9M2CR and DC8AM was near-perfect. this affirms cw/ssb experience that readability remains at a high 5 even when signals are extremely small.

But Amtor mode A via satellite will "hiccup" under error-receiving conditions. Looking again at Fig 2 and the second Block 1, GHI arrives at station Y with the character H mutilated, so station Y repeats its last control

(Continued on page 589)

4-2-70

*by Ken Willis, G8VR**

AS WE ENTERED JUNE with almost half the year gone, it became quite a feat of memory to recall when the last major opening occurred on the vhf/uhf bands. It must be many years since we have experienced so long a period of generally poor conditions, not helped by the fact that big auroras are much less frequent than they were a couple of years ago. It is in quiet times like these that vhf addicts should consider broadening their activities to get the utmost from the hobby. There are so many modes and techniques which are now open to us with the advent of satellites, microcomputers and other forms of hightechnology, and these provide activities which do not necessarily depend on meteorological or solar conditions. For these reasons a larger than usual section on meteor-scatter working is included this month, which I recommend readers to study even if they are still of the opinion that it is "exotic". It is becoming obvious that meteors play a very large part in vhf propagation, one way or another, and one does not need to be an "Einstein" to take advantage of them.

By the time this appears in print we shall hopefully have had some major sporadic-E propagation. There had already been some signs of this, but the real "season" had yet to get going when this was being written.

Expeditions

From EI7CS news of planned activity from VO square during VHF/UHF Field Day. Using the callsign EI2SRC/P, Sligo Radio Club operators will be on Truskmore Mountain, 2,100ft asl, from 1400gmt on 7 July until the same time on 8 July. The club has used this excellent site before, and this year the equipment will be an FT480R into an MML/144/100-S, Mutek masthead preamplifier, H100 feeder and 15-element homebrew NBS Yagi. SSB, fm and cw will be used, and some 70cm operation will be possible if conditions permit.

EA3ADW called in on the vhf net to remind UK operators that as part of the Spanish contest, there will again be many EA stations active during the first weekends of July, August, September and October. During the May weekend EA stations worked up as far as ZI and BJ squares, but heard no G stations. EA3ADW will be operating during these periods from a good new site in BD square using his own callsign. His equipment is formidable: 1kW into three 16-element antennas on 2m, 600W into four 21-elements on 70cm and four 32-elements and 2W on 23cm. Frequencies to listen on are 144·210, 432·210 and 1,296·210MHz.

During VHF Field Day (7/8 July), Kris Partridge, G8AUU, will be operating from Sleza Gora, a mountain site in Poland where the Wrocklaw fm transmitter in the 70MHz band is located. The callsign will either be G8AUU/SP6, or possibly one of the new Polish reciprocal licence calls in the SE6 series. QTH locator will be IK04e. Kris will be looking for UK signals, especially if there is enhanced tropo or sporadic-E, and if a local amateur licensed for cw joins the party, this mode will also be used. Keep an ear for him on 2m and on the 14MHz vhf net, which he will be monitoring.

Confirmation of the Derbyshire Hills Contest Group's trip to WL square has come from Martin, G6ABU. They will be in WL03h square from the evening of 3 August until 15 August, operating on 2m, 4m and 70cm. On 2m they will have 2×4CX250s into 2 × 17-element Tonnas, using 144·325MHz for tropo ssb, 144·444MHz for ms ssb and 144·144MHz for ms cw.

On 70cm a K2RIW amplifier will feed 4 × 21-element Tonnas with a masthead GaAsfet preamplifier, and ssb only will be worked, using mainly 432·230MHz. On 4m 10W to a five-element Yagi should be good enough for many G stations to work them. At the time of writing, Martin said that only one reciprocal call had been issued—EI2VPX/P. It was planned to use this on 4m, 2m cw/ms, and on the 14MHz vhf net, but they hope to obtain extra reciprocals before they set off. Anyone wishing to contact G6ABU with regard to this expedition can telephone him on Nottingham 289122, or write, QTHR.

Other expedition "snippets", courtesy of SM6AFH/SM6EOC, are that the Albatross Contest Group (G4ULX) will be in UL and VL squares from 3 to 14 August operating 2m and 70cm, and also in YL15e during the contest on 1/2 September. EA7BVD (XY64d) will operate 144, 432, and 1,296MHz in all contests this year. F1ADT/P will be in BE12g from 1 to 24 July operating on 144 and 432MHz, and F6CJG will be in the same square for some days in the same month.

For a really rare one, OZ1EYE/MM will operate from a fishing boat in DQ square during the last weekend in July or the first weekend in August using 144MHz. YU7AU will be in HD19d from 23 July until 4 August, and will take skeds via the vhf net when on site. Finally, LA6HL is making another trip to Iceland this year and will be there from 28 July until 16 August, visiting squares RZ, QZ, PY, QX, SY, TY and SZ in a very busy schedule. His main interest is ms cw, though he hopes to find time to come up on Oscar 10. His ms QRG will be 144·083MHz, and he plans always to listen for the first 5min period, and will only respond when he hears a station calling him in order to conserve battery power. Operation will mostly be after 0300. He also plans to operate from OY, mostly through Oscar 10, using 150W to 2 × 9-element Yagis.

Paul Martin, EI2CA, will be operating portable from UO, UN and VO squares for the Perseids shower, 11 to 13 August, using only 70MHz with the possibility of 70/50 crossband. Operation will be on ssb (70·175MHz), and if there is sufficient interest, 50·175MHz for reception. Talkback facilities will be provided on 7,060kHz, checked on every even hour (gmt). He is QTHR for skeds. Results from UN in August 1982 were excellent, but because of the short ms path involved he recommends an antenna elevation of about 30°.

Beacons

Jan-Martin Noeding, LA8AK, has reported that beacon LA3VHF on 144·880MHz is operational again after being QRT for three years; is located in DS77j, with 150W erp from a 10-element Yagi beaming SSE.

News of another Scandinavian beacon comes from Mats Espling, SM6EAN, who says that SK7UHH is now QRV from square IQ23j. It is transmitting 30W erp omnidirectionally, and 400W erp, bearing 030° for auroral warning. These are significant increases in power compared with previous levels. This is a 70cm beacon, operating on 432·940MHz from the island of Öland on a site 60m asl. Mats says he knows of two occasions when this beacon has been heard in the UK, both before the power increase, so it should be worth listening for—it would be most interesting if it ever went auroral here.

Closer to home, G3UUT, who has always been associated with UK beacon hardware, has returned from his overseas duty in Holland. He tells me that the 50MHz beacon at headquarters, GB3NHQ, should be installed and awaiting final clearance from the DTI by the time this gets into print. Other beacon projects, notably the possibility of installing a 50MHz auroral warning beacon somewhere in the north, are part of current VHF Committee discussions. Readers' views on beaconry are always welcome, and all such correspondence will find its way to the VHF Committee after anything of news value has been extracted for *4-2-70*.

Reception reports for beacons LA3VHF/LA4UHF would be welcomed by LA3BAA, QTHR.

GM3WOJ reports no progress on reinstating the GB3ANG 4m beacon. An alternative site has been offered but it is still hoped to re-install it with the 2m and 70cm beacons, with the ms keying removed and in F1 mode.

Repeater news

At meetings held in Kirkwall on 4 April and in Caithness the following week, the Orkney-Caithness Repeater Group was formally constituted, and caretaker officers appointed to serve until the first agm, to be held in 1985. GM3IBU was elected chairman, GM4LNN secretary and treasurer, while the keeper of the group's repeater GB3OC will be GM3IBU. Applications for membership should go to Mrs C. G. Gee, GM4LNN, QTHR.

The Kent Repeater Group held its annual general meeting at the University of Kent on 18 May. The group's newsletter contains a report on their repeaters. GB3CK continues to operate on low power, and there are some problems of cavity detuning at low ambient temperatures which cannot be dealt with at the present time as there is no permanent heating available on site. Activity on this repeater is reported as being low, and there are still long periods when it is idle. A new transmitter, a Pye T460, is being modified and is producing a good 7W output on bench tests, though the existing equipment is providing satisfactory service.

*11 Old Downs, Hartley, Kent DA3 7AA

GB3KN has again suffered antenna failure—a professionally-built colinear which simply fell apart after only 10 months' operation. A temporary dipole which was put into service surprisingly gave better coverage than the colinear, with the result that a pair of dipoles with phasing harness was tested with very promising results. It is probable that they will have been installed on the repeater by the time this report appears. A noise which caused considerable problems for users of the repeater was traced to feedback rather than deliberate jamming, which it was at first thought to be.

GB3NK continues to function reliably and there have been no periods of downtime due to faults occurring. The talk-though period has been lengthened from 2·25 to 4·75min; this experimental time-out is to continue for a further six months. There are no problems of lack of use of this repeater—mobiles often complain that they cannot get into it due to fixed stations "hogging" the system. The group is anxious that the repeater be used mainly for its primary purpose, that is for mobiles, and appeals to fixed stations to recognise this and not discourage newcomers by persistently tying-up the machine.

A plan to re-site GB3SK at the University of Kent in Canterbury has been approved by the RMG, and DTI approval is awaited. Meanwhile, the opportunity is being taken to rebuild the repeater completely, including new logic similar to the GB3US design. GB3KS is now operational on low power from its original site. New cavities have been installed which permit a single antenna to be used, this being the former transmit antenna. An application will shortly be made to re-site GB3KS, though the group realizes that this may take months rather than weeks to gain approval. The secretary of the Kent Repeater Group is Martin, G4RVV, who should be approached, QTHR, by intending members.

Newly-operational repeaters are GB3BI (R5), Inverness; GB3AH (RB11), Swaffham; GB3DS (RB13), York; GB3PD (RB14), Peterhead; and GB3WI (RB15) Wisbech. Letters of intent are on file for Peterhead, Whitehaven, Calder Valley, Benbecula and the Isle of Man, all on 2m; and for Rossendale Valley, Burton-on-Trent, Dumfries, Appleby, West Cumbria, South Lakeland, Huntingdon, Medway Towns, Hendon, Lewes, Barnoldswick, Sunderland, Scunthorpe, Anglesey, West London, Hemel Hempstead, Cardiff and Morecambe Bay, all on 432MHz. RTTY data repeaters/beacons on 432MHz which are in the proposal stage are Sussex Coast, Central Scotland, Bristol/Bath, Wells, Bury St Edmunds and Leicester.

Andy, G8TJQ, sent in some information relating to the Sussex Repeater Group's activities. GB3SR (Worthing) is now on R7, having changed channels with GB3ES (Hastings), which is now on R3. This has had the hoped-for effect of removing the interference which users of GB3NL had been experiencing. The group's "roadshow" is touring the local clubs and is due to be at Crawley (Sussex) on 25 July. News of a surplus equipment sale to raise funds for a rebuild of GB3WX came too late for publication, as it was planned for 23 May. It is to be hoped that this was a success and justified the efforts of this active group.

Sporadic-E

As June approached, many operators kept a close watch on frequencies between 50 and 144MHz in the hope of catching an Es opening on 2m. On many days in April and May European fm broadcast stations could be copied at good strength in the UK, but seldom did the action get above 70MHz. However, early in May some interesting events occurred. Around 1600 on 4 May, an EA6 station in BZ square was worked by stations in Yorkshire. The call was probably EA6FZ, though there was some doubt as to the last letter in it. The situation was further confused by the fact that EI9Q was a good tropo signal at the time in this part of the UK, and a pile-up developed, with a certain amount of animosity resulting from the appearance of an EA6 on the same frequency—rather a surfeit of goodies! On the morning of 5 May John Hunter, G3IMV (Bucks), was, as he put it, "sniffing around on the vhf net" when he heard an excited I3LGP saying that stations in northern Italy were working into Denmark. John moved to 144MHz and at the same time monitored 70MHz, where he found much European fm broadcast. At 1032 he heard HG4KYB on ssb on 2m at a good S8, talking to a station inaudible in the UK, this lasting for about 30s. At 1033, after hearing a fleeting signal from an IW0, John worked I3YXQ, and the brief event was over. The Eta Aquarids meteor shower was active at the time, and John felt that the signals he heard were typical of some produced by meteor reflections. There is some support for the theory that this was sporadic-E assisted by meteor ionization in the E-layer. During this event Jim, G8LFB, heard an I7, so there was a selective path open between the UK and Italy at that time, whatever the propagation mode.

As John Branegan, GM4IHJ, has repeatedly pointed out, Es occurs much more frequently on the lower frequency bands than on 2m. This is one reason why a European allocation on 50MHz would be so appealing. The 70MHz band would be equally productive in Es dx if only more countries were authorized to use this band. Jeremy Whitfield, G3IMW, (London) is a regular 70MHz operator, and he monitors for Es by listening on the 28MHz band. For him the "season" started on 23 April when he worked OH5AD on that band at 1317, and then an hour or so later heard ZB2VHF on 50MHz. It was fortunate that ZB2BL, the beacon keeper, was transmitting on 28MHz at the time, as Jeremy was able to contact him and set up some crossband contacts (50/28) for himself, G3NOX and G4JLH. There may be many relative newcomers to amateur radio who, having come into the hobby during the sunspot maximum period and heard incredible dx on 10m, would not find the presence of an OH signal on that band very surprising, but at that time of year, and in the present state of the sun, a path-length such as OH-G would be very indicative of sporadic-E, yet not necessarily provide any evidence that the E-layer ionization was strong enough to permit contacts on 2m.

Perhaps next month we shall have many reports of major Es openings to the Mediterranean, as these always seem to occur in June to open the season on that band.

Four and six metres

The response to the request for applications for a further batch of 50MHz experimental permits was very good, and at present the vhf manager has the unenviable task of studying these, knowing that there will not be nearly enough permits to satisfy all those who are keen to work this band. Meanwhile the activity outside tv hours remains high, with a good deal of crossband work between 50MHz and 28, 70 and 144MHz. Harold, G8VN (Mickleover), listens most days between about 0745 and 0830am. He has heard many of the regulars with his fixed dipole mounted in the roofspace of the house—looking east-west. He has a temporary 2m antenna, also indoors, to work crossband, and uses an MM receiving converter into a TS530S. He is hoping to be one of the lucky ones who gets a permit for 50MHz, in which case he will improve his equipment.

Chris, GM3WOJ, reported much improved results from his new QTH in Fortrose, Ross-shire. His unusual ms contact with G4IJE is described under "Meteor scatter". On tropo he has worked two good stations, G6XM and GW3LDH, but he experiences very bad local QRM from Rosemarkie tv on 51·75MHz, located some five miles distant, which makes reception during daylight hours almost impossible. Chris says that he does not plan any 70MHz expeditions during the Perseids this year but will be very active on both 6 and 4m, including crossband to other frequencies, from his home QTH.

Jeremy, G3NOX (Essex), says that he has been surprised by the number of reports he has received from stations listening on 50MHz. He has a big antenna, a 5-over-5 pair of Yagis, which he put up just in time to have an Es contact with ZB2BL crossband (50/28) on 23 April via sporadic-E. With his Lunar 6M10 amplifier he can make contact with most of the UK under normal conditions, though GM is a bit difficult. With conditions just above normal, GM3WCS can be heard as a tropo signal. Jeremy welcomes reports on his transmissions and is QRV most days, 0715-0745am, as well as some evenings after tv has closed down.

On 4m, another Jeremy, G3IMW (London), bemoans the lack of activity on the band, and finds it ironic that *4-2-70* mentions the crowding on 2m while this band is so uninhabited most of the time. He urges people in the north, GM, EI and particularly GI to come on the 4m band as there are many times when he hears the Angus beacon strongly—or did so when it was QRV. He comments on the effect of the closure of GB3WHA on northern stations, coupled with the present (and hopefully temporary) loss of GB3ANG's 70MHz signal to southern operators. G3IMV recently increased his power to the legal limit, but previously with only 7W he worked six countries and 18 squares on the band, plus three more countries crossband. He made his first auroral contacts on 70MHz on 26 April in the shape of GM4DIJ and G4PBP (YM). He commented that others were hearing beacon GB3SIX with auroral tone on this occasion. Jeremy has been listening to some ms contacts on the band, and experimenting with 30° antenna elevation: results are so far inconclusive.

G6FU (Cornwall) reminds me that UK amateurs had an allocation on 58·5 to 60·0MHz *before* the last war (see April *4-2-70*). This is indeed true —G8VR used to work the band in those days with simple self-excited equipment!

Meteor scatter

If one were to be asked "what is the most reliable means of communication on the 2m band?" few, I suspect, would choose the meteor scatter mode. Yet ms cw is probably the only mode by which you could guarantee to pass information on that band to, say, Yugoslavia, Poland, Czechoslovakia or Italy at any time of the day or night. The QSO might go through quickly, or it might take several hours, but you could more or less guarantee that contact would be made, provided that the operator at the other end knew

where and when to listen—this proviso is in any case a necessary requirement for any two-way contact to be made. Only a few years ago, meteor scatter was regarded as an "exotic" mode requiring much expertise and very special equipment for its implementation. In fact, all one needs is about 1,000W erp—say 90W to a 10-element Yagi, a simple memory keyer which can be built on a kitchen table, plus a cheap tape recorder suitably modified to allow the motor speed to be slowed right down.

Some millions of meteors are estimated to enter the earth's atmosphere every day, and many of these produce ionized trials which will reflect radio waves at frequencies up to and including the 144MHz band. Generally speaking, the longer the wavelength, the stronger the reflections, so 70MHz and particularly 50MHz are very good bands for this mode of propagation. During major showers the reflections can be frequent and very strong, but even with "sporadic" meteors which enter the atmosphere randomly, contacts are possible on every day of the year provided both stations observe certain ground rules and know what they are doing. The procedures for ms working are well documented in, for example, the RSGB's *Amateur Radio Operating Manual*, and elsewhere, so they will not be repeated here. Let it simply be said that whereas tropo, auroras and sporadic-E cannot be "turned on" when required—nor can the position of the moon be varied at will to suit eme propagation—some meteors are always present in the atmosphere, and in a long enough period several will have trajectories which will reflect signals between two stations up to 2,000km apart, with beams directed either towards one another or at some fixed point in space (backscatter or off-set working).

Recently, to prove that high power is not required for ms cw working, SM6EAN (FR) and G8VR (AL) arranged a schedule during which SM6EAN used 30W to 4 × 10-element Yagis, while G8VR used a barefoot FT225RD running 25W nominal to a single 16-element Tonna. The contact was completed easily, with SM6EAN copying one burst of 40s duration from G8VR, and another of 20s. Future tests will be carried out with both stations adjusting power to give the same erp, approximately 150W (that would be about 6W output to a 16-element Yagi).

Many of the 50MHz permit holders have discovered that the band is ideal for ms, with long bursts being received on both cw and ssb when only modest powers and simple antennas were being used. In fact when the separation between stations is relatively short, simple antennas with high-angle radiation such as a single dipole can be more effective than a high-gain, highly-directional Yagi.

GM3WOJ and G4IJE have had many ms skeds on 50MHz, but one recently formed the basis of a claim for the fastest-ever completed ms contact through a sked. They typically work 30s periods on ssb, and on this occasion, GM3WOJ started by giving callsigns. As he went over to receive at the end of the 30s transmission, Paul realized that a long burst was in progress and gave reports, calls and a "break" instruction. The burst continued long enough for Chris to respond with a "roger-report", breaking again to allow Paul to give full rogers, all within 39s from the commencement of the sked.

G4OIG (Northampton) is one station who uses only modest erp (60W to a nine-element Tonna) but who has nevertheless worked many excellent stations using ms cw. Recent contacts were with CT4KQ (WA), SM5CNQ (HS), SM5KWU (IT) and YU2SET, with four out of five skeds providing complete QSOs. Down in Devon G4NDG (Tiverton) uses comparable equipment to G4IOG, and has had six good contacts with DL3MBG (GI), Y27BL (GL), SP6GZZ (IL), DL6NAA (FK), SM7KNK (HP) and LA7KK (FU). He sent in a tape recording of a very long burst from LA7KK, which was most impressive. David Dibley, G4RGK (Bucks), is another low-power station, but with a 16-element Tonna. He keeps his antenna at a fixed elevation of about 10°, which is a very good idea, not only for ms but also for auroral working. In the past couple of months he has worked OK3CGX (II), YU3FM (HG), OK2PEW (IJ), OK2PBV (JJ), YU7MAU (JF), YU2EZA (IG), SM5KWU (IT) and LA7KK (FU). This sort of dx from these three stations should encourage others to try the mode. The ability to operate on 14MHz to arrange skeds over the vhf net is a very distinct advantage.

G4RGK commented on the "missing information procedure" mentioned in May *4-2-70*. He agrees that many European operators find it confusing. Equally there are some operators who, having copied a report, assume that the station sending it has copied both callsigns, so they send reports or "roger-reports" for the entire period, making it virtually impossible to complete the contact. In a recent such situation, G4RGK sent a string of BBBBBs (both callsigns needed) but was only rewarded by a series of RRRRs from the remote station, who clearly did not understand what was being sent. Result—no contact.

John Hunter, G3IMV, has worked so many squares that he finds it difficult to locate operators in those which he still needs. In this situation skeds on the vhf net can be invaluable, and have given him ON6UG/EA in AA, and UC2AAB in OO in recent weeks. UC2AAB is going to ON square for the Perseids, and LA1K will be in EY. With this sort of information plus a sked arranged, working the rare ones can be made much easier. I prophesy that within a very few years ms will be regarded as a "normal" mode, just as auroras and Es are today. Using ssb in this mode is rather more difficult, but by no means impossible. I recall G4IJE working an EA6 one night when it was blowing a gale outside, with all other modes totally absent. This was on ssb and it was a great thrill to hear the EA's "roger-roger-roger" issue from the loudspeaker on an apparently dead band as they completed the contact. If you are in any doubt about how to get started, drop a line to *4-2-70* with your queries.

Rainscatter or Es?

Propagation, assisted or affected by scattering of rf energy by rain-drops, is usually associated more with microwave frequencies than 144MHz. However, Vucinic Djuro, YU6ZAH, says that he experienced this phenomenon on 22 June 1983 along a line running west from his QTH (in IC square) when he worked G4CDC, G6GRK, G4SFY, G3XT, G4KMH, G3XGK, G6OYL, G6KS, G3ZXZ, G6CMJ, G4DHF, G8JJ, G3LQR, G2BAH, G6DDK, G3MOU, G3IMV, G3LTF, G6ECM, G4FUF, G3ZYZ, G3POI and G6ETA. He points out that his friend and neighbour YU6ZAS, just a few kilometres distant, heard none of these signals from the UK.

I would hazard the guess that all of the UK stations worked would have attributed the contact to sporadic-E rather than any rain-assisted mode, and the fact that YU6ZAS heard none of them is quite consistent with Es propagation, which can cause great frustration due to its selective nature. There have been many times at this station when operators only a few miles away were handing out S9 Es reports to dx stations inaudible at G8VR. However, if one thing is certain it is that we know far too little about propagation, especially the causes of Es. There are theories gaining ground which associate Es propagation with local thunderstorms, so this piece of information is of great interest, and may hasten the day when the full picture emerges. Meanwhile it was good to hear from Vucinic, who says he has been a *Rad Com* reader for many years. We in turn owe a lot to our Yugoslav friends for providing such good stations and operators, who enable us to take advantage of dx openings in that direction whatever the mode.

VHF Newsletter

As an experiment the VHF Committee is sponsoring the issue of a vhf newsletter on a subscription basis. It is intended to be of interest mainly to "weak-signal" operators on the vhf/uhf bands, and will attempt to give up-to-date information of activity from rare squares, expeditions, propagation information etc. Some eight to ten issues, mailed directly to subscribers, will be published each year according to the availability of newsworthy items. The editor will be Dave Butler, G4ASR, who is a well-known vhf operator living in the Hereford area. It is planned to issue the first such newsletter in July 1984, and subscriptions (£4.20 per annum) should be sent to the membership services officer at RSGB headquarters. The newsletter and *4-2-70* will complement one another rather than compete for information. A single or double sheet can obviously be produced much more rapidly than a fully-fledged magazine, so some of the more urgent items of news which arrive too late for publication in *4-2-70* will appear in the *VHF Newsletter*. Respond without delay to receive the July issue.

From here and there

LA8AK says that a group of Scandinavian amateurs is testing propagation using "horizontal fm", that is, horizontal antennas instead of the verticals normally used by operators of this mode. The group has selected a frequency of 433·775MHz, so those interested should monitor this frequency when conditions are good to Scandinavia. Stations already taking part are SM6HYG, LA4WN, LA6VBA, LA9DL and LA8AK.

Plans are well advanced at RSGB headquarters, in conjunction with John Morris, GM4ANB, to produce maps incorporating the "Maidenhead" system of QTH location. Initially three maps are to be produced, one of them showing different countries in a range of colours for easy identification, and the other two in different sizes, to accommodate most operators' needs. Watch *Rad Com* for news of their availability.

Brendan Rooney, EI7CS, who is chairman of the Sligo Amateur Radio Club, says that eight of the members are in the RSGB. EI7CS is active from VO square on 2m using 100W to a 10XY antenna, and looks for contacts via tropo, aurora and Es. EI8EV operates from UO square with 10W ssb/cw/fm to a six-element, horizontally-polarized quad ("horizontal" fm operators please note).

Ljube, YU7AU, will assist any station who is missing a YU QSL card. If they will send a card to him with a couple of ircs, he will endeavour to forward the card to the YU station in question. Ljube's full address is Ljubisa Miletic, Masarikova 2/XVIII, 2600 Pancevo, Yugoslavia. □

RSGB National VHF Convention 1984

by John Morris, GM4ANB; Charles Suckling, G3WDG; and Ken Willis, G8VR

THE RSGB NATIONAL VHF CONVENTION 1984, held at Sandown Park on Saturday 24 March, proved to be the most successful ever staged. Between 2,250 and 2,500 visitors attended. The exact number is not known because the supply of tickets, based on previous demand, ran out quite early in the afternoon! It seems that this popular event goes from strength to strength, probably reflecting the growth in Class B licence holders who operate on the vhf bands. However, the success also suggests that the VHF Committee, which plans the convention each year, has established a formula that appeals to the bulk of those who attend. In fact to date the only criticism received by the organizers was that there were too few "black boxes" on show—but as every vhf addict knows, the convention puts a premium on home-construction and experimental techniques, so examples of these are given pride of place at Sandown Park.

Much credit must also go to the RSGB Exhibition & Rally Committee, under the chairmanship of Norman Miller, G3MVV, which takes under its wing the awesome array of tasks associated with the staging of such an event. On this occasion Les Hawkyard, G5HD, was assigned the task of getting the trade show set up and running, and what an excellent job he did. His wife also carried her share of tables and chairs, and checked off the complex details to ensure that every trader who had booked-in received the appropriate stand space and facilities. There was the usual fleamarket, whose many goodies were descended upon by the early arrivers; this was organized by Alf Othen, G8FSZ, and its popularity can be gauged by the fact that for most of the day it was difficult to get close to the action, so great was the crush around the stalls.

As in previous years a talk-in link was provided for amateurs coming by road, and this was manned by South West London Raynet members under the direction of Mr M. P. Black, G4HJY. Another popular facility was an equipment-measuring stand, provided by Chris Morcom, G3VEH. Chris had a busy time—marred somewhat by nearby loudspeakers blaring pop music (a strange vhf connection perhaps)—and it was noticeable that many commercial rigs exhibited appalling noise figures; the FT290 being among the worst offenders in this respect, with 20-25dB in fm mode being typical. Not much good for eme one suspects!

The afternoon lecture sessions, which began at 1415 following an opening address by the President, Bob Barrett, GW8HEZ, were very popular. The only problem was that several of those attending wished that they could be in two or more places at the same time, in order to take advantage of all the material offered. In his address the President, who is, incidentally, the first Class B licensee ever to hold this office, welcomed visitors to the convention and commented on the work of the RSGB in dealing with the steady growth of members caused by the increasing popularity of amateur radio world-wide. He pointed out some of the vhf matters which had been dealt with by Council in the past year, notably the issue of 50MHz experimental permits, and recently their extension plus the efforts being made to increase the vhf allocations for UK amateurs. He emphasized the value of a strong national society to combat pressure from other users of our bands, using the Belgian experience to illustrate this important aspect of the Society's role.

The President then proceeded to make several awards. Many visitors were seeing these trophies for the first time, as it had been customary in previous years to make the presentation at the evening dinner session which was discontinued this year.

Cotswold & Big M Contest Group receiving the Arthur Watts Trophy as winners of the restricted section of VHF NFD 1983

G3VEH and friends check their equipment on the test facility provided by Don Hamilton, G8DON

Lecture Stream A

The opening lecture in this session was given by John Regnault, G4SWX, on the subject of gallium arsenide devices. In an excellent presentation, well illustrated, John described the theory and operation of such devices when used as low-noise vhf/uhf amplifiers, tracing their ancestry from around 1948 when the first germanium transistor appeared. He introduced many practical points into the lecture, which caused many to think about their own front-end designs, particularly from the point of view of dynamic range. He also showed how it was possible to construct a front-end which provided flat-gain over the entire range 50-2,000MHz, with 2dB nf, and 8-10dB gain. Such wideband front-ends in television receiver design could cause many problems for amateurs from the point of view of tvi. Finally, John gave his views on anticipated further developments, some of which would have a great impact on amateur equipment, with GaAs devices becoming available at low prices for microwave use. This lecture was published as "Gallium arsenide fets for 144 and 432MHz" by G4SWX (*Rad Com* April 1984, pp304-5), for those who wish to refresh their memories regarding the many useful and interesting points which it contained.

The next lecture was equally fascinating. Peter Blair, G3LTF, gave his account of eme operation, a lecture lavishly illustrated by colour slides depicting antenna systems that the average amateur can only dream about. Peter has some 20 years' experience of eme work, mainly on the 432MHz band, and he first outlined the minimum requirements for successful operation in this mode. Due to the low reflectivity of the moon to radio signals, and the fading encountered through Faraday rotation, he put the requirements as a 20ft dish on 432MHz and a transmitter power of 600W. The receiver system requires an nf of about 0·8dB.

Peter was joined towards the end of his talk by Bob Reif, W1XP, who had made the journey from Massachusetts to attend the convention. Bob is an experienced "moonbouncer", and he showed pictures of his own antenna systems, some successful, others abandoned, which he had used over the years. The whole presentation by Peter and Bob took amateurs out of their normal vhf/uhf environments and gave them a glimpse of what future communication could be like. G3LTF predicted that for the typical operator in a suburban location, the future for eme lies in the choice of 2·3GHz as the operating band, and in a 10ft dish in the backyard. With such equipment worldwide contacts should be possible as more and more amateurs become equipped for such operation.

The final session in Stream A was devoted to a forum during which members of the VHF Contests Committee took the stage to answer a barrage of questions from the audience covering a variety of contest-related matters. Unlike some of these forums, there was a marked lack of "barracking", and much intensive discussion. This indicates the

PRESENTATION OF CONTEST TROPHIES BY THE RSGB PRESIDENT

L ro r: VHF Contests Committee Cup being received by G4HWA obo Hillbillies Contest Group, overall winner of 1,296MHz Trophy Contest; Mitchell Milling Trophy to G4CLA obo Parallel Lines Contest Group, leading station overall 144MHz Trophy Contest; Geoff Brown, GJ4ICD, leading fixed station in the 144MHz Trophy Contest, winner of the Thorogood Trophy

L to r: GM4CXM and GM4COX with the Tartan Trophy received as leading station in the 1983 VHF NFD. On behalf of the South of Scotland VHF/UHF Contest Group, winner of the 70MHz Trophy Contest, they also accept the VHF Manager's Trophy; G3SJX, G8APZ and the HADRABS & Addiscombe Contest Group, overall winners of the open section, VHF NFD 1983, receive the Surrey Trophy; 1951 Council Cup, awarded to the overall winner 432MHz Trophy Contest, to G6ELI and G8TFI obo South Bucks Contest Group

importance attached to contest operation by many amateurs, particularly those in clubs who use these occasions to participate in contacts which they might not be able to make from their own locations. One was left with the impression that the VHF Contests Committee does a very valuable job, often without much by way of thanks or appreciation, and it was a useful experience for many to see, for the first time, those who represent this facet of the hobby so effectively.

Members of the HADRABS & Addiscombe Contest Group with their emergency beer machine

Lecture Stream B

The opening lecture in Stream B was billed as "Oscar 10 experience", by Ron Broadbent, G3AAJ. However, after a short introduction, accompanied by slides, Ron handed over to Jim Miller, G3RUH, for some insights into the latest bird. G3RUH gave a rundown of the sort of equipment needed to work through Oscar 10. During the busy weekends something like 500W erp (say 25W to a 12-element x-y crossed Yagi) and a 3dB receiver noise figure should do the job. Monday is QRP day, when 200W irp (10W to a 12-element) is quite adequate. It is very important not to use more power than necessary; all you manage to do is turn up the satellite's agc, so making everyone else get weaker, including the station you are trying to work! At quiet times even 20W erp of cw (200mW to a 15-turn helix) can just about access the transponder, and G3RUH played a recording to prove it. The talk was enlivened by computer programs (most of which worked!) showing how slowly the satellite moves at apogee, making "handraulic" rotation quite adequate.

For the second lecture Charlie Newton, G2FKZ, of the Propagation Studies Committee, provided a retrospective view of "Solar Cycle 21-facts and fallacies". The minimum of the solar cycle, and hence the start of Cycle 21, has been fixed as June 1976. The cycle followed the usual sawtooth pattern, with a fast rise, peaking in 1979, followed by a gradual decline. Cycle 21 was unusual in that the preceding sunspot minimum was not all that low, with a mean sunspot number of 12. This unusually high minimum was followed by a very steep initial climb—indeed, the steepest for 250 years, leading up to a good, high peak. G2FKZ presented a very large amount of data, including a spectacular viewgraph plot, at least 2m long, which needed two people to slide it across the projector! In this short report it is not possible to give an adequate summary of all the facts and implications, but of particular interest to aurora watchers will be G2FKZ's comment that aurora seems to go with neutron, rather than proton, count from the sun, while coronal holes (of the right species) are the "bread and butter of aurora".

Last in Stream B came "The 50MHz story", narrated by Keith Fisher, G3WSN, the RSGB vhf manager, and Ken Ellis, G5KW, the 50MHz corresponding member on the VHF Committee. G3WSN described the current state of the 50MHz experiment, and the criteria used by the

authorities to choose the 40 permit holders. On the whole the experiment is working well, with no reports of interefence from the experimental operation; a factor which was important in setting the recent increase in permit numbers to 100. On the operational side, G5KW described some of the experiences of the 50MHz experimenters, including his own activities in the Scilly Isles. A particularly interesting phenomenon was the critical importance of distance to propagation. When in Kent, G5KW could hear stations on the south coast easily working across the Atlantic, while at his location the dx was conspicuously absent. Then, on moving to the Scillies, G5KW heard clear signals from stations on the other side of the Atlantic, which were totally inaudible further east on the mainland. The presence of dedicated, active stations on 50MHz is already demonstrating that propagation occurs when many would assume it to be impossible, and we will surely experience many surprises as the experiment proceeds.

Lecture Stream C

The microwave lectures, as usual, were very well attended, with the lecture room virtually packed for all three sessions.

The first lecture was given by Les Sharrock, G3BNL, on the subject of microwave power generation. He described the various ways of generating power on the higher microwave bands, including crystal-controlled sources, travelling wave tube amplifiers, klystrons, Gunn oscillators, and impatt oscillators/amplifiers. With medium/high power operation in mind, crystal sources were complicated and often made use of rather difficult-to-obtain devices. TWT amplifiers were not considered to be ideal for portable operation due to the difficulty of providing the high voltages necessary. FET amplifiers were still rather expensive for power generation. With all these factors in mind, Les described how he had developed a system which married the ease of generating power with free-running oscillators, with low-power crystal-controlled sources, to obtain tens or hundreds of milliwatts of crystal-controlled power.

Les Sharrock, G3BNL, with his 10GHz phase-locked transceiver

His system uses phase locking to achieve this. A low-power crystal-controlled signal, which can be generated easily, is mixed with a sample of the oscillator's output to produce an i.f. at 144MHz. After amplification this is divided to 1·44MHz by a Plessey SP8269 divider, and phase comparison takes place at this frequency. The output from the phase detector is fed via a suitable loop filter and dc amplifier to the Gunn device. G3BNL noted that most of the system could be transferred between equipments, and that he had successfully locked medium-power Gunn oscillators for both 10GHz and 24GHz.

The second lecture, "Microwave propagation whatever the weather", was given by Barry Chambers, G8AGN. He began by covering some of the more important aspects of microwave propagation, including free-space propagation, line-of-sight propagation, the effects of ground reflections, how signals pass over obstructions and the range of attenuation possible, and the use of passive reflectors to overcome obstacles. The flyswatter antenna was cited as a good example of how to employ passive reflectors. Barry then went on to describe how the weather can affect microwave propagation. Two of the most important effects are ducts and rain scatter. The former can occur on all of the microwave bands, and the mechanisms of duct formation were explained, with the help of some very interesting slides, which showed the visual effects of ducts. Ducts generally occur during periods of fine weather, but bad weather can also be of use to microwave operators: enhanced conditions can occur when there is heavy rain around. This type of propagation has often been experienced on 10GHz, and occasionally on 5·7GHz.

The final lecture of the afternoon was given by Dave Robinson, G4FRE. Dave noted that there had been few talks at the VHF Convention in recent years concerning the "middle bands", ie 2·3, 3·4 and 5·7GHz. He began by outlining the frequency relationship between these bands, and how it is possible to employ some common equipment, such as oscillator sources and power amplifiers in the 384MHz range. Simple transmitters use varactor multipliers to reach the final frequency. A power level of about 10W was recommended to drive the multipliers. Simple receivers, transmitters and antennas were then described for each of the bands in turn, and recommended designs were highlighted.

For 2·3GHz receiving, the well-tried interdigital converter was felt to be the best, with the Microwave Committee oscillator board for the local oscillator source. Two varactor doublers for transmitting were described, designed by G3LQR and DF7QF. Suitable antennas were the G3JVL loop-Yagi and dishes. The techniques for the other bands were similar, except that on 5·7GHz waveguide systems were also attractive. G4FRE also gave a flavour of the activity levels on the three bands, together with details of the available beacons.

Round-up

Once again the Six-Metre Group took advantage of the gathering of vhf operators to hold their own annual meeting, at which officers were elected for 1984–5.

No-one seems to have complained about the decision to abandon the evening social event; indeed, the presentation of trophies during the main part of the convention appears to have been well-received.

As before, thanks are due to Geoff Stone, G3FZL, of the VHF Committee, who was the overall convention organizer again this year. It is difficult for the visitor to picture the tremendous amount of behind-the-scenes work that goes on in staging an event of this size, and we are lucky to have among the amateur fraternity enough people who are prepared to give their spare time to such activities. Preparations for the 1985 convention are already being made by the VHF Committee. See you at Sandown Park next year! □

AMTOR SPINS A TIME-WARP AROUND OSCAR 10

(Continued from page 583)

signal C2. But station X has already received an acceptable C2 and is therefore blithely sending JKL, which arrives at Y and is duly printed out. The second C2 at X makes it send JKL again so a repeat JKL is printed at station Y. Unhappily GHI is lost and we get an extra JKL instead. In the absence of further errors, traffic will continue to run smoothly through the system after this.

Let's look at an error on a control signal. C2 sent after receipt of the second JKL at station Y get mutilated in transit; meantime MNO is already on its way from station X and is duly printed out at station Y. The mangled control signal causes station X to send an RQ block and no print-out occurs at Y. A C1 arrives back at X which demands a repeat of Block 1 so we get a repeat print of MNO at Y. Yet another C1 gets back to X after Block 1 has been repeated, and a third MNO block is sent on its way and gets printed out at Y. Thereafter, in the absence of more errors, traffic will continue to be sent smoothly through the system.

Summarizing, the two fault conditions will produce the following results:
(1). A mutilated three-character block arriving at Y is lost, and the following three-character block is printed twice.
(2). A mutilated control signal does not lose any block but results in three print-outs of the block after which it is received.

On the face of it, this sounds like pretty rough copy over Amtor-Oscar, but bear in mind that the "clean" path via Oscar 10 is entirely capable of producing perfect print—the hazards occur at the ground-station ends. Anyone doubting this statement should look at Fig 3—which is a copy of the untouched, uncorrected print-out of 9M2CR's own downlink at half-hour intervals over a 2hr 30min period starting at apogee on orbit No 554 on 8 March 1984. The downlink was received on a second Amtor system at 9M2CR set in mode L and connected to a printer. Round-trip distances varied from 77,900 to 67,500km over this period. From this, it is reasonable to suppose that clean copy could be obtained for a period of 5 or 6h spanning apogee. Tests between 9M2CR and YB0AQT(YAET) have shown that the "clean" 2m environment at 9M2 is a great asset, whereas the QRM pandemonium at YB0 can be a real nuisance. Yet with two clean ends, copy can be excellent.

So Amtor-Oscar is well worth a try (AMSAT will especially welcome its low 60 per cent duty-cycle for the Oscar 10 transponder). Maybe G3PLX will dream up a system time-delay to stop confusing the ARQ logic! Meantime we can surely claim that Amtor spins a time-warp around Oscar 10. Vielen dank, Horst; not forgetting AMSAT and G3PLX! □

Microwaves

*by Mike Dixon, G3PFR**

Operating news

Two dxpeditions, both planned to coincide with the August Perseid meteor shower, will present the opportunity to work rare squares on 70, 144 and 432MHz by ms and "tropo" and will also provide the microwave operator with the chance of dx on 1·3, 2·3 and 10GHz.

The first, from 4 to 18 August, organized by the Derbyshire Hills Contest Group will operate from Eirean squares WL and WM (and possibly VL and VM). The operating frequencies will be 1,296·23, 2,320·23 and 10,100MHz. Operation on 2·3 and 10GHz will be by sked only, or as arranged on the lower bands. Further information from Dave Hardy, G8ROU, QTHR.

The second, from 6 to 15 August (organized by GW3NYY, GW4LXO, G8TFI and GW8TVX) will operate on 1·3GHz from XQ square, with concentration on 144MHz ms from 11 to 14 August. Calls will be put out for "normal" QSOs when skeds permit. The equipment planned for 1·3GHz is 100W to 4 by 23-element Tonna beams and a masthead GaAsfet preamp on receive. Further information from Richard Hope, GW8TVX, QTHR.

In May *Microwaves* it was reported that G8PSF had achieved his 1·3GHz Twenty Squares Award using a very modest station. This month a similar achievement was notified (via the microwave awards manager, G5UM, QTHR) but from a much more difficult situation. Russ Clarke, GW3CCF, working from amid the Clwyd Hills in North Wales using similar modest gear has won his "sticker" and has 20 counties worked towards a further claim. In his covering letter Russ indicates that he has now increased his power to 25W "in anticipation of the forthcoming season" and notes a "north-west activity evening" (Tuesdays, 2000bst onwards) which seems to regularly attract upwards of a dozen stations in the area bounded by Preston, Southport, Manchester, Prestatyn and Wolverhampton. Other callers-in will, no doubt, be welcomed.

Jack, G5UM, also reminds operators that the "original" Four Metres and Down certificates are still available for 1·3GHz operation, and that only eight Senior awards have been made since 1976 (when the first one went to G4BEL) although the tally for the Junior award stands at 52.

John Tye, G4BYV, said that "my dx for the month was DC9XO in EM square on 3·4GHz" and adds that Peter, Y23BD, is now QRV on 1·3GHz from GM square.

Andy, G8PTH, sends news of an attempted "first" to be tried by F9CH and F6BGR between 9 and 13 July. The French stations, using 140W of fm atv on 1,255MHz and a 10,000m² (!) antenna, will attempt eme. The antenna to be used is, in fact, the experimental solar "oven" in the eastern Pyrenees near Font Romeu, with a dipole in place of the usual "crucible" and the computer reprogrammed to track the moon rather than its usual target. Maurice, F1FVX, who supplied this information, says that the moon will be at a low elevation at this time. Further information will be given on French repeaters, on 144·170MHz ± 10kHz and 3,670kHz ± 10kHz. Calculations by G3WDG suggest that signal to noise might be about 10dB in 10MHz bandwidth.

Fundamentals: the basic transceiver system

Regardless of frequency and whether a "hi" or "lo-tech" approach to design is taken, there are certain basic principles and building blocks common to all. The simplest possible effective transmit/receive system is shown in schematic form in Fig 1.

In receive mode the incoming signal from the antenna (8) via the feeder (7) and t/r switch (6) is mixed with the oscillator signal (1) in the mixer module (2). This produces sum and difference products, one of which is selected, amplified and demodulated (3)—the standard superhet receiver and very fundamental! If the same oscillator can be modulated or keyed (4) and connected to the antenna via the t/r switch (6), then full QRP transceive operation is accomplished with a minimum of components. Again very fundamental!

For those who take an interest in lf/hf QRP working, this type of arrangement should be familiar. However, at these frequencies it is common for the mixer (2) and the amplifier/demodulator (3) to become one, since the mixer is usually configured as a direct-conversion device, with the oscillator tuned exactly to the incoming frequency (zero i.f.), the mixer then acting as its own demodulator.

Such techniques can be applied at vhf and above, but generally they become unacceptably inefficient. It is more usual to employ an intermediate frequency (for example 10·7, 30 or 100MHz) at which stable, low-noise amplification (with selectivity) can take place before demodulation. The transmitter, in principle, remains unchanged.

It should be apparent that the oscillator is the "heart" of such a simple system and must possess sufficient stability to hold an incoming signal within the receiver passband on receive, or to stay within the other station's receiver passband on transmit. The other requirements are that its output spectrum should be substantially free from spurious harmonics and noise, both of which will degrade performance.

Fortunately, by using a Gunn-effect device mounted in a well-designed and built cavity and generating rf directly in the 10GHz band, it is fairly easy to meet these requirements. Stability is good enough to allow use with a receiver passband of, say, 70 to 200kHz (even at 24GHz, witness the new dx record!). It is also fortunate that the Gunn device is very easy to modulate to transmit fm by simply varying its supply voltage slightly. Herein, then, lies the basis of the 10GHz wideband system—what could be simpler and more fundamental?

Many oscillator designs have been published in the last 7 to 10 years and, at the time when Gunn diodes started to appear in amateur use, a review article by G3YJO was published in *Rad Com* May 1974. Three of the designs due to G8APP and G3WJG were all based on the iris-coupled, forward-cavity design concept. Subsequently a simplified version was published in *Microwaves* February 1976 by G3RPE, who commented favourably about this design, having built several versions without undue problems. A further simplification (the elimination of the sliding short) appears in the *VHF/UHF Manual* 4th edn, p9.43, Fig 99c.

My early experiences (1976) with this design were generally favourable, with the occasional oscillator tending to generate spurii, but this was subsequently found to be due to "odd" Gunn diodes rather than the cavity itself. Currently available "surplus" diodes seem less prone to this type of instability, require a somewhat higher operating voltage (typically 8·5 to 10V), give a higher output (typically 10 to 20mW) and generate much lower levels of sideband noise than previously.

The versatility of this type of oscillator arises from the ease with which the cavity length can be altered, the wide tuning range of the dielectric

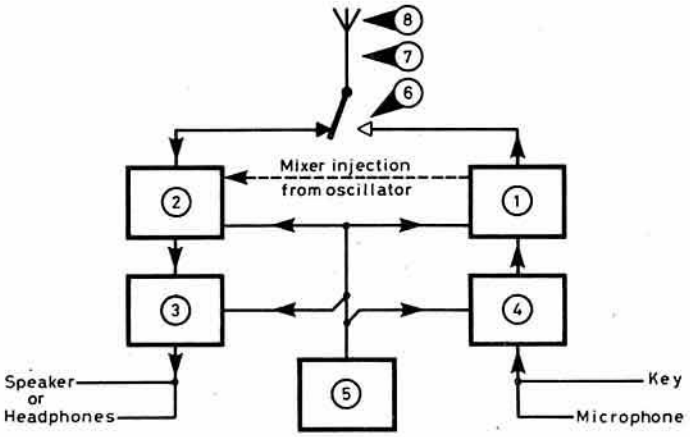


Fig 1. Block schematic of a simple transmit/receive system. Key: 1, oscillator; 2, mixer; 3, i.f. amplifier, demodulator and audio; 4, modulator; 5, power supply; 6, t/r switch; 7, feeder; 8, antenna. Signal and dc paths are shown by arrows

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

screw, and the ease of adjustment of output power. I would thus have no hesitation in recommending this design as one of the "classics" of amateur technology!

A few hints on construction may be useful to the beginner. Choose the cavity length for the upper part of the band (say 10,500MHz), as a 2BA tuning screw will easily tune it down to the bottom of the band. Saw the iris plates from sheet—the use of tin-snips distorts the metal and it is almost impossible to straighten it out again to be truly flat. Always use a plain flange—this enables the iris plate to be clamped and supported firmly: a choke flange does not allow this.

Adopt a logical sequence of construction: cut and square-off the requisite length of waveguide, remove all burrs, and leave clean, even surfaces which should be finished by "honing" using fine emery paper on a flat plate; for example, a piece of plate glass. Next mark the position of the Gunn mount and, on the flange shoulder, the position of the tuning screw. Solder the flange in place with its face flush with the waveguide end—preferably using silver solder as this will make later (soft soldering) operations easier.

Using a pillar drill, drill *squarely* through the flange shoulder and one wall of the waveguide in one operation, and then open these to the appropriate tapping size (2BA or 5mm size). Tap through both holes and, when this operation is complete, clean off all burrs using a fine file or an emery stick.

Again using the pillar drill, drill both walls of the waveguide 3/32in, *from one side*, at the Gunn mount position, open the lower (earthing end) hole to 2BA (or 5mm) tapping size and tap appropriately. Once more carefullly remove all burrs. The appropriate tapping sizes are, respectively: for 2BA, 4mm; and for 5mm, 4·2mm.

Having prepared the end shorting plate, jig this into position with a small G-clamp and the earthing-screw mounting nut, using a chrome-plated, stainless steel or rusty mild steel screw. If the flange has been soft-soldered into place, this must also be jigged with a screw to prevent movement during the next soldering operation. Soft-solder the end-plate and mounting nut in place using the minimum of solder—I always prefer to use solder paint containing a water soluble flux and a good gas blowtorch with a fine flame. The final operation is to inspect the work, remove dirt, oxidation and traces of flux and solder inside the cavity; the objective is to end up with a bright, shiny piece of metalwork.

The mounting and decoupling components *must* be accurately centre-drilled (a lathe job—find a willing friend!) otherwise there is a risk of fracturing the diode if the holes are off-centre. The assembly of these parts is obvious from the diagrams, to which reference should be made. Extreme accuracy in marking out and drilling is not needed since, as already indicated, such an oscillator is easy to adjust and has a wide tuning range!

Alternatives to this design which I know work well (but need retuning to the amateur band) are the Mullard CL8630 (oscillator only) and the Solfan (oscillator/mixer) modules, both often obtainable at rallies. Neither is, in my opinion, quite as versatile as the G8APP design but can be successfully used. Ex-doppler modules using separate (side-by-side) oscillator and mixer cavities are not really suitable for amateur use except, perhaps, as ready-made signal sources or a source of good Gunn and mixer diodes.

Next month I will deal briefly with the mixer module: here again there are several alternatives, the most versatile of which is the 'in-line' type which can eliminate the t/r switch. Meanwhile, if any reader has queries regarding the construction of this type of oscillator, I will be pleased to try to answer these.

24GHz dx record

On 25 April a new 24GHz record was set up between I4BER/I4CHY (Province of Pescara, GD44b) and IW3EHQ/I3SDY (Province of Udine, GG72j) at a distance of 289km. The former stations at 1,200m asl, and the latter at 1,700m asl used 10GHz for dish alignment!

I4BER received IW3EHQ's signals immediately although, due to receiver problems, it took six hours to complete the two-way contact. Both ends of the contact were above the snow-line, and the predominantly over-sea path must have been "optical", though no doubt aided by super-refraction. Each station used Gunn oscillator transceivers with noise figures around 5·5dB in 200kHz bandwidth and 100-150mW transmit output. Congratulations to all concerned.

In other publications

Two overseas publications have come to hand, both containing items of microwave interest.

The first is DC0DA's publication *Der shf Amateur* which contains design data for a solidstate, pcb-based 5·7GHz transverter with a claimed output of 1W (ssb) and a companion linear amplifier using a YD1060 disc-seal triode. There is also a useful design for a 2·3GHz interdigital filter with a 3dB bandwidth of 47MHz (93MHz at 20dB) and an insertion loss of about 0·6dB.

Issue 1/84 of *Dubus* has constructional details of a 24GHz omnidirectional (11dB) antenna and waveguide to coaxial transition, a 2·3GHz solidstate 7W linear amplifier, and a two-stage GaAsfet preamplifier for 5·7GHz. Readers are reminded that subscriptions (£5 post-paid) for *Dubus* are now due. Cheques should be made payable to R. McHenry and sent to him at 26 Charlbury Road, Oxford OX2 6UU. Bob emphasizes that there are no back-numbers available.

Late news

Arising from the recent IARU Region 1 conference, the worldwide "Maidenhead" locator (abbreviated on cw as loc) is being adopted, the implementation date being 1 January 1985. A major explanatory article is planned for publication in *Radio Communication*, and its extension to higher accuracy for microwave purposes will be covered here and in the *Microwave Newsletter*. Meanwhile the reader is referred to G4ANB's article "Locator system for vhf and uhf", *Rad Com* November 1980.

After considerable and lengthy discussion on current 10GHz band usage, the RSGB Microwave Committee will recommend that wideband operation should take place at frequencies between the narrowband segment (10,368 to 10,370MHz) and the beacon frequencies (nominal 10,400MHz), again as from 1 January 1985. The reasons for this recommendation are manifold, the main ones being that it allows optimization of antenna feeds to permit the use of both wideband and narrowband modes without difficulty, and enables wideband operators to tune both the narrowband and beacon frequencies using a narrower oscillator tuning range. On simple equipment this brings the benefit of better "bandspread" using smaller tuning screws or existing screws with limited movement, making the construction of slow-motion drives easier.

The reason that most wideband operation has occurred between about 10,050 and 10,100MHz is largely historical and is a hangover from the days of "bent" klystrons which were difficult to tune much above 10,050MHz. By contrast many modern, simple systems can be based on doppler modules which are more easily retuned to the upper part of the band.

The VHF Contests Committee has indicated that it has responsibility for adjudicating the Region 1 September 144MHz and the October 432-and-up contests this year. This represents a major undertaking and it has been decided for this year only that there would be no special rules allowing half-points for one-way contacts on microwaves. It is hoped that this will not deter operators from entering the contest. □

BOOK REVIEW

VHF Propagation Handbook by J. D. Stewart, WA4MVI. 112 pages. Second edition 1982. 215 by 140mm limp covers. Published by Nampa Offset Printing Inc USA. Available from RSGB Publications (Sales).

A really excellent book which is a must for both the newcomer and the experienced vhf operator. The book explains in easily understandable terms, with clear and lucid diagrams, the many mechanisms and quirks of vhf propagation which are often obscured in technical jargon. This book may be criticised by some as being deliberately aimed at the newcomer to the hobby, by keeping matters simple and not delving into great depths on the mechanisms of the various forms of propagation. The reviewer feels that this is not the case, the book making compulsive and informative reading to one who has been an active vhf operator for over 12 years.

There are eight chapters in the book, dealing with everything from the history of the vhf bands through terrestial propagation, amateur satellites, and moonbounce, to radio astronomy projects for the amateur. The main emphasis throughout the book is on the 50 and 144MHz bands, with little mention of 220MHz and 432MHz. One slight failing of the book is that, as the author is American, the meteor scatter procedure described differs from the European system, as do some other minor points in operating, but these are only minor complaints. The chapter on moonbounce, which at no less than 25 pages is the longest in the book, must be one of the best explanations of the subject ever written, a credit to Jim Stewart who is himself a very experienced eme operator. He describes it as the "ultimate adventure in amateur radio". The photographs which accompany this chapter will make most amateurs of modest means envious of the huge antenna systems illustrated.

This book is an operator's book, and whether you are newly-licensed or an experienced vhf dxr there will be something of interest to you. I hope that you will enjoy it as much as I have. *G4SWX*

SWL News

*by Bob Treacher, BRS 32525**

HF news

Paul Crankshaw, BRS48909, made the best of quite poor conditions during late April and early May, catching 5W1EJ on 21MHz, and FW8AF and AH8A on 14MHz. 1·8MHz provided C31SD and 3A2GL on ssb, while on cw K1MM/1S0 was heard for three new countries on the band. Paul, and Martin Parry, BRS52543, both caught SU1XJ on 3·5MHz.

Cliff Adams, BRS10906, is the G2 QSL sub-manager, but he still found time to monitor 14MHz, logging CE0GBL, VK9LH and VE7DRO/VE8, who reported the wx on Ellesmere Is as a staggering −24° on a warm, sunny spring day! Cliff found a number of islands on the air during the early part of May, together with a number of /MM stations. These included VK9NS, VQ9BC, D68WB, VP8QP, ZD7CW, D44BS, FB8WJ and FR7DC. Maritime stations were HP7YU/MM (off EA6), W5GFH/MM (off CT1), K1HO/MM (off VO), and VP8HK/MM (off LU). Your scribe can add several further islands, logged on 14MHz during early May—KA9IBG/PJ4, AH6AT, FO8EQ, ZD9CC, VK9ND, 8Q7AV, KX6IY and FH8CR.

David Whitaker was still awaiting VU7WCY and CY0SPI cards when he wrote, but had received confirmations from 6Y5IC and K0HA (Nebraska) for 1·8MHz ssb. He also received his card from W5LFL—one of 10,000 sent out.

VHF news

With VHF NFD almost upon us I hope band conditions will improve. At the time of writing there have been no dx openings of any note to report, although during the good weather at the end of April and in early May French stations in AI, BI and ZI were logged at this QTH while using a 5λ/8 whip in the shack!

Colin Watson, BRS46598, reported on two listening sessions he had while /M in XQ80d on 24 and 25 April. During the first GB3AS and GB3PA were audible, while on 25 April GM4WZP/P and GI6WLL were both heard on S21. GB3CS, Colin's local repeater, was busy, with GM and GI stations working through it into OZ.

Dave Whitaker, BRS25429, reported a fairly quiet 144MHz contest on 19 and 20 May, with little heard outside of the British Isles. Best dx seemed to be GJ4ICD.

For those QTH square chasers among us, a note from G6CBN to my xyl, BRS62088, will be of interest. Activity is proposed on 144MHz from the rare squares of AP, BP, AO and BO—all located in the North Sea. G6CBN is very hopeful of organizing an expedition to these squares during a weekend in June or July, in conjunction with the Great Lumley RC. At that time conditions both at sea and on the air seem favourable for good dxing. Just keep an ear on the band for the pile-up! All listener cards will be QSLd promptly.

Newcomers

Terry (Hamish) Jenner, BRS84462, returned to amateur radio after buying a Trio R600, then an R2000, but on receiving no response in 12 months to any of the QSL cards he sent, he despatched both to the bottom of the wardrobe. However, a further three months produced a large batch of cards received through the bureau, so out came the two receivers from their long sleep—only to be sold and replaced by an Icom ICR70. This is now used with a G5RV with pleasing results.

Steve Wilson, BRS53549, uses an FR50B for 3·5-28MHz, a Pye PTC2007 with some modifications for 144MHz, and a BC342N for 1·5 to 18MHz, together with a homebrew rtty/cw decoder. G3GVC, G4VZA and G4BEQ have been a great help to Steve, who is blessed with an ample back garden suitable for a 132ft dipole.

Les Hobson, BRS84809, has been interested in the hobby for nearly two years. He now uses an FRG7700 with FRT and FRV7700, and a Wrasse SC-422, together with a 9in Hitachi monitor. He also has an HQ1 quad beam and an AD370. Les's main interest is sstv, and he has copied signals from WB3APB, 9K2DZ, CT2CZ, HP1XGL and HA5JI. He replies to the majority of stations copied by sending a photograph of their video with his QSL card. Good results have accrued, with many stations delighted to see their signals "frozen" by photograph. Les mainly monitors the 14MHz sstv frequency of 14·230MHz ±5kHz, but often encounters interference from ssb stations, who are frequently unaware that the sstv is supposed to be there!

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

1984 HF Countries Table
(Starting score 150)

Station	DXCC	28	21	14	7	3·5	1·8	Total
G-LISTINGS								
BRS48909	211	78	143	161	126	119	46	673
BRS25429	199	96	118	142	103	118	52	629
BRS52543	204	81	105	141	129	124	45	625
BRS8841	—	60	126	144	116	125	40	611
BRS44395	—	86	128	121	91	58	44	528
BRS31879	162	42	103	108	64	63	36	466
BRS10906	182	55	119	120	51	76	10	431
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
BRS44984	—	23	36	65	42	40	0	206
RS49875	94	31	50	42	28	20	3	174
DX LISTINGS								
ORS45992	185	112	121	161	48	51	2	495

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
BRS25429	ZN	—	—	24	8	—	—	32a
RS49875	YN	—	—	13	5	2	2	22a
BRS32525	AL	—	—	10	4	—	—	14a

* a = tropo, b = Es, c = Ar, d = MS.

Overseas news

Michel Monteil, FE8957, wrote from Egletons, France, having noted the comments in my April column. Michel, who is also G6WDK, is the son of F8UM. He has been an swl for 14 years, and monitors the amateur bands with an SR700A and a homebrew vfo. On vhf he uses an IC202 and a converter for 432MHz. Michel sent scores for the All-time Countries Table, which will be included in due course. He also sent details of his vhf activity during 1983, and I hope he submits a score for our 1984 table.

Stan Porter, ORS45992, updated his activity from 7Q7. He had received the WCY Award from Germany—apparently quite an impressive piece of wallpaper. This was his twentieth award. Latest dx for Stan had been ET3PS and HK0HEU, both on 3·5MHz. V85GA was heard on 14MHz, and BY4AA, TJ1AF, F6BFN/TT8, W6QL/CE0Z and KC2GE/PJ3 on 28MHz.

Although there is still only one entry for the overseas countries table, I hope for some improvement next month.

Here and there

G3TXF commented on the item concerning the incorrect use of the RST code which appeared in May's *SWL News*. He had experienced a funny RST report, not from an swl, but a fellow amateur! In a recent 14MHz cw QSO he received a 335 report from a VP2M station, although as far as G3TXF could judge, his signal was quite readable, and his cw note was quite stable. It really is surprising that some people can become amateurs, and yet do not even know what constitutes a proper report!

John Goodrick, BRS44395, made second place in the cw portion of the 1983 UBA All Year Round Contest. This goes with his first place in the Society's HF Championship. Entries for the Society's hf contests were slightly up on the poor level in 1982, but there really ought to have been more, and it is certainly hoped that there will be for this year's six events. Contests of any description, whether they are on hf or vhf, which are organized by the Society and other affiliated clubs, encourage listeners to take part, to give experience in receiving information quickly and accurately, and as a means of judging propagation conditions. If the number of entries does not improve soon, some of the listener events may be close to extinction—a situation which I hope never arises. I will attempt to publish a list of hf swl contests in due course, which I hope will help make listeners more aware of the events that are included in the contests calendar just for them.

It was encouraging to see a good entry for the White Rose RS Fourth Lower Frequency Band Contest. A record number of countries were logged as a result of the event being moved from its original slot late in January. Another society hoping for a bumper entry to their listener contest is Cray Valley RS, whose 14th SWL Contest takes place on 8 and 9 September.

Finale

That's it for another month. News, views, hf and vhf table scores and all-time scores for September's bumper issue should reach me no later than Tuesday 10 July, with late news by Wednesday 18 July.

EPHEMERIS

Satellite news and views

*by R. O. Phillips, G4IQQ**

Uosat 2

At the time of writing, the picture concerning Uosat 2 was not entirely clear but was certainly a lot more encouraging than for several months. Events took a turn for the better at the beginning of May when, after detailed calculations had been carried out it was decided to attempt to listen for the local oscillator signal for the L-band command receiver. For brief periods on two successive orbits on 11 May a sensitive radar station in Greenland picked up the signals, and the correlation of the doppler shift and timing gave positive proof that the satellite was still functioning, at least to some degree.

On the morning of 14 May members of the team at Surrey carried out their routine attempts to command the satellite as they had since the beginning of March. At 1101gmt a series of commands on the 435MHz uplink were sent, and to the considerable surprise and delight of the operators the 145·825MHz beacon came back to life. Initial indications were that the spacecraft was in good health, and indeed the signals received at this QTH during the evening pass were as good as those after the launch.

Within a few days the university had received reports from enthusiastic observers all around the world. However, it is likely to be several weeks before a detailed analysis can be completed.

Earth-satellite-satellite-Earth links

Many operators will probably recall the satellite-to-satellite links possible using the Oscar 7 and Oscar 8 satellites. The 432MHz uplink signals to the Oscar 7 mode B transponder were relayed at 146MHz directly into the input of the Oscar 8 mode A transponder and finally back to Earth at 29MHz. Due to the low altitudes of these two satellites, the occurrence of common visibility to both satellites was very limited.

During April, Dave Rowan, G4CUO, and Pat Gowen, G3IOR, decided to attempt a similar experiment using the Oscar 10 mode B transponder and the mode A transponder on one of the active Russian satellites. Their detailed calculations led them to believe that a near ideal situation would occur on Monday 7 May. Both stations duly set their transmitter and receiver frequencies to the pre-calculated values, and at 0711gmt their patience was amply rewarded. A successful two-way QSO was made between G3IOR and G4CUO with reports of 559 and 329 respectively. The positions of the two satellites at the time of the contact are shown in Fig 1 together with important orbital information.

In addition to the careful preparation, success was probably aided by the facts that Monday is QRP day and that RS6 is thought to be the more sensitive of the RS series.

Having given some further thought to the subject (and having drawn the diagram) it occurred to me that it ought to be possible to use this technique to extend the range of Oscar 10 to provide one-way communication to any point on the Earth. More on this in a subsequent issue.

Other news

The annual general meeting of AMSAT-UK took place on 12 May and attracted a disappointingly low attendance of some 35 members. The official proceedings included the election of the new committee, which now comprises: Dr Arthur Gee, G2UK, chairman; Ron Broadbent, G3AAJ, secretary/treasurer/editor; and G4CUO, G3YJO, G3RWL, G3MQD, G8UVE and G4IQQ as committee members. After the formal business, there followed a lively discussion on a number of topical issues. Of particular concern was the problem of stations using very high values of eirp to the satellites, particularly—though not limited to—Oscar 10. Examples were quoted of a number of British amateurs who consistently run too much power and are clearly quite proud of the fact. While these stations may not be breaking the letter of the amateur licence they are clearly not in line with the spirit of amateur radio.

Another highly controversial subject, and one I have commented on occasionally, was the use of amateur satellite frequencies for non-amateur radio purposes. There was general agreement for such applications, though the need for a positive benefit to amateur radio was stressed. In this context a point made by several members was that very little information has been made available on the results of experimental/scientific packages on board Uosat 1.

Discussion then moved on to the subject of the future amateur satellite programme. G3AAJ and G4IQQ floated the idea that AMSAT-UK should attempt to construct a satellite or at least a major system. It was generally felt that to attempt a complete spacecraft might be too ambitious at this stage, but there was support for a more limited project—preferably by providing a transponder using techniques or frequencies not tried before. The committee of AMSAT-UK will investigate the matter further over the coming months with a view to identifying possible projects and, most importantly, the available resources. Any suggestions or offers would be welcomed.

	Oscar 10	RS6
Orbit No	676	10,575
Range (km)	24,500	2,500
Latitude (°N)	19	30
Longitude (°W)	356	1
Bearing	173	182
Elevation	47°	35°
Frequency (MHz)	435·0825	29·413
Frequency across	145·9195MHz	

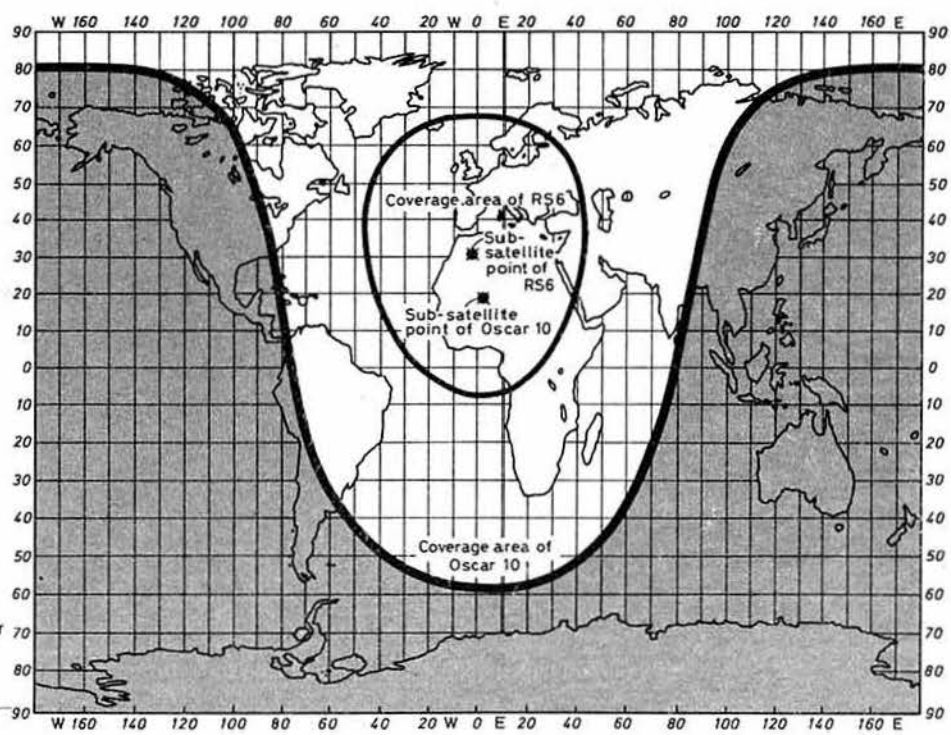


Fig 1. Coverage areas of Oscar 10 and RS6, and their sub-satellite points at 0711gmt on 7 May 1984

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

The Month on The Air

*by John Allaway, G3FKM**

PENDING PUBLICATION of a full report on the recent IARU Region 1 Conference, here are a few changes which particularly affect some readers of this column. The first concerns the use of 3·5MHz, and the footnote to the hf band plan has been amended to read:

Note. 3,500–3,510kHz and 3,775–3,800kHz are reserved for intercontinental working.

This means that the segment for dx working on ssb has been extended. It would be very helpful if routine contacts could be made elsewhere at times when there is intercontinental propagation, but quite clearly this would not be so at mid-day in the summer!

In these days of millions of QSL cards passing through the larger bureaux it is not surprising that attempts are being made to make their sorting easier, and another accepted resolution was that *QSL cards exchanged through the QSL bureaux of member societies should preferably have a size of 9cm × 14cm.* (I agree with this—my cards are exactly this size . . .)

Sections of the 3·5 and 14MHz bands have been designated as "contest-preferred segments". Contesters are being asked to try to confine their activity to those areas, leaving the rest of the bands free for routine use. Ways of reducing the number and length of contests are being investigated —bad news for that quite considerable number of people who enjoy joining in the fray even if not trying to win, but this should please those who complain bitterly about their favourite band always being ruined by contest activity . . . . . No letters please—the writer is neutral!

Paul Lawrence, G4SOX, is receiving QSLs for contacts he didn't make on 3·5,14 and 21MHz ssb last year by an operator called Tim. Paul only uses 14 and 28MHz very infrequently.

DX news

The recent Laccadive Is expedition seems to have met with some problems in sending out QSL cards. Leaflets have been sent out with its cards saying that in order to ensure delivery some have been posted outside India. VU2GDG has asked anyone who worked him at VU7 and who hears either him or his daughter (VU2GO) on the band to call in and confirm receipt of the VU7 card.

According to the *DX Bulletin*, the ARRL DXCC desk has received documentation concerning possible country status for British bases in Cyprus.

LA9PCA reports that the club station at Longyearbyen (JW5E) has now obtained a small cottage where equipment will be installed and accommodation will be available for visiting amateurs. Transport is available by SAS (according to *DX News Sheet*) and anyone wishing to operate should contact Mathias, JW5NM. JW1CY will cease activity this year, and LA5VAA will be on from Hope Is as JW5VAA for about a year. LA9PCA may become JX9PCA in October from Bear Is.

Two Wake Is stations have been worked in the UK recently—AH9AB around 14,220kHz at 0900, and AH3AA/KH9 who has been noted on 14,178kHz between 1400 and 1600. C21RK has been a good signal on 21,258kHz at 1100, and is reported to frequent the ZL2AAG Net on 7,085kHz from 0700.

A new Tongan station has been reported—A35MS, who has been worked on the low end of the 14MHz band on ssb. FW8AF is on the air every Tuesday on 14,279kHz between 0800 and 0900 when he normally takes part in a list operation. He also joins the ZL2AAG Net on 7,085kHz from 0830, particularly on Mondays. ZK1DA is active from the Cook Is on 14MHz ssb, ZK1CT, located on Mauke Is, prefers 14,185kHz after 0700. T2ADE has another year on Tuvalu—he has been found in nets at 0300 on Saturday on 14,310kHz and on 21,292kHz at 2000 on Fridays and Saturdays.

Those looking for E Malaysia might like to look for Esmile, 9M6VW, who seems to have a preference for the area around 14,200kHz at 1600. DJ4IJ/XZ works for a broadcasting station and will be in Burma for at least another year; he hopes to get written permission to operate. UA3EC is in Ulan Bator for a year and currently on the air as JT0EC. JT0DJT is also active and has been worked in Europe on 14 and 21MHz cw.

F6ECS, reputedly a French Army dentist, should now be in Mayotte where he will be on the air for 18 months. 5R8AL in nearby Malagasy has been worked, together with newcomer 5R8EZ, on 21,215kHz at 0930.

According to *DX News-Sheet* CT1ZG has a letter from the President of Mozambique's office confirming that there is no officially licensed amateur radio in that country.

9U5JB is using 18 and 24MHz ssb and is interested in arranging schedules —anyone interested should join in his schedule with ON5NT at 21,410kHz at 0830 on Sunday.

Research by *DX News-Sheet* shows that G8GRN/5X is unlicensed. However, G4CTQ will pass all QSLs to him when he returns to the UK, but it is unlikely that any will be sent out in return. Problems are also arising in getting 5X5FS cards, and again the licensing position is unclear.

WB4BSJ/KL7, on St George Is, and KL7RG, on St Paul Is, are both located in the Pribilof Is. A decision on DXCC status for the islands has still not been taken, as the last DXAC vote was a tie.

The prefixes XF2 and XF3 now carry a geographical meaning—the former is used for islands off the Mexican coast W of 90°W and the latter for those E of 90°W.

Although CE0FCM/CE0Z is now off the air, CE0EVG is likely to be on Juan Fernandez Is until the end of the year.

Expeditions

G3VPO reports that the Madeira DX Group (CT3s AR, BD, BM, BP, CW, YA, YD and YF) intends to visit the island of Selvegens, 265 miles south of Madeira. The activity will last for one week commencing on 9 August, and the callsign used will be CS9IS. CT3BM is the organizer, and will deal with QSL card requests. At the time of writing, transportation was expected to be provided by the Portuguese Navy.

Iris and Lloyd Colvin finally returned home to the USA during April after their six-month expedition to S America. They visited 13 countries and made DXCC under nine different calls in the course of making over 55,000 QSOs.

The recent BV0AA expedition seems to have been a considerable success. SM0GMG was unable to go with the group so it consisted of PA0GAM and OH2BH. Operation took place from the same twelfth-floor apartment from which the Italians operated last year, and much help was received from Tim Chen and other members of the CRA. OH2BH arrived from Tokyo with two FT757GX transceivers and an FL2100Z, with a TH2 Mk3 beam. An IC740 and GLA1000B were used with an 18AVT for cw operation. Michio, JA1MIN, was also given permission to operate during the last two days, and helped the group to total 12,500 QSOs. Interviews took place with an official of the PTT and with the media. Gerben, PA0GAM, says that in future BV0 callsigns will be used for special stations so that the next visiting station will be BV0AB. BV2C may be on the air by

Alfredo, CP6EL (centre), with Lloyd and Iris Colvin during their visit to Santa Cruz, Bolivia, in January 1984

*10 Knightlow Road, Birmingham B17 8QB

Members of the BV0AA expedition, and friends. L to r: Steven, Gerben, Tim, Martti and Michio, JA1MIN (who is wearing SM0GMG's tee-shirt!)

by now with some of the equipment left by BV0AA, and donated by the N California DX Foundation. This gear may be available for future visitors' use.

WB6GFJ, of the group which attempted to visit Clipperton Is earlier this year, says that they are now trying to find transportation by seaplane which could land in the lagoon. Licensing permission is still valid and if the team does not make the expedition by 1 September it should certainly get there by April 1985.

Overseas news

CRRL News says that to commemorate the 450th anniversary of the discovery of Canada by Jacques Cartier in 1534, Canadian amateurs may use the following prefixes from 20 June to 20 August: Newfoundland and Labrador, VA1 and VA2; VE1s, CZ1; the Yukon, CK1; and in the rest of Canada VY2 to VY8 as appropriate.

The Radio Amateur Society of Thailand holds regular monthly meetings to which all foreign radio amateurs and listeners visiting Bangkok are invited. This takes place on the first Sunday of every month at the Singha Bier Haus on Asoke Road. The meetings begin at 11am and a buffet luncheon is available.

A new 28MHz beacon is active from Freetown, Sierra Leone, This is 9L1FTN and it transmits on 28,272·5kHz running 10W to a λ/2 vertical. The equipment was built and provided by Cheshunt & District ARC, and reports are welcomed—please send them to G4OAA, QTHR.

G3ZYP has returned to Cyprus for a three-year tour of duty and is active as ZC4AM/5B4DN. He operates from home in Limassol on 14, 21 and 28MHz cw and ssb using an FT101 and groundplanes. His preferred frequencies are 14,070, 14,270, 21,070, 21,270, 28,070, and 28,570kHz. The club station at Episkopi, ZC4EPI, has a Yaesu 980DM which often operates on 28,940kHz fm, as well as on cw and ssb on the hf bands. A directional antenna system is planned as is rtty (using a BBC micro) and 28MHz fm.

WARC bands in Eire

The Irish Department of Communications has issued licences to existing Irish operators who have applied to use the 10, 18 and 24MHz bands—10,100-10,150kHz, 18,068-18,168kHz and 24,890-24,990kHz. Approval has been given on a secondary basis.

25 years of the SPDX Club

Twenty-five years ago a small group of Polish amateurs who were particularly interested in dx presented draft rules for the foundation of a specialist club to join together SP amateurs interested in dx traffic. On 9 June 1959 the council of PZK approved these, and thus was born the SPDX Club. Membership principles are similar to those required for the DXCC Award. An applicant must produce QSL cards from at least 75 countries to become a candidate, and at least 101 to become a regular club member. Fair play and good sportsmanship is expected of all members. The candidacy period is six months—during this period the callsign is published in the club's bulletin, and the applicant must obtain positive opinions and recommendations from at least two regular members. If, during the same period, no objections are received about operating practices etc, regular membership is granted.

To date there are over 300 Polish members of the club. Foreign amateurs and listeners may obtain honorary membership. This is obtained by producing evidence of working (or hearing) 15 members (for European applicants) or 10 members (for others). To date over 1,700 licensed amateurs and nearly 300 listeners have obtained this award. During the 25 years the SPDX Club has led to high achievements—10 members have DXCC totals exceeding 300, and over 100 others have between 200 and 300 countries confirmed. Most have DXCC, several the 5BDXCC, and some are in the Honor Roll. The club organizes the SPDX Contest, and to celebrate the 25th anniversary some special stations will be on the air—for instance SP0DXC was on during the SPDX Contest this year and those working it may count three (or five) points towards their award. It should have been active again from 8 to 10 June, and will be on during the special meeting which will be held in September (at which all honorary members will be welcome). Further information on the club is available from Henryk Cichon, SP9ZD, Szczyglow 1, 40-533 Katowice 2, Poland.

Welcome

The following joined the Society during May: EA1BAL, EA3DXF, DF8VU, EI2BUB, EI5OB, EI8GI, EI9EO, K5AAD, N8RT, SM7VU, TF3KB, VE3GRG, VE55BAF, VK1NDK, VK2FU, VK4VC, WB6GVB, G8GNC/W8 and 9H4R. New listener members include W. Rees (A6), A. Kemplay (V8), A. Lafosse (F) and M. Doyle (EI).

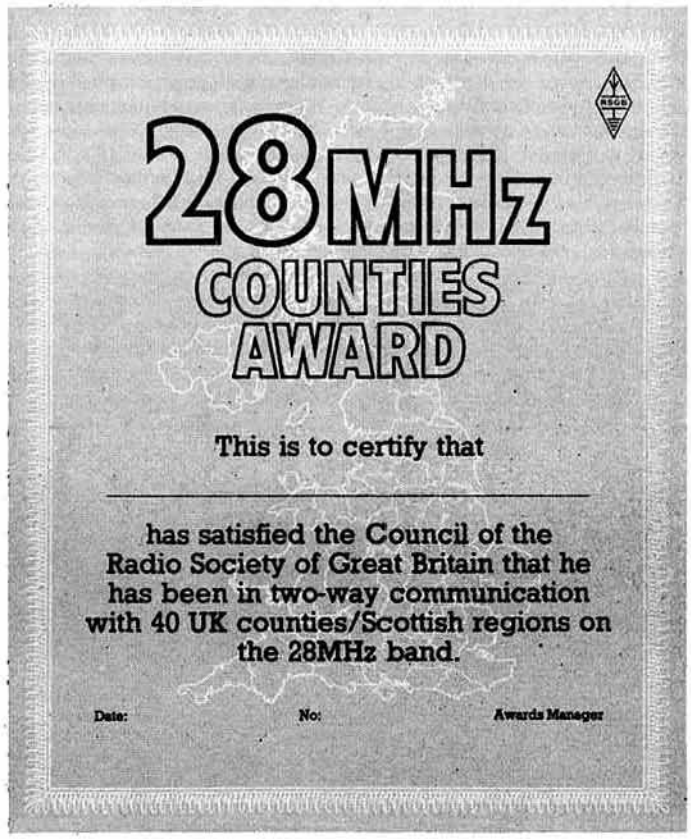
Awards

The Oak House Award

Issued by the West Bromwich CRC. Holders of G calls need contact with one member of the club (two points) plus 10 other people located in squares YM40, YM50, ZM31 or ZM41. All others obtain their full 12 points by working (or hearing) one club member. The starting date is 1 January 1983, and applicants should send QSO information plus £1.25 or eight ircs to W. E. Ansell, G1EHD, 117 Oxhill Road, Birmingham B21 8HB. (Club members include G1s BGX, FFO, AJK, EHD, EZC, CCY, DHA, G4s WOV, SFG, OGN, OJJ, DHP, KZJ, VFO, MAR, G6s YZL, ZLW, ZYZ, and G8VJZ).

RSGB 28MHz Counties Award

This certificate will be issued for confirmed contacts with (or confirmed reports from) 40 UK counties/Scottish regions on the 28MHz band. Endorsements are available for 60 and all 77 counties/regions. All QSOs/reports must have been since 31 March 1983. UK applicants should submit QSLs and proof of RSGB membership, others should submit a list of QSLs certified by the awards manager of an IARU member society. Applicants in the USA and Canada may submit a list certified by the awards manager or secretary of their local ARRL affiliated club. All contacts must be made from the same location. The award is free to RSGB members. To others the fee is eight ircs for the award and three ircs for the 60 or 75 counties endorsements. Address applications to RSGB HF Awards Manager, PO Box 73, Lichfield WS13 6UJ.



QTH CORNER

CS9IS	CT3BM, Avelino da S Pereira, Beco do Lombo da Bon Vista 34, 9000 Funchal, Madeira.
FW9AF	BP 92, Wallis Is. S Pacific.
WB4BSJ/KL7	c/o St George School, St George Is, Alaska, 99660, USA.
ON4UBA/HB0	via ON7JF, J.de Bruyn, 3 Zorgvliet, B-2580 St Kateline Waver, AN Belgium.
HS1MG	GPO 2100, Bangkok, 10501 Thailand.
T2ADE	Box 5, Tuvalu, Central Pacific.
T70A	Telecomms Dept, Piazza Liberta, San Marino 47031, Rep of San Marino.
TZ6FIC	F6CRS, J. Laurent, Bourg Bas, Saint-Agne, 24520 Mauleydier, France.
VS6GX	via G4LJF, I. H. Shepherd, 22 Martins Drive, Wokingham, Berks.
YB5ASO	via W4BBP, 4243 Loveless Drive, Ellenwood, Ga, 30049, USA.
ZC4AM	(see 5B4DN).
ZK1XL	via K6OZL, J. R. Hill, 1730 Easy St, Hanford, Cal, 93239, USA.
5B4DN	A. Matheson, 1 St Edmund's Close, Bromeswell, Woodbridge, Suffolk IP12 2PL.
6W1AR	via DJ3AS, H. Doelle, Am Hilgenberg, 5, D-3500 Kassel-Harlesh, FR Germany.
7Q7LW	L. Sampson, Box 24, Mtakatcha, Malawi.
8Q7BT	via G4JMM, 53 Field-Barn Drive, Southill, Weymouth, Dorset DT4 0EE.
9J60KK	via 9J Bureau, RSZ, Box 20332, Kitwe, Zambia.
9L1FTN	via 9L1SL, Box 10, Freetown, Sierra Leone.
9M6VW	via K2OA, M. Broder, 66 Irongate Lane, Matawan, NJ, 07747, USA.

Tiurai 1984

The Radio Club of French Polynesia will be organizing a special event—the "Tiurai"—from 0000 to 2400 on 14 July. The club will be running an all-band operating event, and those who work three stations in French Polynesia (on at least two bands) on that day will qualify for a certificate. Last year the special TO8 and TO0 prefixes were used, and there is a possibility that there will be special prefixes again this year to replace FO8 and FO0. Note that for the certificate QSOs with the same station on different bands counts as QSOs with different stations. Activity will concentrate around 3,800, 7,090, 14,110, 14,180, 14,240, 21,300 and 28,600kHz. Send log information plus 12 ircs to: Special Tiurai '84 Award, c/o Radio Club of French Polynesia, BP 5006, Pirae, Tahiti, French Polynesia. In addition to the certificate a special trophy will be given to the station in each continent who works most FO8/FO0 stations during the week 14 to 21 July—on any band or modes. The trophy is free and is a pearl shell carved with the winner's name.

Contests

Venezuelan Contest

0000 7 July–2400 8 July (phone)
0000 28 July–2400 29 July (cw)

3·5 to 28MHz. Single-operator, single- and multi-band, multi-operator, single- and multi-transmitter classes. Exchange RST plus serial number starting from 001. QSOs with own country count for multiplier credit only, with other countries each counts two points. The multiplier is one for each YV call area, USA call area, and country worked on each band. Final score in multi-band entries is total QSO points from all bands multiplied by the sum of the multipliers from each band. A plaque goes to the highest scorer in each class and a medal to top scorer in each continent. Certificates will be sent to entrants in Europe and Africa who contact at least 10 YVs plus 10 other stations. Separate log for each band and enclose usual summary sheet—all award applicants are asked ~~to in~~clude US$2 or equivalent. Post before 15 August (phone) or 15 September (cw) to Radio Club Venezolano, PO Box 2285, Caracas, Venezuela.

European DX Contest

0000 11 August–2400 12 August (cw)
0000 8 September–2400 9 September (phone)
0000 10 November–2400 11 November (rtty)

3·5 to 28MHz. Single-operator, all-band, and multi-operator, single-transmitter categories. The latter may only change band once within a period of 15min. A quick band change and return for working new multipliers is allowed however. Single-operator entrants may only operate for 36h—the 12h rest may be taken in up to three periods and must be clearly marked in the log. QSOs are between non-European and European stations, and exchanges RST plus serial QSO number (from 001). USA stations will give their state. Each QSO counts one point, and a station may be worked once per band. The multiplier for European stations is ARRL countries, but in addition each call area in JA, PY, VE, VO, VK, ZL, ZS and UA9/0 may also be counted. Each USA state also counts as a multiplier, but not the call areas. Multiplier total on 3·5MHz should be multiplied by four, on 7MHz by three, and on 14/21/28MHz by two. Additional QSO points may be gained by passing "QTCs". These consist of reports of confirmed QSOs made earlier and sent back to a European, and contain the time, call and QSO number of the station being reported, ie 1300/DA1AA/134 (this means that at 1300 the non-European station worked DA1AA and received number 134). A maximum of 10 QTCs from any one station is permitted, and these may be passed in more than one contact, but only the original one counts for QSO points. Use separate log sheets for each band (40 QSOs per sheet)—official forms are available from DARC. Dupe sheets are needed for each band on which more than 200 contacts were made. Post logs before 15 September, October or December respectively to WAEDC Committee, Postbox 1328, D-8950 Kaufbeuren, FR Germany. (Note that in addition to the DXCC list this contest also counts Shetland, Sicily, Bear Is and 4U1—Vienna, as multipliers.) Photocopies of rules are available from G3FKM—sae please.

Ang, JA1HQG, QSL manager for XU1SS

1984 IARU Radiosport Championship

0000 14 July to 2400 15 July

1·8 to 144MHz. CW only, phone only, or mixed-modes. Single- or multi-operator (the latter may use mixed-mode single-transmitter only). Each station may be worked once only on each band. Single-operator entrants may operate for a total of 36h only, and off periods (which should be of at least 30min duration) should be marked clearly in the log. Multi-operator stations must remain on a band for at least 10min at a time. Exchange RST plus ITU zone (UK is 27). QSOs with own zone count one point, with other zones in same continent three points, and with others five. The multiplier is the sum of different zones worked on each band. Certificates will be sent to top scorers in each ARRL section, ITU zone, and DXCC country. Awards are available to those who make at least 250 or 1,000 QSOs, or who work 30 zones (these for single-operator entrants only). Official log forms and summary sheets are available from ARRL, and forms CD-77, CD-175, and an ITU zone list are also available. Please send a large self-addressed envelope and sufficient return postage. Entries must be posted before 15 August to IARU HQ, Box AAA, Newington, Ct, 06111, USA. (*NB.* Earlier rules mention the need to send in a "dupe" sheet for any band where more than 500 QSOs were made.)

The YO DX Contest

2000 4 August to 1600 5 August

3·5 to 28MHz. CW and ssb—following IARU band plans. Single-operator, single- and multi-band, and multi-operator, multi-band categories. Exchanges consist of RST plus ITU zone, and YO stations will additionally give a two-letter code identifying their "county". There are 41

1984 28MHz Countries Table

G3XQU—132	G4PEL—65	G4NXG/M—45
G4SKI—99	G3TXF—64(cw)	GW4TEJ—38(ssb)
G4MUW—74 (ssb)	G3WVG—58(cw)	G4OBK—23(cw)
G4TTR—74	G3DXW—56(ssb)	GM3CHX—19
G4VJK—67	G4RAB—52	G3KSH—18(cw)
G3KDB—67(cw)	G3XXT—49	G4FVK—2
G3SXW—66(cw)		

Current Countries Six-band Table

	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total
G3KMA	88	218	285	314	312	298	1,515
G3MCS	45	199	243	310	310	293	1,400
G3GIQ	59	186	228	308	310	292	1,383
G3UML	21	191	206	312	281	242	1,253
G3XTT	93	172	204	265	271	242	1,247
G3HTA	60	160	216	296	266	232	1,230
G2DMR	41	144	153	288	290	256	1,172
VK9NS	53	152	211	278	232	177	1,103
G3RUR	1	140	165	275	254	225	1,060
G3IGW	90	134	227	224	197	180	1,052
G3NOF	4	83	74	309	305	263	1,038
G3XQU	1	116	148	262	262	237	1,026
G3YMC	71	91	149	216	227	181	935
G4LJF	1	120	134	227	195	186	862
GM3YOR	61	83	115	183	178	173	793(cw)
GW4OFQ	31	151	108	151	157	107	705
9K2BE	41	67	78	125	166	178	655
Average	45	142	173	255	248	221	1084

Band leaders are listed in heavy type. Deadline for the next table is 15 July. Entries to G3GIQ please.

HF propagation predictions for July 1984

Using the table
The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band, ie ♀ = 0000, ♀ = 0200, ♀ = 0400 etc.
The probability of signals being heard is given on a 0 (indicated by a dot) to 9 scale; the higher the number the greater the probability, with 1 meaning 10 to 19 per cent of days, and so on. Additionally 50MHz F-layer and 1·8MHz openings are indicated by a dagger (†) sign in the 28 and 3·5MHz columns respectively. The higher probability figures are printed in BLACK, lower probability in RED and lowest probability in GREEN type.

	28MHz				21MHz				14MHz				10MHz				7MHz				3·5MHz			
GMT	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122
	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802
EUROPE																								
Moscow						1		23	314	556	546	896	866	544	445	689	753	221	112	468	42			35
Malta						11		33	412	666	656	897	977	655	455	789	886	322	223	478	††3			24†
Gibraltar								12	2	255	444	785	854	665	555	789	987	532	223	578	††4	2		24†
Iceland									1	123	222	464	644	555	555	678	776	533	223	456	444	2		23
ASIA																								
Osaka								11	1	1	232	223	673	1	21	12	463				13			
Hongkong						11	1	22	1	1	123	224	685	2	1	12	475				143			
Bangkok						112	112	43	211	123	235	786	4		12	477	1			145				22
Singapore						122	112	44	211	123	235	787	41		12	478	1			146				23
New Delhi						122	112	44	322	212	235	787	63		12	478	41			156				23
Teheran				1	1	223	213	651	435	322	235	788	853		2	478	73			256	4			23
Colombo				1	1	223	213	651	422	213	235	788	73		2	478	51			256	2			23
Bahrain				11	1	223	224	662	535	212	235	788	863		2	478	73			256	4			24
Cyprus				21	1	344	334	772	756	655	566	899	986	332	234	589	863	1	11	367	54			34
Aden			1	21		323	335	762	745	311	235	789	873		2	478	751			156	42			24
OCEANIA																								
Suva (S)									2	322	223	442	3	321	12	431		1		11				
Suva (L)			12	42	1	132	356	872	223	653	234	674	13	42	1	441	1	1		11				
Wellington (S)									112	332	223	563	123	321	12	453	1	1		131				
Wellington (L)			1	32	1	142	34	872	543	553	23	686	234	42		463	2	1		131				
Sydney (S)						111	1	32	113	543	234	684	212	321	12	474		1		142				
Sydney (L)				1	1	22	122	64	521	353	234	87	212	421	1	64		2		142				
Perth				1	1	233	213	65	323	353	235	78	521	12	2	47	2			253				23
Honolulu									2	222	223	421	13	421	1	2	1	1						
AFRICA																								
Seychelles			1	21		323	335	762	745	322	235	789	873		2	478	751			156	42			24
Mauritius			1	21		334	445	763	755	423	235	789	874	1	2	478	751			156	42			24
Nairobi			1	31	1	323	446	763	855	422	235	789	985	2	2	478	773			156	44			24
Harare			112	31	1	223	456	863	865	632	235	789	986	3	2	478	774	1		156	44			24
Capetown			12	41	1	232	456	872	86	653	234	789	98	42	1	478	771	1		156	44			24
Lagos			12	42	1	132	356	872	864	642	224	689	986	41	1	478	774	1		146	44			24
Ascension Is			11	32	1	142	345	882	86	553	224	689	98	42	1	478	772	1		146	442			3
Dakar			1	22	1	32	244	783	863	553	122	689	987	42		378	775	1		46	442			3
Las Palmas				11	1	33	232	573	853	676	566	799	997	643	333	589	886	321	111	257	††3			25
S AMERICA																								
South Shetland			1	22	1	32	245	783	8	3	553	234	689	9	7	42	1	378	755	1		146	442			3
Falkland Is				22	1	32	244	773	863	553	234	689	986	421	1	368	775	2		136	442			3
Rio de Janeiro				12	1	32	233	673	863	553	233	579	986	421		258	775	2		26	442			3
Buenos Aires				12	1	32	233	574	863	453	233	579	886	421	1	248	775	2		26	442			3
Lima				1	1	12	121	254	852	353	232	247	886	421		14	675	2		2	442			
Bogota					1	2	111	144	841	243	221	236	886	421		4	575	2		1	242			
N AMERICA																								
Barbados				1	1	12	121	254	852	343	221	257	886	421		25	775	2		2	242			
Jamaica					1	1	11	133	741	233	221	126	785	421		3	474	2			42			
Bermuda					1	1	11	133	741	133	221	146	785	421		14	574	2		1	242			
New York						1		22	631	123	221	135	675	321		13	364	2		1	4			
Mexico								12	531	123	221	113	475	321			154	2			2			
Montreal								22	631	123	222	235	675	321		13	364	2		1	3			
Denver								11	421	123	222	123	355	321		1	34	1						
Los Angeles								11	311	122	223	122	245	321	1		24	1						
Vancouver									211	122	223	222	235	321	1		14	1						
Fairbanks									112	222	223	332	123	421	1	211	1	1						

The provisional mean sunspot number for April 1984 issued by the Sunspot Index Data Centre, Brussels, was 68·6. The maximum daily sunspot number was 124 on 26 April, and the minimum was 12 on 10 April. The predicted smoothed sunspot numbers for July, August, September and October 1984 are, respectively: (classical method) 53, 51, 49 and 47; (SIDC adjusted values) 41, 40, 40 and 39.

of these. QSOs with Romania count eight points, with other stations on one's own continent two points, and with others four. The multiplier is the number of YO counties and ITU zones worked on each band added together—note that contacts with one's own country do not count. Submit separate logs for each band and show date, time, report sent and received, if multiplier, and points claimed. Indicate own zone at beginning of each page. Enclose summary sheet and signed declaration that licence and contest rules have been obeyed. Post before 7 September to Romanian Amateur Radio Federation, PO Box 05.50, R-76100 Bucharest, Romania. the Romanian counties are as follows: (YO2) AR, CS, HD, TM; (YO3) BU; (YO4) BR, CT, GL, TL, VN; (YO5) AB, BH, BN, CJ, MM, SJ, SM; (YO6) BV, CV, HR, MS, SB; (YO7) AG, DJ, GJ, MH, OT, VL; (YO8) BC, BT, IS, NT, SV, VS; (YO9) BZ, CL, DB, GR, IL, PH and TR.

Around the bands

The G8KG summary reads as follows: "Far from running out of steam, the upsurge in solar activity which began early in the year has continued, so that even the longer-term averages of solar flux and sunspot number have risen somewhat in recent months.

"At the time of writing (22 May) the 27-day average solar flux had been above 120 sfu for 110 days (apart from three days at 119) and had again risen to 140 sfu, while the mean sunspot number for February–April was

Sunspot Index Data Centre—Brussels

1983 RI definitive sunspot numbers

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	60	103	109	53	114	61	62	131	46	29	17	26
2	65	85	93	70	104	72	59	128	56	51	22	23
3	55	88	86	61	94	73	61	105	59	63	37	15
4	63	94	93	53	85	68	87	103	69	74	51	14
5	82	82	113	36	95	77	80	79	84	65	66	17
6	103	71	88	49	88	85	79	49	78	75	74	39
7	109	72	77	64	92	104	79	60	72	87	84	41
8	126	63	68	59	98	100	82	70	68	99	90	48
9	100	39	74	59	110	100	69	69	74	106	70	71
10	83	26	55	64	114	86	59	63	70	121	68	82
11	90	21	49	69	101	73	68	88	65	136	56	76
12	77	18	32	65	114	66	86	103	41	122	43	66
13	89	11	12	64	132	72	85	104	36	100	36	66
14	92	10	24	64	125	88	88	97	36	80	29	52
15	77	24	44	53	130	92	92	93	42	72	28	50
16	89	17	63	54	99	84	93	80	33	61	38	35
17	102	22	74	63	93	79	96	72	35	60	31	46
18	86	32	88	75	99	78	98	71	45	63	36	36
19	93	33	82	110	88	103	96	54	40	46	26	31
20	81	32	82	90	105	117	101	40	32	26	12	25
21	74	39	87	87	110	117	109	52	36	18	18	21
22	73	33	70	83	104	136	114	50	38	22	0	15
23	59	40	66	91	102	143	95	51	42	22	0	20
24	58	50	60	92	111	122	105	35	46	20	0	22
25	75	67	48	123	98	122	85	52	42	18	0	21
26	77	70	70	118	100	110	58	53	50	20	7	23
27	75	88	72	126	85	92	49	51	51	12	10	12
28	89	98	48	146	68	83	40	55	48	15	12	10
29	99		44	142	88	68	73	63	43	16	19	11
30	101		54	137	68	63	89	59	33	15	21	13
31	110		37		60		110	45		16		9
Mean	84·3	51·0	66·5	80·7	99·2	91·1	82·2	71·8	50·3	55·8	33·3	33·4

1983 yearly mean: 66·6

79 as compared with only 41 for the last quarter of 1983. After the excitements of the peak years this may not seem all that high, but a quarterly mean sunspot number of 79 is well above the median value of the data for the past 150 years.

"A major factor in the recent moderate activity has been a particularly active region on the sun. This caused daily solar flux figures to peak at 180 sfu on 27 April, and there was much flare activity in the latter part of the month—the solar flux reaching 37,000 sfu during the largest of the flares. This region was still active when it passed behind the sun, and it has just reappeared and announced its arrival with a major flare in which the flux peaked at 10,000 sfu. By the time this report appears in print it will have paid us a third visit, and it will be interesting to see how it has fared during its travels."

The following kindly supplied logs from which this section has been extracted: G2HKU, G3YY, G5JL, GJ3EML, G3s GIQ, GVV, KSH, LPS, URA, YRM, G4EHQ, GM4KHE, G4s OBK, UOL, UYR, WNZ, and RS10906.

Stations listed in italics were using cw.

1·8MHz. 0200 *4X4NJ*. 0400 *K1ZM, W1DEO* 2100 *EA3VY, IS0NZA, LA7SI, OH, OZ, SM, UP2NK*. 2200 *F3XB, I2VVC, RA3ADB, SM4APZ*. 2300 *UA9AME*.

3·5MHz. 0400 *PY1ZAE, W2, W8*. 0500 *CN8AD, CO2PY, HI, HK, KL7UV, K3UOC/PJ7, ZLs 1AIZ, 2SN, 2UV, 4AP, 4IE*. 0600 *PV8ADG*. 2100 ST2HM, *5Z4MX*. 2200 VK6LK. 2300 C31LA.

7MHz. 0000 *EA9KC, TZ6FIC, YB5ASO, 4K1ANO*. 0500 *CE3DNP, CM, CX, HI7JM, W6-W7, ZF1LA, ZL*, (to 0800). 0600 *FG7AH*, 6Y5DZ/J3, LU, LU6EYK/X, *K3UOC/PJ7, VK, ZK1XL*. 0700 HR1MA, OA4IU, PT9ZE, 3A2EE. 1700 C30LBG. 2000 DF4RD/SV9, *ZC4CZ, ZS6BUX*. 2100 *UW3HY/1*. 2200 HK3BCS/SU. 2300 *ZD8TM*, ZP5CDV, *ZS1CT*.

10MHz. 0400 *VE3, W1,2,3,4,8*. 0500 *ZL* (to 0800). 0600 *VK* (to 0800). 0700 *W6*. 0800 *LU6WBW, VK3MA, W1FZY*. 1700 *ON4UBA/HB0, DL1BA/3A*. 2000 *SV0AH, ZC4CZ*. 2100 *ZL3GQ*. 2200 *VK3MR*. 2300 *K7GN*.

14MHz. 0500 *KH6, VK, W6-W7* (to 0700), WL7ALG (Mietkov Is). 0600 VK9NS. 0700 *FO8KP, KH6GS, KL7RS*, ST2SA, T32AF, *VK6RU*. 0800 *FO8JR, KL7, VY1AD, ZL*. 1300 *KA0CYR/SV9*. 1400 *8J1ITU*. 1500 D68WB, DF4RD/SV9, VU2BEJ. 1600 VS6GX. 1800 9L3FD, 9N1MM. 1900 C21RK, JA, JY5CI. 2000 HK0HEU, HS1BV, VQ9BC, 5Z4DP, 8Q7BT, 9M2CO. 2100 HH2MT, JA, VK, VP2MCG. 2200 C53FG, *K3ZO/HK3*, J6LLO, TR8DR, TU73, *K6XN/VP9*.

18MHz. 0700 *VK2PA*. 1500 *DL1SN*.

21MHz. 0700 *BY1PK*, JA. 0800 *OD5LX, TJ1QS, VS6HI, VU2BK, OH6XP/4U, 9J60KK*. 1100 *TR8DR*. 9K2BE. 1200 *UZ0SWQ*. 1300 *DU7XX, FB8WK*, VQ9RE, VE5AFT/5N. 1500 *A4XJP, FP8HL*, FR7CR, V85RB, YB, *3B8FK*. 1600 DU7DR, OD5AS, 5N0NAS, 9M2DC, *9U5JB*. 1700 D68WB, *DF4RD/SV9*, 3X4EX. 1800 5H3BH, 6W1DY. 1900 VP8. ZD7BW. 2000 OE8FL/YK, ZL4JO.

24MHz. No reports.

28MHz. 0800 *VS6HI*. 0900 *UD6DEY*. 1000 FB8WJ, ZS3KB. 1100 D44BS, JY5ZM. 1200 A24WF. 1300 J28DX. 1400 FM0FJD, FR7DC, 5Z4DP, 1500 CE3AUL, ZD7CW. 1600 9L1SL. 1700 A71AD, J39BS, 5N9GM, *7X2ARA*. 1800 HC1DT, TZ6FIC, 9U5JM. 1900 C53AL, *YV5ANE, ZP5AO*.

Thanks also go the the authors of the following for items extracted: *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), the *DX Bulletin* (K1IN), and the *Long Island DX Bulletin* (W2IYX).

Please send all items for the **September** issue to reach G3FKM by **17 July**. □

The history of the Commonwealth Contest

by A. J. SLATER, G3FXB*

I HAVE ALWAYS been an enthusiastic supporter of the RSGB Commonwealth Contest, largely due to my love of contest work, but also because of my fairly strong feelings concerning the Commonwealth. The love of this event largely originated as a result of my friendship over many years with "Rusty", G5WP. To him the Commonwealth Contest—or BERU as it was known in earlier days—represented much of his interest in amateur radio. Every year he found it a fascinating challenge, and his experiments with equipment and antennas over any given year were geared to one thing—optimum performance in the Commonwealth Contest. To those of us who listened fascinated as he contacted strings of ZLs on 3·5MHz there was no doubt that he achieved the optimum in site and antenna performance. The fact that many of us could only barely hear the dx replying is witness to that performance.

I had always dreamed of emulating the performance of G5WP, for Rusty was one of only three UK stations to have won the event outright in its 53 years. He died in 1980, and I was involved in dismantling his station. As a result I have secured his files on the Commonwealth Contest going back to its origination and containing results back to 1937. They make most fascinating and interesting reading and form the basis of this article.

The early days

The contest was initiated in 1931 by the RSGB at the suggestion of NZART (New Zealand Amateur Radio Transmitters). It was dubbed "British Empire Radio Week" and did in fact last seven days, from 22 to 28 February 1931. It was won by Trevor, VK2NS, who died a few years ago, and who amassed a total of 64 points from 64 contacts. As a matter of interest these included 55 with New Zealand and just three with the UK. To provide a trophy a subscription list was opened and resulted in a fine rose bowl now engraved with winners up to the present day. The title of the event became BERU—its rhythmical sound on cw never forgotten by the old-timers, and in fact still used as part of "CQ" calls during the contest. These initials stood for British Empire Radio Union, which was the name given to that section of the RSGB membership resident within the British Empire, and represented a large proportion of the active British Empire amateur transmitting fraternity.

It soon became apparent that G stations were not likely to be frequent winners of the trophy, due largely to the predominance of activity from the UK aiding overseas scores. In fact currently there are only two G calls engraved on the trophy: Fred Miles, G5ML, in 1935, and Rusty, G5WP, in 1950. Dud Charman, G6CJ, would have made his mark in 1952 but at that time he was serving on the contest committee and in those days such service debarred one from being the recipient of any awards. As a result of

Vic Williams, VE3KE, Galt, Ontario, still supporting the Commonwealth Contest under the call VE7UZ

*Wychwood, Park Lane, Maplehurst, Horsham, West Sussex RH13 6LL.

this bias towards overseas winners, Lt Col Thomas, then G6MW, presented a further rose bowl to be awarded annually to the leading UK station. The first recipient was J. Hunter, G2ZQ, in 1936.

The results prior to the second world war make interesting reading. By 1937, apart from the "senior transmitting contest", there was a "junior transmitting contest" for low power operation, and a "receiving contest". The senior event lists 132 participants, the junior 113, and the receiving 41. Included are a number of calls still with us today and still participating each year. High on the lists from overseas at that time special mention must be made of "Snow" Campbell—then known as Merv—VK3MR, and Eric Trebilcock, BERS195, both of whom I had the pleasure of meeting in Melbourne, and both of whom are just as active today. The world was a different place then. South Africa was in the Empire, and not only had ZS but also ZT and ZU calls. VE5s were in British Columbia, there being no VE6, VE7 or VE8. There was considerable activity from British personnel in Egypt, all valid for BERU scoring. Israel did not exist, but QSOs with ZC6 (Palestine) were valid. Bahrain was VU7, Singapore VS1, Kenya VQ4 —the list is endless. Note the following for a spot of nostaligia;

"Zero hour approaches, watches are synchronized, cigarettes stored in, pencils sharpened. The dx bands resemble a country village in their quietitude and then—the storm breaks. Dah, dit, dit dit dit, dah; dah dit dit dit, dit, dit dah dit, dit dit dah echoes around the world, amateurs in foreign countries hastily examine their atlases for a clue as to the whereabouts of the mystic country "Beru"—discovering, if they are lucky, that such a place does really exist. If we are a G and have had contest experience we exercise patience and listen for the elusive test calls from the remote zones. If we are new to the game it's a 10 to 1 chance we shall make the mistake of crashing out a test call which will almost certainly be abortive. Experience has taught those of us who have operated in previous BERU contests that it pays to answer dx rather than initiate test calls."

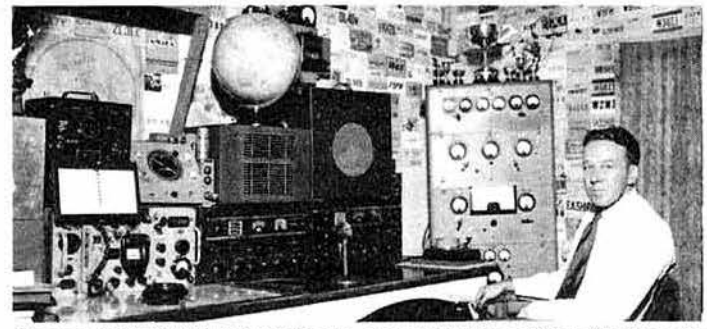
Things have not changed too much in 47 years, although we can at least call "CQ" today. In 1937 we only had an experimental licence and could only call "Test"! One final point from the 1937 results; G6RH won the junior trophy attributing his success to the "fortunate incident of working six Irish Free State stations in the middle hours of 28 February". Yes, even the EIs counted then!

The 1939 event was the last for eight years due to the intervention of the second world war. It was notable for the introduction of a serial number exchange for the first time, and a maximum of 30h operating time out of the four days allocated to each event. The details of equipment in use makes interesting reading. Home-made transmitters appeared to be in almost universal use, with such final valves as T40, T55, RK20 and RK47 very much in evidence. However, Jack Drudge Coates, operating as VU2FO with a single 6L6 running between 9 and 12W, was sixth in the senior section and winner of the junior. The "single signal superhet" receiver seemed to be in fairly universal use, both commercial and home-made. The W8JK beam was common to a number of leading entrants in a fixed or rotary form, and other popular antennas were the Windom and the "Y" matched doublet. The winner in 1939 was ZS2AL, a position he was to achieve again when the BERU resumed in 1947.

The post-war years

The immediate post-war period was one of austerity, and 1947 in particular witnessed a very severe winter. The write-up of the results for that year contained the following announcement: "In view of the uncertainty of many British contestants as to their obligation to observe fuel restriction hours, and lack of uniformity of these restrictions in different areas of the British Isles, the Council has reluctantly decided that it would be unfair to make awards to British Isles entrants this year". Needless to say, activity was reduced, but at least the BERU was back. In 1949 there were no such restraints, and activity was up to a reasonable level again. However, it seems that operating practices left something to be desired, as the results refer to the fact that "quite a bit of unsportsmanlike activity did take place, including the sending of "CQ" on the frequency of a rare dx station after a QSO with him had been completed—sweeping the band with the pa switched on, and bad notes generally". In 1950 a telephony BERU was introduced but did not last long. Somehow, as I recall, it never had the magic of the cw event.

Through the 'fifties the BERU continued to attract good support. British Forces in Germany and Austria were eligible to participate for a time. Transmitters were becoming more commercial, and receivers certainly so with the AR88 and the HRO very much to the fore. Large Yagi arrays or the cubical quad were being used more and more by the leading stations as the years passed by. During the early 'sixties we lost the ZSs when South Africa became a republic outside of the Commonwealth. More new prefixes began appearing and the equipment became more and more commercial. An analysis of activity in the 1969 event found just under 1,200 stations active and went on to point out that "it was very noticeable that there was



George Dent, VQ4AQ, Nairobi, Kenya, a regular BERU participant in the early 'fifties. Note the BC610 on the right, the two AR88s and the hand-key

the usual big turn-out of two-letter Gs, also the G2 + 3 letters and G3 + 3 letters with the first letter in the first third of the alphabet. As 9H1BL remarked, he had visions of bespectacled Edwardian gentlemen struggling up to the attic on gout-ridden legs to dust the cobwebs off the TPTG!"

It was in 1972 that the duration of the BERU was reduced to 24h. Nevertheless scoring rates in that year were somewhat higher than in 1931 when VK2NS made those 64 contacts in one week. Despite the 24h limit, VE1TG, for example, made 213 contacts on 14MHz alone. By 1975 support was declining and there was talk of a change in format for the 1976 contest. However, a burst of exceptional propagation conditions, coupled with improved publicity, resulted in a reprieve. G2QT summed it up as follows: "Conditions excellent. A most enjoyable contest—why scrap it?" The only change instituted in 1976 was in fact the change of title to "The Commonwealth Contest".

W. E. Russell (Rusty), G5WP (r), receives the Col Thomas Rose Bowl from RSGB President Norman Caws, G3BVG, at the 1963 agm

The future

After 53 years the BERU is still alive under its new title. The final words go to Rusty, G5WP, who was referring to the participation from the UK when he wrote: "Year after year the same calls are locked in deadly combat. One will emerge the winner of the struggle, and records show that the same station is likely to hold the position over several years until displaced by a younger, doughty or more effective competitor. But each year some of the winners dating from the 'thirties can still be heard taking their annual exercise in contest operation. This raises the question that old-timers must ask themselves—why? Well, for one thing, it is surely the amateur radio contest without parallel for man and machine. Any entrant soon finds that to have any hope of success he must have a good signal on any bearing on all bands from 3·5 to 28MHz, and to have receiver selectivity better than the next man. It is several years now since a two-letter call managed entirely to overcome the presumption of the G3 + 3 lads, but still the senior citizens plod sedately into very respectable placings and the Col Thomas Rose Bowl waits to be won for the first time by a G4 with three letters or, come to that, even two."

Long may we keep alive the traditions of the BERU and the British Commonwealth which it is all about. Meantime there is always the challenge of winning the contest outright from the UK—it has only happened three times in 53 years. □

RAYNET

*by Geoff Griffiths, G3STG**

Chairman, Raynet Committee

Raynet and the user services

The changes to the sections of the amateur licence which deal with the control of the number of exercises which groups may carry out for the user services, *Rad Com*, June, p470, will do much to relieve the difficulties being experienced in some areas of trying to balance the users' demands fairly.

The fact that the DTI has chosen to make these changes, reflects the sensible way in which members approached the changes in operating procedure announced in January 1983. The trial 12-month period which followed those changes has shown that Raynet could make a very useful contribution to emergency communication facilities for the users without completely clogging up our bands with frivolous activities.

Many groups do not find themselves in the position of working with all the user services though: indeed a large proportion of members find that the majority of their event activity is centred around the needs of one user service only. For some groups, that service might be St John Ambulance or cepo. Occasionally, the major user service is the county constabulary, and this is one of the strengths of Raynet in that it can respond flexibly to local needs and circumstances.

I believe that the change in licence conditions gives controllers an opportunity to make contact again with all their user service organizations. There will be a need to explain the new regulations as they apply to the users' needs, a chance to talk about the current strength of membership and state of readiness of the group, and to investigate any opportunity for co-operation with services who have not so far sampled the expertise of the local group.

It is important, of course, not to commit the group to taking on events which are beyond their current level of training or strength, for fear of producing less than a professional level of service. It is important also that groups should develop a balance of commitment to all their users and not become unduly concentrated on just one.

So, if you are ready, why not go out and preach the Raynet gospel once more, even if you only deliver an up-to-date copy of your group directory and call-out list.

RAC Lombard Rally

The Yorkshire groups seem to have really started something when they operated for the police in support of the RAC Lombard Rally in 1983. Not only did that involvement lead them to working on the National Breakdown Rally (see *Raynet* May) but also led to an opportunity to talk to the RAC Motor Sports Association and the user services about the 1984 event.

Controllers will already have had some preliminary details about routes and dates, and I hope that members will see the benefits to be gained by meeting the challenge of operating under pressure and difficult conditions in November, and of working co-operatively with other groups. I wonder if the signal procedure that your group has settled into really is compatible with the methods of the group next door? As always, the greatest need is in the areas of lowest population density (both general and Raynet) where signal paths are obstructed and where access and transport arrangements are most difficult.

I wonder what Raynet will make of it all? I suspect that those members who are able to take part will do very well, and learn a great deal about themselves, their equipment and their operating abilities.

The membership registration scheme

Surprisingly enough, the first two months of operation of the computerized record system seems to have gone smoothly, without major hiccups having yet come to light. I suppose that we shouldn't be surprised really, in view of the two-years' preparation by members of the Raynet Committee, the hard work carried out by RSGB headquarters staff to ensure that both hardware and software met the needs of members, and the extraordinary efforts put in by Dave, G3TJP, to keep the previous scheme running and ensuring a smooth transfer of information gathered over the years by Taff Crane, our late and beloved registration secretary.

No doubt there will still be quantities of the old "blues and yellows" membership registration forms lurking in the system somewhere, and Dave tells me that where these have been used, he has been happily processing these since 1 May. Would all controllers and group registration secretaries please note that these old style forms will not be processed by David after the end of July. After that date all membership registrations, whether for new members or for renewals, should be sent to RSGB headquarters at Potters Bar for processing through the new system.

So, if you have any of the old cards still waiting for photographs, now is the time to get them completed and sent off.

Membership rules

All members should be receiving a copy of the Raynet membership rules as part of their registration documents under the new scheme. This will put an end to the rather nonsensical situation whereby Raynet members in the past have signed a statement that they agree to the rules of the organization but have probably found it quite difficult to discover what those rules were.

Most members will probably not come into contact with the rules of the organization very often, and might well ask: "Why bother?" After all, the real strength, meaning and purpose of the network is all about what goes on in our local groups, and who needs rules anyway?".

The new document is the result of 12 months' careful study of the needs of the organization, and it is a tribute to the previous draughtsmen of Raynet that so little has changed from previous editions. Hopefully, you will rarely need to refer to it, but the rules do reveal how the inter-county and national fabric of Raynet is stitched together. Please do take a little time to look through them and put them somewhere safe, not just in the bin.

Zonal representation

The Raynet zonal representation scheme is fast approaching the end of its first three-year period. The first representatives began their work in January 1982, although due to resignations for various reasons, subsequently replacement representatives have been elected in two zones.

Therefore, in 10 out of the 12 zones, elections for zonal representatives will be being held towards the end of the year. The zonal representative performs a most useful function in Raynet, encouraging links between groups within the zone, and providing links in both directions with the Raynet Committee. All the representatives who have served the three-year period have taken part in Raynet Committee deliberations, and all are corresponding members of the committee. Some indeed have been very vocal in helping the committee to understand where it goes wrong!

Do you know who your zonal representative is? If not, why not? Are you sure that he knows the way that you feel about the activities of your group and about Raynet generally? Are you sure that he or she is fully aware of what your group's activities are, where and when you meet, on what night your net activity takes place, and on which frequency? He or she can only serve you if you use your representative effectively and constructively.

So when the election procedures begin, please give some thought to the subject, and decide whether your representative over the last three years has done a good job for you and your group, bearing in mind what you have done for him or her. If you are very lucky, they might even be prepared to stand for re-election.

Raynet Technical Information Service

Although certain technical information of interest to Raynet groups has been available for some considerable time, little publicity has been given to its existence, and the original information has not been added to nor regularly updated. With this in mind it is proposed to set up the Raynet Technical Information Service.

The success of such a scheme will be, in part, up to groups' technical experts who will be expected to feed information into the scheme. Initially four categories of information will be catalogued.

1. Circuits of non-commercial units, ie talk through switching and level setting circuits, small portable crossband T/T antenna assemblies, rtty terminal units etc.

2. Commercial (pmr), so-called black box equipment, or homebuilt fm transceivers. Information required, is for example, remote switching etc using FT290 and similar units over, say, up to 100yd.

3. Manuals of pmr equipment and valved hf equipment (emp) KW2000 FT200 etc.

4. Details of members who have specialized information on, for example, rtty, antennas, pmr equipment and particular makes of black boxes.

Any information, pet circuits etc you consider would be of interest to other Raynet groups should be sent to: W. J. Colclough, G3XC, "Highview", Indian Queens, St Columb, Cornwall TR9 6LL. □

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

RSGB SLOW MORSE PRACTICE TRANSMISSIONS

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

Time	Callsign	MHz	Mode	Town	Notes
Sundays					
1015	G3CGD	1·875	A1A/A3E	Cheltenham, Glos	
1100	G2FXA	1·910	A1A/A3E/ J3E	Stockton-on-Tees	
1100	G3BLS	145·250	F2A	Osney, Oxford	[1]
1200	G3PER	145·575	F2A/F3E	Heysham, Lancs	[1]
1200	G3HVI	145·250	F2A/F3E	Stoke-on-Trent, Staffs	[1]
1200	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1830	GM4RZJ	145·475	F2A/F3E	Thurso, Caithness	[1]
1830	G3RLO / G4NZU	144·525	F2A/F3E	West Bridgford, Notts	[1]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1845	G4OBK	3·565	A1A/J3E	Chorley, Lancs	
1930	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
1930	G3LDW	144·250	A1A/J3E	Halesowen, W Midlands	[1]
2000	G4TKM	145·425	F2A/F3E	Birmingham	[1]
2005	G3OLU	145·375	F3E	Braintree, Essex	[1]
2100	G4EWK	144·850	F2A	Burton-on-Trent, Staffs	[7]
2130	G3ORP / G4UAQ	144·250	A1A/J3E	Maidstone, Kent	[6]
2200	G4OJD	145·250	F2A/F3E	Brixham, Devon	[1]
Mondays					
1400	G4OOC	145·250	F2A/F3E	Leeds, Yorks	[1]
1800	G4FEX	145·250	F2A/F3E	Horsley Woodhouse, Derbys	[1]
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1845	GM4RZJ	145·475	F2A/F3E	Thurso, Caithness	[1]
1900	G3ULY / G4EXD	1·880	A1A	Culgaith, Cumbria	
1900	G3CMH/A	144·250	A1A/J3E	Yeovil, Somerset	[1]
1900	G8QR	145·250	F2A/F3E	Norwich, Norfolk	[1]
1900	G3RLO / G4NZU	144·525	F2A/F3E	West Bridgford, Notts	[1]
1900	G4ILD / G3ZQS	145·250	F2A/F3E	Riston, Lancs Darwen, Lancs	[1]
1900	G4DLB	145·250	F2A/F3E	Banbury, Oxon	[1]
1915	GM4RSJ	145·250	A2A/F3E	Prestwick, Strathclyde	[1]
1930	G4VBL	144·625	F2A/F3E	Fulham, SW London	[1]
1930	G4LLU / G4JSQ	144·160	A1A/J3E	Wolverhampton, W Midlands	[1]
1930	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
2000	G2FXA	145·250	F2A/F3E	Stockton-on-Tees	[1]
2000	G3GMS	145·250	F2A/F3E	Whitley Bay, T & W	[1]
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2000	G4PYR	1·880	A1A/J3E	Solihull, W Midlands	
2000	G4VSC	145·250	F2A/F3E	Belfast	
2000	G4OO	145·250	F2A/F3E	Spalding, Lincs	[1]
2030	G3ASR	1·875 / 144·175	A1A/J3E (lsb)	Harrow, Middx	[1] [12]
2030	G4ICC	3·535	A1A/J3E	New Duston, Northants	
2030	G4NZA	145·250	A2A/F3E	Wellington, Somerset	[9]
2100	G4OTV / G4RPQ / G4RWT	145·250	F2A/F3E	Tunbridge Wells, Kent Goudhurst, Kent Paddock Wood, Kent	[1]
2100	G3AVJ	145·250	F2A/F3E	Huyton, Merseyside	[1]
2100	G3WOR	144·250	A1A/J3E	Lancing, Sussex	[14]
2230	GM4RZJ	145·475	F2A/F3E	Thurso, Caithness	[1]
Tuesdays					
1100	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
1200	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1830	G4ILD / G3ZQS	145·250	F2A/F3E	Rishton, Lancs Darwen, Lancs	[1]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1900	G3RLO / G4NZU	144·525	F2A/F3E	West Bridgford, Notts	[1]
1900	G3WQK	144·775	F2A	Eastbourne, E Sussex	[1]
1900	G4RS	3·565 / 145·250	A1A/J3E F2A/F3E	Catterick, N Yorks	[1]
1915	GM4RSJ	145·250	A2A/F3E	Prestwick, Strathclyde	[1]
1930	G4BFJ	1·950 / 144·625	A1A/J3E F2A/F3E	Banstead, Surrey	[1]
1930	G4DAL	145·250	F2A/F3E	Lancaster, Lancs	[1]
1930	G4TDO	144·160	A1A/J3E	Wolverhampton, W Midlands	[1]
1930	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2030	G4PDP	144·250	A1A/J3E	Biggleswade, Beds	[1]
2030	G3KGU	1·910	A1A/A3E	Theydon Bois, Essex	
2100	G4EWK	144·850	F2A	Burton-on-Trent, Staffs	[7]
2100	G3AVJ	145·250	F2A/F3E	Huyton, Merseyside	[1]
2200	G3AWL	144·250	A1A/J3E	Easington, Co Durham	[8]
2200	G4OJD	145·250	F2A/F3E	Brixham, Devon	[1]
Wednesdays					
1100	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
1400	G4OOC	145·250	F2A/F3E	Leeds, Yorks	[1]
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1830	G4TYF	145·250	F2A/F3E	Bishop Auckland, Co Durham	[1]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1845	GM4RZJ	145·475	F2A/F3E	Thurso, Caithness	[1]
1900	G4ILD / G3ZQS	145·250	F2A/F3E	Rishton, Lancs Darwen, Lancs	[1]
1900	G3RLO / G4NZU	144·525	F2A/F3E	West Bridgford, Notts	[1]
1900	G2ABC	145·250	F2A/F3E	Truro, Cornwall	[1]
1900	G3ULY / G4EXD	3·583 / 145·475	A1A F2A	Culgaith, Cumbria	[1]
1900	G3KWT	145·250	F2A/F3E	Leeds, Yorks	
1915	GM4RSJ	145·250	A2A/F3E	Prestwick, Strathclyde	[1]
1930	G4NNS	144·625	F2A/F3E	Sunbury-on-Thames, Middx	[1] [10]
1930	G4FKH	3·550	A1A	Chelmsford, Essex	[1]
1930	G4LHI	145·250	F2A/F3E	Huntingdon, Cambs	[1]
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2000	G2FXA	144·250	A1A/J3E	Stockton-on-Tees	[1]
2000	GW4KDP	145·550	F2A/F3E	Barmouth, Gwynedd	[1]
2000	G3SWP	144.250	A1A/J3E	Doncaster, S Yorks	[1]
2000	G4BP/A	145·475	F2A/F3E	Scarborough, N Yorks	[3]
2000	G4PYR	1·880	A1A/J3E	Solihull, W Midlands	
2000	G4OO	145·250	F2A/F3E	Spalding, Lincs	[1]
2030	G4UOL	1·910	A1A	Ilford, Essex	[1]
2130	GM4HYF	28·350 / 145·250	A1A F2A	SE Glasgow	[1]
2230	GM4RZJ	145·475	F2A/F3E	Thurso, Caithness	[1]
Thursdays					
1400	G4OOC	145·250	F2A/F3E	Leeds, Yorks	[1]
1800	G4FEX	145·250	F2A/F3E	Horsley Woodhouse, Derbys	[1]
1830	G4ILD / G3ZQS	145·250	F2A/F3E	Rishton, Lancs Darwen, Lancs	[1]
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1845	GM4RZJ	145·475	F2A/F3E	Thurso, Caithness	[1]
1900	G3RLO / G4NZU	144·525	F2A/F3E	West Bridgford, Notts	[1]
1900	G3BLS	145·250	F2A	Osney, Oxford	[1]
1900	G4RS	3·565 / 145·250	A1A/J3E F2A/F3E	Catterick, N Yorks	[1]
1915	GM4RSJ	145·250	A2A/F3E	Prestwick, Strathclyde	[1]
1930	G4BFJ	1·950 / 144·625	A1A/J3E F2A/F3E	Banstead, Surrey	[1] [10]
1930	G3ASR	1·875 / 144·175	A1A/J3E A1A/J3E (lsb)	Harrow, Middx	[1] [11] [12]
1930	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
1930	G4SBH	145·250	F2A/F3E	Torquay, Devon	
2000	G2ACZ	1·819	A1A	Mablethorpe, Lincs	
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2000	G3GMS	145·250	F2A/F3E	Whitley Bay, T&W	[1]
	G4NZA	144·650	A2A/F3E	Wellington, Soms	[9]
2100	G3WOR	144·250	A1A/J3E	Lancing, Sussex	[14]
2100	G4EWK	144·850	F2A	Burton-on-Trent, Staffs	[7]
2100	G3AVJ	145·250	F2A/F3E	Huyton, Merseyside	[1]
2200	GM4HYF	28·350 / 145·250	A1A F2A	SE Glasgow	[1]
2200	G4OJD	145·250	F2A/F3E	Brixham, Devon	[1]
2230	GM4RZJ	145·475	F2A/F3E	Thurso, Caithness	[1]
Fridays					
1830	G4ILD / G3ZQS	145·250	F2A/F3E	Rishton, Lancs Darwen, Lancs	[1] [1]
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1830	G4TYF	145·250	F2A/F3E	Bishop Auckland, Co Durham	[1]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1900	G3RLO / G4ZNU	144·525	F2A/F3E	West Bridgford, Notts	[1]
1930	G3HVI	145·250	F2A/F3E	Stoke-on-Trent, Staffs	[1]
2000	G3RR	145·550	F2A/F3E	Barnoldswick, Lancs	[1]
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2030	G3CAR	144·625	F2A/F3E	High Wycombe, Bucks	[1]
2100	G3AVJ	145·250	F2A/F3E	Huyton, Merseyside	[1]
2200	G3AWL	144·250	A1A/J3E	Easington, Co Durham	[8]
Saturdays					
1200	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1830	GM4RZJ	144·475	F2A/F3E	Thurso, Caithness	[1]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1900	G3RLO	144·525	F2A/F3E	West Bridgford, Notts	[1]
1930	G4TDO	144·160	A1A/J3E	Wolverhampton, W Mids	[1]
2000	G4TKM	145·250	F2A/F3E	Birmingham	[1]

Notes

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

Contest News

First 1·8MHz Contest 1984 results

"Hard work" was the verdict of many entrants to this year's First 1·8MHz Contest. A lower level of activity from overseas and a high noise level made for a smaller entry to the event. The band was quite crowded, with some dx for those with good ears and good antenna systems. VK6HD was worked by six G stations, and a handful of Americans and Canadians were also shown in some logs. Even though it was thought to be hard work it was enjoyable, and a large number of entrants already look forward to next year.

Congratulations go to all the certificate winners, and thanks to everyone for an easy set of logs to check. There might still be the odd log written in pencil and some still fail to use HFC2 coversheets, but slowly and surely the standard of entries seems to be getting better. One swl log was received, a disappointing response, but congratulations are extended to Don Piccirillo, BRS52868, whose log showed he has a good understanding of cw contests. Let us hope the event as a whole will next year be blessed with an increased entry, with better conditions and less QRN! *BRS32525*

UK SECTION

Posn	Callsign	Points	Posn	Callsign	Points
1	GW3YDX	846*	22	G4DRS	431
2	G3MXJ	812*	23	G4EVS	420†
3	G3RRS	763	24	G2QT	417
4	G3SJJ	762	25	G3GHY	415†
5	G3SWH	750	26	GW3JI	404
6	G3RVM	745	27	G8RZ	396††*
7	G3TXF / GM3ZSP	744*	28	G4OGB	386†
			29	G3KSH	372††
9	G3FXB	715	30	G3AWR	362
10	G3PDL	700	31	G3BGM	326††
11	G4BUO	693	32	G4KKZ	322
12	G4GIR	591	33	G3VDF	318
13	GM3YOR	585	34	G3MCX	302
14	G3OLB	581	35	G3ZRZ	300
15	G4KGG	564	36	G3IHR	297†
16	G4IUZ	532	37	G4HZF	288†††
17	G4UPS	525†*	38	G4UOL	286†
18	G4NCJ	492†	39	G3GMM	215
19	G4BOU	483	40	G8QZ	170
20	G3VYI	464	41	G3TRR	99
21	G4VFC/A	438†			

Check logs gratefully received from G6UT, G4EBK and GW6OM.
* Certificate winners
† First-time entry
†† Senior-citizen entry
††† First-time, senior-citizen entry

OVERSEAS SECTION

Posn	Callsign	Points	Posn	Callsign	Points
1	OZ1W	440*	12	DL1SN	131
2	OK1DXS	437*	13	SP6ZFU	130
3	DL5YAS	368*	14	OK2PGT	120
4	EI8ED	324†*	15	OK1DBM	115
5	F6HYR	322*	16	EA2CR / OK1DZD	88*
6	OK1DFF	317			
7	OK1DRU	294	18	SP5GH	56
8	OK2BIU	175	19	SP9AKD	51
9	UA1CWZ	154*	20	VK6HD	48*
10	OK1NV / SP3JHY	140*			

UK RECEIVING

Posn	Station	Points
1	BRS52868	195*

Low Power Contest April 1984 results

Interest in QRP operation is on the increase! The continuous throng of visitors around the G-QRP club's stand at the recent NEC event showed that QRP operation is a "growth industry." Participation in the 1984 Low Power Contest was higher than in previous years, with 27 UK entrants and five from overseas.

This year's winner was Ron Stone, GW3YDX, whose 5W from a TenTec Argonaut and inverted-V at 55ft netted 134 QSOs, with an average rate of about 16 QSOs per hour. Runner-up was G3XWZ/A, who was using an FT902DM with outboard transistor pa to a pair of lofty dipoles at 220ft. In third place was Chris Page, G4BUE, running an Argonaut 515 into a G5RV at 30ft.

George, GM3OXX/A, was again leader in the 1W section, and will be receiving the certificate awarded to the highest scoring 1W entrant in the UK.

Comments on conditions and activity were generally favourable. There were differences of opinion among participants about the QRO stations taking part in other contests at the same time. To some they were "QRM", but to others they were a valuable source of five-point QSOs!

Subject to approval of Council, GW3YDX will receive the 1930 Committee Cup.

One possible rule change for next year would be to make the power categories 1W and 10W, to bring the rules into line with recommendations made within IARU Region 1 to define QRP as 10W input and QRPP as 1W input. Low power enthusiasts are invited to comment, please.

Comments from entrants

"Thought activity was best ever this year"—*G4BUE.*
"Lots of QRM from the DIG and Gagarin contests, but really enjoyed the contest"—*GM4ELV/A.*
"Let's hope I did the right thing by working all the five-point Germans instead of accepting a slower contact rate for the portables"—*GW3YDX.*
"The conditions did not allow me to do more than one QSO (G4BUE), sri!"—*OK2BMA.*
"Had been looking forward to the contest but was entertaining visitors from England on the very same day—not usual 'full go' "—*DJ6FO.*
"Quite pleased with what little 1W rig managed, hope to have a 40m rig next time"—*G2HLU.*
"Thoroughly enjoyed contest. Conditions, especially 7MHz, better than last year. Bags of patience and good manners by all competitors"—*G3IQF.*
"Rig in 1984 was 1962 vintage NFD tx"—*G3JKY.* *G3TXF*

SECTION A

Posn	Callsign	Power (W)	QSOs 3·5MHz	QSOs 7MHz	Pts 3·5MHz	Pts 7MHz	Total score
1	GW3YDX*	5	75	59	993	712	1,705
2	G3XWZ/A*	5	80	47	1,003	577	1,580
3	G4BUE*	5	45	66	627	839	1,466
4	G3AZ	5	47	48	670	665	1,335
5	G4ARI	5	64	28	915	390	1,305
6	G3VTT	5	48	43	677	617	1,294
7	G3KKQ	5	62	27	870	405	1,275
8	G4ERT	5	92	2	1,220	30	1,250
9	G3VIP/P	5	43	44	562	630	1,192
10	G3DNF	5	54	24	730	330	1,060
11	G3IQF	5	42	24	620	340	960
12	G4OGB	5	43	29	595	360	955
13	G3AWR	5	32	34	460	490	950
14	G3IGU	5	38	25	500	355	855
15	GM3OXX/A*	1	46	12	540	210	750
16	G4SIS	5	33	16	492	202	694
17	G4GQR (G4UNX)	5	43	26	472	212	684
18	G3JKY	5	11	34	125	470	595
19	G2HLU	1	38	0	550	0	550
20	G4HMC	1	0	35	0	492	492
21	G3NKS	5	32	0	470	0	470
22	G3BCC	1	34	0	445	0	445
23	G8QM	5	22	8	310	120	430
24	GM4ELV/A	1	0	40	0	425	425
25	G3CWL/A	5	4	16	60	210	270
26	G3MCK	3	17	0	253	0	253
27	G3KZR	1	12	0	180	0	180

SECTION B

Posn	Callsign	Power (W)	QSOs 3·5MHz	QSOs 7MHz	Pts 3·5MHz	Pts 7MHz	Total score
1	PA0PN*	4	14	23	185	275	460
2	DJ6FO*	4	3	28	43	410	453
3	DL1SN*	5	1	15	15	210	225
4	OK1DKW	5	0	12	0	170	170
5	OK2BMA	5	0	1	0	15	15

* Certificate winners
Check logs were gratefully received from G3SB and G4BUO.

Town & County Contest 1984 results

The Town & County Contest held in March (the second in the series), attracted 24 entries in the transmitting section, seven receiving entries and five check-logs. It was a shame that so very few logs were received, as over 160 different stations were active, and many of these appeared to have made a substantial number of contacts. This is one of the few 'phone contests in the current RSGB calendar for individual operators, and was organized at the request of many members who wanted a short, sharp event—so where were the logs fellows?

The winner was Jon Short, G4NCJ, who operated from a portable location on a farm near Yate in Avon. His good score came from the use of a massive turnstile antenna 50ft high, working against a 200ft counterpoise and earth system. In second place was G3SJK, operating the Rutherford Appleton ARC station, G3RRS, using a dipole 80ft high, and third was G3JFH. These three entrants will receive certificates. Mention should be made of the efforts of GM3IBU, who operated from the Orkney Isles and had a hard time breaking through to the south.

At the top of the receiving section was Paul Crankshaw, RS48909, from Troon in Ayrshire, who managed to log most of those who were active. There were some misunderstandings about the rules and some entrants will find that their scores have been adjusted. SWL entrants should note that it is necessary to log the time of each contact to count for points. No-one was penalized this time, but it did make extra work for the adjudicator and will not be allowed in the future. As there were less than 10 entrants in this section, only one certificate will be awarded.

Most entrants wrote a few words saying how much they had enjoyed the contest, and agreed with the rules and the timing. The committee was grateful to those who sent in logs and for the non-entrants who provided check-logs, as these were most useful for cross-checking purposes.

G4RWW

TRANSMITTING SECTION

Posn	Callsign	Checked score	Town	County
1	G4NCJ/P †	625	Yate	AVN
2	G3RRS *1 †	619	Didcot	OFE
3	G3JFH †	602	Cheltenham	GLO
4	G4DRS	600	Biggleswade	BFD
5	G3SJJ	589	Nottingham	NOT
6	G4NUT/A *2	588	Newport Pagnell	BKS
7	GW4GNY	405	Welshpool	PWS
8	G4FKK	380	South Croydon	SRY

Posn	Callsign	Checked score	Town	County
9	GM3NIG	374	Glasgow	SCD
10	G3BPN	332	Crewkerne	SOM
11	G4ECI *3	305	Stockport	MCH
12	G4NVA	302	Crewe	CHS
13	G3OCG	295	Putney	LDN
14	G4MFU	283	Hailsham	SXE
	G4MET	283	Stalybridge	MCH
16	G3LHJ	272	Newton Abbott	DVN
17	G4NIF	245	Lydney	GLO
18	G4RWW	230	Croydon	LDN
19	G4SUI/A	221	Mirfield	YSW
20	G6HC	167	Thornton Heath	LDN
21	G4VUD	143	Newton Abbott	DVN
22	G4RIM	140	Ivybridge	DVN
23	G3SDZ	130	Newark	NOT
24	GM3IBU	51	Kirkwall	OKE

*1 Rutherford Appleton Lab ARC (operated by G3SJK)
*2 North Bucks Contest Group (operated by G4MEJ)
*3 Used Bramhall MCH to 006 then Stockport

RECEIVING SECTION

Posn	Station	Checked score	Posn	Station	Checked score
1	RS48909†	435	4	RS28198	276
2	RS84508	337		RS20249	276
3	RS32525	320	6	RS44395	239
† Certificate winners			7	GW8NVN	166

Check logs received from G3GMM, G3ZRZ, G4AJA and G4HTD.

September 70MHz Trophy & SWL Contest rules

0900—1600gmt, 16 September 1984

The following general rules, published in the January 1984 issue of *Radio Communication*, will apply: 1, 2, 3, 4e, 5a, 6a, 7a, 9, 10a, 11a, 12a, 13-24.

All entries and check logs to: VHF Contests Committee, c/o P. Suckling, G4KGC, 46 Windsor Close, Towcester, Northants NN2 7JB.

ROPOCO 2 1984 rules

1. The general rules for RSGB hf contests, published in the January 1984 issue of *Radio Communication*, will apply.
2. Eligible entrants. All paid-up members of the RSGB resident in the British Isles holding a Class A licence. Single-operator entries only.
3. When. 0800 to 1000gmt. Sunday 26 August 1984.
4. Contacts. CW in the 3·5MHz band only. Entrants are requested to confine their operations to 3,520-3,570kHz. Send RST plus—for the first contact, entrant's own postal code; for the second and subsequent contacts, the postal code received in the previous contact. Contacts with European stations will not count for points.
5. Scoring. 10 points per contact.
6. Entries. Logs must be sent to A. K. Gray, G4DJX, 44 Sherwood Ave, St Albans, Herts, postmarked not later than Monday 10 September 1984.
7. Awards. Certificates will be awarded to the first, second and third placed entrants.

South Manchester DF Qualifying Event

Date: 5 August 1984
Map: OS map 109 1 : 50,000 series, Manchester
Assembly: 1300bst for start at 1320bst
Location: Car park at Heaton Park on the A665 immediately north of the junction with the A6044. ngr 826 033

Competitors requiring tea should notify Mr D. Holland, 32 Woodville Drive, Sale, Cheshire M33 1NF (tel 061-973 1837) not later than 29 July 1984.

Mid-Thames DF Qualifying Event results

Sunday 29 April dawned bright and sunny—as had the 21 days before it. This led to unusual difficulties for the organizers of the Mid-Thames DF Qualifying Event held on the Oxford map. Not only was there a general lack of ground cover—only to be expected at this time of the year—but also, everything was bone dry: so much so that even G3UJO was hard put to it to find a wet place to hide, short of total immersion in the river (unpopular, but not unprecedented).

Twenty-two teams turned up at the start, at the western end of Shotover Plain. Station A, run by Mark Hodgson, G4PNN, and Tony Judd, G6DZG, under the Oxford club callsign G5LO/P, was a little weak at the start and a great deal weaker at the finish, after an over-enthusiastic competitor had accidentally severed the antenna near the transmitter. By the time this happened, however, several teams had signed in at both transmitters, so the overall results were not affected. The station was situated 15km from the start beside a bridle path near Woodstock, with the antenna running for part of its length through a disused and partly bricked-up railway tunnel. The organizers did not seriously expect anyone to waste time exploring the tunnel, and in the event hardly anyone did, but a second decoy site—a tramp's shed in the hedgerow—attracted more attention. It was not occupied, not even by the tramp.

Station B, run by Peter Bradley, G3UJO/P, was nearer the start, only 9·5km distant. True to form, G3UJO had managed to find a marshy and extremely muddy field near Boars Hill, and was working into a loop antenna encircling the wettest part of the swamp. This produced a strong signal at the start, and some effects for some competitors at the finish, though no-one had much trouble finding the transmitter. First to find his second transmitter was Trevor Gage of Mid-Thames, who handed in his form at station B only 86 min after the start. He was followed 1·5min later by Dick Brocks of Chelmsford.

The afternoon ended with the customary tea at Stanton St John Village Hall, prepared and served with the usual expertise by Jean Mollart and helpers. This was followed by the presentation of prizes to the two qualifiers, Trevor Gage and Dick Brocks, and to the first lady to arrive at both sites, the indefatigable Doreen Pechey.

Contests Calendar

7-8 July	VHF NFD & SWL *(Rules in April issue)*
7-8 July	Venezuelan (Phone) *(Rules in July* MOTA)
14-15 July	IARU Radio Sport Championship *(Rules in July* MOTA)
15 July	Low Power Field Day *(Rules in June issue)*
15 July	DF Qualifying Event Mid-Thames *(Details in June issue)*
28-29 July	Venezulan (CW) *Rules in July* MOTA)
4 August	432MHz Low Power & SWL *(Rules in June issue)*
4-5 August	YO DX *(Rules in July* MOTA)
5 August	144MHz Low Power & SWL *(Rules in June issue)*
5 August	DF Qualifying Event South Manchester *(Details in July issue)*
11-12 August	European DX (CW) *(Rules in July* MOTA)
19 August	DF Qualfying 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 FD *(Rules in July issue)*
1-2 September (prov)	SSB FD *(Rules in May issue)*
1-2 September	144MHz Trophy and IARU VHF & SWL *(Rules in June issue)*
8-9 September	European DX (Phone) *(Rules in July* MOTA)
9 September	DF Qualifying Event Chelmsford/Colchester
16 September	70MHz Trophy & SWL *(Rules in July issue)*
October-December	432 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	European DX (RTTY) *(Rules in July* MOTA)
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.

Then came another surprise presentation—a handsome engraved tankard to organizer and operator G3UJO, together with a birthday cardsigned by all the competitors. The fact that it was not actually his birthday—there had been some confusion over dates when the event was being arranged—did nothing to diminish the merriment of the occasion, and Bradley agreed to follow royal precedent and have his official birthday on 29 April!

			Time of arrival	
Posn	Name	Club	Station A	Station B
1	T. Gage	Mid-Thames	1417	1446·5
2	R.Brocks	Chelmsford	1416	1448
3	A. Williams	Braintree	1418·5	1455
4	A. Simmons	Mid-Thames	1414	1457
5	M. Hawkins	Chelmsford	1418	1457
6	R. Shepherd	Mid-Thames	1416·5	1506
7	W. Pechey	Mid-Thames	1415	1509
8	C. Plummer	Mid-Thames	1517	1419
9	I. Buston	Colchester	1434	1518·5
10	M. Easterbrook	Dartford Heath	1435	1527·5
11	P. Lisle	Mid-Thames	1436	1531·5
12	B. Mepham	Mid-Thames	1536	1457
13	A. Butcher	Chelmsford	1541	1504·5
14	W. North	Mid-Thames	1618	1531
15	E. Mollart	Mid-Thames	1554	1626
16	C. Merry	Dartford Heath	1628	1444
17	D. Newman	Slade	—	1428·5
18	G. Whenham	Coventry	—	1450
19	B. Poole	Mid-Thames	—	1531

T. Gage and R. Brocks qualify for the National Final

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 **January 1984** issue. Unchanged details will be published again in **January 1985.**

RSGB affiliated organizations are requested to report all programmes and news items to their regional representatives regularly. Information for inclusion in the **September** issue should reach them by **9 July** and for the **October** issue by **18 August.**

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 to be announced

Accrington (NW Repeater Group)—Third Thursday in each month, 8pm. Globe Bowling Club, Willows Lane, Accrington. Sec Howard Aspinall, G3RXH, tel 0282 59367, office hours only.

Ainsdale (AARC)—3, 17, 31 July, 8pm. Scouts HQ, Marine Drive, nr pier, Southport. 10/24 July (DF hunts, start 7.30pm). Details from sec David Norris, G4TUP, tel 0704 35947.

Barnoldswick (Rolls-Royce ARC)—First Wednesday in each month, 8pm. Rolls-Royce Sports & Social Club, Barnoldswick. Morse classes Mondays, 7.30pm. Details on GB2RS, or from sec Leslie Logan, G4ILG, tel 0282 812288.

Barrow (South Lakeland ARS)—First Tuesday and third Thursday in each month. Norweb Social Club, adjacent Ormsgill Hotel, Barrow. Sec G6LKB.

Blackburn (East Lancs ARC)—First Tuesday in each month, 7.30pm. Shadsworth Leisure Centre, Blackburn. Sec Simon Eatough, G4GVQ, tel 0254 57864.

Bolton (B & DARS)—Wednesdays, 8pm. Horwich Leisure Centre, Horwich. Pro Keith Pope, G6CGZ, tel 0204 62443.

Bolton (BTC ARC)—Details from sec c/o Electronics Dept, Bolton Technical College, Manchester Road, Bolton.

Bolton (Edbro RC)—Details from A. L. Brown. c/o Edbro Ltd, Lever Street, Bolton.

Bolton (Norweb ARC)—Information from C. J. Moulding, G4HYG, c/o Sports & Social Club, Norweb Electricity, Manchester Road, Bolton BL3 2QN.

Bolton (Red Rose RS)—Details from sec Geoff Mollison, G8VCW, tel Bolton 21424.

Bury (BRS)—3 July (Surplus equipment sale), 10 July (Visit to IBA transmitter site at Emley Moor), 17 July (Mosses Centre is closed—meeting venue to be arranged), 24, 31 July (Informal meetings at the centre), 8pm. Mosses Community Centre, Cecil Street, Bury. Pro Malcolm Pritchard, G3VNQ.

Carlisle (Border Television ARC)—Details from sec, Border Television Ltd, Television Studios, Carlisle, Cumbria.

Carlisle (ARS Cumbria)—Details from Mr D. Youngman, C/Avionics, RAF, Carlisle, Cumbria.

Chester (C&DRS)—10 July (Barbeque and club station G3GIZ on the air), 17, 24, 31 July (To be arranged), 8pm. Chester Rugby Union Football Club, Hare Lane, Vicars Cross, Chester. Morse classes at 7.30pm by G4MOU. Chairman Alan Warne, G4EZO, tel 0244 40055. Note only one meeting in August on 28th.

Congleton (CARC)—Details from RS42758, 156 Holmes Chapel Road, Congleton, Cheshire CW12 4QB.

Crewe (South Cheshire ARS)—Second Monday in each month. RAOB Social Club, Earle Street, Crewe, Sec B. G. F. Roe, G4LVR, tel 0270 665661.

Eccles (E & DARS)—Tuesdays, 8pm. The Duke of York Hotel, Church Street, Eccles. Sec Chris Harrison, G8KRG, 53 Peveril Close, Whitefield, Manchester M25 5NS, tel 061-773 7899.

Fylde (FARS)—3 July (Tour of the radio and radar equipment at Blackpool Airport), 17 July (Informal meeting with morse class), 7.45pm. Kite Club, Blackpool Airport. Details from Harold Fenton, G8GG, tel 0253 725717. Club members were guests of the Royal Navy recently when their meeting was held at HMS *Inskip* by courtesy of Lt Cdr D. Hutchins, RN.

Included in the visit was a conducted tour of the Navy's premier radio station, which provides essential communication from Whitehall to Washington, the Falklands to the Far East, and to vessels, both on and below the surface, in all parts of the world. Banks of high powered transmitters —some with a power of 50,000W, feed a veritable forest of antennas dominated by the four giant masts, which at 650ft are considerably higher than Blackpool Tower!

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

Kendal (Westmorland RS)—Second Tuesday in each month. Strickland Arms on the A6 near Kendal. Sec Neil Martin, G6OPO, tel 0539 31476.

Leyland (LHARG)—9 July, 7.30pm. Astley Park Sports Club, Hallgate, Astley Village, Chorley. For details contact the new sec, Dave Hodkinson, G1AOG.

Liverpool (L & DARS)—Tuesdays, 8pm. Details from Harry Cohen, G4GHS, tel 051-428 5442.

Liverpool (Riverside ARS)—Details from sec, c/o Dept of Elect & Rad Engineering, Riversdale College of Technology, Liverpool L19 3QR.

Liverpool (Sefton ARC)—Alternate Wednesdays. Liverpool Prison Officers Social Club, Hornby Place, off Hornby Road, Walton, Liverpool. Sec Mike Webb, G6ICR, tel 051-487 0756.

Liverpool (UoLARS)—Informal meetings in the shack each lunchtime at the top of the Old Union Building, 2 Bedford St North, Liverpool 7. Enquiries to sec Haroon Lakhaney, c/o Rad Soc, Guild Office, 2 Bedford Street North, Liverpool 7.

Macclesfield—Second and fourth Tuesdays each month, 8pm. Fermain Club, Oxford Road, Macclesfield. Sec Dave Lucas, G6HLQ, tel Macclesfield 28610.

Manchester (ICLR&ES)—Information from sec c/o 4TB, International Computers Ltd, Wenlock Way, West Gorton, Manchester M12 5DR.

Manchester (M & DARS)—Wednesdays, 7.30pm. Newton Heath Community Centre, 203 Droylsden Road, Newton Heath, Manchester. Sec John Dent, G4LRR.

Manchester (MUARS)—Informal meetings most lunch-times and Wednesday afternoon in the shack on the first floor on the north side of the Students' Union Buildings. Sec Richard Skobelski, G6ROQ. Enquiries for atv skeds on 70cm for 1984 to the society.

Manchester (South Manchester RC)—Fridays (Formal), Mondays (Informal), 8pm. Sale Moor Community Centre, Norris Road, Sale. Sec David Holland, G3WFT, tel 061-973 1837.

Manchester (UMIST RS)—During term time, Wednesday afternoons in the shack on L floor in the main building. Thursdays, 8pm, in the Union Bar. Contacts are Dave Crye, G6BSK, or Dave Brooke, G6GZH, c/o Shack, tel 061-236 3311, ext 2945, or c/o Radio Society, UMIST Union, Box 88, Sackville Street, Manchester M60 1QD.

Manchester (West Manchester RC)—Wednesdays, 8pm. Atherton & Tyldesly Scout HQ, Shuttle Street, Tyldesly. Sec Dennis Tennant, G4KCB.

Maryport (Solway RC)—Information from sec J. Aldersey, Maryport Educational Settlement, High Street, Maryport, Cumbria CA15 6BQ.

Morecambe (MBARS)—Fortnightly meetings. Details from sec Bill Delamere, G3PER, tel 0524 52659.

Oldham (OARC)—Mondays, 8.30pm. Devonshire Arms, Elliot Street, Lees, nr Oldham. Sec Mrs F. Butterworth, G4SPX, PO Box 29, Oldham, tel 061-652 8862.

Ormskirk (O & DARC)—First and third Thursday in each month, 7.30pm. Ormskirk Community Centre. 7 July (Special event station at the Westhead Carnival). Sec Mrs A. Day, G1AZI, tel 0704 894047.

Penrith (Eden Valley RS)—Third Thursday in each month, 7.30pm. Kings Arms, Temple Sowerby, Penrith. Club net 7pm, Thursdays, 3·650MHz. Sec Alison Ashcroft, G1FBO, tel 0768 88260.

Preston (PARS)—5 July (Preparation for VHF NFD), 19 July, 2 August (No meetings scheduled), 8pm. Lonsdale Club, Fullwood Hall Lane, Fullwood, Preston. Sec George Earnshaw, G3ZXC, tel 0772 718175.

Rossendale (Rossendale Valley ARC)—Wednesdays, 8pm. 4 Bacup Road, Rawtenstall. Sec Mrs Celia Adams, G6GZM, tel 0706 220935.

St Helens (StH & DARC)—Thursdays, 7.45pm. Conservative Rooms, Boundary Road, St Helens. Pro Alan Manchester, G6FJU, tel 0744 56889.

Salford (Dial House RS)—Wednesdays, 5.30pm. Dial House, 21 Chapel Street, Salford. Details from sec, Manchester Central Area Sports & Social Club, c/o M43, Dial House.

Salford (UoSCS)—Wednesday afternoons from 1.30pm. Shack on the top floor of the Clocktower, The Pavilion, Castle Irwell Students Village. Contact Paul Wells, G4GMV, c/o SUCS, Students Union, University of Salford, University Road, Salford M5 4WT.

Skelmersdale (S & DARC)—Thursdays, 8.30pm. Dunlop Sports & Social Club, Skelmersdale. Sec George Rogers, 113 Foxfold, Fosters Green, Skelmersdale.

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

Tarporley (Mid-Cheshire ARS)—Wednesdays, 8pm. Cotebrook Village Hall, Sadlers Lane, off the A49, Tarporley. Sec Rick Dodd, G8PNL, tel Winsford 57766.

Thornton Cleveleys (TCARS)—Mondays, 7.30pm. Norbreck 1st Scout Hut, Carr Road, Bispham. Sec Mrs Janet Bullock, 26 Lancaster Avenue, Thornton Cleveleys, tel 0253 826451.

Wallasey (St Dunstan's ARS)—Information from E. C. John, G3SEJ, 52 Broadway Avenue, Wallasey, Merseyside L45 6TD.

Warrington (WARC)—Tuesdays, 7.30pm. Grappenhall Community Centre, Bell House Lane, Warrington. Sec Bill Green, G8HLZ, tel 0925 814740.

Warrington (Racal Communication RS)—Information from sec, c/o Racal Communications Ltd, Chesford Grange, Warrington, Cheshire W81 4RH.

Warrington (UK FM Group Western)—First Thursday in each month, 8pm. Grappenhall Community Centre, Bell House Lane, Warrington. Sec Gordon Adams, G3LEQ, tel 0565 4040.

Warrington (10th Warrington Scout Group ARC)—Information from sec, c/o 41 Highfield Avenue, Great Sankey, Warrington, Cheshire WA5 2TW.

Wigan (Douglas Valley ARS)—Thursdays except the second in each month. Shevington Conservative Club, Shevington, Wigan. Sec Dave Harrison, G4NDJ.

Wigan (WCTARC)—Information from J. R. Hesford, Dept of Electrical Engineering, Wigan College of Technology, Parsons Walk, Wigan WN1 1RR.

Wigan (Winstanley College RC)—Details from G4WCR at Winstanley College, Winstanley Road, Bidlinge, Wigan.

Wirral (WARS)—4 July (Sale of surplus equipment), 18 July (Computers and amateur radio), 1 August (To be announced), 7.45pm. Guide Hut, Westbourne Road, West Kirby, Wirral. Sec Cedric Cawthorne, G4KPY. Tel 051-625 7311.

Wirral (W&D ARC)—4 July (BBQ at Heswall), 7/8 July (VHF NFD, four-band club entry), 15 July (Third Sunday df hunt), 18 July (D & W), 25 July (DF hunt for G8PMF Award), 8pm. Irby Cricket Club, Irby, Wirral. Sec Gerry Scott, G8TRY, tel 051-630 1393.

Wigan (WCG)—Details from Flat 1, 6 Charlesville, Oxton, Birkenhead, Merseyside L43 1TP.

Woodford (RATEC)—Mondays, 8pm. British Legion Club, Moor Lane, Woodford. Sec N. D. Spears, G4RWI, 58 Cheadle Road, Cheadle Hulme, Cheshire.

Workington (Windscale ARS)—Details from P. Reay, G6TAK.

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

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

Barnsley (UK FM Group Northern)—First Sunday in each month, 7.30pm. The Royal Hotel, Barnsley. Details from sec G4LUE.

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

Doncaster (DMI of HEARC)—Mondays, 8pm. Gertrude Bell Hall, Armthorpe, Doncaster, sec B. Coupe, G8GTG, tel Doncaster 770663.

Goole (GR&ES)—Tuesdays, 17 July (Mini df night), 24 July ("Hong Kong", G6KHZ), 31 July (Quiz night), 7.30pm. Junior Chambers Building, Boothferry Road, Goole. Details from sec Richard Sugden, G8IOH, tel 0405 84 462.

Halifax (H&DARS)—First and third Tuesday in each month, 7.30pm. The Running Man PH, Pellon Lane, Halifax. Details from sec David Moss, tel Halifax 202306.

Halifax (Northern Heights ARS)—First and third Wednesday in each month. Bradshaw Tavern, Bradshaw, Halifax. Sec G6CJL, tel Halifax 54635.

Harrogate Repeater Group—Details from K. Cleary, G4ATZ.

Hornsea (HARS)—Wednesdays, 8pm. The Mill, Mill House, Atwick Road, Hornsea. Details from sec M. Willerby, G4MWE.

Hull (H&DARS)—Mondays, 7.30pm, cw classes; Tuesdays and Thursdays, 7.15pm, RAE classes; Fridays, club night. West Park Recreation Centre, Walton Street, Anlaby Road, Hull. Sec G6VOM.

Hull (HUR&ES)—Tuesdays, 1.15pm. Room 313B, University Union Building, Cottingham Road, Hull.

Hull (WACRAL)—Plans in hand for annual conference in September. Details from L. D. Colley, G3AGX, 13 Ferry Road, Wawne, Nr Hull. Tel Hull 822276.

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

Leeds (BYLARA)—Sec Mrs D. Hughes, G4EZI.

Leeds (White Rose RS)—Wednesdays, 8pm. Moortown Rugby Football Club, Moss Valley, Alwoodly, Leeds 17. Sec G6HBY.

Leeds (L&DARS)—Mondays, 8pm. Old Hall Golf Club, Woodhall Lane, Calverly, Leeds. Sec Chris Camm, G8TZT.

Maltby (MARS)—Fridays, 13 July (Barge trip), 7pm. Old School Buildings, Church Lane, Maltby. Details from I. Abel, G3ZHI, tel Rotherham 814911.

Marsden (Pennine & DARS)—Alternate Wednesdays. The Olive Branch Inn, Manchester Road, Marsden. Sec J. S. Shaw, G4RAJ, tel Huddersfield 35955.

Mexborough (M&DARS)—Fridays, 7.30pm. Harrop Hall, Dolcliffe Road, Mexborough. Sec D. Lamb, G6YGZ.

Otley (OARS)—Tuesdays, 8pm. RAOB Club, Otley. Joint secs G6SPU/G6OAC, tel Leeds 504381.

Pontefract (P&DARS)—Thursdays, 10 July (Joint df hunt with Wakefield DARS), 26 July (DF hunt), 28 July (Demonstration station at museum), 4/5 August (Demonstration station at the park where the battle re-enactment will be taking place!), 7.30pm. CW classes on Mondays. Carleton Community Centre, Carleton, Pontefract. Details from sec Ron Tams, G4TCG.

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

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

Sheffield (SARS)—First and second Monday in each month. Firth Park Pavilion, third Monday (Informal), Sheaf House Hotel, Brammall Lane, Sheffield. Sec G8VQS, tel 0246 31696.

Spen Valley (SVARS)—Thursdays, 8pm. Old Bank Working Mens Club, Mirfield. Note new sec T. Clough, G4PHR.

Wakefield (NWRS)—Thursdays, 7.45pm. Carr Gate Working Mens Club, Wakefield. Sec S. Thompson, G4RCH, tel Leeds 536633.

Wakefield (W&DARS)—10 July (144MHz DF foxhunt with Pontefract ARS), 24 July (Pitch & putt competition—Holmfield Park), 7 August (On the air/natter night), 8pm. Ossett Community Centre, Prospect Road, Ossett. Details from sec Walter Parkin, G8PBE, tel Wakefield 378727.

Wharfdale Repeater Group—Sec G3KKP.

York (YARS)—Fridays, 7.30pm. 10/11/12 July (GB2GYS exhibition station on stand 591 at the Great Yorkshire Show), United Services Club Room, 61 Micklegate, York. Details from sec Keith Cass, G3WVO, tel York 36230.

Would secs please bear in mind when sending material to RR2 that this news is prepared some six weeks in advance of publication. If you are arranging your autumn/winter club meetings, RR2 is available to give talks on the RSGB and other topics. *RR2.*

REGION 3—RR to be announced

Atherstone (AARC)—Second and third Mondays in each month, 7.30pm, Tudor Centre, Coleshill Road, Atherstone. Sec G6BEO, tel Hinkley (0455) 212051.

Birmingham (Castle Vale, Wells Krautkramer ARC) (G4WKK) Private club, employees only. Sec Godfrey Hands, tel 021-351 5661.

Birmingham (Midland ARS)—17 July ("Amateur tv", by Peter, G6DRN), 7.30pm. 294a Broad Street, Birmingham B1 2DS. Sec G8BHE, tel 021-422 9787.

Birmingham (Slade RS)—First Friday in each month, 7.45pm. Kingsbury Road Community Centre, 75 Kingsbury Road, Erdington, Birmingham. Sec G4FGF, tel 021-770 3474.

Birmingham (South Birmingham RS)—11 July (Brainstrust quiz—Mastermind!), 7.30pm. Returns to Hampstead House, Condover Road, off Fairfax Road, West Heath, Birmingham B31 3QY. Sec G8RGQ, tel 021-459 8312.

Birmingham (University of Aston ARS)—Club rigs available for activity on hf, vhf and uhf. G3UOA and G8PGM. Meets Fresher Fayre, 1pm. Chairman M. Beach, St Peters College, College Road, Birmingham B3 3TE.

Birmingham (UoBARS)—Active in contests, holds RAE class. Meets lunchtime during term, also Fridays, 7.30pm. Clubroom, second floor, Students Union, side entrance near Midland Bank. Sec Martin Alcock, G6KJJ, Guild of Students, Edgbaston Park Road, Birmingham.

Bridgnorth (Severn RS)—Newly affiliated. Contact Mr E. G. Churchyard, 11 Greenfields Drive, Bridgnorth, Salop.

Bromsgrove (BARS)—7 July (Display station at S Bromsgrove High School), 10 July ("Vintage wireless", by Tony Hopwood), 24 July (Informal meeting), 8pm. British Legion Club, Bromsgrove. Sec Alan, G4LVK, tel 021-445 2088.

Bromsgrove (B&DARC)—13 July (To be announced on GB2RS), 8pm. Avoncroft Art Centre, Bromsgrove. Sec Jim Calder, G6EAM, tel Kingswinford (549) 5850.

Burton-upon-Trent (B-on-T&DARS)—Wednesdays, 8pm. Stapenhill Institute, Main Street, Stapenhill, Burton-on-Trent. Sec Mike, G4HBY, tel Burton-on-Trent (0283) 62344.

Cannock Chase (CCARS)—Thursdays, 8pm. Bridgetown War Memorial Club, Union Street, Bridgetown, Nr Cannock. Pro Joe Gregory, G8HZP, tel Cheslyn Hay (0922) 416419.

Coventry (CARS)—Fridays, 8pm. Baden Powell Scout HQ, 121 St Nicholas Street, Radford, Coventry. Sec Dave Parker, G8OMB, tel Coventry (0203) 396936.

Coventry (CTARS)—Mondays, 7pm. Winfray Annexe, Coventry Technical College. Preparations for large amateur radio display, GB4TCF, Town & Country Festival, Stoneleigh, on 25 to 27 August. Sec Roy Flowers, tel Coventry (0203) 77947.

Droitwich (DARC)—Second and fourth Mondays in each month, 8pm. Scout HQ, Droitwich. Sec G. Talde, G4HFP, tel Stourport-on-Severn (02993) 3818.

Dudley (DARC)—Mondays, 7.45pm. Allied Centre, Greenman Alley, off Tower Street, Dudley. Sec G4SQP, tel Codsall (209) 5636.

Evesham (Triple B Contest Group)—Private club, contest working only. Sec G4WAD, tel Evesham (0386) 6246.

Halesowen (MEB Sports & Social Club)—Tuesdays 8pm. MEBHQ Social Club, Mucklow Hill, Halesowen. Sec G4RWH, tel 021-747 8784.

Hereford (HARS)—1 July (Droitwich Rally), 6 July ("Oscilloscopes", by Dave, G8IVO), 20 July (Informal club meeting), 8pm. Civil Defence HQ, Gaol Street, Hereford. Sec Eddie, G3WRQ, tel Hereford (0432) 54064.

Kidderminster (K&DARC)—Tuesdays, fortnightly, 8pm. Aggborough Community Centre, Hoo Road, Kidderminster. Sec G8WOX, tel Kidderminster (0562) 751584.

Lichfield (Lichfield Chad RC)—Mondays, 8.30pm. Naval Club, Burton Old Road, Lichfield. Sec Grahame, G4ESK, tel Lichfield (54) 23919.

Malvern Hills (MHRAC)—Second Tuesday in each month, 7.30pm. Red Lion Inn, St. Ann's Road, Malvern. Sec Nic, G4TGX, tel Malvern (06845) 65802.

Much Wenlock (Wenlock ARES)—Second and fourth Monday in each month, 8.30pm. Raven Hotel, Much Wenlock. Sec Phil, G6JMG, tel Bridgnorth (0746) 862103.

Redditch (RRC)—12 July ("Operating procedures", by Tom Douglas, G3BA), 26 July (General meeting), 8pm. WRVS Centre, Ludlow Road, Redditch. Sec Ray, G3EVT, tel Alcester (0789) 762041.

Rugby (RATS)—Wednesdays, 7.30pm. Cricket Pavilion Entrance, B Building, Rugby Radio Station, A5 trunk road, Hillmorton, Rugby. Sec Barry, G4ECO, tel Rugby (0788) 75935.

Shrewsbury (Salop ARS)—5 July (Summer social), 12 July (Informal meeting), 19 July (Third fox hunt), 26 July (Natter night), 8pm. Albert Hotel, Smithfield Road, Shrewsbury. Sec G4XBI, (ex-G6UDB), Tel Shrewsbury (0743) 62737.

Solihull (SARS)—Third Tuesday in each month, 7.30pm. The Manor House, High Street, Solihull. Sec G6HSZ, Tel 021-742 3378.

Solihull Contest Group—Newly affiliated. Only information available, contact, R. J. Maskill, G4PYR.

Stafford (S&DARS)—Tuesdays, 8pm. Coach & Horses Motel, Pasturefields, Staffs. Sec G4RSW, tel Stafford (0785) 46306.

Stoke-on-Trent (North Staffs ARS)—Mondays, 8pm. Harold Clowes Community Centre, off Dawlish Road, Bentilee, Stoke-on-Trent. Sec David, G6MLI, tel Stoke (0782) 332657.

Stoke-on-Trent (SonTARS)—Thursdays, 7.30pm. 2a Racecourse Road, Oakhill Road, Stoke-on-Trent. Sec Jim, G4IMV, tel Newcastle (0762) 613207.

Stourbridge (StARS)—2 July (Informal—all the usual attractions!), 16 July ("A look at the club's artifacts", details on GB2RS). No meetings in August. The Robin Woods Centre, School Street, off Enville Street, Stourbridge. Sec Malcolm, G8JTL, tel Lye (593) 4019.

Stourbridge (Wordsley)—Thursdays, 12 July (RSGB film "The Secret Listeners"), 26 July (Club chat night), 8pm. Vine Inn, Camp Hill, Wordsley, West Midlands. Sec Andy, G4TGM, tel Kingswinford (2) 295082.

Stratford-on-Avon (S-on-A&DARC)—9 July ("Hints and tips—your chance to show how you do it"), 23 July (Construction evening), 7.30pm. The Control Tower, Bearley Radio Station, Bearley, nr Stratford-on-Avon. Sec David Boocock, G8OVC.

Sutton Coldfield (SCARS)—23 July ("Computers in connection with amateur radio", by Peter Ward and Brian Edwards). Second and fourth Mondays in each month, 7.30pm. No August meetings. Central Library, Sainsbury Building, Sutton Coldfield. Sec G6UFD, tel 021-358 6501.

Tamworth (TARS)—Mondays, 8pm. The Rugby Club, Cotton Green, Tamworth. Sec G4BKA, tel Tamworth (0827) 283952.

Telford (T&DARS)—4 July (Committee meeting and final preparations for VHF Field Day), 11 July (RSGB video night), 18 July (TBA on GB2RS), 25 July (Guest speaker Tom Douglas), 7.45pm. Dawley Bank Community Centre, Dawley Bank, Telford. New sec Martyn Kinder, G6XUF, tel Telford (0952) 47952.

Tenbury (T&DARS)—Thursdays, fortnightly, 7.45pm. Constructional evenings other Thursdays. Club House, The Barn, Pool House, Hanley Childe, Tenbury Wells, Worcs. Sec Ken Pardoe, tel Kyre (08854) 274.

Walsall (WARS)—14, 21, 28 July, 9am-4.30pm. Special event station GB2WSC, Walsall Sadlers Centre, for shopping fortnight. Club meetings, Wednesdays, 8pm. Forest Community Centre, Hawbush Road, Leamore, Bloxwich. Sec Bob, G4FAJ, tel Brownhills (05433) 2169.

Warwick (Mid-Warwickshire ARS)—10 July (Lecture about St John Ambulance), 8pm. 24 July (Fox hunt and barbecue). 61 Emscote Road, Warwick. Sec G4TIL, tel Southam (092681) 4765.

West Bromwich (WBCRC)—Sundays, 8pm. Victoria Public House, Lyng Lane, West Bromwich. Sec Stephen, G1BGX, tel 021-544 4759.

Warwick University—Only information available, University of Warwick ARS, Students Union, Coventry CV4 7AL.

Willenhall (W&DARS)—Wednesdays, 8.30pm. Saracens Head, Bloxwich Road South, Willenhall. Sec John, G4LWI, tel Wolverhampton (0902) 782036.

Wolverhampton (WARS)—Tuesdays, 8pm. MEB Club, St Marks Road, off Chapel Ash, Wolverhampton. Sec Martin, G6ZHV, tel Wolverhampton (0902) 763387.
Worcester (W&DARC)—1 July (Worcester & District Annual Mobile Rally, Droitwich High School, Ombersley Road, Droitwich). Club lectures held at Oddfellows Club, New Street. Informal evenings at Old Pheasant Inn, New Street, Worcester. Sec Alasdair, G4NRD, tel Evesham (0386) 41508.
Worcester Moonbounce Society (G1EME)—Moonbounce enthusiasts welcome. Peter Crosland, Red Lion Cottage, Holt Heath, Worcester. Sec Peter, C30AKA, tel Worcester (0905) 620041.
Wythall (WRC)—Tuesdays, 7.30pm. Wythall Community Assn, Wythall House, Silver Street, Wythall B47 6LZ. Sec Mike Goode, G4SMA, tel 021-444 2427.

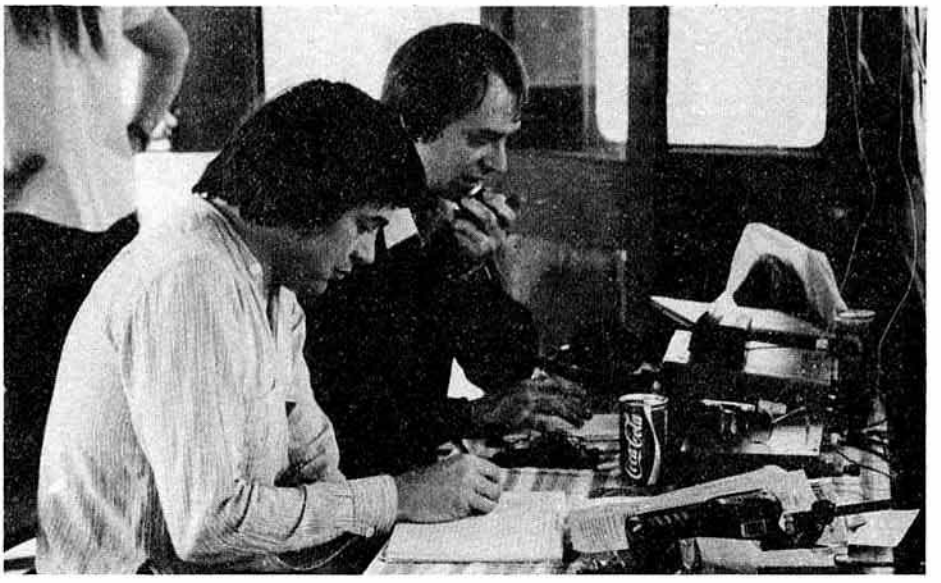
In order to keep the large Region 3 filing system up to date, club secretaries should continue to send their programmes to Leo, G4EQI *until a new RR is appointed.*

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

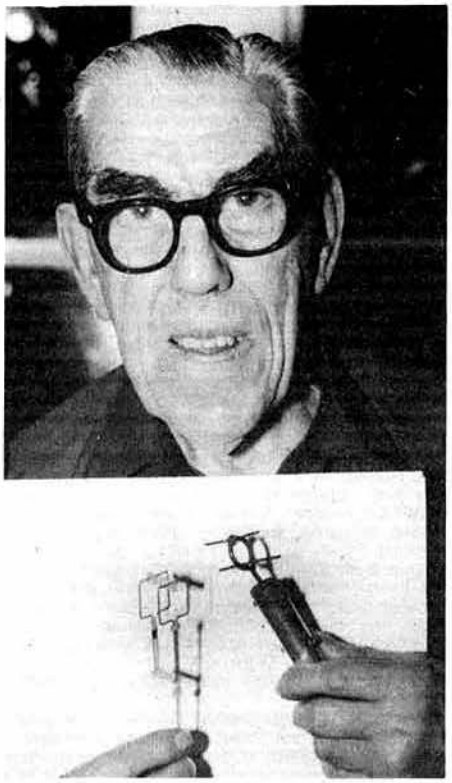
Bolsover (BARS)—4 July (NFD preparation), 11 July ("Amtor on air", G3XTL), 18 July (TBA), 25 July (TBA), 7.30pm. The Angel Hotel, Bolsover. Sec Ian Mellors, G4WCX, tel Mansfield 811129.
Bourne (BARS)—First and third Tuesdays in each month, 7.30pm. Village Hall, Edenham. Sec Ian Bothwell, G6SBE, tel Bourne 424426.
Buxton (BARS)—24 July (Open forum), 8pm. Egerton Hotel, St Johns Road, Buxton. Sec Dave Cooper, G6MIF, tel Buxton 6174.
Derby (D&DARS)—4 July (Junk sale), 11 July (Visit to Radio Derby, limit 15 people), 18 July ("AMTOR", a practical demonstration by G3XOF), 25 July (Night on the air), 1 August (Bring & buy), 7.30pm. 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.
Derby (NHARG)—Fridays, 7.45pm. Nunsfield House, Boulton Lane, Alvaston, Derby. Sec John Robson, G4PZY, tel Derby 767994.
Eastwood (Notts & Derby Border ARC)—Tuesdays, 7.30pm. Hand-in-Heart, Cotmanhay. Sec Peter Fretwell, G4UFC, tel Ilkeston 302990.
Grantham (GRC)—17 July ("Worked All Britain", by G4FQO), 8pm. Shirley Croft Hotel, Harrowby, Grantham. Sec John Kirton, G8WWJ, tel Grantham 65743.
Grimsby (GARS)—Alternate Thursdays, 7.30pm. Cromwell Social Club, Cromwell Road, Grimsby. Sec Reg Scarlett, G4HZF.
Heanor (SE Derbyshire ARS)—Tuesdays during term, 7.30pm. SE Derbyshire College, Ilkeston Road, Heanor. Sec Bill Peck, G4VNB, tel Mansfield 795380.
Hinckley (HARES)—Second Wednesday in each month, 7.30pm. John Cleveland College, Butts Lane, Hinckley. Sec Norman Geary, G8STX, tel Hinckley 632778.
Ibstock (IARS)—Sec Ted Bowen, G4JKQ, tel Ibstock 60396.
Leicester (Leicester Repeater Group)—Sec M. Winters, G4RZH.
Leicester (LRS)—Sundays, 10.30am, Mondays, 7.30pm. Gilroes Cottage, off Groby Road, Leicester. Sec Frank Elliott, G4PDZ, tel Leicester 871086.
Lincoln (LSWC)—Wednesdays, 8pm. City Engineers Club, Waterside South, Lincoln. Sec Pam Rose, G4STO, tel Gainsborough 788356.
Loughborough (L Falcon ARC)—Fridays, 8pm. Brush Sports & Social Club, Fennel Street, Loughborough. Sec Peter Crooks, G4KGG, tel Loughborough 268561.
Louth (LARC)—First and third Wednesday in each month (Computer night), 7.30pm. Kings Head Hotel, Louth. Details from Paul Empringham, G6GZS, tel North Somercoates 483.
Mansfield (MARS)—First Friday and third Tuesday in each month, 7.30pm. Victoria Social Club, Princes Street, Mansfield. Sec Duncan Walters, G4DFV, tel Mansfield 648679.
Melton Mowbray (MMARS)—St John Ambulance Hall, Asfordby Hill, Melton Mowbray. Sec Richard Winters, G3NVK, tel Melton Mowbray 63369.
Newark (N&DARS)—5 July (DF Hunt), 7.30pm. Palace Theatre, Appleton Gate, Newark. Sec Roger Hiscock, G4MDV, tel East Stoke 539.
Nottingham (ARCON)—5 July (Forum), 12 July (Preparation for Henry Mellish School exhibition station), 19 July (Fox hunt/activity night), 26 July (Social evening), 7.30pm. Sherwood Community Centre, Woodthorpe House, Mansfield Road, Nottingham. Sec Jim Towle, G4PJZ, tel Nottingham 624764.
Ollerton (Dukeries ARC)—Sundays, 2pm. Labour Hall, New Ollerton. Sec Paul Jackson, G4WBH.
Ollerton (Robin Hood ARS)—Fridays, 8pm. White Hart Inn, Ollerton. Sec P. Buckmaster, G6VGN, PO Box 1, New Ollerton, Newark, Notts NG22 9XL.
Scunthorpe (S&DARC)—Tuesdays and Thursdays, 8pm. 3 July (D F Hunt), 10 July (TBA), 17 July (Microprocessors), 24 July (Natter night). Sec Ida Aizlewood, G6ZCA, tel Scunthorpe 732268.
Skegness (S&DARS)—First and third Tuesdays in each month, 7.30pm. White Swan, Burgh-le-Marsh, Skegness. Sec Clive Ironmonger, G6HYF.
Spalding (S&DARC)—Second Friday in each month. 8pm. The Maple Room, White Hart, Market Place, Spalding. Sec Betty Whitley, G6YBL, tel Spalding 2781.
Stamford (S&DARC)—Twice monthly, 7.30pm. Anchor Hotel, Stamford. Sec David Bradberry, G4OSM, tel Stamford 54433.
Wigston (WARC)—Fridays, 7.30pm. United Reform Church, Wigston Magna. Sec Roy Tabberer, G6HAJ, tel Leicester 403107.

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

Bedford (B&DARC)—25 July (Club house closed for summer holidays). Ravensden. Sec, G4PBE.
Cambridge (C&DARC)—Fridays during termtime. Visual Aids Room, Ground Floor, Coleridge Community College, Radegund Road. Details of programme etc from the club press officer, G2FKS.
Cambridge (CUWS)—Sundays, 9pm. St John's College Buttery Bar, term-time. Sec G8NJJ.
Corby (CARG)—Fridays, 8pm. Hightree Scout Centre, The Nook, Corby, Northants. Sec P. Richardson, G8MLA, PR R. Buttery, G8IZU.
Dunstable (DDRC)—6 July (Short technical talk, speaker to be announced), 15 July (DF hunt on 1·8 and 144MHz), 20 July (The first live demonstration of GB3TV, the club's tv repeater, located on Dunstable Downs. Meet the people who designed and built one of Great Britain's newest amateur television repeaters), 8pm. Chews House, Dunstable Downs. Sec Phil Morris, G6EES.
Leighton Linslade (LLRC)—2 July ("Electrical and electronic tool aids for the radio amateur", by Mike Wells, of AB Engineering Co Ltd), 9 July (Quiz, part three at the MK & DRS in Newport Pagnell), 16 July ("PA amps, lightning and emp protection, and the history of amateur radio", by George Jessop, G6JP), Vandyke Community College. Sec Peter Brazier, G6JFN.
Luton (Kent Process & Continental Microwave ARC)—First Wednesday in each month. Luton Sports Club, Tenby Drive. Sec G3DOT.
March (M&DARC)—Room 7, March Adult Education Centre, Station Road, March, Cambs, 7.30 to 9.30pm. Further details from sec G4KPZ.
Milton Keynes (MKARS)—First and third Monday in each month, except when Lovatt Hall is closed. 9 July (Third and final round of the quiz between MKARC, LLARC and Aylesbury Vale ARC). Sec G3ZPA.
Northampton (NRC)—5 July (Discussion evening), 12 July (Visit to BBC Radio Northampton, meet at 7.45pm in club car park), 19 July (Discussion evening), 26 July (Mobile df hunt, scored on distance and not time. Meet at club car park at 8pm), 8pm. Kingsthorpe Community Centre, Northampton. Sec Keith Howell, G6MFS.
Peterborough (GPARC) (G4EHW)—Southfields Junior School, Stanground, Peterborough, 7.30pm, during term-time. For further details of club programme contact sec Frank, G4NRJ.
Peterborough (PR&ES) (G3DQW)—Peterborough College of Adult Education, during term-time. Further details and programme from sec D. Wilson, G4KSW.
Shefford (S&DRS)—Thursdays, 8pm. Church Hall, Amptill Road, Shefford, Beds. Sec Alan, G4PSO. No detailed programme has been received for July but they are having one of their "super" junk sales some time in July.
St Neots (SN&DARS)—Horseshoe Inn, Offord Darcy, nr Huntingdon. Sec G8XSO.
Wellingborough (Nene Valley RC)—4 July (Natter night), 7 July (VHF Field Day and the Wellingborough Charities Carnival with GB4WCR), 11 July ("Tube sale", by G4MEO), 18 July (Lecture from crime prevention officer), 25 July (Natter night), 8pm. Dolben Arms Public House, Finedon, near Wellingborough, Northants. Sec L. Parker, G4PLJ.
Wisbech (WR&EC)—Every other Thursday. Five Bells, Parson Drive, Wisbech. No detailed programme received, but a special event station will be put on by the club for the Wisbech Rose Fair. Details from sec Ken Stockley, G4UQN, tel Wisbech 61029.



Members of the Vale of White Horse ARS operated GB4GWR from Didcot Railway Centre, home of the Great Western Society in South Oxfordshire, recently. 1,210 contacts were made with stations in all continents. Four half-hour operating sessions were held from the cab of former Great Western Railway steam locomotive 5051 *Drysllwyn Castle*, using 144MHz fm. These unique contacts were confirmed with special QSL cards signed by the driver and fireman. The photograph shows the hf station at one end of the shack (a former GWR saloon coach, number 9005) with John, G4PFY (operating) and Roger, G4PMK.
***Photo:* Tony, G6ZKI**



"Dud" Charman, G6CJ, delighted the members of Salisbury ARS at the Grosvenor House club rooms on 3 April, when he demonstrated the fundamentals of antenna radiation patterns with the aid of live working models scaled down (or up) to 3GHz.

The antennas were mounted at varying heights above a large copperplate groundplane, the signal strengths being converted into audio tone as a sensing dipole outlined the wave patterns. The presentation was a fascinating display which brought to life the text book data.

He is seen here with some of his antennas.

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

Amersham (Forest Glade DX Group)—Details c/o 100 Chestnut Lane, Amersham, Bucks HP6 6EE.

Aylesbury (AVRG)—Details from David Roberts c/o Hunters Moon, Buckingham Road, Harwick Road, Aylesbury, Bucks.

Aylesbury (AVRS)—7 August (Please contact sec for details), 8pm. Haydon Hall Community Hall. Club net, 8pm. other Tuesdays, S22 and near 3·6MHz. Details from Cathy Clark, tel 0844 51461.

Banbury (BARS)—The club night had to be altered to the last Thursday in each month. St Paul's Church Hall, Warwick Road, Banbury. For details contact sec T. Burrell, G8OZH.

Bracknell (BARC)—11 July (VHF NFD, "An inquest"), 8 August (Natter night), 8pm. Cooper's Hill Community Centre, Bracknell. Sec Dave Sugden, G4CGS, tel Bracknell 55898.

Bracknell (Sperry Gyroscope ARS)—Details c/o Sports & Social Club, Downshire Way, Bracknell, Berks RG12 1QL.

Chesham (C&DARS)—Wednesdays, 8pm. Stable Loft, Bury Farm, Pednor Road, Chesham. Details from sec John Alldridge, G6LKS, tel Chesham 786935.

Didcot (Rutherford Labs RC)—Details c/o J. D. Gilbert, Bldg R25, Chilcot, Didcot, Oxon OX11 0QX.

Farnham VHF Group—Details c/o 31 Pigott Road, Wokingham, Berks RG11 1PZ.

Harwell (HARS)—Details from Cliff Sharpe, G2HIF, tel Wantage 3497.

High Wycombe (Chiltern ARC)—For details of next meeting contact sec. Club net Thursdays, 8pm. Start on S20, then will QSY. Details from G3NCL, tel High Wycombe 712020.

High Wycombe (Mid-Thames DFC)—Details of the club c/o Lowfield House, Bolter End Lane, High Wycombe.

Iver (Home Counties Amateur TV Group)—Fourth Wednesday in each month, 8.30pm. Richings Park Sports & Social Club, Iver, Bucks. Talk-in is provided on 145·200MHz. Details from P. M. Andrews, G6MMJ.

Langley (LCARS)—Details c/o Station Road, Langley, Berks SL6 7UF.

Maidenhead (Home Counties ATG)—Details c/o 33 Switchback Road North, Maidenhead, Berks.

Maidenhead (M&DARS)—Details from G3VCT, tel Bourne End 21036.

Milton Keynes (MK&DRS)—Second Monday in each month, 8pm. Lavatt Hall. Sec Dave White G3ZPR.

Milton Keynes (Robson Nats Cote Apprentice Technical Club)—Details c/o Bletchley Park, Milton Keynes MK3 6EF.

Newbury (N&DARS)—Please note new sec Mike Fereday, G3VOW, tel Newbury 43048.

Oxford (OURS)—New students interested in amateur radio please contact Robert Henshaw, G4GCM, Trinity College.

Oxford (O&DARS)—Sec C. H. May, G4PUU, tel Oxford 52859. Contact him for meeting details.

Oxford (RAFARS)—July meeting will be a social evening and dinner, no date at the time of going to press. Anyone interested phone Stuart Wilkins, G3HMJ, Oxford 58498. Monthly net last Sunday in each month, 3,710MHz, 1145h local. Area rep Eric Palmer, G3FVC.

RAF Halton (ARE&CC)—23 June (RAF Halton Show, GB2HAS). Details from A. J. Gilchrist, tel Wendover 623316, home.

Reading (Ariel RG)—Details c/o 57 St John's Road, Caversham, Reading RG4 0AL.

Reading (R&DARS)—Details c/o Chris Young, G4CCC, tel Reading 471761.

Reading (Racal S&S Club)—Details c/o PO Box 112, Reading RG2 0QI.

Slough (Burnham Beeches RC)—First Monday in each month, 8pm. St John Ambulance HQ, Burlington Avenue, Slough. Please note new sec Diana Betts, G4MVV.

Slough (McMichael ARC)—Details c/o J. Parry, McMichael Ltd, Slough, Bucks SL2 5EL.

Slough (S Bucks Contest Group)—Details c/o 47 Severn Crescent, Langley, Slough SL3 3UU.

Vale of the White Horse (VoWHARS)—3 July (AGM, your attendance is especially requested). Details from Ian, tel 0235 31559.

REGION 7—RR to be appointed

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

Ashford (Echelford ARS)—7.30 for 8pm. The Hall, St Martins Court, Kingston Crescent, Ashford, Middx. Club nets Sunday, 1000, 1·93MHz ± QRM; Wednesdays, 2000-2100, 144·575MHz (fm). Sec Alf Othen, G8FSZ, tel Byfleet 48307.

Bexleyheath (North Kent RS)—Second and fourth Tuesday in each month, 8pm. The Pop-in Parlour, Graham Road, Bexleyheath. Details from J. R. Frampton, 84a St James Way, Sidcup, Kent.

Biggin Hill (BHARC)—8.30pm. St Marks Church Hall, Church Road, Biggin Hill. Details from Ian, Greenway Cottage, Tatsfield, Westerham, Kent TN16 2BT, tel 09598 376.

Coulsdon (CATS)—9 July (Ordinary club meeting —subject to be decided. Further details via GB2RS), 26 July (Morse tuition and club project session), 8pm. St Swithin's Church Hall, Grovelands Road, Purley, Surrey. Details from Alan, G6HC, tel 01-684 0610.

Cray Valley (CVRS)—First and third Thursday in each month, 8pm. Christchurch Centre, Eltham High Street, Eltham SE9. Details from Chris Henderson, G4FAM.

Croydon (Surrey RCC)—First and third Monday in each month. July ("Aerials" by G8TB), 7.45 for 8pm. TS Terra Nova Mess Deck (First floor), 34 The Waldrons, South Croydon, Surrey. Details from J. Simkins, G8IYS, tel 01-657 0454. Club nets Sundays, 10.30am, 29·111MHz usb; Fridays, 8.30pm, 144·225MHz usb; and Fridays, 9.15pm, 29·6MHz fm.

Crystal Palace (CP&DRC)—21-22 July (Special event station at Lambeth Country Show, callsigns to be notified). Meetings third Saturday in each month, 8pm. All Saints Parish Room, Upper Norwood, SE19. Details from sec G. M. C. Stone, 11 Liphook Crescent, SE23, tel 01-699 6940.

Dorking (D&DRS)—Second and fourth Tuesday in each month, 8pm. Star & Garter Hotel, Dorking Station. Club net Sundays, 0730gmt, 3·780MHz. Sec G3AEZ, tel 0306 77236.

Guildford (G&DRS)—Second and fourth Friday in each month, 8pm. Model Engineers HQ, Stoke Park, Guildford. Sec Helen Mullenger, G8SXB, tel Aldershot 20384.

Guildford (UHF Repeater Group)—First Thursday in each month, 8.45pm. Anchor & Horseshoe, Burpham, Guildford. Details from Roger Taylor, G4HZA, 6 High Street, Chobham, Woking, Surrey, tel Chobham 7552.

Kingston (K&DARS)—Third Wednesday in each month, 8pm. Alfriston, 3 Berrylands Road, Surbiton. Details from Brian Smythe, G3ODH, tel Epsom 26005.

New Cross (Clifton ARS)—Fridays, 8pm. Above the New Cross Inn, Clifton Rise, London SE14. Details of programmes from R. Hinton, 42 Sutcliffe Road, Welling, Kent.

Redhill (Reigate ATS)—Third Tuesday in each month, 8pm. Constitutional & Conservative Club, Warwick Road, Redhill. Sec Chris Barnes, G8FEE, 25 Hartswood Avenue, Reigate RH2 8ET.

Sutton & Cheam (S&CRS)—6 July (Subject pending, at SCOLA), 7/8 July (VHF NFD at Leek), 20 July ("German war radio equipment", by Tony Cockle, G3IEE, at Downs), 5 August (Woburn Rally). Downs Lawn Tennis Club, Holland Avenue, Cheam, and Sutton College of Liberal Arts. Details from Alan Keech, G4BOX.

Thames Ditton (Thames Valley ARTS)—First Tuesday in each month, 8pm. Thames Ditton Library, Watts Road, Giggs Hill, Thames Ditton. Sec Julian Axe, G4EHN, tel 01-946 5669.

Wimbledon (W&DRS)—13 July (Repeat showing of video tape of 1983 summer camp), 26-29 July (Club summer camp at Chessington, Surrey. Full details will be sent to members. Special event station GB0WIM will operate from the camp to celebrate 21st anniversary of the club), 10 August (Natter night and cw practice), 8pm. St John Ambulance HQ, 124 Kingston Road, Wimbledon SW19. Details from Geoff Mellett, G4MVS.

REGION 8—RR M. Elliott, G4VEC, 20 Haysel, Sittingbourne, Kent ME10 4QE. Tel 0795 70132.

Brighton (B&DRS)—Alternate Wednesdays, 8pm. "Seven Furlong Bar", Brighton Race Course. Details from Nigel, G8JFT, tel Brighton 697682.

Burgess Hill (Mid-Sussex ARS)—Thursdays. Marle Place Adult Education Centre, Leylands Road, Burgess Hill. Details from Bob Hodge, G4MMI.

Canterbury (East Kent ARS)—First and third Thursday in each month, 7.30 for 8pm. Radio Cabin, Youth Centre, Kings Road, Herne Bay. 19 August (Mobile rally. Due to circumstances out of their control, this event is now cancelled.) Details from Stuart, G6LZG, tel Canterbury 68913.

Canterbury (UoKARS)—Tuesdays, 7.30pm. Radio Shack, behind Maintenance Buildings, off Giles Lane. Talk-in on S15. Details from Christine, G6RQY.

Chichester (CARC)—First Tuesday and third Thursday in each month, 7.30pm. Fernleigh Centre, 40 North Street, Chichester. Details from Chris, G4EHG.

Crawley (CARC)—Fourth Wednesday in each month (Formal), second Wednesday in each month (Informal), at a club member's QTH. Trinity United Reform Church Hall, Ifield, Crawley. Details from David, G4IQM, tel Crawley 882641.

Dartford (DDFC)—If you are interested in DFing, this is the club for you. They meet at the Horse & Groom PH, Dartford Heath, on Tuesdays, prior to a Sunday df hunt. Contact Pete, G8DYF, tel Greenhithe 844467, for details.

Dover (SEKYMCARC)—7.30 for 8pm. Dover YMCA, Godwynehurst, Leyburne Road, Dover. Details from Alan Moore, G3VSU, tel Dover 822738.

Eastbourne (Southdown ARS)—2 July ("Bangers and beer night"). The Chaseley Home, South Cliff, Eastbourne. Details from Peter, G8IQO, tel 0323 763123.

Gravesend (GRS)—Mondays, 8pm. Windmill Tavern, Shrubbery Road. Details from G4BNQ.

Hastings (HERC)—Wednesdays, 7 July (HERC summer barbecue at the G6HH VHF FD contest site, Fairlight Helipad Picnic area, nr Hastings), 18 July ("HF antennas", by F6IDC (ex-G4ZU) Dickie Bird), 8pm. West Hill Community Centre, Croft Road, Hastings. Activities at HERC clubhouse, Downey Close, St Leonards-on-Sea—Tuesdays, morse and basic micro course; Fridays, chat night. Last Friday in month is film night. Details from Dave, G4NVQ, tel Hastings 420606.

Horsham (HARC)—5 July (Talk on VHF NFD operating). Guide HQ, Denne Road, Horsham. Details from Tony Wadsworth, G3NPF, tel Horsham 66290.
Kent Repeater Group—The group, by annual subscription, supports two vhf and three uhf repeaters in Kent: GB3KN, GB3KS, GB3NK, GB3EK, and GB3CK. Details of meetings and subscriptions etc from Martin Stoneham, G4RVV, tel Herne Bay 69828. The group can also supply speakers for other clubs in the area.
Lewes (L&DRAC)—First and third Tuesday in each month. Bridge View Community Centre, Lewes. Details from Frank Day, G4PZU, tel Lewes (07916) 3239.
Maidstone (MYMCAARC)—Fridays, 8pm. YMCA Sportscentre, Melrose Close, Cripple Street, Maidstone. Details from Graham Edy, G4AXD, tel Maidstone 29462.
Margate (Radio Club of Thanet)—Tuesdays, 7.30 for 8pm. Grosvenor Club, Grosvenor Place, Margate. Details from Ian Gane, G4NEF, tel Thanet 594154.
Medway (MARTS)—Fridays, 6 July (Film night—"Ham radio" and "Moving up to amateur radio"), 20 July (Talk "How to improve your dx on 2m", by Ken Willis, G8VR), 7.30pm. St Lukes Church Hall, King William Road, Chatham. Details from Andy Wallis, G4TQS, tel 0634 363960.
Sussex Repeater Group—This group is responsible for GB3BP, GB3BR, GB3CP, GB3HO, GB3NX, GB3SR, and GB3WX. It is to be noted that GB3SR at Worthing exchanged channels with the Hastings repeater GB3ES on Friday 13 April. 'SR is now to be found on R7 and 'ES on R3. The effect of this channel change is that interference which was experienced from users of GB3NL has now disappeared, rendering 'ES a more usable repeater. The SRG Roadshow is available to give presentations to local clubs. Details from Andy Clark, G8TJQ.
Swale (SARC)—Mondays, 7.30 for 8pm. The Ivy Leaf Club, 52 Dover Street, Sittingbourne. Details from Brian Hancock, G4NPM.
Tunbridge Wells (West Kent ARS)—All future meetings will be held weekly on Fridays at the Adult Centre Annexe, Quarry Road, Tunbridge Wells. Formal meetings will be on 13 and 27 July. Informal meetings on 6 and 20 July. 21 July (Radio & Electronics Fair, Victoria Hall, Southborough, Kent. All are welcome). Details from Brian Guinnessy, G4MXL, tel 0892 32877.
Worthing (W&DARC)—Tuesdays, 7.30 for 8pm. Amenity Centre, Pond Lane, Worthing, West Sussex. Details from Eric Sandaver, G4KIT, tel Lancing 766418.

REGION 9—RR to be announced
Axe Vale (AVARC)—6 July (Visit to IBA Stockland Hill (Meet at normal meeting time and place and travel in convoy), 7.30pm. Cavaliers Hotel, Axminster, Devon. Club call, G8CA. Chairman, Cliff Toomer, G4RKE; treasurer, Pip Piper, G4LHS; equipment officer, George Smith, G8AOJ; sec Bob Newland, G3VW, tel 02974 5282; pro Roger Jones, G3YMK, tel 0404 864468.
Camelford (North Cornwall RC)—First Wednesday in each month, 7.30pm. RAOB Club, Fore Street, Camelford, Cornwall. Chairman, Mike Frances, G3LOV; treasurer, M. J. Tyson, G6LJQ; sec Tony Medland, G4WAV; pro Jack Boundy, G8ZOK, tel Tintagel 770542. 4 July (Evening on the air, at Davidstow aerodrome. HF, vhf and uhf portable mode of operation).
Caradon Hill Repeater Group (GB3CH RB2)—Chairman, P. H. Woodward, G6CIY; treasurer, G6OVL; sec Chris Bartram, G4DGU, 23 Tuckers Park, Bradworthy, Holsworthy, North Devon EX22 7TL, tel 0409 24543.
Exeter (EARS)—Club call G6ARE. 9 July ("Static and chips", by Rex Williams, G3RSJ), 7.30pm. Community Centre, St Davids Hill, Exeter. Other Mondays (Informal), Emmanuel Scout Hut, Okehampton Road, Exeter, Pro 11 Chancel Court, Chancel Lane, Pinhoe, Exeter EX4 8QE.
Exeter (EUARS)—Sundays during term, 2.30pm. Room 225, Applied Science Building, North Park Road, Exeter. Contact Miss Bellchambers, G8ZPJ, Devonshire House, Stockers Road, Exeter EX4 4PZ.
Exmoor (ERC) (G8SSS)—Thursdays, 8pm. Loughrigg, East Street, South Molton, Devon. Sec Peter Dixon, G4JBR, tel 07695 2738.
Exmouth (EARC)—Club call G4HOB. Alternate Wednesdays, 7.30pm. 6th Exmouth Scout Hut, Marpool Hill, Exmouth, Devon. Chairman, Harry Williams; treasurer, Steve Gurney, G8UXJ; sec Des Thompson, G8SBU, tel 0395 265059.
Newquay (N&DARS)—Club call G4ADV. Alternate Wednesdays, 4 July (RSGB video), 18 July (Amtor). Drill Hall, Crantock Street, Newquay, Cornwall. Chairman, Ken Eliott, G4INTX; treasurer, Brian Pearce, G8GOR; sec Andy Angove, G6ZWI, tel Newquay 4285. Club pro and manager of club repeater, GB3NC, W. J. Colclough G3XC, treasurer of repeater, Ted Warne, G3YJX.
North Devon (NDARC)—Odd months, fourth Wednesdays, 7.30pm. Community College, Abbotsham Road, Bideford. Even months, fourth Wednesday, 7.30pm. Community College, Chaddiford Lane, Pilton, Barnstaple. Chairman, Les Hawkyard, G5HD; treasurer, Jeff Beal, G4ELU; sec George Hughes, G4CG; assistant sec, Charles Searl, G4LST. Details from sec, tel 0271 3683.
Paignton (South Devon RC)—7.30pm. Gerston Hotel, Victoria Street, Paignton. Chairman, P. Shuffell, G4SBX; sec M. Waite, G4SBH, 37 Isaacs Road, Barton, Torquay, Devon, tel 0803 34640; treasurer, G. Brooking, G8YKH; pro B. Guy, G4OJD.
Penzance (Cornish RAC)—Club call G4CRC. Computer section: 16 July ("Boolean algebra", by Ken Ball). The Church Hall, Treleigh, on the old Redruth bypass. Details from sec Simon, G4PEM, tel Penzance 3948.
Plymouth (College of Further Education Students' Union ARC)—Details from SUARC, Devonport Annex, Paradise Road, Devonport, Plymouth PL1 5QR.
Plymouth (PPARS)—Club call G3TCP. Meetings during term every day. Sec now Mike Price, GW6HOU.
Plymouth (PARC)—Club call G3PRC. Alternate Mondays, 7.30pm. Hyde Park Infants School, Hyde Park Road, Plymouth. Sec Cyril Stevens, G6XZG, PO Box 46, Plymouth PL1 1SY.
St Austell (English China Clay RC)—Club call G6ECC. Chairman, Chris Rogers, G4MXB; vice-chairman, Geoff Tregoning; treasurer, Tony Turner, G4XBC; RSGB & Raynet, Chris Golley, G4JYF; sec Mike Porter, G4OKS, tel 0726 850818. Details of meetings from sec.
Saltash (S&DARC)—First and third Fridays in each month, 7.30pm. Burraton Toc H Hall, Saltash. President Harry Griffiths, G2DFH; chairman, J. Miller, G8NSP; treasurer, G. Huntley, G4LXB; sec, R. Rayment, 142 Mile House Road, Stoke, Plymouth, tel 0752 50793.
St Ives County Secondary School—Club call G4DWB. Repeater, GB3SI. For details of club and repeater contact David Blackford, G3NPB.
Stockland Hill Repeater Group—The group has been reformed. The sec/treasurer is Roger Jones, G3YMK, 10 Oak Close, Upottery, nr Honiton, Devon EX14 9QG, to whom all enquiries should be sent.
Tavistock (Kelly College ARS)—Society call G4COF, operational on hf, 144 and 432MHz. Details from G8ONR, tel Tavistock 2881 at the school, or Tavistock 3231. Intending visitors should phone in advance.
Tiverton (South West TRC) (G4TSW)—Mondays, 7.30pm. The Queens Head, Castle Street, Tiverton, Devon. Sec V. W. Baldry, G6IVU, PO Box 3, Tiverton, Devon EX16 6RS, tel 0884 253319.
Torbay (TARS)—Club call G3NJA, G8NJA. Fridays (Informal get-together), last Saturday in each month (Formal, club business discussed, followed by a talk or demo on some subject). The club holds a net on 3.75 ±, Monday, Wednesday, and Saturday. Monday and Wednesday the nets start at 1030h, Saturday at 1000h. Sec M. Rider, 7 Kingston Close, Kingskerswell, Devon TQ12 5EW. Rally date 26 August, venue, STC Social Club, Paignton.

Note from RR. As these club notes will be my last I thank all regular scribes for their help with detailed info, and to those not so regular, a little help has been better than none at all! 73s G3XC.

REGION 10—RR E. J. Case, GW4HWR, 2 Abbey Close, Tyrhiw, Taffswell, Mid-Glamorgan CF4 7RS. Tel 0222 810368.
Abergavenny & Nevill Hall (A&NHARC) (GW4FL)—Thursdays, 7.30pm. Pen-y-fal Hospital, above Male Ward 2, Abergavenny. 28 July (Abergavenny & Border Counties Show. Special event station, GB2ABC, will be operating), 4 August (Pen-y-fal Hospital Fete. Special event station, GB2PYF, will be operating). Sec D. F. Jones, GW3SSY, tel 0873 78674.
Aberystwyth (ARSGBG)—Second Tuesday in each month. 10 July (Natter night). Bay Hotel (On the sea front opposite the bandstand.) Sec J. Mike Pryse, GW4JXB, tel 0970 828446.
Barry (BCoFERS) (GW3VKL, GW4BRS, GW6BRC)—Thursdays, 7.45pm. Barry College of Further Education Annexe, Weycock Cross, Barry. Sec Margaret Beynon, GW4GSH.
Blackwood (BARS) (GW6GW)—Fridays, 7pm. Oakdale Comprehensive School, Oakdale, Blackwood, Gwent. This club does not meet during the school holidays. Sec Wynn Wright, GW8UAM.
Bridgend (B&DARC) (GW4LNP)—Second Wednesday in each month, 7.30pm. NCB Social Club, Tondu, Bridgend. Sec Peter Lynn, GW8WCI, tel Bridgend 861115.
Bristol Channel Repeater Group (GB3BC)—Membership sec Roy Selleck, GW6MBU, 12 Norseman Close, Rhoose, tel Barry 711146.
Cardiff (CRSGBG) (GW5BI)—Second Monday in each month. 9 July ("The Raynet scene in the Cardiff area", by Jim Commerford, GW8ENT, South Glamorgan Raynet Group Controller), 7.30pm. Pantmawr Hotel, Tyla Teg, Pantmawr Estate, Whitchurch, Cardiff. Sec Cyril Laws, GW6ZHP, tel Cowbridge 3212.
Cardiff (Highfields ARS) (GW4LFO)—Thursdays, 7pm. Highfields Handicapped Centre, Allensbank Road, Cardiff. For further information contact Mr Sid Hudson at the centre, tel Cardiff 750315.
Cardiff, Llandaff (SGIHEARC) (GW3RNW) (GW1AAA)—For further information contact Steve Williams, GW8CUR, 301 Newport Road, Cardiff.
Camarthen (CARS)—Second and fourth Friday in each month, 7.30pm. West Wales Hospital Social Club, The Quay, Carmarthen. News of activities next month. Sec Mrs M. Meridith, husband's callsign is GW4XLK, was GW1ABP QTHR.
Chepstow (C&DARS) (GW4LWZ)—No information available.
Cwncynon (CARS) (GW3FFE)—Sec R. Allwood, GW4UAJ, 7 Daniel Street, Cwmbach, Aberdare.
Lougher (LAR&EC) (GW4HVJ)—Tuesdays, fortnightly, 7.30pm. Lougher Scouts Hall, Heol Cae Tynewydd, Gorseinon. Sec Tim Griffin-Thomas, GW8TYS, tel Gorseinon 893392.
Merthyr (HMARC) (GW3RDB)—c/o Engineering Dept, MP9, Hoover Ltd, Pentrebach, Merthyr Tydfil.
Newport (NARS) (GW4EZW)—Mondays, 2 July (Natter night/hf group), 9 July (Dealer night—equipment update, Ross, GW3NWS), 16 July (RSGB film), 23 July (Closed for summer recess), 7pm. Brynglas House, Brynglas Road, Newport. Sec Robert Johns, GW4NXD, tel Pontypool 56348.
Pembroke (P&DRAC) (GW2OP)—Last Friday in each month, 7.30pm. The Defensible Barracks, Pembroke Dock. Sec Dave Workman, GW6EHC, 0646 686532.
Pontypool (PARS) (GW3RNH)—Sec G. A. Smith, GW6JRB.
Port Talbot (BSCARS) (GW3OEP)—Thursdays, 7.30pm. BSC Sports & Social Club, Margam. Sec Reg Bray, GW4ESV, tel Briton Ferry 821993.
Powys (PARC) (GW4HVN)—Thursdays, 7.30pm. The Cricket Pavilion, Montgomery. Sec Mike Smith, GW4DWX, tel Welshpool 2068.
Radio Club (GW4IYD)—LCR Components, Woodfield Works, Tredegar, Gwent.
Rhondda (RARS) (GW2FOF)—Thursdays, fortnightly, 7.30pm. National Union of Mineworkers' Club, Tonypandy. Sec John Howells, GW4BUZ, tel Tonypandy 432542.
Swansea (SARS) (GW4CC)—First and third Thursdays in each month, 7.30pm. Lecture Room N, Applied Sciences Building, Swansea University. Sec Roger Williams, GW4HSH, tel Swansea 404422.
Swansea (SRACC)—Sec Mr. Morgan, 1 Jersey Street, Hafod, Swansea.
Swansea (UCSRS)—Sec Mr R. B. Hughes, Electrical Eng Dept, University College, Singleton Park, Swansea.
West Wales Repeater Group (GB3WW)—Contact 7 Crofton Drive, Baglan, Port Talbot.

I would like to welcome the new clubs that have appeared on the list since January. I shall be pleased to hear from all club secretaries and especially from those clubs having little or no information, so that I can include the details in the near future. Best wishes to all RSGB members in Region 10. *John, RR10.*

REGION 11—RR B. H. Green, GW2FLZ, 1 Clwyd Court, Tan-y-Bryn Road, Colwyn Bay, Clwyd LL28 4AH. Tel 0492 49288.
Anglesey (AARG)—Second and fourth Tuesday in each month, 7pm. Primary School, Benllech, Anglesey. Sec Mr C. Williams, GW6DOK, tel Gaerwen 603.

Bangor (University College of North Wales ARS)—The Rockets Room, Room 261, School of Electronic Engineering Science, Dean Street, Bangor, Gwynedd.
Colwyn Bay (Conwy Valley ARC) (GW6TM)—12 July (Discussion evening on any topic), 8pm. Green Lawns Hotel, Bay View Road. Sec Mr J. N. Wright, GW4KGI, 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)—12, 26 July, 8pm. Shotton Conservative Club, King George Street, Shotton, Deeside. Sec Mr M. McIntosh, GW4IEQ, tel 0244 549154.
Menai Bridge (Ysgol David Hughes Radio Club)—No further details.
Porthmadog (P&DARS)—Third Thursday in each month, 7.30pm. Queen's Hotel, Porthmadog. Details from sec Mrs L. A. Jones, GW4WKQ, Henllys Bach, Llanbedrog, Pwllheli, Gwynedd, tel 0758 740445.
Rhyl (R&DARC) (GW4ARC)—2, 16 July, 7.30pm. 1st Rhyl Scout HQ, Tynewydd Road, Rhyl. 2 July (DF hunt, starting at club HQ). Sec Mr J. McCann, GW4PFC, tel 0745 583467.
Sealand Deeside (RAF Sealand ARC)—Contact E. E. Hewins, OIC, Radio Wing No 30, MU RAF Sealand, Deeside, Clwyd.
Upper Bangor (Dragon Radio Club) (GW4TTA)—First and third Mondays in each month, 8pm. Bangor Rugby Club, Caernarfon Road, Bangor. Sec Mr D. N. F. Whitehouse, GW4URY, tel Pentraeth 224.
Wrexham (WARS)—Second and fourth Wednesday in each month. Friends Meeting House, Holt Road, Wrexham. Sec Pete Higgs, GW4IGF, tel Rossett 570212.

REGION 12—RR M. R. Hobson, GM8KPH, 17 Well Brae, Pitlochry, Perthshire PH16 5HH. Tel 0796 2140.

Aberdeen (ARS)—Fridays, 7.30pm. Club Rooms, 35 Thistle Lane, Aberdeen. Coffee, tea etc available. Details from Don Travis, GM4GXD, tel 04676 251.
Benbecula—Jim Thomson, GM3CXF, is trying to form a club in the Uist/Benbecula area. Interested parties should contact Jim on 0870 2051, ext 25, during office hours, or 0870 2413 at other times, or write to him at No 2 Bungalow, Balivanich Aerodrome, Benbecula, Western Isles PA88 5LA.
Caithness (CARC)—Second Wednesday in each month, 7.30pm. Loch Watten Hotel, Watten, (midway between Wick and Thurso). Details from sec Ian Morrison, GM4MIM, tel 0995 3960.
Dundee (Kingsway Technical College ARC)—Tuesdays, 7.30pm. St Michaels School, Grayham Street, Dundee. Details from sec Berni Deans, GM4TQN, 4 Deanbank Street, Dundee.
Elgin (Moray Firth ARC)—First Monday in each month, 7.30pm. Spey Bay Hotel. Spey Bay, nr Fochabers. Wednesdays, Moray College of Further Education, Elgin, 7.30pm. Details from sec Rev Stan Bennie, tel 0542 32312.
Forfar (F&DARC)—The club is now meeting again and has a full programme. Forfar Leisure Centre. Details from sec Ken, GM4XKP, tel 0307 63095.
Fort William—Members in Fort William have formed an *ad hoc* group which meets on the first Thursday of each month, 7.30pm. West End Hotel, Fort William. Further information from Norman Baird, GM4JNB, PO Box 6, Fort William, or try a call on S20.
Grampian Repeater Group—President, GM8MHU; sec/treasurer, GM8HGD; project manager, GM6GJZ; committee—GM6AXU, GM3DNV, GM3DWX, GM8FFX. Members should note that the Peterhead uhf repeater GB3PD should now be operational on RB10. Details from sec Alec Jones, GM8HGD, tel Peterhead (0779) 2413.
Invergordon (Easter Ross RC) (GM4MFL)—Fridays, 7.30pm. Community Room, South Lodge School, Invergordon. Details from George, GM4DKL, tel 086-284 2556.
Inverness (IARC)—Cameron Youth Club, Planefield Road, Inverness.
Perth (PRG)—The group maintains two repeaters, GB3PR on R3, and GB3PU on RB0, both located about 1km south of Perth. The repeaters are both financed entirely by donation, and users may care to send a donation towards the upkeep to M. R. Hobson, GM8KPH, 17 Well Brae, Pitlochry, and *not* QTHR.
Orkney (Kirkwall)—First Wednesday in each month, 7.30pm. Lynfield Hotel, Kirkwall. RAE class available. Details of club, RAE, or GB3OC from area rep Bill, GM3IBU.
Shetland (Lerwick RC)—Thursdays, 7pm. Room 14, Islesburgh Community Centre, King Harold Street, Lerwick. Details from Arthur, GM4LBE, tel 0595 4270.
Speyside Repeater Group—Information from Ron, GM4ILS, tel 0343 45842.
Unst (URC)—Details from Mr Auty, Valsgarth, Haraldswick, Unst.

REGION 13—RR to be announced

Berwick-upon-Tweed (Borders ARS)—First and third Friday in each month, 7.30pm. Tweedview Hotel, Tweed Street, Berwick-upon-Tweed. Details from GM8BDX, or G3HDT, tel 0289 88260.
Dalgety Bay (Marconi Space & Defence Systems ARC)—Details from GM4HRL.
Dunfermline (DARS)—Second Thursday in each month, 7.30pm. Room 7, Old High School, Priory Lane, Dunfermline. Details from GM8IID, tel 728778.
Edinburgh (E&DARC) (GM4HAM)—Tuesdays, 7.30pm. City Observatory, Catton Hill, Edinburgh. Details from GM3RFQ.
Edinburgh (Ferranti Recreation Club ARS) (GM4FER)—Membership restricted to company personnel. Details from GM8JKG, tel 031-441 5684. Visits by other clubs by prior arrangement.
Edinburgh (GB3ED Repeater Group)—Details from GM3GBX, tel 031-447 2611.
Edinburgh (Heriot-Watt UARC) (GM3WEE)—Wednesdays, 2.30pm. Mountbatten Buildings, 31-35 Grassmarket, Edinburgh.
Edinburgh (Leith Nautical College AR&EC) (GM4AXG)—Mondays, 6-8.30pm for electronic construction. Room T2-4, Leith Nautical College, 24 Milton Road East, Edinburgh. Details from Susan Beech, GM4SGB, at the college.
Edinburgh (Lothians RS)—First and third Wednesday in each month, 7.30pm. Harwell House Hotel, 13 Ettrick Road, Edinburgh EH10 5TJ. Details from GM4HWO, not QTHR. tel 031-332 5502.
Galashiels (G&DARS)—Wednesdays, 7.30pm. Focus Youth Centre, Livingstone Place, Galashiels. Sunday 23 September (Open day). Details from GM3DAR, tel 56027.
Glenrothes (G&DARS) (GM3ULG/GM4GRC)—15 July ("Antarctica", by VP8AQA), 19 August (Films and forward planning discussions), 16 September (AGM), 7.30pm. Provosts Land Centre, Leslie, Fife. Details from GM4LYQ, tel 745047.
Kelso (KARS)—Mondays, 7.30pm. Abbey Row Community Centre, Kelso. Details from GM3VLB, tel 24664.
Lothians Raynet Group—Details from GM3OWU.
Peebles (PARC)—First and third Monday in each month, 7.30pm. Kingsmuir Hotel, Springhill Road, Peebles. Details from Nigel, GM6VDN, tel 20372.
Scottish Borders Repeater Group—Details from GM4BDJ, Cairndhu, Walter Street, Langholm, Dumfries-shire, tel 0541 80018.
St Andrews (UoStAR&ES) (GM4BGA)—Details from GM4JWV, tel 74507.

REGION 14—RR T. G. Wylie, GM4FDM, Torranmhor, 3 Kings Crescent, Elderslie, Strathclyde PA5 9AD. Tel Johnstone (0505) 22749.

Ayr (AARG)—Second and fourth Friday in each month, 7.30pm. The Community Leisure Centre, Wellington Square, Ayr. Details from Mr R. D. Harkness, GM3THI, tel Ayr (0292) 42313. New session starts 7 September.
Central Scotland FM Group—Maintains GB3CS, GB3AY, GB3FF and GB3PA. Contact sec A. Fraser, GM3AXX, for further information.
Clyde Valley DX Group—c/o 15 Quarry Road, Law, Carluke, Strathclyde.
Dumfries (D&GREC)—First and third Monday in each month, 7.30pm. The Cargenholm Hotel, Dumfries. Further information from GM4NNC. (This is latest information available to RR).
Dunoon (D&DARS)—Wednesdays, 7.30pm. Presently in The Community Centre, Edward Street, Dunoon. Details from Mr P. Burn, "Benthead", Cromlech Road, Sandbank, Dunoon, tel Dunoon 6334. (New club, new members most welcome.)
Falkirk (FARC)—First and third Monday in each month, 7.30pm. Details from Mr G. Stewart, GM6CRQ.
Glasgow (West of Scotland ARS)—Fridays, 7.45pm. 22 Robertson Street, Glasgow. Club does not close during summer months. Morse classes. Further details from Mr G. McKenzie, GM4NUN, tel 041-639 3095.
Greenock (G&DARC)—Fridays and Tuesdays, 7pm. The Club Room, 22 Inverkip Street, Greenock. Details from Mr D. McKinnon, 8 Octavia Terrace, Greenock, tel Greenock 25075.
Helensburgh (HARC)—Thursdays, 7.30pm. The John Logie Baird School, Churchill Estate, Helensburgh. Details from Mr D. Reid, GM6JLQ, tel Dumbarton 841452.
Irvine (Cunninghame & DARC)—Tuesdays, 7.30pm, (RAE class) and Thursdays (Club night). The Community House, 1 Bonnyton Row, Girdle Toll, Irvine. Details from Mr N. Brown, GM4VHZ, tel Beith (05055) 2052.
Kilmarnock (Kilmarnock & Loudon ARC)—Tuesdays, 7.30pm. The Broomhill Hotel, London Road, Kilmarnock. Details from Mr B. Beggs, 17 Church Lane, Galston, Ayrshire, tel 0563 820615.
Loch Lomond (LLARC)—New club. Details from Mrs J. Killough, 4 Sunderland Avenue, Dumbarton. (Sec please contact RR).
Motherwell (Mid Lanark ARS)—Fridays, 7.30pm. The Wrangholm Hall Community Centre, Jerviston Street, Motherwell. Details from Mr T. O'Neil, 187 Main Street, Chapelhall, Airdrie, tel 0236 451476.
Renfrew (R&DARS)—Details from 2 Crookston Avenue, Cardonald, Glasgow G52 3PS. (No name, callsign, or meeting place available.)
Scottish Borders Repeater Group—Information from GM4BDJ.
Stirling (S&DARS)—Second and fourth Wednesday in each month, 7.30pm. The YMCA, 9A Barnton Street, Stirling. Details from Mrs. P. McKenzie, GM4SWG, tel 0786 824810.

REGION 15—RR J. T. Barnes, GI3USS, Whitegables, 95 Crawfordsburn Road, Bangor, Co Down BT19 1BJ. Tel 0247 3948.

Antrim (A&DARC) (GI4SIW)—Second Monday in each month, 8pm. Back Room of the Railway Bar, Railway Street, Antrim. AGM held on 12 March. Details from GI4FUB, tel Antrim 64931.
Ballyclare (EARC) (GI4KKK)—Second Tuesday in each month, 8pm. Fairview Primary School, Hillmount Avenue, Ballyclare. Details from GI4LKA or any officer.
Ballymena (BRC) (GI3FFF)—Tuesdays, 8pm, morse tuition. Wednesdays, 8pm, RAE tuition. Thursdays, 8pm, club night. Sundays, 4pm, club activity. All at club rooms, 70 Nursery Road, Gracehill. Sec GI4HCN.
Banbridge (MUARC)—Second Sunday in month, 3pm. QTH of GI4BAC. Details from GI4BDL.
Bangor (B&DARS) (GI3XRQ)—First Friday in each month. Sands Hotel, Bangor. At the agm a committee of 12 was elected, with GI4NAE as chairman, GI4OCK as sec and pro, and GI3USS as treasurer.
Belfast (BRSGBG)—Third Wednesday in each month, 8pm. 90 Belmont Road, Belfast. AR GI4RXS.
Belfast (COBYMACAARC) (GI6YM)—Tuesdays, 7pm; Saturdays, 2.30pm. Club Room, Fourth Floor, YMCA, Wellington Place, Belfast. Sec GI6BJO.
Belfast (College of Technology ARS) (GI2BX)—Almost certainly the oldest GI callsign is now used by the club on 144MHz and hf at lunchtimes. An interesting programme is being arranged. For details contact the sec, James Barr, 121 Kitchener Street, or at college, tel Belfast 227244, ext 243.
Belfast (QUOBRC) (GI3LLQ, GI8FQB)—Tuesdays, 7.30pm. Club Rooms, 37 Fitzwilliam Street. RAE and morse tuition available. Details from Victor, GI6JHF, tel 703027, evenings, or 661111, ext 4006 day time.
Coleraine (C&DARS) (GI4NRQ)—Fridays, 8pm. Flowerfield Arts Centre, Portstewart. Sec GI4LNJ.
Coleraine (NWARC) (GI4DBB)—First Tuesday in each month, 8pm. New venue—The Scout Hall (1st Coleraine Troop), The Crescent, Coleraine, which is located between Bushmills and Ballycastle Roads in Coleraine and adjacent to the playing fields. The committee elected at the agm consisted of GI4AVE, chairman; GI4KIG, treasurer; GI8NBW, secretary; GI4JNS and GI3KVD. Programme details from GI8NBW, tel Ballymoney 62127 or 62238 (office hours only).
Craigavon (MVARC)—Second Sunday in each month, 3pm. QTH of GI4BAC, Banbridge. Details from sec Victor, GI4BDL, tel 0762 881366.
Enniskillen (Lough Erne ARC)—Third Monday in each month. Railway Hotel, Enniskillen. The club held their agm at Lakeland Forum and elected GI4NRE as chairman; GI6UHA, sec; GI6ZCC, treasurer; and three other committee members—GI4PCY, GI4UHP, and GI4CZW.

Larne (L&DARS) (GI4PHA)—First and third Wednesdays in each month, 6.30pm. Room 270, Larne Technical College. RAE and morse tuition available at the club. Details from GI4CPP, tel Larne 5407.
Lisburn (LVARS) (GI4GTY)—Second Monday in each month, 7.30pm. Rathvarna Teachers Centre. Details from sec GI6UFU, tel Hillsborough 683118.
Londonderry (NW of IARC) (GI4CFH)—First Monday in each month, 7.30pm. The New Boathouse, Victoria Road, Prehen, Londonderry. Sec GI4OUN.
Magherafelt (MARS) (GI4MFT)—First Tuesday in each month, 8pm. 12 Garden Street, Magherafelt. RAE course at local Technical College, Mondays. CW classes at club QTH, Tuesdays. Details from sec Jack, GI4LVC, tel 0648 32096.
Moy (Armagh, Dungannon & DRC)—Second Tuesday in each month, 8pm. The Pony Club, Moy. Details from Kevin Boyd, GI4SLQ, tel Moy 84597.
Omagh (West Ulster ARC)—Second Monday in each month, 8pm. McAleers, Campsie, Omagh. Sec GI4OHW (Ex-GI8XQM).

REGION 16—RR to be announced
Basildon (Marconi ARS)—First Monday in each month. Details from Chris Mitchell, G8PKM (not QTHR), tel Chelmsford 323323.
Braintree (B&DARS)—2 July ("Power supply units", by G3PEN), 16 July (CEGB nuclear power), 7.45pm. Braintree Community Centre, Victoria Street. Details from Jeff Roberts, G6OIX, tel Braintree 44857.
Bury St Edmunds (BStERS)—Third Tuesday in each month, 7.30pm. Guildhall, Guildhall Street. Details from John Munro, G3GBB, 29 Angel Hill, Bury St Edmunds.
Canvey Island (South Essex ARS)—Wednesdays, 7.30pm. The Paddocks Community Centre, Long Road, Canvey Island. Details from G6BYH, tel Canvey Island 683526.
Chelmsford (CARS)—First Tuesday in each month, 7.30pm. Marconi College, Arbour Lane. Details from Andrew Mead, G4KQE, tel Silver End 83094.
Colchester (CRA)—22 July (Anglian Mobile Rally, Stanway School). Meetings 7.30pm. Colchester Institute, Sheepen Road. Details from Frank Howe, G3FIJ, tel Colchester 851189.
Felixstowe (FARC)—Tuesdays, 8pm. Felixstowe Golf Club. Details from John Hobin, G3XIX.
Great Yarmouth (GYRS)—Thursdays, fortnightly, 7.30pm. STC Sports & Social Club, Beevor Road, South Denes. Details from A. D. Besford, G3NHU.
Harlow (H&DRS)—Tuesdays, 7.30pm. Mark Hall Barn, First Avenue. Details from Cilla Mann, G4KVR, c/o Mark Hall Barn, First Avenue, Harlow.
Haverhill (H&DRS)—Fridays, 7.30pm. Copse Hall Farm, Steeple Bumpstead Road. Details from Dave Hickford, G4MVK, Tel Haverhill 61207.
Ipswich (IRC)—Second and last Wednesday in each month, 8pm. Club Room, Rose & Crown, Norwich Road. Details from Jack Tootill, G4IFF, tel Ipswich 44047.
Loughton (L&DRAS)—6 July ("Recording problems at the Albert Hall", by G3PCA), 20 July (HF df hunt), 7.30pm. Loughton Hall, Rectory Lane. Details from C. Knowles, G6FWT, tel 01-508 7190.
Lowestoft (LD & Pye ARC)—Details from Alan Seago, G4KDL, tel Lowestoft 66289.
Martlesham (MRS)—Wednesdays, 7.30pm. British Telecom Research Labs, Martlesham Heath. Please contact G3ZNU first.
Norwich (Norfolk ARC)—Wednesdays, 7.45pm. Valley Drive Community Centre, Plumstead Road, Norwich. Details from Peter Forster, G3VWQ, tel Norwich 37709.
Saffron Walden (SW & DRAS)—Third Wednesday in each month, 8pm. Details from Garry Morton, G6KDW, tel Saffron Walden 22715.
Southend (S&DARS)—Fridays, 8pm. Civic Suite, Council Offices, Hockley Road, Rayleigh. Details from G3YOA.
Stanford-le-Hope (S-le-H&DARC)—Mondays, 8pm. St Joseph's Parish Rooms, Scratton Road. Details from Jim Thompson, G4OVG, tel Stanford-le-Hope 642312.
Stowmarket (S&DARS)—First Monday in each month, 7.30pm. Red Cross Hut, Station Yard. Details from Jim Lowe, G8SCB, tel Needham Market 721296.
Thurrock (TARC)—First and third Tuesday in each month, 8pm. Grays Park Hall, Orsett Road, Grays. Details from G3KMD.
Vange (VARS)—Thursdays, 7.30pm. Main Hall, Barstable Tenants Community Association, Long Riding, Basildon. Details from Mrs D. Thompson, 10 Feering Row, Basildon SS14 1TE.

REGION 17—RR to be announced
Andover (ARAC)—7 July (VHF contest). First Tuesday and third Wednesday in each month, 8pm. The Wolvesdene Club. Sec G8OPR.
Basingstoke (BARC)—10 July ("A question of weather", by Mr Bruce of the Met Office), 7.30pm. The Swan, Sherborne St John, Basingstoke. Chairman G4WIZ, tel 07356 5185.
Basingstoke (Repeater Holding Group)—First Wednesday in each month, 7.30pm. Chineham House, Shakespeare Road, Basingstoke. Sec G3KWU, tel 0703 812453.
Bournemouth (BRS)—First and third Friday in each month, 7.30pm. Kinson Community Centre, Kinson, Bournemouth. Sec G4EKE, tel 0202 877945.
Chippenham (C&DARC)—Tuesdays, 7.30pm. Chippenham Sea Scouts HQ. Sec G8UGY, tel Bromham (0308) 850289.
Eastleigh (Itchen Valley ARC)—Alternate Fridays, 7.30pm. The Scout Hut, Brickfield Lane, Chandlers Ford. Sec G6DIA, tel 0703 863039.
Fareham (F&DRS)—4 July ("Homebrew dummy loads and atus", by G4GBZ), 11 and 25 July (OTA natter night), 18 July ("QRP from St Kilda", by G3WLY), 7.30pm. Portchester Community Centre, Portchester. Sec G4ITG, tel Fareham 234904.
Farnborough (F&DRS)—Second and fourth Wednesday in each month, 7.30pm. Railway Enthusiasts Club, Access Road, Farnborough. Pro G4MBZ, tel Farnborough 837581.
Gillingham (Blackmore Vale ARS)—Second Thursday in each month, 7.30pm. Contact sec G3WRV for venue.
Gosport (Rowners&DARS)—First and third Monday in each month, 7.30pm. Hardway Community Centre, Gosport. Sec G6OTY, tel 04985 2541.
Guernsey (GARS)—Tuesdays and Fridays, 8pm. The Lodge, La Corbinerie, Oberlands, St Martins. Sec GU6TKE, tel 0481 25858.
Horndean (H&DARC)—2 July ("On the air cheaply", by G2DZT), 6 August ("Suppression of car electrics" by Lucas), 7.30pm. Merchiston Hall, London Road, Horndean. Sec G6OIV.
Jersey (JARS)—The club QTH, Le Hocq Tower, St Clements, open on Fridays, 7.30pm, Sundays 9.30am and Tuesdays, 7.30pm. This latter for morse and RAE tuition only. Sec GJ4TXB.
Jersey (JAEC)—Second Wednesday in each month, 8pm. The Communicare Centre, St Brelade. Sec GJ8KVV, tel 53333.
Liphook (Three Counties ARC)—First and third Wednesday in each month, 8pm. The Railway Hotel, Liphook. Sec G6SOQ, tel Bordon 3395.
Portsdown Hill Repeater Group—Sec G8GNB, tel 03294 41456.
Portsmouth (Marconi EARS)—Last Tuesday in each month, 8pm. Broad Oaks Canteen, Portsmouth Airport. Sec G3FWE.
Portsmouth (P&DRS)—Tuesdays, 7.30pm. Portsmouth Community Centre, Malins Road, Buckland. Sec G3JZV.
Poole (PARS)—Meetings held at the Poole Technical College, 7.30pm. Contact sec G3ZYD, tel Poole 671562, for dates.
Salisbury (SR&ES)—Tuesdays, 7.30pm. Grosvenor House, Churchfield Road, Salisbury. Sec G2FIX, tel 0722 743837.
Southampton (SARS)—Wednesdays, 7.30pm. Bittern Park School, Dimond Road, Bittern. Details from G4LKD, tel 042121 3451.
Southampton (SUARC)—Tuesday evenings, informal meetings every lunch time, Clubroom, Old Union Building. Sec G4LYL.
Swindon (S&DARC)—Thursdays, 7.30pm. Park School, Marlowe Avenue, Swindon. Chairman G8CPA, tel Swindon 20734.
Weymouth (SDRS)—3 July (Club meeting), 7.30pm. 29 July (Warmwell Country Fair). Army Bridging Camp, Wyke Regis. Sec G6HKD, tel Weymouth 787747.
Wimborne (FRARS)—Sundays, 7.30pm. Flight Refuelling Social Club, Merley, Wimborne. Sec G8VFY, tel 0202 882271.
Winchester (WARC)—Third Thursday in each month, 7.30pm. The Log Cabin, Stockbridge Road, Winchester. Sec G3SHQ, tel Twyford 713003.

Note: Your RR has not heard from the secretaries of the fifth, ninth, tenth, eighteenth, and twentysecond clubs in the above list for a very long time, therefore the accuracy of the details given for these clubs cannot be guaranteed.

REGION 18—RR to be announced
Consett (DARC)—Mondays, 7.30pm. RAFA HQ, Sherburn Terrace, Consett. CW class. HF and vhf gear for the use of members. Sec G1AAJ, tel 0207 520477.
Durham (DURES)—Wednesdays, 7.30pm. Physics Dept, Science site, Durham University.
Easington (EARC)—Tuesdays and Thursdays, 7.30pm. Easington Village Club, Easington, Co Durham. Sec G4RIK.
Great Lumley (GLAR&EC)—Alternate Wednesdays, 7.30pm. Great Lumley Community Centre. Sec G8HPW.
Hartlepool (HRH)—Mondays, 7.30pm. Methodist Church Hall, Frange Road, Sec G3NWU.
Middlesbrough (BTARC)—Thursdays, 8pm. British Telecom, Block 1, Lytton Street, Middlesbrough. Details from sec Bill Arnold, G4IJM.
Middlesbrough (TRG)—Normally last Tuesday in month. BT HQ. Details from sec Pauline Bland, G8MBK.
Morpeth (NARC)—Thursday, 7.30pm. Old Telephone Exchange, Ellington. Sec Ian, G4GWB, tel 790090.
Prudhoe (TARC)—Tuesdays, 7.30pm. Frenchmans Arms, Throckley. Sec G8TVY.
Redcar (ECARC)—Fridays, 7.30pm. RAFA Club, Esplanade, Redcar. RAE and cw classes, lectures, bar and refreshments. Details from sec G8JLA, pro G6LNK.
Sunderland (SRAS)—The Brewery, Westbourne Road. Sec Colin Howe, G4RTJ.
Tyneside (TARS)—Mondays, 7.30pm. Community Centre, Vine Street, Wallsend. Sec G4ILW.

REGION 19—RR to be announced
Barking (B&DARS)—Mondays, Tuesdays, Thursdays, 7pm. Westbury Recreational Centre, Ripple

Members of Edgware, Southgate and Verulam clubs met at South-Mimms recently to hear an illustrated lecture on some of the latest hf equipment. Officers of the clubs are seen here with representatives of Lowe Electronics. L to r: (back row) Andy, G4DHQ; David, G8GIY; John Fitch, G8EWG, chairman of Southgate; John Cobley, G3RMD, secretary of Edgware; Frank Claytonsmith, G3JKS, chairman of Verulam; John Bluff, G3SJE, chairman of Edgware; (front row) Tony, G4NBS; John Wilson, G3PCY; Hilary Claytonsmith, G4JKS, secretary of Verulam; and Dave Brown, G4KFN. *Photo:* G3PZF

Road, Barking. Monday is RAE class night, Tuesday is morse code practice. Wednesday is constructional, and operational night, and Thursday a general get-together. Contact sec Alan Sammonds, tel 01-594 2471.

Cheshunt (C&DARC)—4 July (Equipment evening), 11 July (Natter), 18 July (Visit—tba), 25 July (Natter night), 8pm. The Church Room, Church Lane, Wormley, nr Cheshunt, Herts. Details from Roger Frisby, G4OAA, tel 09924 64795.

Chingford (Silverthorn ARC)—7.30pm. Friday Hill House, Simmonds Lane, Chingford E4. 14 July (Chingford Day), 27/29 July (Special event station, details from G4SGO). Sec G4AJA, tel 01-529 2282.

Chiswick (ABCARC)—17 July (Radio Interference Service—discussion), 7.30pm. Committee Room, Chiswick Town Hall, London W4. Sec W. G. Dyer, G3GEH, tel 01-992 3778.

Ealing (E&DARC)—Tuesdays, 8pm. Northfields Community Centre, 71A Northcote Road, Ealing W13. Details from A. Berg, G4SCR, tel 01-997 1416.

Edgware (E&DRS)—7/8 July (VHF/NFD), 12 July (Outside visit, tba), 26 July (Informal). Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. Sec J. Cobley, G4RMD, tel Hatfield 64342.

Grafton (GARS)—8pm. Five Bells Pub, East End Road, East Finchley, London N5. Sec Jim Chambers, G4IBK, tel 01-346 5841.

Harrow (RSH)—6 July ("Basic microwaves"), 13 July (Informal), 20 July ("Airborne radio"), 27 July (Informal). 8pm. Harrow Arts Centre, High Road, Harrow Weald. Details from Chris Friel, G4AUF, tel 01-868 5002, or G8XBZ.

Havering (H&DARC)—Wednesdays. 4 July (Business meeting), 11 July (Informal), 18 July (TBA), 25 July (Informal), 8pm. Fairkytes Art Centre, Billet Lane, Hornchurch, Essex. Sec J. Gibbs, tel Upminster 26904.

Ilford (IGRSGB)—Thursdays, 7.30pm. 50 Mortlake Road, Ilford, Essex. Sec G. Skeat, tel 01-590 3193. Chairman is J. Hooper, G3PCA, tel 01-478 3741. All are welcome to attend this venue but please telephone first if you are a new member.

Ilford (Gould Advance RC)—Wednesdays. Service Dept, 2-8 Roebuck Road, Ilford, Essex. Club callsign, G4CAE. No other details. Sec R. Howard, G4JOK.

London (BBC Ariel RG)—Membership is restricted to members of the BBC club and their families. For details of this club, membership and the monthly nets please contact K. H. J. Rainbow, G8LRE, sec, ARG, tel 01-580 4468, ext 4891 (Room 110 HWH).

London (Central POHQARS)—This group have started a 3·5MHz net which is open to all BT employees and other Post Office and PTT employees in other countries. Listen out on Wednesdays, 2000h local time in UK on 3,750kHz. Net control, G3BYW. Details from J. A. Clarke, G3TIS.

London (City University ARS)—Thursdays. The club has recently re-started its operations and meets at the City University somewhere not specified in the letter. Contact Robert Benyon, G4KSK, Fiat 4, Bulien House, Collingwood Street, London E1, tel 01-253 4399.

London (Civil Service ARS)—First and third Mondays in each month. CSARS hold meetings mainly during the lunch hour at the Civil Service Rec Centre, Monck Street, Millbank SW1. Details from G. Costin, G4GFU, tel 01-632 6444, daytime. A station should be operational at this centre soon. Net held Tuesdays, 7.30pm, 144·575 fm and 3·720MHz at 8pm, G3CSR/A.

London (New Scotland Yard ARS)—This society is not open to the public, but the club station is active from time to time using G4NSY and G6NSY. Further details from sec, NSY ARS, Room 99, New Scotland Yard, Broadway, London SW1 0BG.

Southgate (SARC)—12 July (tba), 8pm. St Thomas's Church Hall, Prince George Avenue, London N1 J4. Pro R. Snary, G4OBE.

Stevenage (S&DARS)—First and third Tuesdays in each month, 8pm. Fairlands Hall Community Centre, Archer Road, Stevenage, Herts. Sec C. Barber, G4BGP, tel Baldock 893736.

St Albans (Verulam ARC)—10 July ("HF wire antennas", by Louis Varney, G5RV), 24 July (Informal), 8pm. RAFA-HQ, New Kent Road, St Albans. Please note this month only main meeting is as above. Full details from Hilary, tel St Albans 59318.

South West Herts UHF Group—Information from sec T. Groves, G4KUJ. Current situation on uhf repeaters is: GB3SWH is operational; GB3HR may be moving from the site; GB3BH is under construction.

The winner of Cheltenham ARA's construction contest, G4ERP, being presented with his trophy by Reg, G3GMN. Second and third-placed in the contest were G4TLX and G6CUM respectively

Stanmore (Marconi RS) (G6STA, G2MT)—Open only to Marconi personnel working at Stanmore Works. Operational most lunch times on 2m. Sec G4RBP.

Wanstead (ELGRSGB)—Third Sunday in each month, 3pm. Wanstead House Community Centre, The Green, Wanstead, London E11. Details from Julian, tel 01-550 7013.

UK FM Group—For information on this group and future policy please contact Pat Spenceley, G8LZA, by letter, or J. Parkins, G8KVP. This group is still active.

Watford (WRC)—4 July ("10m fm", by J. Petter, G3YPZ), 18 July (TBA). Tudor Arms, Bushey Mill Lane, N Watford. Sec Gordon, G8XXV, tel 01-950 3611.

REGION 20—RR to be announced

Bath (B&D ARC)—Alternate Wednesdays, 7.45pm. Englishcombe Inn, Englishcombe Lane, Bath. Club now has the callsign G4TMH and operates on hf and vhf. Details of the forthcoming meetings can be obtained from Trevor Whitehead, tel Bath 319150, or sec Mike Mason, tel Bath 311046.

Bath (Downside School ARS)—Details of the school's radio activity can be obtained from the Physics Department, Downside School, Stratton-on-the-Fosse, Bath, Avon.

Bridgwater (Sedgemoor ARC)—Bridgwater Arts Centre, Castle Street, Bridgwater. Details from B. Horsey, G3TTP, tel 0278 652058.

Bristol (BARC)—Tuesdays, 7.30pm. YMCA, Park Road, Kingswood, Bristol. 3 July (Contest preparation), 10 July (Contest post-mortem). Details from Trevor Cockram, G8GFZ, or Alan Williams, G3ZKI, tel 0272 553020.

Bristol (BRSGBG)—30 July (Chris Morcom, G3VEH, will be giving a talk on "Are you getting the best from your mobile antenna"), 7.30pm. Queens Building, Bristol University. Details from Brian, G4FRG, tel 0272 848140.

Bristol (First Crockern Scouts Short Wave Group)—Details of the group (licensed amateurs and short wave listeners are welcome to the shack by arrangement), from Pete Knowles, 30 Church Path Road, Pill, Bristol BS20 0EE, tel Bristol 8814248.

Bristol (HTVRC)—Details can be obtained from Robin Thompson, G3TKF, tel Keynsham 3965.

Bristol (North Bristol ARC)—Fridays, 7.30pm. SHE, 7 Braemar Crescent, Northville, Bristol. Details of summer activities, morse classes etc, from Ted Bidmead, G4EUV.

Bristol (South Bristol ARC)—Wednesdays, 7.30pm. Whitchurch Folk House, East Dundry Road, Whitchurch, Bristol BS14 0LN. 4 July (Talk on the RSGB by Regional Representative Brian Goddard, G4FRG, and Tony Capel, G4ROX), 11 July ("70cm activity night", by Martin, G4EIA), 18 July (Computer bring & buy/activity night, by Brian, G1DBH), 25 July ("HF activity night", by Alf, G4TXW), 1 August (Lecture (to be advised on GB2RS)), 8 August ("Pocket phone rally", by Mark, G4SDR). Details from Len Baker, G4RZY, tel 0272 834282.

Bristol (UoBARS)—Details of the society's activities etc can be obtained from Mark Posen, G6DYY, c/o Students Union, Bristol University, Queens Road, Clifton, Bristol BS8 1LN.

Bristol 432MHz Repeater Group (GB3BS)—Information from Steve, G4MCQ.

Cheltenham (BYLARA)—YLs and xyls. Details can be obtained regarding membership c/o Little Croft, Shurdington Road, Cheltenham. (Ladies—how about some copy for this column? *RR20*).

Cheltenham (CARA)—6 July ("Communications in Africa", by G3KKN), 7 & 8 July (VHF NFD (jointly with Hereford)), 20 July (Natter night), 3 August (A quiz (as previously done) followed by Mastermind for the four leading contestants), 7.30pm. Stanton Room, Charlton Kings Library, Cheltenham. Details from Gill Harmsworth, G6COH, tel Cheltenham 525162.

Cheltenham (Government Communications ARC)—Details from sec, c/o Government Communications Headquarters, Benhall, Cheltenham.

Cheltenham (Smiths Industries RS)—The venue for these meetings may change from the Club House, Newlands, Bishops Cleeve, so it would be best to check with Roger Hawkins, G8UJG, c/o Sports & Social Club Office, Smiths Industries ADS Co, Evesham Road, Bishops Cleeve, Cheltenham GL52 4SP.

Gloucester (GARS)—Wednesdays, 7.30pm. Please note new headquarters is at St John Ambulance Headquarters, Heathville Road, Gloucester. For details of summer outdoor activities etc and information on membership please contact Tony Martin, G4HBV.

Mendip Repeater Group—GB3WR, 144MHz repeater, GB3UB and GB3US 432MHz repeaters, and GB3UT, 1·3GHz tv repeater. Details of the repeaters, subs, and applications for membership can be obtained from Steve Gardner, G8GMZ, tel Midsomer Norton 413902.

Portishead (Gordano ARG)—7.30pm. Ship Hotel, Down Road, Portishead. Details from Robin Coles, G8ROC, tel 0272 691685.

Shirehampton (SARC)—Fridays, 7.30pm. Twyford House, High Street, Shirehampton, Bristol. Details from Ron Ford, G4GTD.

Street (S&DARS)—Strode College, Church Road, Street. Details from Bill Scriven, tel Street 42277.

Taunton (T&RDC)—Fridays, 7.30pm. The County Hall, Taunton (opposite the Crescent car park). Details from sec Graham Swetman, G8TJF.

Thornbury (T&DARC)—First Wednesday in each month, 7.30pm. White Horse Inn, Groves End (A38). Details from Alan Jones, G8AZT.

Wells (EMI Sports & Social Club RC)—Cedar House, Chamberlain Street, Wells, Somerset BA5 2PJ. (Regret no further details—*RR20*). Details from sec, at the above address.

Weston-super-Mare (RAFARS)—This is the headquarters station of the RAFARS, and details of membership etc can be obtained from the Admin Secretary, RAFARS, RAF Locking, Weston-super-Mare, Bristol BS24 7AA.

Weston-super-Mare (WsMARS)—9 July (DF hunt. The first transmission by the "hare" will be at 1930h bst and then at 10min intervals until found, or darkness ends the hunt. Transmissions will be on S23 and will last for 2min. The hunt is open to any licensed amateurs wishing to participate), 7.30pm. Rugby Club (off Drove Road), Weston-super-Mare. Details from Dave Restrick, G4/KA0NGP, tel W-s-M 28482.

Yeovil (Y&DARC)—Thursdays, 12 July ("A look at 6m", by G3MYM), 19 July ("J-fet rf amplifiers", by G3MYM), 26 July (Natter night), 7.30pm. Details from Eric H. Godfrey, G3CG, Dorset Reach, 60 Chilton Grove, Yeovil BA21 4AW, tel 0935 75533.

Yeovil Repeater Group—The 70cm Yeovil repeater should be on the air by July, on RB2. Details of membership and subscriptions from S. J. Darch, G6AGL.

Members' Ads

CONDITIONS OF ACCEPTANCE

These subsidized flat-rate advertisements are accepted as a service to members of the RSGB only. They must be submitted on the Members' Ad form printed on the back of a *recent* address label carrier used to mail *Rad Com* to the advertiser: this will automatically provide proof of membership and should not be more than two months old. No acknowledgement of receipt will be sent, and advertisements not clearly worded or punctuated, or which do not comply with the conditions of acceptance, will be returned. No correspondence concerning this service will be entered into.

Trade or business advertisements, even from members, will not be accepted for "Members' Ads" but should be submitted as classified or display advertisements in the usual way. Traders who are members must enclose a signed declaration that the items for sale or wanted are part of, or intended for, their own personal amateur station.

The RSGB reserves the right to refuse advertisements, and accepts no responsibility for errors or omissions, or for the quality of goods offered for sale. Advertisements for citizens band equipment will not be accepted.

Warning. Members are advised that they should, as far as possible, ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The "purchase" of goods legally owned by a finance company could result in the "purchaser" losing both the goods and the cash paid.

The current rate is £1 for 40 words or less: 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 **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

Datong UC1 up-converter, gen cov rx built-in, 144/28 converter gives 2m and/or 10m output, vgc, £80. G3AAV, QTHR. Tel Leeds 751100.

Commodore 64, comp with C2N Datassette unit, Joystick, two cassette interface units, all leads, two datacassettes, five games, all boxed, used 4h, would prefer exchange for working hf tx/rx, or £240 the lot. GM4TGC, QTHR. Tel Kincraig (054 04) 280/270.

70cm linear, 4CX250, hb, 10 years old but good wkg cond, comp with MM 28-432 transverter, leads, £95. Ham M rotator, £90. Slim crank-up, tiltover mast, 23-38ft wall mounting, £120, or both, £200. Tel Jim, 0202 518828.

Variac 240V input, 0/265V output, 13·5A load, £25. Advance constant voltage transformer, 190/260V input, 240V output, 250W load, £25. Mitutoyo outside micrometer, 0/1in, new, unused, £10. G8NNJ, QTHR. Tel Romford 41717.

R107 rx, gwo, ideal beginner, used all year, exchange good pair binoculars or sell, £40. RS54209, 1 Southampton House, Avon Road, Tidworth, Hants, 5pm, weekends.

RXs Hammarlund HQ170A, £150. HRO psu, six coils, gwo, spare set, three coils, £35. TCS12 1·5/12MHz, spares, £25. TX G2DYF, ssb (faulty), homebrew psu, £20. Collect lot, £200, or swap for hf tx/rx. Tel Chelmsford 469532.

Scan rx SX200N, psu, Revcon antenna, as new, £210. Diablo 1620 quality printer with paper traction (hyterm terminal), £950. Transdata 8in disc store (intelligent terminal), six discs, £330. Tel 025-14 28526 (Hants).

FT101ZD five-band, value, £450, swap for Icom IC451, 70cm, or Icom ICR70, TR7010 2m ssb, sell £90 ono, or swap for 100W 2m linear. W.H.Y? Jim Morris, G8NHC, QTHR.

Venus SS2 slow scan tv monitor, good cond, £115. FT7B tx/rx, 80-10m, ssb/cw/a.m., 50W op, good cond, box packing, etc. £270. G4FQF, QTHR.

KW Vespa hf tx, psu, Realistic DX300 rx, can run mobile, home base or portable, homebrew atu, £180 ono. Buyer collects or pays carriage. G4WYN NOT QTHR. Tel 0530 811691.

HF rx, Realistic DX160, 150kHz-30MHz, boxed, £80. Creed 75 receive only, tape perforator, keyboard, in bits, £5. Buyer collects or pays postage. G6KBS, QTHR. Tel John, Baldock 892831.

Teletype KSR33, serial interface, spare KSR33, £35. Buyer to collect. *Wanted:* Software for AMT1 for use with Nascom 2. G3MYY, QTHR. Tel Blackmore (0277) 821341.

TR2300, case, nicads, charger, whip, helical, £105. FRG7 timestep digital readout, atu, £130. Icom 4E, case, spkr/mic, seven months old, £125. All equipment in exc cond. G6XYZ, QTHR. Tel 06073 2327.

Ferrograph Series Five, orig manual, full wkg order, £40. 1k ZX81, Maplin keyboard, cassette, Scarab interface program, many books etc, £30. Printer, £25. Two loudspeaker cabinets, Electro voice units, suit disco pa etc, £400 the pair. Will deliver at cost of petrol. G4RQN, QTHR. Tel Kings Lynn (0553) 71389.

Datong up-converter UC1, 90kHz-30MHz input, 28MHz output, 144MHz output/input, as new, £60. Nascom One, keyboard pcb, most ics, components, full instructions, £25. G4COF, QTHR. Tel Mike Loader, 0822 3231.

Versatower, 60ft telescopic tiltover lattice tower, autobraked winch, four years old, £370. Buyer arranges transport. G3ZLS, QTHR. Tel Knowle 70235.

Yaesu FTDX560 hf tx/rx, ext vfo, mic spare valves, £225. QM70 28/144 transverter, £50. KW201 rx, amateur bands only, £90. Eddystone EC10 rx, gen cov, 500kHz-30MHz, £50. G3THM. Tel Fleet (Hants) 28735.

Yaesu FT480R, exc, boxed, £275. Nine-el crossed 2m Tonna, 15m heavy duty coaxial, £30. Hirschmann light/med weight rotator, £15. Hirschmann control box, £15. 200W Zetagi ssb mains linear, £60. RS85321. Tel Penrith (0768) 63200, 5pm.

C432 70cm handheld, 5ch, £50. Honeywell temp recorder, 240-120V auto transformer, nice case, £15. Two old scopes, not working, one £5, one free. Buyer collects. Tel 0734 482559, after 8pm.

FDK Multi Palm 2, 2m/fm portable, 8ch, S20, S22-23, R1, R36, toneburst, charger, etc, exc cond, £90 ono. G4IZA, QTHR. Tel 0787 76386.

ZX81, 16k ram pack, psu, all leads, as new, £28. Tel Oakham 55334, evenings.

TET HB23SP 2-el beam for 10, 15, 20m, used only four months, £85 ovno. Prefer buyer inspects/collects. Contact Pete, G4RYO, QTHR. Tel Kingsbridge 6331 (Devon), evenings only please.

Receivers: Eddystone 830/7; Eddystone 850/4; Eddystone EC10, Marconi Atalanta, Racal RA17L, all reconditioned , rx and tx, Pye R460, T461, 70cm fm, as new, tx/rx, Icom IC720A, all filters fitted, absolutely mint cond, sensible offers please! Tel 03306-613, after 7pm.

Yaesu FT101E hf trans, 160-10m, mic etc, boxed, £285 ono. G4OWY, QTHR. Tel Weymouth (0305) 786930.

Sony ICF7600D rx, 150kHz-30MHz, fm, brand new, cost £180, for £120. Sony AVC 1420CE bw video camera, virtually unused, comp with psu, carrying case, orig packing, £120. Tel 041-334 2811, evenings.

Commodore 3032, dual disks, Wordcraft, games, books, £475. Atlas 215X hf solidstate tx/rx, £250. Trio R1000, £185. 15A psu, £30. *Wanted:* Eddystone gdo, comes in wooden box, must be mint. Tel David, Hornchurch 55733.

Power supply, semi-homebrew, 10-15V, 16A, large and heavy, £20. Two Philips vcrs, N1700, comp except head servo module, £25. N1500, some parts missing for spares, only £10. Leak trough line stereo tuner, £15. G8PQG, QTHR. Tel Oxford (0865) 67165.

Datong morse tutor, £35. Audio processor filter, £28. Heathkit rfsg 100kHz to 110MHz incl, psu, £25. Mic AKG190E, cables, £35. Eight-ch stereo mono mixer, £27. Pair stereo headphones, Dynatron, £10. G4WRL. Tel 0643 4743, evenings.

Dozen assorted capacitors up to 2·5kV, 4μF, £10. Heavy duty mains transformer, 400-0-400, three other mains transformers, eight smoothing chokes, £10 lot. Untested, believed ok. Large, heavy, so collect only. G5JL. Tel 01-561 2773 (near Heathrow).

SEM Transmatch, 160-10, Ezitune fitted, as new, £70. *Wanted:* FT290R, to be exchanged for Arado VLF95 metal detector, new, worth £295. Contact Tony, G4SVY. Tel Sandown (0983) 405190.

Ex-WD WS No 12, large wartime hf tx, cw control unit, atu, boxed set valves. Free to caller, faulty R107 with handbook. Buyer collects from Warwick. G4HWF, 2 Epsom Close, Ely, Cardiff. Tel Richard Rudd, Cardiff 552075, home, or 593355, work.

Portable shack, Landrover 1981-W, safari estate roof rack, towing hitch, 2·6l, six cyl, 19,000 miles, long MoT, 12 seats (reversibly) modified to eight with operating bench, £3,750. G4NNS, QTHR. Tel Sunbury-on-Thames 89036.

4m Microwave Modules transverter MMT 70/28 (use with 28MHz tx/rx), unused, exchange for 2m mobile rig, fm or multimode. Cash adjustment as necessary. G3ZOG, QTHR. Tel Sunderland (0783) 280080, 6-9pm.

Lynx computer, 48k, in mint cond, box, 57 key typewriter keyboard, 248 × 256 pixels, RS232, rgb, sync, composite video, demo tape, user magazines and Ian Sinclair's book, £135. G4RTG NOT QTHR. Tel Thetford (0842) 3627.

Icom 740, fm fitted, £550. Automatic atu, Icom AT500, £275. MM transverter, 144/28MHz, £45. FT902DM, £500. FC902 ant tuner, SP902 spkr, £100. Creed 444 teleprinter, ST5 terminal unit, £50. Tel Skegness 810192.

Colour Genie computer, 32k, £125. Sale or swop: Korg keyboard vocoder with mic, any radio gear considered. G4TKH. Tel Potters Bar 43879.

TS130S, £425. PS30 power supply, £60. AT130 atu, £75. MC50 desk mic, MC30S fist mic, £20 each. SP120 spkr, all in orig packing, 35ft winch-up tilt over mast, £75. Buyer collects. G4RDK. Tel Plymouth 880218.

SSB Electronics SAN137 noaa/meteor weather satellite rx, £265 ono. Yaesu 480R tx/rx, as new, £300. ICS electronics Amtor/rtty program on eprom for BBC computer, £36. Must clear, need new hf rig. G4XHF, QTHR, ex-G6THT. Tel Paul, 0293 515201.

FT200, FP200, in good cond, handbook, spare valves, pa, fan fitted, £180 ono. Buyer collects, inspects. View evenings, weekends. G3SDK, QTHR. Tel Towcester (0327) 50012.

Drake 2B, 2BQ Q-multiplier, Princess tx, 150W, cw, 3·5-21MHz, orig prototype, 1964 published design, offers invited for either or both. G3JJG NOT QTHR. Tel 0242 862445.

Yaesu hf linear, FL2100Z, almost new, £360, no

offers. Yaesu FP707 pwr supply, used once, £95. Icom 25E, new March 1984, £235. All items perfect, would exchange all or part for Icom 740, TS430S, FT757. G4OLC. Tel 0670 855953 (Northumberland).

SCR195/BC322, second world war vhf packset, collectors item, offers? Creed model 75 teleprinter, maintenance handbook, offers? G3NKS. Tel Cheltenham 41099.

Yaesu FT101E, good cond, 160-10m incl 10·1MHz, 600Hz cw filter, rf speech processor, cooling fan, set spare valves, service manual, £340. 100W dummy load, £10. Sigma pwr/swr meter, £8. All together, £350. G4NNU, QTHR. Tel Seaton (0297) 20680.

Tono 550 communications terminal, cw, rtty, ASCII, reverse/normal, variable speeds, memories, can also be used as morse tutor send/receive, less than one year old, £239. G6LPS. Tel Worcester (0905) 26171.

Rotator for very light beam, takes 5/16in shaft, spare indicator, instructions, £15. BC221, psu, charts, £15. *Wanted:* FT7 or similar rig, wide-spaced capacitors, 200pF twin or split stator, 350pF. G4ILA, QTHR. Tel Lymm 2388.

FRG7, digital display, £140. Trio 2200, £45. Stolle rotator, £35. Katsumi keyer, £25. HF5, £40. Radial kit, £20. 2m antenna, £9. TV game, £5. G3XXN, QTHR. Tel 0709 814911, between 6-7pm daily.

Tower, Strumech P60 heavy duty, 2m 10XY, MBM88, rotator, 2m converter, £20. 70cm converter, £22. ATV converter, £15. Metal radio desk, 64 by 32in, BC221, Klystron unit, £20. Klystron psu, £7.50. LCR bridge, £25. 19in rack cabinets. G8GQS, QTHR. Tel 0427 3940, weekends.

Hygain TH33 Mk3 13-el beam, £130. Buyer dismantles, collects. Changed to quad. G3LYT. Tel 0406 362501.

BBC 32k morse programs: random allsorts; 100 plain language 3min tests; save/re-load your own texts; 70 cw punctuation/abbrevation; choose internal speaker/oscillator/rig; morse keyboard; learn and pass really fast! £4.75. D. Brandon, G4UXD, 1 Woodlands Road, Chester CH4 8LB.

Yaesu FTDX401, 560W p.e.p., remote vfo, FV401, Yaesu manuals for both, Yaesu YD844 desk mic, set unused spare valves incl matched pair 6KD6, £275 ono. Can deliver 100 miles Liverpool, otherwise help with petrol. All letters answered. G3IEP, QTHR.

Ultimast, special order, wall-mounting, tilts to left, head units UHD1, UHD2, heavy duty auto brake winch, all new, unused, cost £360, accept £250 ono. Buyer collects. G4BOO, QTHR. Tel Thatcham (near Newbury) 68640.

FDK750E multimode, EXP430 transverter, 2m and 70cm multi, good cond, best offer over £275 for pair. G6XUF. Tel Martyn, Telford (0952) 47952.

Datong D70 morse tutor, £40. KW202 amateur bands rx, exc cond, £100. May exchange for Trio VFO230. G4VUX, QTHR. Tel 0923 776254, evenings.

Jaybeam hf trap vertical antenna, 10m UR67 uhf termination, Tonna 13-el 2m Yagi, 20m UR67, N terminated, Jaybeam 8m telescopic mast, guys, stakes, buyer collects. Offers for the lot by letter please. G4FOH, QTHR.

Microwave Modules 70cm/30W linear, £90. Grundig Satellit 3000 rx, £200. ICSM5 desk mic, £15. RF-switched preamps, MM 2m, £20; Mutek 2m, £25: Mutek 70cm, £55. Mobile mic set, £25, offers considered. G6HUG, QTHR. Tel 01-504 4830.

Original Sylvania valves, 1A5GT/G, 3D6/1299, 1LA6, 1LD5, 1LN5, unused, one pair of each, mint cond, offers. Tel 0772 313092.

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.

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.

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.

TR700G 10W 2m fm mobile, comp, unmodified, checked to Trio spec, one of their best models, xtal on 11, 20, 21, 22, 23, R2-7, £90. G3FCW, QTHR. Tel Leeds (0532) 585044.

Sell or exchange: Z80A single board computer (Superbrain clone), £250. Two Teac 5·25in drives, £80 each. Switching psu, £55. Cherry keyboard, £50. CPM, £75. Smart case, £60. All together, £500, or swap hf gear. Everything brand new. Cragg. Tel Bournemouth 426647.

Search and rescue beacon with rt, Burndept. Eddystone professional rx, 880/2, £100. VHF marine rt, 230V ac or 24V dc, £80. HRO 5T, no mods, some other collectors items, sae list. *Wanted:* Air band scanning rx, 230V ac. Late Eddystone. G3DVF, QTHR. Tel Alnwick 602487.

Trio TR7200 2m fm mobile, cw mount, 5λ/8 gutter mount, £70. Avo type 8 Mk5, £65. F. W. Henshaw, G8BBO, QTHR.

Yaesu SP102 spkr, new, £30. B44 Mk2 tx/rx, unmodified, as new cond, working order, wiring diagrams, information for 2m, £25. G3KDH, QTHR. Tel Tring 3505.

DST100 50kHz-30MHz, circuit, speaker, buyer collects, £65. Salkeld, 8 Milne Street, Castleton, Rochdale, Lancs.

Marine vhf Neptun, 55ch synthesized, full duplex, 25W, dual watch facility, UK type approved, comp with manual, as new, £365 incl mainland delivery. G3SWC. Tel Rudgwick (040372) 2444, evenings.

IC202S, beacon, satellite xtals, vgc, in orig pkg, £130. ZX81, 32k ram, G4IDE rtty rom, pio, all in neat metal case, real keyboard, psu, asstd game and radio tapes, full docs, £100. G8GGG NOT QTHR. Tel Oxford 773979.

14AVQ trapped vertical, 40-10m, nearly new, £60. Approx 50 io B7G and B9G valves, Weller soldering gun, comp in case, £15. G3PKA, QTHR. Tel Bournemouth (0202) 429358.

Yaesu FT707 mobile 100W hf rig, FP707 matching power supply, as new, 270Hz cw filter fitted, £450 ono. G4NXX. Tel Dave, Abingdon 25898, after 6pm.

Icom IC701 solidstate tx/rx, 160-10m, usb/lsb, cw/rtty, 200W p.e.p., matching psu/spkr mic, leads, manuals, mint cond, new pas, orig boxes, offers about £460. Heathkit HW32A 20m tx/rx, 130W p.e.p., ssb, matching psu/mic, recent overhaul, leads, manuals, £75 ono. G3MCA. Tel Orpington (0689) 56497.

TR2500, supplied accessories, boxed (Nov 1983), £155. Two spare slide-on nicad packs, £16 each. 12V converter, £10. Soft case/belt hook, £9. All exc cond. Package deal, £195. G6TRS, QTHR. Tel Worcester (0905) 27793, office, 54516, home.

Drake L4B 2kW linear, the best. *Wanted:* Drake MN2000 atu, must be vgc. Collins 30 LI linear, like new. Tel Derby 557705.

Yaesu FT780R, as new, in orig packing, mobile bracket, £325 ono. G6RSR NOT QTHR. Tel 0844 53862 (south Oxon), after 6 July.

Hilomast 60ft pumped up-down to 14ft 6in (and compressor), £300. Tel Doug, 0268 26138.

Honda 250cc ND-B, Y reg, Jan 1983, genuine 2,600 miles, taxed, immac cond, £550. Consider px either way for late model hf or 2m tx/rx. G6XRL. Tel 061-489 3770, work, Poynton (Cheshire) 876192, home.

Trio 2200G, cw charger, etc, £90 ono. FT7, £250 ono. *Wanted:* iambic keyer and memory. Tenor sax mouthpiece. Cornet 48 bass accordion. GW3COI, QTHR. Tel Abersoch 2675.

FT902DM, mint cond, hardly used, comp with instruction book, orig packing, £625 ono. G4FXS, QTHR. Tel 021-458 3537, after 7pm.

TRS80 L2, cw tutor, 747 flight simulator, mach-code edt/asm, Pascal, various games, interface for printer, £150. G4LMS, QTHR. Tel 0924 469288.

Icom 25E, as new, scanning mic etc, mounting bracket, £195. G4PCK, QTHR. Tel Torquay 38134, evenings.

TS830S, MC50 mic, technical manual, in mint cond, hardly used, £520. Prefer buyer inspects collects. G4MPE, QTHR. Tel Congleton (Cheshire) (02602) 70594.

Standard C78 70cm fm portable/mobile, nicads, λ/2 whip, 5/8 + 5/8 mobile whip, 12V, charger leads, but no charger, two-off 12-el 70cm ZL beams if collected, £135 the lot. Tel Colin, G8FQT NOT QTHR, Horsham (0403) 56245.

Shack clearance: FT101ZD fm Mk3 fan, Weltz SP15M Creed, 7E Hygain, 12AVQ SEM Tranzmatch. Electronic keyer, delivery arranged, £500. G4MMV. Tel 09644 2396, any time.

Swan 100 mx tx/rx, 100W ssb/cw, Shure mic, £300 ono. Carriage extra. G3ZMX, QTHR. Tel 070681 4244.

HRO with vlf and 10-80 coils, pu spkr, good appearance, and working order, set of spare valves, handbook, £40 collected. G3XPX NOT QTHR. Tel Tunbridge Wells 48575.

Bencher paddle, as new, orig packing, £29, post paid. Several mains power supplies, medium and high voltage, cheap (collect these). Linear amp, homebrew, pair 811As, hefty power supply, £40 (collect). Not for beginners. G5LH, QTHR. Tel 0632 662490.

1940s Creed desk-fax machines, pair in wkg cond, transmit paper, receive paper, operating notes, maintenance manual, transformers, as per *Rad Com* August 1978, £45 for all above items. GI4CZW, 9 Tarmon Brae, Enniskillen. Tel 0365 24 500, evenings.

Heathkit HW101, psu, mic, manuals, exc cond, £160. Paul O'Brien, G3DNR, 46 Bromstone Road, Broadstairs, Kent CT10 2HT. Tel Thanet 63641.

FT290R multimode, no mods, vgc, case, nicads, telescopic and helical antenna, £200. MML144/30LS linear, £50. Both items in orig packing. G6YNL NOT QTHR. Tel Bob, 0235 816401.

Tower, Strumech P60 heavy duty, in exc cond, Olivetti A6 computer, payroll, accounts etc, printer, radio desk with rack units on castors, £10. 19in 6ft rack cabinets, £10. Hydraulic rams, motor pump, etc, £20. G8GQS, QTHR. Tel 0427 3940, weekends only.

TH3JR, good cond, lacquered when new, cw Higain balun, swr plots, £75. VFO 120 for use with TS120 or TS130, £55. G3LMH, QTHR. Tel 0962 881644.

FT101B, hf tx/rx, no mods, exc cond, £230. Buyer collects. G3VXF, QTHR. Tel Hindhead (Surrey) (042-873) 4328.

Microwave Modules MM4001 rtty tx/rx, much modified ASCII keyboard, in vgc, auto cq/ry etc, four memories etc, £200. G4TYE NOT QTHR. Tel 021-747 2798.

Trio TS700G 144MHz multimode tx/rx, 12/240V, fitted mosfet preamp, cw sidetone, variable power control, vox unit, mic, leads, manual, orig packing, £285 ono. *Wanted:* all-band hf tx/rx. Buy or part-exchange mint FRG7700. W.H.Y? G4BLT, QTHR. Tel Wakefield 255515.

QTH G3RUG: det four beds, gas ch, large lounge, sep dining breakfast rooms, int garage, wide drive, room for boat and caravan other side, downstairs shack with wc, stub masts with halyards on chimneys, 60ft tower, (one third acre) photos. Tel 061-439 7183.

Mast, Heathkit, 32ft, galvanised, four-legged, 3ft square at base, 1ft square at top, dismantled, £130. Tel Canworthy Water 493.

Trio 2500 handheld, cw spkr/mic, soft case, car adaptor/charger, £175. Sota 80W 2m linear, 1W in gives 20 + W out, £55. MM transverter, 144/28, as new, £55. G4RZG. Tel 0767 314189/0462 813235.

Creed 444 teleprinter, vgc, on transport pallet, handles, lectern, two pairs gears for 45 and 50 bauds, Creed 444 technical manual, comp with table/plinth 20in d, 23in w, 25in h, containing 80 + 80 psu, all wiring, loop current adjuster, socket outlets for external tape reader, terminal unit etc, ST5 terminal unit, PW66 automatic page winder (which enables use of both sides of paper roll), 6S/5 tape reader with tuning forks for speed setting, two paper rolls, two tape rolls, correct oil, grease, £120. Prefer buyer collects but can assist with transport. G5TU NOT QTHR. Tel Falmouth (0326) 250597.

FL100B, FR100B, spare valves, manuals, spkr, all in gwo, £170 ono. G4UOR, QTHR. Tel 0392 663120.

Icom IC245E 2m multimode mobile, £180. G8GMC NOT QTHR. Tel Portsmouth 751585.

Daiwa SR9 2m rx, vfo or xtal controlled up to 11 channels, fitted R1, S21, 12 months old, vgc, orig packing, £30 ono. David Traynor, 2 Pembridge Court, Ellesmere Port, South Wirral L65 9EG. Tel 051-356 0883.

Lowe SRX30D digital communications rx, mint cond, about one year old, 200kHz-30MHz, a.m./ssb/cw, fm detector, squelch fitted by Lowe, extremely sensitive, stable, reluctant sale, £120 ono. Phil Bridges, G6DLJ. Tel Southampton (0703) 891975.

IC215 2m fm portable, R2-7, S20-23, vgc, £75. Pye Cambridge, wkg on 2m, needs attention, £8. CT54 valve voltmeter, ohms, dcv, acv to 200MHz, £8. Precision wavemeter type 724A, beautiful cond, offers. G4EZE. Tel Newcastle (Staffs) (0782) 615652.

Drake TR7, PS7 matching psu, gen cov rx, vgc, £575 or exchange computer rtty equipment. Icom 271E hardly used, £450. *Wanted:* BBC2 micro and rtty (Amtor) hardware. G4ULQ. Tel Bournemouth (0202) 875065, evenings or weekends.

Telefunken 600Ω mic, as new, suitable hi-fi or group, £6. Clock-radio, unwanted gift, £8. Philips service manual for LD21001 video recorder, 5in reel, b&w video tape, £5. Postage paid by buyer. G6XRB, 38 Old Hall Road, Tingley, Wakefield WF3 1QE. Tel 0532 524108.

Yaesu FT200, FP200, hf tx/rx, in exc cond, £240 ono. Ham Master 4500 base mic, £25. Will go half on postage. GW6OIO NOT QTHR. Tel Abergavenny (0873) 7141.

FT101ZD Mk2, fm fitted, fan, dc converter, 250Hz cw filter, spare valves, a.m. board, FTV901R transverter, 2m fitted, SP901 matching spkr, £575 the lot. No split. G4WBW. Tel Alsager 3879, after 6.30pm.

BRT400, £40. S27, £25. CR70A, £20. DX100L, £50. BC433G, £35. All good cond. A. Baker, 34 Wenny Estate, Chatteris, Cambs PE16 6UX.

Trio TS770 2m/70cm multimode tx/rx, exc cond, rarely used, £550. G8MAF, QTHR. Tel 01-889 6380, between 6 and 8pm.

FRSDX400 rx, extra If stage, spare set of new valves, £120. VGC Codar pre-selector PR40, £10. HF5V vertical antenna, £10. Two Philips cassette mono recorders, as new, £10 each. Tapes of sstv, about 30, 20p each. SSTV slow to fast scan DL2RZ converter, cpte, power supplies, connections, board SC140, receive only, £100. Alba 14in b&w portable tv, with modulator, £10. Buyers collect please. R. J. Newey, 23 Leahouse Road, Oldbury, Warley, West Midlands. Tel 021-544 6171.

Hygain TH6DXX beam, 20, 15, 10m, balun, 8ft 6in by 2in steel sub mast, long enough to accommodate included triatric stay support, and vhf/uhf beam on top, partly dismantled, longest sections 12ft (for roof rack transport), £200. Prefer buyer collects but could assist with transport. G5TU NOT QTHR. Tel Falmouth (0326) 250597.

FDK Palm 2 tx/rx toneburst, leather case, spare nicad pack, charger unit, 10 simplex xtals, six repeater xtals, exc cond, £75. G4GXF, QTHR. Tel 03752 2089, evenings, weekends.

FDK3000 multimode, no mods, mint, comp manuals, £250. Daiwa SR9 2m monitor rx, fitted eight xtals, £30. Yaesu FP12 amp power supply, built in spkr, £55. Letters please. G8TOM, QTHR.

Trio 9130 2m multimode, mobile mounting, etc, orig packing, £320. MM2001 rtty-to-tv converter, boxed as new, £125. G4GIQ, QTHR. Tel Northwich 45584.

FT101Z, as new, not WARC, only used as driver, mic, blower, a great bargain at £300, no offers. G8ISR, QTHR. Tel Barnsley 81957.

Communications rx, Drake SSR1, £110. Purchaser collect. G1BZV, QTHR. Tel 046 26 6935 (north Herts).

Vintage collection, offers invited: GEC c.1934 broadcast; Marconiphone TW10 all-wave c.1936; Ekco A274 hifi-fm, c.1952; Grundig 3028/GB a.m./fm c.1950; Tannoy ex-RAF horn spkr; S. G. Brown type F phones; GEC leather-banded phones; "commercial" signal generator, built second world war components. G3SBA, QTHR. Tel 05827 4815.

Trio R1000, SP100, immac, boxed, £240. Grundig 2100 rx, 150kHz-30MHz, in 14 wavebands, fm, ssb, £110. Hitachi cctv camera, 8·5mm lens, £70. Crofton cctv monitor TVM10, offers. Computer psu, 13·8V at 9A protected, £25. Tel Mike, Preston (0772) 635560, anytime.

FT757GX hf tx/rx, brand new, £585. Matching YM38 scanning mic, £15. GEM quad, spider used once, otherwise brand new, boxed, £100. US Navy wavemeter LM14 (BC221 equivalent), psu, charts, £10. G4BUO, QTHR. Tel Tonbridge (0732) 359742.

Trio TR7730 25W fm 2m rig, fully synthesized, 10MHz coverage, £180. Trio TR8300 uhf 10W xtal bound rig, most repeaters, SU8, SU16, SU20, SU22. Tel 01-363 6075.

Yaesu FRG7700 comm rx, used only 12h, mint cond, indoor antenna, £275 ono. Tel Wix 780 (north Essex).

FT290R system: nicads, charger, mobile mounting bracket, λ/4 whip, rubber duck, telescopic, carry case etc, around £200. IEEE 488 serial interface, £50-ish. G4NYS. Tel Jane, Reading (0734) 875166, evenings or 790398, day.

Microwave Modules MMS2 advanced morse trainer, hi-mound HK708 key, £125. GW4WQC. Tel Cardiff 811546.

FT208R, comp system, mobile base or portable, incl nicads, charger/power supply, rubber duck, slim-jim, four-el quad, sprk/mic, MM bracket, only few weeks old, genuine reason for sale. G6IVB/G4OFS, QTHR. Tel Reading (0734) 789755, or 875166, evenings.

Versatower, one year old, 40ft two-section post mounted series, two 1500LB heavy duty winches, head unit, sold dismantled less post mount for collection west London, bargain, £240. Tel 01-977 6677.

Yaesu FT290R multimode, 2m portable, Microwave Modules MML 144/30LS 30W linear, nicads, case, mobile mount, charger, λ/4 flexiwhip, £270 ono. Linear alone, £50. Bob Pearson, G4VXF. Tel Garston (0923) 672611, ext 493, days, Luton (0582) 33876, evenings.

DX33 triband trapped antenna, 10/15/20, (Western Penetrator), vgc, £120. Tel 0463 241211.

FT290R, two sets, nicads, soft case, charger, £170 ono, or exchange for older type hf tx/rx, 14-el Parabeam, used contests only, £25, or exchange for five-band hf vertical or 13-el Tonna. G6PZW, QTHR. Tel 051-546 4852.

Sharp MZ80K computer, 48k, integral monitor, cassette deck perfect cond, as hardly used, no mods, boxed, manual, software, incl Basic, games, rtty, QRA, offers over £200. G4LPO, QTHR. Tel Doncaster (0302) 536444.

Daiwa automatic atu (500W p.e.p.), £90. Datong automatic speech processor, £50. Spacemark sstv monitor, £20. SSTV message generator, £20. IRCs, 10, £2. ICs, 74 series etc, half price, *73* magazines, 1976-81, £15. YD844 mic, £5. G4CVZ, QTHR. Tel 051-220 5470.

R1000, matching spkr, handbook, £200. G3DZW, QTHR. Tel 01-368 0962.

National NC173 gc rx, £25. G3GIB. Tel Berkhamsted (04427) 2814.

P60 tower in eight acre potential antenna farm, house, over seven beds, lodge, four beds, vhf, uhf, dx site, overlooking sea and Snowdonia from mid-Irish sea, sailing, climbing, golf, trekking etc, in wildlife reserve. GW2HIY, QTHR. Tel Holyhead 2763.

Video camera, superb JVC GXS9 low light colour camera, zoom lens, electronic viewfinder, Saticon tube, absolutely as new, in orig packing, only 20h use, ideal for amateur television station, £380 ono. G8VEH, QTHR. Tel Lancing 763978 (Sussex).

Drake TR7A, PS7, SP75, MMK7 service kits/manuals, never used, orig boxes/bills, £950. Racal RA17, RA98A, £275. Immac diversity switch, £35. Philips scope PM3110, £225. Cossor scope 1058, £90. RCS univ counter MDL802, £150. Level voltmeter TM6B, £150. Pye colour bar generator, £150. Marconi sig gen TF144G, £175. Mains unit frequency generator TF390G, £175. Jaybeam vertical antenna C5/2M, all for sale/offer due to bereavement, G3DVO. Tel Doncaster (0302) 840963, or 885276.

R1000 gen cov rx, dc kit fitted, good cond, £190. G4MPD, QTHR. Tel Northwich 47552, 6-7pm.

Yaesu FC902 atu, vgc, comp with orig packing, £95, no offers. Tel Coventry (0203) 610552.

Yaesu FT301D hf solidstate tx/rx, FC301 atu, boxed, handbooks, as new, £400. G6MUK, QTHR. Tel 03316 2479.

Icom ICR70 hf rx, fitted with fm option, absolutely mint cond, £410. Grundig Satellit 2100, ssb unit, £100. Both include carriage. Tel Sheffield (0742) 745850.

HQ1 minibeam, hybrid quad, £65. Datong PC1 converter, vgc, £75. G4PPU, QTHR. Tel 01-399 3844.

FT227R mobile rig, swr meter, slim jim, 14-el Parabeam, all good cond, £160 ono. 21-el dx-tv antenna, uhf wideband, very high gain, new, £50, £25 ono. G8RWJ, QTHR. Tel Pett 2012.

Need cash: Mutek SLNA 144S 0·9dB nf preamp, exc cond, £26. Jaybeam six-el quad, good cond, £20. 2X 4CX300A Eimac tubes, unused, offers. *Wanted:* 144MHz 4CX250 linear and psu parts. W.H.Y? G6ELH NOT QTHR. Tel Watford (0923) 30254.

Yaesu FT707 tx/rx, FP707 power supply unit, FC707 antenna tuner unit, all in gwo, £490. G1DIJ. Tel Brian, 061-865 2955.

IC2E, spkr mic, BP4 battery case, six nicads, DC1 12V adaptor, mobile charging lead, cases, £150. 20W pa, suit 2E, £20. 2m rx converter, 10m op, £10. *Wanted:* FT290. G6RMA, QTHR. Tel Dan, 0322 524938, evenings please.

ND1 synthesized 25W 2m fm mobile, £95. New Bencher paddle, £30. G2DAF type linear, pair 813s, £35. Marconi TF995A, £25. DX100 tx, £25. Pair new 400-4 tetrodes with bases, £20. Tel Jonathan, Telford 57727, office, Sambrook 731, home.

Land Rover series 2A 2·25l petrol, lwb, hard top, side windows, overdrive, fwh, large roof rack, new boarding, 2m 5λ/8, halo mounted, new tyres, seats and carpets throughout, interior converted as two-berth motor caravan, sink, new cooker, aux battery for powering lights, radio gear etc, MoT to April 1985. Ideal vehicle for contests, expeditions, holidays etc, offers around £1,500, or px Range Rover. G8PQG. Tel Dave, Oxford (0865) 67165.

Eddystone EA12 rx, £150. KW204 tx, £120. AR88D rx, £50. All in wkg order. Buyers arrange transport. GW2HIY, QTHR. Tel Holyhead 2763.

Icom IC720, PS15 psu, £525. *Wanted:* 20m monobander. Electric winch for Versatower. Trio 7010. G3WBN, QTHR. Tel 01-654 2761.

Oscilloscope, Cossor CDU150, 40MHz, two channels, dual timebase, recently overhauled and calibrated, service manual, £170. Buyer to arrange collection. Datong FL1, used little, £30. 813 and ceramic base, offers? G3ONP, QTHR. Tel 0902 788459, 6-8pm.

Advance sig gen type B4B5, 100kHz-30MHz, £30. EMI measuring oscilloscope type WM1, inc built-in centre zero voltmeter, 0·2-500V, £30. Heathkit valve voltmeter type IM18, PK3RF probe, manual, owner-constructed, manuals, £20. All in good cond. Prefer buyer collects or pays carriage. G3HJT, QTHR. Tel 01-890 6487.

Free FT290R, power supply, 16-el BCX beam, mast, rotator, to the person who buys this QTH. Mid-terraced house, two bedrooms, gas heating, 2 miles from Oxford centre, close to A40/M40. T. Vale, G6FOK, QTHR. Tel Oxford 64711, ext 6493.

Icom 25E, as new, boxed, incl 5λ/8 whip, gutter mount, £220. G3GAD. Tel Orpington 33408.

Exchange Belcom LS20XE 2m fm tx/rx Pocketar 2, incl batt ch, flexiwhip, hardly used, for HQ1 mini beam. Edith MacManus, 14 Large Square, Stainforth, Doncaster DN7 5RL. G4VVE. Tel 0302 841954.

Exceptional Creed 444 printer, cover, not ex-Buzby, overhauled professionally 1983, comp with Creed-made gears, 45, 50 bauds, full workshop manual, paper, tape rolls, spare governed motor, strobe forks, 125, 140Hz, other items on request, will not split. Sensible offers only. G8LT, QTHR.

Computer: TRS80, 16k, level 2, Basic dedicated, green screen monitor, comprehensive reference manual, books, programming techniques, TRS80 graphics, basic conversion handbook, TRS80 programs, software, microchess, backgammon, flying saucers, space-warp, £120. Exchange for FRG7 rx. Tel Oxford (0865) 724121, after 6pm. G6UAX, QTHR.

Model maker's fly-press by Skfenley Blocksidge, exc cond, £25. Unused cr tube D13/47GH, offers. Heavy psu from 150W a.m. rig, valve recs, offers. Two valve amps like Mullard 5/10, £5. 6in image intensifier and shield psu, offers. G3EFK, QTHR. Tel Downland 51212.

Yaesu FT200, FP200, exc cond, £180. Handhelds, three GEC couriers, batts, mics, £30. Handhelds, three Ultra Cubs, mics, no batts, £35. Tanberg 3000X cross field tape recorder, £35. *Wanted:* 70cm handheld. G3MZR, QTHR. Tel 01-980 2896.

Standard C5800E 2m multimode, six months old, £265. Codemaster CWR610E rtty/cw reader, morse practice facility, £125. Sold to finance 70cm. Both in mint cond, orig packaging, manuals, accessories. G6IBC, QTHR. Tel John, 01-790 8163, after 5pm or weekends.

Commodore 64 rtty, TAL2 plug-in interface, 26 memories, split screen, type ahead, eight user buffers, six baud rates, SEL call printer facility, 425Hz commercial shift receive, press agencies world-wide, £85. More information. G6ZDD. Tel Alan, 01-346 6174.

HQ1 minibeam, 50ft low loss coaxial, £48 ono. 12AVQ, radials, 45ft coaxial, £38 ono. Chimney mount, 18ft mast, £10. Emigration in the autumn forces sale. G5DJW, QTHR. Tel 0342 823016.

FT707, £325. FP707, £90. FC707, £50. Datong rfa, £20. Datong anf, £50. Datong asp, £50. All plus carr. All as new, used for swl only. RS53683. Tel Jim, 01-942 7094, after 6pm.

Yaesu FRG7700 gen cov comm rx, mint cond, cash required to finance new interest in 2m working, £220 ovno. Buyer collects or pays transport cost. G4RTI. Tel Eric, 021-744 3685.

Icom IC202 2m usb, 144·0-144·4, 145·8-146·0, £90. CWR682 morse decoder, built-in keyer, £95. G3RSJ, QTHR. Tel Exeter 32797.

Yaesu FT901D, no mods, used little on transmit, £395. Kenwood atu 230, Kenwood spkr SP23D, audio filters, £98, the pair. All above items in mint, as new cond. Standard C8800 2m 10W fm mobile, five memories, scanning facility, synthesized, good cond, £155. Diawa infra red mic, £12. G6LIG, QTHR. Tel Martyn, Belper 3671 (Derbys), evenings and weekends.

FT-ONE Yaesu, fm, bargain, £799, no offers but will consider part exch. W.H.Y? FT207R, only £79. Accessory equipment, half price for same. Datong D70, asp, £39 each. G4JYH, QTHR. Tel 01-886 0126, daytime.

Two hf rigs: Trio TS510, optional cw i.f. filter, fair cond, some spare valves inc 6146B, £135 ono; Argonaut 509, immac, only £195 for this much sought after QRP rig. Tel Dave, Tring 4948.

Eddystone 830/7 hfgc rx, good cond, manual, £150 ono. Microwave Modules 144/28 converter, £6. Mains transformer, standard primary, 1kV at 0·75A out, £5. 3MSC morse records, hb oscillator, £3. G4XMK. Tel Oxted (08833) 4718, 8-10pm.

Trio TS120S, mic, YK88CW filter, £315. PS30 pwr supply, £58. AT120 tuner, £38. £400 the lot, ono. Emigration in the autumn forces sale. All equip in exc cond, low log hours. G5DJW, QTHR. Tel 034282 3016.

FT101E, matching spkr, cw filter, spare pas, drivers, immac cond, 12V dc cable, handbook, etc, £390. G4AKG, QTHR. Tel 651 5147, afternoon or evening.

Drake TR7, the complete matching system, worth over £2,000, comprising fan cooled rig, psu, synthesized vfo, tuning network, processor, speaker, mic, workshop manual, orig packing boxes, £995. G4RSR, QTHR. Tel Dave, Yateley (0252) 873792.

Rad Com, 16 unbound volumes, 1968-83, two issues missing, £30 ono. Cannot deliver. G3DU, QTHR. Tel 01-997 7514.

Collins KWM2, psu, in Collins carrying case, selling on behalf of widow of G4GLZ (ZE1DG), £400 ono. For viewing demo, etc, contact G3GGS, QTHR. Tel Leyland (Lancs) (07744) 33945.

Microwave Modules MMT144/28 2m transverter, two months old, as new, £80 ono. SE1F, PS134, 13·5V, 4A psu, good cond, orig packaging, £15. Pye Vanguard AM25B, rx unmodified, tx modified for 2m, £15. G4PDF. Tel 0525 717618 (Beds).

Heavy duty 40ft triangular mast, tapers from 2ft to 6in, two sections of 20ft, galvanized, vgc, £100 ono. PF1, wkg SU8, batteries, cases, £20. G4MQE, QTHR. Tel Richard, 0472 824568.

FT290R 2m all-mode in case, nicads, charger, colinear, GH22 (unpacked), mint cond, hardly used, £275 ono. Buyer collect. Dow, G4LHK, QTHR. Tel Cheadle (Staffs) 75 7225.

Ten fm rigs, DNT M40FM, modified to 29·310 to 29·700MHz, brand new, warranted, £33 each. Kenwood R300 rx, £90. 13·8V 20A power supply unit, £40. Zetagi 30W linear for 10 fm, £18. G4SNO. Tel 0562 884824, evenings or weekends.

FT901D, cw memory, a.m. filter, SP901 spkr, £450. MMT28/144 10m transverter, £50. MMC1296/28 23cm converter, £15. G4BEL, QTHR. Tel 0353 740355, evenings.

FT480R multimode, boxed, £285. 5XY Jaybeam, Channel Master rotator, £60. 27yd UR67, £14. 2m λ/4, mag mount, £8. Pye pocketphone, 70 converted, RB0, £40. Creed tape reader, teleprinter/punch, power supply, £12. Tel Scarborough 364399.

Icom 740 hf tx/rx, £485. Icom SP3 spkr, £25. Kenpro 600RC rotator, £95. G4SOQ, QTHR. Tel 01-640 2599.

Yaesu FR101S rx, absolute mint cond, £240 ono. L. D. Ireland, Carnhell Green, Camborne, Cornwall TR14 0NA. Tel Praze 831236.

UHF vhf swr meter, FS7, unused, £37.50, includes postage. G4UEO, QTHR.

23cm, four 23-el Tonnas, power splitter, £100. Jaybeam six-el quad, £5. Other vhf, uhf converters, antennas, equipment, effects late G2AXI. SAE for details and lists of other items, books, mags, etc. G3CBU, QTHR. Tel 0256 58921.

Yaesu FT101ZD, six-band version, cw fan, YD148 base mic, FC901 matching atu, all in exc cond, with orig packing (for what that's worth), the lot, £415. Tel Farnborough (0252) 547900.

Trio TS830S hf tx/rx, used little due ill-health, offers around £600. FDK Multi 2700 ac/dc 2m pll tx/rx, £120. G4MH minibeam, £40. Property of G5NN. Tel Ridley, St Gennys (08403) 466, after 6pm.

Yaesu FTDX401 tx/rx, used little, incl internal power supply, noise blanker, dual calibration vox break-in, cw, sidetone, matching spkr, £225. HRO rx, nine coils, power pack, £30. Prefer buyer collects. G3HTB, QTHR. Tel Leeds (0532) 671789.

IC02E, new, boxed, leatherette case, £185. G4TAK, QTHR. Tel 0942 714651.

Drake TR4 hf tx/rx, RV4 remote vfo, AC4 psu, Datong rf clipper, Shure 201 mic, £275 or swop for equivalent vhf base station rig. G4SLT, QTHR. Tel Reading 478729.

Burndept 470 uhf handheld, exc cond, xtalled on RB4, RB6, RB10, nicads, a rare opportunity, comp with service manual, £150 ono. No time wasters please. Tel 0302 835280.

Realistic DX302 rx, 10kHz-30MHz. Quartz synthesized digital readout, cw, usb, lsb, a.m., bfo, with Global AT1000 atu, £170 ono. G6ZIM, QTHR. Tel Oxford (0865) 66075.

Sale of the century: Eddystone 880/4 professional rx, £250. FT221R, £250. MMT 432/144R, £120. Marconi TF801D/8S, 10-485MHz, £80. Clark mast, pneumatic, 40ft, £100. Westminster SU8, £50. Bird Thruline vhf/uhf elements, Sanders sig gen, CT478 1·3-4·2GHz, £50. Printer 7ERP, auto TX6A tdms, 5ABV desk, £25. Eddystone dials, 898, new, £10, used, £5. Wayne Kerr wavemeter, 1·9-5GHz, 3-8GHz, 7-14GHz, £15 each. NEMS Clark 55-250MHz, £100. Three and 2ft dishes, feeds for 24GHz, 10GHz, 5·7GHz, demountable tripod, gunsight, drive, 1° cals, £50. Large qty vhf, uhf, microwave components, filters, switches, twts, noise generators, send for lists. Vector voltmeter, 1-240MHz, useful for power (mw), £30. RG188, 50Ω min, coaxial, 10p/m. 3cm tx/rx, nb, wb, Bantam, 2m, £10. Ask, I probably have it. Carriage at cost. Prefer buyer collect. G8ANZ. Tel 045382 4123.

29MHz 6W mobile fm rig, 29·3-29·7, nine months old, first class cond, 25W linear, £45 the lot plus p&p. G4NVQ, QTHR. Tel 0424 420608, evenings, weekends.

TenTec Argosy, incl 2·4kHz, 500Hz i.f. filters, cw audio filter, calibrator, noise blanker, mic, £360. TenTec rf speech processor, £40. G4NZP, QTHR. Tel Mike, Portsmouth 754014, after 6pm.

Triplett output meter model 650SC, volt-ohm tester model 666SC, both switched ranges, £2.50 each. Blowers, 240V ac shaded pole, Mycalex type, 45CFM continuous-rated, suitable QRO pa, £3. *History of Longridge & District nr Preston,* 11 by 9in, 296 pages, published 1888. G3ANK, QTHR. Tel 0202 486141.

Trio 2300, nicads, charger, soft case, orig packing, £115. Postage extra. Datong morse tutor, perfect cond, in orig box, used little, £45. Postage extra. G4UPK, QTHR. Tel 0704 20003.

Microwave Modules morse talker MMS1, brand new cond, £75 ono. Carriage extra. G6CNX, QTHR. Tel Sheffield 653840, or Sheffield 483514.

FT101E, used little, £350. 432/144 Microwave Modules transverter, no repeater shift model, £85. IC2F mobile fm tx/rx, needs attention, but xtalled all channels, £25. *Wanted:* Linear for hf, 144 and 432MHz. G8BCL, QTHR Aylesbury area. Tel 0296 34455, daytime, 0844 208074, evenings.

Marconi generators TF801D, £55. TF1064B, £75. Teletype 33TC, £40. Heathkit H14 line printer, RS232, cost £250, accept £110. Eddystone EB35, £30. Seafarer RT100 marine rt, £75. Twin cassette telephone answering machine, £65. LCD digital multimeter, £20. Tel 0222 617245.

IC202S, extra two xtals for extended ranges, vgc, orig packing, etc, £125. 23cm dish feed, dipole, reflector plate, in brass from Mutek, £25. HB prefab 2m dia dish, you collect, £10. G3SPJ. Tel 01-311 8405.

Palm 4, seven xtals, £100. FTV107R, 2m, 70cm, £175. Lunar 2M30160P, £130. 10M 10XY, 70cm 12XY, £20 each. Two by 5λ/8 70cm mobile, £7. 70MHz tx/rx, 70·26, £20. PCS2800, £120 ovno. Collect or carriage extra. *Wanted:* Belcom LS102L. G3BKL, QTHR. Tel 0980 862489, after 7pm.

Versatower P40, 40ft telescopic tower, minus post, three years old, £225. TA33JR three-el beam, 10-15-20, £35. G4CHD, QTHR. Tel Cheltenham (0242) 513178.

***Admiralty Handbook* 1931,** 1938, *Air Ministry Handbooks for Wireless Operators,* 1939, *RSGB Amateur Radio Handbook,* 2nd edn, 1944, other books by Scott-Taggard, Dictron, Camm, Decibel, Stranger, Norris, Sowerby, Squire, Ladner, Stoner. G3GOS, QTHR. Tel Axminster 34259, after 6pm.

Trio TR2300, nicads, charger, listen on input, VB2300 10W pa, £135. G8PHY, QTHR. Tel 07048 76662.

Yaesu FT7, mains power supply, £220. G3IYT. Tel 0472 812914.

Lowe SRX30D rx, MM 70cm converter, REW 2m converter, Stolle rotator, Hamgear hf preselector, £150. Tel 061-793 1059.

Exchange quality photographic equipment comprising Rollieflex 2·8f tlr camera, good cond, Rollieflex 2·8d tlr, exc cond, with host of genuine accessories in Nikon holdall. Pentax SP500 35mm camera, f2 Takumar, case, genuine accessories. Nikkor-mat ftn body, mint, Microcord tlr, exc, many spares, value around £700. Will take good Collins KWM2, Drake TR7 or similar rig for all above. No time wasters please. S. A. Wright, G4LBY, QTHR. Tel Mansfield 29473, evenings or weekends.

Gould OS245A dual trace oscilloscope, 10MHz, 5mV-20V sensitivity, 1μS-0·5S per division timebase, x5 and x10 expansion to 100nS, Z mod input, X-Y mode, comp with input leads, manual, exc cond, £150. G4KLT, QTHR. Tel Rochdale 46428, evenings only.

Trio TS130S, £375. Matching PS30, £60. Both hardly used. Bargain for someone wanting compact hf station. Yaesu FT290R, no mods, charger, case, nicads, helical, £200. All items ovno. G4LQT NOT QTHR. Tel Stafford (0785) 52604.

Two Yaesu ptt mics, £3. Low pass filter, £10. Muirhead sig gen, 1Hz-111kHz, £50. Heavy duty coaxial, used but good cond, 15ft, 22ft, 35ft, 42ft, £1 per yard. Six-core cable, 75ft, £1 per yard. G3VWE, QTHR. Tel 0275 656783.

FT757 gx, FP700 psu, one month old, £650. G4TAX NOT QTHR. Tel 04446 41195.

Microwave Modules MMS1 morse talker, absolutely mint cond, comp with instructions, orig packaging, £95. G4VQR, QTHR. Tel 0924 827384, after 6pm.

Yaesu FT790R 70cm multimode, nicads, mobile antenna, 19-el Tonna, can deliver reasonable distance, £250 ono. Oric 48k computer, books, programs, £90. G6OIB NOT QTHR. Tel Ely (Cambs) (0353) 3992.

Books, manuals, instructions, on following: hf RCA tx MI8167; test equipment IE46B, BC906D, BC1066B, I196B; RAF 78RX unit; Advance B4, etc sig gen; National NC121 rx; Aiwa AR158/9; FT200/250; TR2200G; No19; KA2000A; BCC69 dg; £2.50 each. G3MBL, QTHR. Tel 01-445 4321.

Icom 251E, £400. Trio 7010 cw compact 12V mains psu, for base station operation, unused mobile mount, £100. FRG7 rx, £100. MMA144V 2m switched preamp, £22. G3VSA, QTHR. Tel 061-437 1437.

Shack clearance before rebuild: KW201 rx, KW109 QRO atu, Drake TR4C, remote vfo, 14AVQ 2m converter, KW Q-multiplier, valves, xtals, meters, etc. Sensible offers and/or sae for full list and further details. G3ADZ, QTHR.

Tektronix plug-ins, 2in, 3in, 5in crts, noise diodes, disc seal triodes, 6in vacuum plant, comprehensive list of vhf equipment and test gear. G2CPM. Tel 0635 40464.

Yaesu FT107M solidstate hf tx/rx, WARC bands, 18 months old, fitted internal mains psu, digital vfo, 12ch memory, exc cond, grey, £525. Microwave Modules MMC144/28LO 2m converter, unused, £18. G3TSO (Cirencester). Tel Coln St Aldwyns (028 575) 532.

Garage clearance: G4WFY requires space for car. On offer: 49MHz handhelds, mobile antennas, nicads, cable, components, old rx valves, power transistors, child's science kits, earth spikes, Henley Solon spares, conduit, steel whip, cash or exchange. Tel 01-805 1910.

Muirhead Mufax D611UF recorder, tu workshop manual, needs clean-up, general servicing, £40. Datong UC1 up-converter, £65. Heath SB401 tx, SB301 rx, all xtals for transceive or separate operation, £170. Buyers to collect or arrange transport. G5XB, QTHR. Tel Reading (0734) 722195.

Yaesu FRG7 rx, unmarked, mint cond, used little, orig packing, £115. Microwave Modules 2m converter, 10-2m, £8. *Practical Wireless* ZX81 radio programs cassette, one, £1.50. G6DAH, QTHR. Tel Southend-on-Sea 526944.

AR245 2m fm handheld, 140-150MHz, 5/1W output, comp with nicads, charger, soft case, two helical antennas, spkr/mic, bargain, £150. G4VCG, QTHR. Tel Frensham (025125) 4105, evenings, anytime weekends.

Prestel dedicated terminal, STC Novatel 7in green high definition screen, auto-dial, auto-signon, numeric entry keyboard, facility for tape in/out, Alpha keyboard and Centronics parl printer, £150 ono. G4KVX. Tel 04946 6933.

MMT432/144R transverter, ssb/fm/cw, repeater shift, 10W output, cw 15dB attenuator, vgc, £120 ono. Homebrew 70cm linear, approx 40W output, £30 ono. AR40 rotator, cw 15m cable, vgc, £50. *Wanted:* mod details for 160m on TS120V. G4ABF, QTHR. Tel Malvern (06845) 66202.

HF cw/ssb Acitron rig, 100W, pre-WARC bands, top band, digital readout, exc wkg cond, wattmeter, mic, low pass filter, HF5 vertical, £230. G4SXZ. Tel Kirton Lindsey 648640.

SX200N scanning rx, a.m./fm, orig packing, all accessories, £195. G3GNN, QTHR. Tel 0302 852207.

25MHz D53A Telequipment scope, additional high sensitivity type G plug-in, all manuals, used little, £150 or offers. Q meter, Advance T2, 100kHz-100MHz, £15 or offers. G4PUU NOT QTHR. Tel 0865 725421.

Standard C8800, 2m fm, 15W, fully synthesized, five memories, two priority channels, high or low scan speed for busy/vacant, automatic mobile bracket, reverse repeater mod, unboxed, manual, good cond, £130. Buyer collects. GM6HLG. Tel 0383 824382, after 5pm.

IC120 23cm pll fm tx/rx, new, £370. Daiwa 2m lin amp, 1·5-4W ip, 50W + op, new, £50. G4/VK4AIZ. Tel 0923 675009.

Capacitors: 0·05μF, 5kV dc, £1.50 each; 0·5μF, 2kV dc, £1.75 each; 10 8μF, 450V dc, £2; 15,000μF, 63V dc, £1.25 each; two black plastic boxes, 100 by 76 by 41mm, £1; four black knobs (4cm dia), £1.25; all post paid. Unused valves. M. Twigg, 30 Valley Drive, Yarm, Cleveland TS15 9JQ.

Wood & Douglas tx/rx, 70cm scanner, toneburst, S-meter, mic, ptt, changeover, spkr, 6AH nicads, aluminium box, two channels fitted, RB14, SU8, good wkg order, £90 ono. Would exchange for sideband rig for 70cm with cash adjustment. G4GMT, QTHR. Tel Huddersfield (0484) 643124, (W. Yorks).

Trio 2200, VFO30, nicads, charger, £90. Trio 9R59DS, £45. R308, 20-145MHz rx, £40. Commodore 64 computer, cassette unit, Joystick, Simon basic cartridge, £235. SAE for list of oddments, old magazines, vintage radios etc. G8ZJJ, QTHR.

Linear amplifier, FL200Z, under one year old, in box, mint cond, £350. Tel 0472 70125.

Yaesu FRG7700 rx, Yaesu FRV7700 converter, Yaesu FRT7700 ant tuner, all in exc cond, all 11 months old, £325. Tel Rotherham (0709) 64569, after 6pm.

Philips business accounting machine, type P310, comp with twin disc drives, printer, software, exc cond, suitable for small business, £495 ovno. G8UMG NOT QTHR. Tel Mansfield (0623) 795915.

Drake TR4C tx/rx, perfect wkg order, checked Radio Shack April, box, spare valves, £195. CD44 rotator, medium duty, £45. Replacing for heavy duty with new beam. G4EUU, QTHR. Tel Havant 483879.

Eddystone 888 rx, six amateur bands, £50. Buyer collects. Morse course, three records, £4. Morse course, eight 7in tape reels, £8. Post extra. G4FUY, QTHR. Tel Reading 733633.

Trio 1000 gen cov rx, Trio SP100 ext spkr, both items available boxed, comp with 12V conversion, manual, £220 ono. Tel 0453 860579, after 6pm.

Trio TR3500 70cm fm tx/rx, £160. Trio TS2500 2m fm tx/rx, £150. Trio ST2 base stand, £30. Trio 2m 25W amp, £40. Micro Module 70cm 30W amp, £90. Trio MS1 mobile stand, £20. Trio SMC25 mic, £10. G6YOG, QTHR. Tel 01-668 8459.

FRG7700 rx, vgc, £225. FT707, fm, slight marks, £325. KW201 rx, KW Vespa tx, matching separates, exc order, £195. Solartron oscilloscope, to 40MHz, £45. 15A psu, £25. Atlas 215X, £250. G4TNY, QTHR. Tel Hornchurch (04024) 57722.

WANTED

Spectrum radio teletype program, interface details, prefer type ahead split screen operation with morse id, but anything considered. Contact Mike, G4HWB NOT QTHR. Tel 061-653 7055.

Morse Key, older the better, top price paid for double current c.1915 and similar. For own use by dedicated telegraphist. G3BEX, QTHR. Tel 049-46 5097.

Alpha 77DX lin amp. Tel Derby 557705.

YC221 display unit. Extender board for FT221R. G2HNO, QTHR. Tel 0202 708405.

Yaesu YO901P, FC902. Bencher key, Eddystone bug. Thruline elements, 250W, 2-30MHz, buy or exchange, particularly wanted. Marconi signal generator up to 500MHz. Microscope slides or microscope accessories. Eproms 2532 or 2716. G3AZI, QTHR. Tel 0772 37815.

Wireless set (Canadian) No29, any items for this set, particularly connecting leads, etc. Suitcase tx/rxs, any spares or damaged sets. Any commercial/military a.m., phone, tx or tx/rx covering 2-8MHz continuous. Taylor, G3UCT, 8 Government House Road, York. Tel 0904 29777.

For the wireless museum: pre-war radio books, magazines, catalogues, wiring diagrams, manuals, QSL cards. Meccano crystal. Philip's "People's set". Baird 30-line record. Phonogram cylinder. Avo valve tester handbook. Beehive/letter neon. Morse keys. Valves. Details please G3KPO, QTHR. Tel 0983 62513.

For Heathkit HW17 2m a.m. rig: any info, circuit diagrams, handbook etc. Would gladly pay photocopies. Working/non-working rigs to enable restoration project to go ahead. GM6JAG, QTHR. Tel 031-664 5403.

18HT high tower vertical antenna, can collect if required. G4FIV, QTHR. Tel 020-886 2362 (Cornwall).

23cm dish, at least 12ft diameter, distance no object but must have feed and mountings. Peter Crosland. Tel 0905 620041, evenings only.

Phelps Dodge USA cavities, 22in tall, 29in overall, 6in diameter, capacitor notch box, fitted PF259 sockets, blue, for 2m repeater GB3SN. Please let me know of any source. G8BIH, QTHR. Tel John, Alton (0420) 82739, evenings.

Trio/Kenwood DS2 dc-dc converter for dc 12-16V operation. G4UNM. Tel 0983 402273.

Micro 6502. Journal numbers 1 to 31 and 44 onwards. Circuits for CBM Pet 2001-8, old rom and Centronics printer 101, buy or borrow. G3NPF, QTHR. Tel Horsham 66290.

R1155 ex-RAF rx. Any info on above rx. Manual, wiring diagrams, mods, to copy or purchase. GW8PNE, QTHR. Tel Treorchy Rhondda 773398, after 4pm.

Racal accessories, manuals, isb adaptor, If adaptor, panadaptor etc. W.H.Y? Willing to pay price according to cond. Bird Thruline wattmeter and accessories. Icom IC290E/A and MML 144/100LS. Tel 03306 613, after 7pm.

Three Bright emitters type R4. TL120 linear amplifier. G3BEX, QTHR. Tel 049 46 5097.

FT7 manual or handbook. Will purchase or pay costs to borrow for copying. Tel Redditch (0527) 28920.

70cm transverter module for FTV107R. G3SYS/F6HYR, c/o 18 Fraser Court, Handbridge, Chester. Tel 0244 676570.

To buy or borrow: manual for Centronics 154 graphics printer model No 154-4. G6JPQ, QTHR. Tel 0283-71 3865.

Urgent: Cushcraft R3 λ/2 triband vertical, comp with control console, hardware in good cond. Tel Leamington Spa (0926) 881507.

AR88 table cabinet. Handbook and large cover for tuning capacitor, oscillator etc. Manual for Avo sig gen model No ZD03771. Manual for Pye Cambridge solidstate/valve c. 1963. G6XNC, QTHR. Tel 01-462 4461.

Solidstate QRP cw tx (13V), about 10W input, must cover 14MHz. Would consider valve type. W.H.Y? *For sale:* Cambridge factory assembled audio notch filter, used little, £10. Cambridge If converter, £5. G3JIC, QTHR. Tel 0744 23916.

FC902 atu, SP901 spkr, to complement FT101ZD. FT780R 70cm fm/ssb, 1·6MHz shift fitted, all to be in mint cond, cash awaits the right equipment. G4BMP, QTHR. Tel 0242 67 4369 (Glos).

FT707, +/− psu (new bands). *For sale or p/x:* FT290R nicads, charger and nine-el Tonna, £210. Sony FX412UK portable tv/radio/cassette, £60. Tel 01-743 2030, bleep Dr Morecroft (after 6pm).

AT200 atu, must be in good cond. Send details or tel. *For sale:* TRS80 quick printer, two RS232 Centronics trsbus interfaces, connects to expansion port on TRS80 cable included, as new cond, £70 incl carriage. G8YCW, QTHR. Tel Ashington 818773.

For R1155/T1154 station: buy or swap tx back mounting bars, T854 AE ammeter mounting, loop AE support and drive tubes, socket type 63, plug type 101. G6MQJ, QTHR. Tel Phil, 0483 572653, evenings.

Info on designer of Microdot which ceased trading this year; need his address or phone number to discuss technical info and updates. R. Bradshaw, G4DTD, CRS Hanslope Park, Milton Keynes. Tel 0908 662921.

Any information regarding Printer Terminal Communications Corp printer type 879MD2, especially setting up details for dil switches. All info acknowledged, postage refunded. G3ISD, QTHR.

Microwave Modules transverter, 144-432MHz, wkg or not working, but must be comp and not butchered. G8FXG, QTHR. Tel 040924 543.

Tunable vhf/uhf modulation meter, a.m./fm, Dymar or similar. GW4BCF, QTHR.

HROs by enthusiast for spares, repair, renovation, etc. Wartime National rxs, RBJ, RBH, RAS, RCE, etc. Please write or phone. Peter A. Hopwood, G3UKH, 58 Bolbec Road, Newcastle-upon-Tyne NE4 9EP. Tel 091 2744115.

Ex-Post Office morse key with large knob, or name of Australian firm producing replica of this key. Any info regarding BPO 610 greatly appreciated. GW4JKR, QTHR. Tel 0248 715582.

CW tx, prefer vfo type, not QRP, WD or homebrew ok but must be good wkg order with psu if possible. Tel John, 0495 270900.

Trio TS120V or TS130V hf tx/rx, cash waiting. NR56 2m monitor. A. Stone, c/o 122 Stradbroke Road, Lowestoft, Suffolk NR33 7HX.

Heath HW7 or HW8, wkg cond with manual. John Moyle, G1AWJ NOT QTHR. Tel Milton Keynes (0908) 665520, evenings and weekends.

FT290R, exchange for Yaesu FT200, mint cond, power supply, G3LLL clipper, spare set of pa valves. G1DIJ. Tel Brian, 061-865 2955.

Vibroplex Champion or Lightning bug. Junker straight key. Wide-spaced 250p + 250p variable capacitor. Heathkit OS2 scope. G3TSS, QTHR. Tel Corbridge (0434 71) 3125, evenings.

Circuit drawing of old rx 1155. Details of front end especially needed for owner to repair modernised version. Any literature concerning this set urgently needed. P. A. Donnelly, G6ZXL, QTHR. Tel Redditch 27254.

BTR2 owners out there who would like to exchange spares, information. Hughes. Tel 0905 840283.

TI99/4A programs for cw, rtty, sstv. W.H.Y? Reasonable price paid. C. J. Raspin, G4KUE, Oriel College, Oxford OX1 4EW. Tel St Helens 24995, after 23 June.

Still searching for ex-RAF indicator 62A or 62, any cond. Strobe unit type 3, for above. Loop antenna type 3. *For sale:* Pye Baby Q, classic rx, £10. 1930s Cossor bc rx, battery valves, £10. Ken Brooks, G3XSJ. Tel Bristol 685280.

Memory keyer, elements for Bird wattmeter, ICB1050, DNT or LCL on 29MHz. *For sale:* LM14, charts, psu, offers. G4DCV, QTHR. Tel 0304 853089, evenings, 0304 840671, ext 56, office hours.

AF transformer type 208. ZA 13391 ex-class D wavemeter. G3FVD, QTHR. Tel 0208 2487.

Yaesu FTV901R transverter, 144MHz, 70MHz, 432MHz modules fitted, or MMT 28/432 transverter. Ant MMT 28/70 transverter. G4IDF NOT QTHR. Tel Worcester (0905) 351568, evenings, weekends.

TS700G, must be in good cond, possibly consider TS700, will collect within 50 mile radius. *For sale:* two-el quad for 10m, exc cond, £35. Tel Pete, G4RPX, QTHR. Tel 02602 4026, after 6pm.

Info: technical, general, anything known about US surplus unit AN/APX6 transponder. Has three digital counters marked trans freq, rec freq, lo freq. Three disc-sealed valves, 1B40, CS42, CS46. Microwave radar or special gear. Anyone know valve pin/disc connections/ratings. Also need 1B40 valve and 1N25 diode. Have tuning head only, anyone got the rest? GM3JDX, QTHR. Tel 031-664 1607.

TS530S matching atu, vfo, if possible, all for newly licensed G4, must be in good cond. G4WPR NOT QTHR. Tel Abingdon (0235) 20229.

VFO for Trio TS520S. Type D RAF morse key. G2DTQ, QTHR. Tel 0922 415048.

Heavy duty rotator, 4:1 balun, 18AVT ground plane antenna or similar, 70cm multimode portable and linear, 70cm beam, hf, 1:1 balun, tubes, 2 × 572B, T160. G4VLE. Tel Scarisbrick 880345.

Pentax camera to microscope adapter. Microscope slides and accessories. Heathkit barograph or weather station. Commodore 64. YO901P; FC901/902. Eddystone bug. Thruline elements, 250H etc, some exchange. Commodore Basic 4 word processor program. Atari 600 disk drive; programs. G3AZI, QTHR. Tel 0772 37815.

To complete 2m eme system: Cushcraft 214B 14-el jnr boomer. SK620 uhf bases for 4CX250 for 70cm QRP project. GW8VHI, QTHR. Tel Reg, 0639 821308.

ATU and swr/power meter, cheap and cheerful please, or wide spaced caps and roller coaster etc for hb. G4XMK. Tel Oxted (08833) 4718, 8-10pm.

Grundig Satellit 1400 rx, nine wavebands, bfo, ssb, must be mint. L.D. Ireland, Carnhell Green, Camborne, Cornwall. Tel Praze 831236.

Acorn Atom programs/software; anything considered, especially radio applications, on exchange basis for other programs. Contribute to the return of the Atom! G1BNE, QTHR. Tel Luton (0582) 33885, after 6pm, weekdays, anytime weekends.

Buy or borrow for copying: manual and/or circuit diagram for Storno vhf radiotelephone type CQF 13C-36M, all costs paid. G6CMX, QTHR. Tel Scunthorpe 854286.

Urgently required by new G4 licensee: roller coaster atu for ex-Govt 100W hf tx. Any military surplus hf tx in good unmodified cond. G8AVJ, QTHR.

R2000 owner. Has anyone had success in matching a monitorscope to this rx? Full details much appreciated. Cost etc refunded. G3ADZ, QTHR.

Xtals for Starphone, 24·066MHz, 34·146MHz, in HC25U or HC18U or near values considered. G8YST NOT QTHR. Tel Keith, 0524 824579.

RSGB (T&R) Bulletins, £10 per bound volume offered for pre-war magazines, your postage also paid. Single copies also wanted. *Hints and kinks* vols 1 and 2. Other amateur publications. G4LQF, 14 Regent Road, Harborne, Birmingham 17. Tel 021-426 3663.

Buy or borrow handbook for Telequipment oscilloscope D43R. Anyone with info on getting my FT902DM with AMT1 to transmit ARQ Amtor. Desperate for ideas. G4LXN, QTHR. Tel Chipping Sodbury 318528 (Avon).

Tx/rx for school radio station, lower price bracket preferred, G2DAF, KW2000A etc, prepared to pay £100. Equipment for Hindleys College, Shepshed, Leics. Money supplied by PTA. Tel John, Kegworth 2734, after 4pm.

Eddystone 960 rx manual or circuit diagram, orig or photocopy or loan for copying. All expenses paid. Wilkins, 281 New Road, Portsmouth PO2 7RA. Tel 0705 661016.

Marconi Atalanta, with mains psu. CR100, B40D, B41D, preferably within 50 miles. G4FUY, QTHR. Tel Reading 733633.

WATERS & STANTON ELECTRONICS

18/20 MAIN ROAD, HOCKLEY, ESSEX, Tel: (0702) 206835
12 NORTH STREET, HORNCHURCH, ESSEX. Tel: (040 24) 44765

SPECIAL PURCHASE

M750X SSB-CW-FM
144–148MHz

These are end of production run units now replaced by the 750XX. All units are boxed and carry a 12 month warranty. Stocks are limited so it's first come first served

£249

NEW CATALOGUE NOW AVAILABLE SEND S.A.E.

TRIO

TS930S HF Tcvr	£1,149.00
AT930 ATU	£145.00
SP930 Speaker	£59.95
TS430S HF tcvr	£752.00
PS430 AC psu	£115.00
SP430 Speaker	£29.90
AT250 ATU	£273.00
MB430 Mobile Unit	£11.50
FM430 FM mod	£35.19
TS830S HF tcvr	£729.00
VFO230 VFO	£249.00
AT230 ATU	£138.00
SP230 Speaker	£42.00
TS530SP HF tcvr	£638.00
VFO240 VFO	£94.00
TS130S HF tcvr	£555.00
TL120 200w 1in.	£172.00
MB100A mobile mount	£19.78
SP120 speaker	£27.14
SP140 speaker	£14.49
AT130 ATU	£95.00
PS20 PSU	£57.00
TL922 2kw.	£950.00
TS780 2m/70cm	£795.00
TR9130 2m tcvr	£442.00
BO9A base	£47.00
TR7930 2m tcvr	£312.00
TW4000A 2m/70cm	£469.00
TR2500 2m h/held	£237.00
VB2530 30w amp.	£71.30
ST2 charger	£53.13
SC4 Case	£14.00
MS1	£32.89
SMC25 Speaker/Mic.	£16.56
PB25 nicad	£25.53
LH2 case	£24.60
BT1 AA case	£5.98
DC25 12v	£16.56
TR3500 70cm h/held	£256.45
TM401A 70cm	£299.00
TM201A 2m	£269.00
SP50 speaker	£14.95
R600 Rx	£263.00
R2000 Rx	£421.00
VC10 VHF conv.	£113.00
YK88C 500Hz	£32.89
YK88CN 270Hz	£38.18
YK88SN 1.8kHz	£33.35
MC50 mic.	£31.97
MC60/S6 mic.	£53.59
MC80 mic.	£39.00
MC42S mic.	£15.18
MC55 Mobile Mic.	£38.65
LF30A LPF	£21.85
HC10 Clock	£69.50
DM81 GDO	£72.90

YAESU

FT1 HF Tx/Rx	£1,495.00
FT980 HF Tx/Rx	£1,265.00
SP980 Speaker	£58.65
FT102 HF Tx/Rx	£685.00
FC102 ATU	£179.00
SP102 Speaker	£52.50
FM/AM	£46.75
FT77 HF Tx/Rx	£459.00
MRKT77 marker	£10.35
FP700 PSU	£125.00
FC700 ATU	£98.90
MMB16 Mount	£13.80
FT757GX HF Tx/Rx	£685.00
FC757AT ATU	£231.00
FP757GX PSU	£149.00
FP757HD PSU	£162.00
FL2100Z amp	£535.00
FT290R 2m Tx/Rx	£269.00
FT790R 70cm Tx/Rx	£249.00
NC11 charger	£9.95
NC nicads	£22.00
CSC1A case	£4.20
YHA/5 Ant.	£5.35
MMB11 Mount	£26.85
FL2010 amp	£63.25
FT208 2m h/held	£199.00
FT708 70cm h/held	£209.00
NC9C charger	£8.80
FNB2 pack	£21.45
PA3 12v	£15.35
MMB10	£8.05
FT203R 2m h/held	£169.00
MH-12A2B mic.	£16.85
MMB21 bracket	£7.65
FT230R 2m 25w	£259.00
FT730R 70cms 10w	£259.00
FT726R 2m	£739.00
430/726	£250.00
144/726	£155.00
50/726	£185.00
SAT726	£95.00
FRG7700 Rx	£369.00
FRG7700M Rx	£435.00
MEMO	£69.00
FRT7700	£46.00
FRA Ant.	£41.80
FF5 LPF	£10.75
FRV7700E	£89.70
YM24A mic.	£21.50
MH-1B8	£14.95
YD148A mic.	£24.00

ICOM

IC751 HF Tx/Rx	£1,099.00
ICPS35 PSU	£149.00
IC745 HF Tx/Rx	£839.00
IC730 HF Tx/Rx	£659.00
PS15 PSU	£119.00
ICR70 Rx	£565.00
ICR71 Rx	£619.00
FL45 filter	£45.00
FL63 filter	£39.00
IC2KL 1kw	£1,349.00
IC271E 2m base	£629.00
IC271H 2m 100w	£649.00
ICPS25 PSU	£89.00
IC290D 2m 25w	£499.00
IC471E 70cm base	£735.00
IC490E 70cm	£495.00
ICO2 2m h/held	£239.00
ICO4 70cm h/held	t.b.a.
HM9 spkr/mic	£16.50
LC3 case	£6.95
LC11 case	£25.00
BP3 nicad	£25.00
BP4 AA	£7.96
BP5	£48.00
DC1 12v	£12.50

MICROWAVE

MML144/30LS	£75.00
MML144/50S	£92.00
MML144/100S	£149.95
MML144/100HS	£149.95
MML144/100LS	£169.95
MML144/200S	£245.00
MML432/30L	£139.95
MML432/50	£129.95
MML432/100	£245.00
MMC435/600	£29.90
MM2001	£189.00
MM4001KB	£299.00
MMT144/28	£109.00
MMT432/28S	£159.95
MMT432/144R	£184.00
MMT1296/144	£215.00
MMC144/28	£29.90
MMDO50/500	£75.00
MMF144	£11.90

MUTEK

SLNA144S	£37.00
SLNA144U	£22.40
SLNA144UB	£13.70
SLNA145SB	£27.00

SECONDHAND

R1000	£199.00
TT9000	£229.00
MM1000K	£79.00
FTV901R	£199.00
FV101DM	£149.00
FT101E	£399.00
NC-2	£36.00
KLM2m/160w	£109.00
KLM70cm/110w	£109.00
MMT1296	£129.00
CN650	£79.00
PCS300	£159.00
IC2E	£129.00
TR7010	£79.00
R600	£199.00

DATONG

FL1	£79.35
FL2	£89.70
FL3	£129.00
D70 cw tutor	£56.35
AD270 MPU	£51.75
AD370 MPU	£69.00
DC144/28	£39.60
ANF	£67.85
SRB2	£86.25

JAYBEAM

TB1 1 el. HF	£69.00
TB2 2 el. HF	£126.00
TB3 3 el. HF	£189.75
VR3 vertical	£46.00
DC1/WB	£41.40
LR1/2M	£29.90
LR2/2M	£23.00
C5/2M	£54.60
LW5/2M	£14.40
LW8/2M	£17.80
LW10/2M	£24.15
LW16/2M	£35.00
PBM10/2M	£44.85
PBM14/2M	£55.80
5XY/2M	£28.20
8XY/2M	£35.65
10XY/2M	£46.00
Q4/2M	£29.30
Q6/2M	£39.10
Q8/2M	£44.85
D5/2M	£25.30
D8/2M	£34.50
UGP/2M	£12.65
D8/70cm	£25.90
PBM18/70cm	£28.00
PBM24/70cm	£42.55
LW24/70cm	£27.00
MBM28/70cm	£21.30
MBM48/70cm	£35.65
MBM88/70cm	£48.90
8XY/70cm	£42.55
12XY/70cm	£52.90
CR23cm	£40.25

TONNA

20505 50mHz	£33.15
20104 144mHz	£14.95
20109 144mHz	£17.70
20209 144mHz	£20.00
20118 144mHz	£32.40
20113 144mHz	£31.00
20117 144mHz	£37.60
20419 430mHz	£20.70
20438 430mHz	£34.00
20421 430mHz	£29.60
20422 435mHz	£29.60
20199 Oscar	£34.20
20623 1296mHz	£25.90

ROTATORS

AR200XL VHF	£47.50
CDEAR40 HF/VHF	£98.90
9502B VHF	£57.50
9523 bearing	£19.75
KR400RC HF	£118.45
KCO38 clamps	£12.65
KSO65 bearing	£21.50
KR500 elevation	£126.50

FDK

M725X 2m 25w	£239.00
M750XX 2m 20w	£349.00
EXP430 70cm tvrtr	£269.00
Palmcomm II 2m h/held	£135.00
ATC720 AM Rx	£179.00
RX40 FM Rx	£142.00

WELZ

SP200 1kw	£82.00
SP300 1kw	£115.00
SP400 150w	£82.00
SP10X 200w	£28.75
SP15M 200w	£41.00
SP45M 100w	£59.75
SP250 2kw	£57.75
SP350 200w	£69.95
AC38 ATU	£73.95
CA-35A protector	£12.75
CT15A 50 watt	£8.95
CT150 400 watt	£42.00
CT300 1kw	£58.00
CH20A switch	£20.75
CH20N switch	£37.00
DF72C duplexer	£19.50
RS455 4a PSU	£39.00
RS655 6a PSU	£65.00
RS1100 11a PSU	£89.00
RS1150D 11a PSU	£107.00
RH2B whip	£9.95
RH200B whip	£22.50
RH702B whip	£16.00
M285 whip	£8.95
M287 whip	£17.50
EL770E whip	£19.95
B285 2m base	£17.50
GH22 2m base	£32.50
GH72 70cm base	£35.75
GLS gutter	£10.75
GLP SO239	£2.95
SPM Magnetic	£15.25
TRB	£9.95
LOR	£23.95
EL80 HF whip	£43.50
EL40 HF whip	£38.00
CP3 vertical	£49.00
CP4 vertical	£95.00
CP5 vertical	£133.00
KB101 vertical	£69.00
KB105 vertical	£89.00

WELZ DIAMOND
GH22
6·5dB
144–146MHz

No other aerial matches its performance and price!

£32.50

Carriage £4.00.

NEW PRODUCTS

Here's a very brief description of new products back in stock or just arriving. **DF-72C** 2m/70cm duplexer for mobile or base station £19.50: **DP-EL770E** dual band 2m/70cm aerial £19.95: **DP-GH72** 70cms 6dB base station aerial £35.75; **5 BAND DIPOLE**—the latest model from Sagant, the MT-240X covers the 5 bands 10-80m, superbly built 70' long complete with balun £54; **BASE STATION MICS**—the new Adonis base mics feature 2 models—AM303G with up-down and response switch £36.50 and the beautiful AM503G noise cancelling plus compressor £47.50: **MOBILE MICS.**—the new Adonis FS-3 is a deluxe mobile mic. that fits sun vizor roof mount—comprises boom mic, roof speaker and control box with up-down control £52: **ICOM OWNERS**—modern ICOM rigs only work with ICOM mics.—Adonis have come up with an 8 pin mic. adaptor plug that matches any mic. to your ICOM rig £10.95; **AR2001**—superb monitor receiver 26-512mHz £325: **BELCOM LS202E**—at last an all-mode 2m hand held £225. **ARRL HANDBOOK 1984**—£12.50: **AARL ANTENNA BOOK**—£7.95; **UNIVERSAL MAG MOUNT**—SO239 £7.95.

ROTATOR OFFER
AR200XL
£39.95

Carriage £2.50

Ideal for VHF arrays 3 core cable control box 2" mast clamps etc.

MAIL ORDER SLIP

To:—Waters & Stanton 18-20 Main Road, Hockley, Essex.

Name .....

Address .....

Items required .....

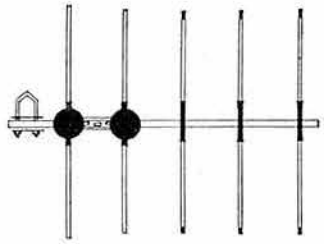
.....

Carriage:—Items under £10-£1.00; Over £10-£1.50; Larger aerials £4; Rigs £3; Securicor £6.

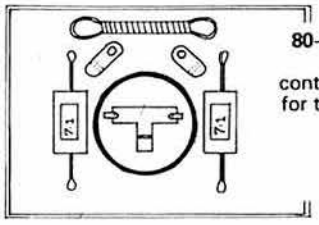
TAR AERIALS AND COMMUNICATIONS

TAR COMMUNICATIONS
G4KZJ G4TAR
Radio Equipment

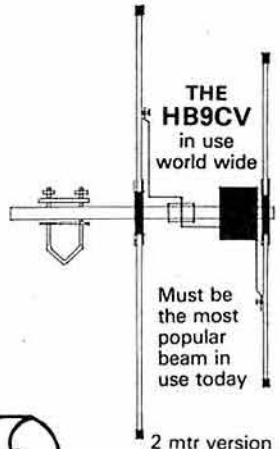
THE COMMUNICATIONS CENTRE
KING WILLIAM STREET, AMBLECOTE
STOURBRIDGE, WEST MIDLANDS DY4 4CY



ZL SPECIALS
*Very popular at the N.E.C.
p&p £2.50 each
5-ele **£9.50**
7-ele **£12.50**



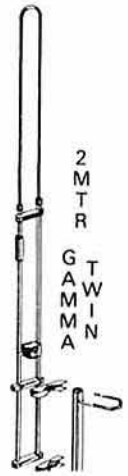
80-10 metre trap dipole
KIT
contains all that's required for this popular multiband dipole
£24.95
+£1.75 p&p



THE HB9CV in use world wide

Must be the most popular beam in use today

2 mtr version
£6.95 + £2 p&p
70 cm version
£5.95 + £1 p&p



2 MTR GAMA TWIN

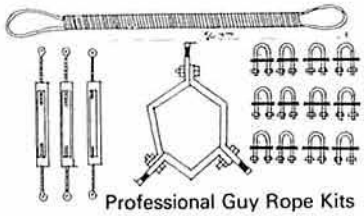
Based on the 'Slim Jim' an inexpensive 2 mtr base aerial—**£7.95** + £1.15 p&p

OUR BEST SELLER

½ Size
40-10 mtrs
£12.95
+£1.30 p&p

Full Size
80-10 mtrs
£14.95
+£1.30 p&p

The G5RV Multiband Dipole



Professional Guy Rope Kits

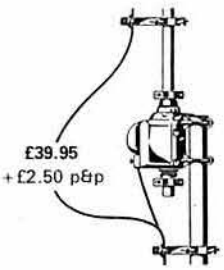
A. Standard 7 × ·56mm strands
£8.95 + £1.75 p&p
B. Heavy Duty 7 × 1mm strands
£9.95 + £2.25 p&p

Contents
1 × 3-way guy ring
6 × thimbles
12 × wire rope grips
3 × turn buckles
30 mtrs wire rope

ROTATORS

Hirsthmann
RO250

Sky King
SU2000-3M
only
£36 + £2.50 p&p



£39.95
+£2.50 p&p

Mast to Mast Clamps

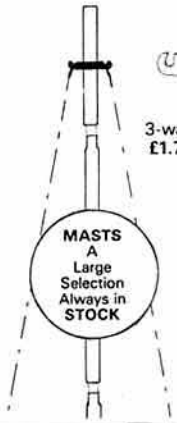
Wall Brackets

3-way Guy Ring
£1.75 + £1 p&p

4-way Guy Ring
£2.00 + £1 p&p

2" Mast Sleeve

£3.50
+£2 p&p



MASTS
A Large Selection Always in STOCK

A 8 section 40' × 2" dia aluminium mast complete with base plate & 2 guy assemblies
£55.00 + carriage

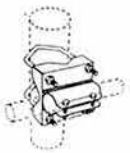
Special Offer
A 4-section 20' × 1½" dia aluminium mast **£12.95**
+£2.50 p&p

Our products are too numerous to list Send £1.00 refundable against any purchase for our catalogue listing our entire range.

Including:

* All parts and components for the **D.I.Y.** antenna constructor.
* Comprehensive range of our masts, brackets and lashing equipment.
* Addition to our mailing list for future developments.

Base Plates any size made to order



140' Hard drawn copper wire
£6.95 + £1.30 p&p

Masts and Aerial brackets. You name it we either make it or stock it. Our catalogue lists them all.

T or K Brackets
12": £4.50 per pair + £2.00 p&p
18": £5.50 per pair + £2.40 p&p
24": £6.50 per pair + £2.40 p&p

TRADE ENQUIRIES ALWAYS INVITED

Our Factory and Showroom

are open 6 days per week 10am-6pm
call in and see our range of new and secondhand equipment. Inc. Yaesu, Trio, etc.

STOURBRIDGE
(0384) **390944**
370987

Jaybeam Stockist

Microwave Modules Stockist

Access

BARCLAYCARD VISA

DATONG
20 EXAMPLES OF 'STATE OF THE ART DESIGN'

The following list shows most of our products. Please phone or write for a free catalogue and free data on product(s) which interest you. It takes only a phone call with your Access or Barclaycard number to speed any product on its way to you. Normally we despatch the same day. Or if you prefer you can obtain our "amateur" products from your local dealer.

All prices include delivery (UK only) and VAT at 15%. Independent reviews shown in (brackets).

AUDIO FILTERS

SRB2 Automatic Woodpecker Blanker (as seen on a well-known TV science programme. (SWM Sept. 83, Ham Radio Feb. 84, World Radio TV Handbook 84). **£86.25**

ANF Advanced stand-alone automatic **whistle removal** filter for SSB, plus CW filter. (SWM July 83, Ham Radio Oct. 83, R&EW July 83). **£67.85**

FL2 SSB/CW/RTTY **Variable audio filter.** (Rad Com, Aug. 80) **£89.70**

FL3 SSB/CW/RTTY audio filter (as in FL2) plus **automatic** whistle remover. **£129.37**

FL2/A Fully assembled PCB module with hardware and instructions to convert FL2 to FL3. **£39.67**

RF SPEECH PROCESSORS

ASP The fully automatic **definitive RF Speech Processor** ("73" July 81) **£82.80**

D75 Manually controlled RF speech processor **£56.35**

D75/K Uncased version of D75 **£40.70**

MORSE EQUIPMENT

D70 The **"go-anywhere"** Morse Tutor. The PP3 battery supplied should last you until the exam! **£56.35**

MK Deluxe **Self contained** keyboard morse sender with memories. (SWM April 82, Amateur Radio April 83) **£137.42**

RADIO DIRECTION FINDER

This system turns any NBFM rig into a radio direction finder **which really works.** It is currently in use from HF to UHF by Government Departments, professionals of all kinds, and **amateur "Wally Hunters".** (Rad. Com. Jan. 84, Citizens Band Jan. 83).

DF + DFA2 Display unit with magmount antenna combiner. Just add four quarter wave whips and your receiver. (Antennas also available). **£182.85**

MINIATURE ACTIVE RECEIVING ANTENNAS

You don't need unsightly rambling antennas for HF reception. Be discrete like the professionals and use a Datong active Antenna. **Your neighbours will definitely approve.** And so will you when you hear the DX!

AD370 Complete active dipole receiving antenna. **Covers 100kHz to 100 MHz.** Weather-sealed for outdoor mounting. With mains power unit. (Rad. Com. June 82). **£69.00**

AD270 Indoor version of AD370 **£51.75**

RF CONVERTERS AND AMPLIFIERS

Other companies also make converters and preamps. When you choose **check the "fine print"** first. You can trust Datong to "do it right".

VLF Receiver 0 to 500kHz on your 28 to 28.5MHz receiver. **£29.90**

PC1 Get **"no-compromise"** reception from 50kHz to 30MHz on your existing 2-metre all-mode. (Rad. Com. April 82) **£137.42**

DC144/28 Receive 2-metres on your 28MHz receiver. Again it is the "fine print" performance which makes this the **best of its type.** (SWM Aug. 82, Rad. Com. April 82) **£39.67** Uncased version: **£29.95**

RFA 5 to 200MHz low noise preamplifier. **Why be bound to one band per preamp?** (Ham Radio Nov. 83) **£33.92**

SELECTIVE CALLING EQUIPMENT

PTS Sixty four channel tone squelch system for fitting to any FM or AM rig. **Excellent performance on noisy channels.** One needed per rig. **£45.99**

CODECALL 4096 channel Selcall for any FM, AM, or SSB rig. **No internal connections** needed. One needed per rig. (R&EW June 82). **£33.92**

PROFESSIONAL PRODUCTS

DATEST 2 Automatic in-circuit tester for transistors, FETs, SCRs and triacs. Complete with test probes. **£51.75**

SS-32 Speech Scrambler Module for first level Security in mobile radio systems **POA**

RFS-1 Wideband RF signal detector and locator. **POA**

DF2 Microprocessor controlled direction finding system. **POA**

POA = PRICE ON APPLICATION

DATONG ELECTRONICS LIMITED

ORDER FORM

Please send me the following | Model | Qty | Unit Price | Unit Total |

Enclose CHEQUE/POSTAL ORDER No. for £

Please debit my VISA/ACCESS account

Your Name | Call Sign | Address | Tel | Town | City | Post Code

Total £

Prices include Post, Packing and VAT (U.K.)

Card No.

All orders sent by return, 1st class parcel post. Any delay will be notified to you immediately.

SEND TO - Dept RSGB, Spence Mills, Mill Lane, Bramley, Leeds LS13 3HE, England. Tel: (0532) 552461

ANTENNES TONNA (F9FT)

YOUR NUMBER ONE CHOICE FOR 6m, 2m, 70, 24 and 23cm ANTENNAS

	L(M)	W(kg)	
50MHz			
5 element†	3·5	3·2	£34.30(a)
144MHz			
4 element	0·87	0·5	£14.95(a)
9 ele fixed	3·3	1·9	£17.71(a)
9 ele portable	3·3	1·7	£20.00(a)
9 ele crossed	3·5	2·0	£32.43(a)
13 ele portable†	4·5	2·5	£31.05(a)
17 ele fixed	6·60	4·5	£37.66(a)
435MHz			
19 element	3·2	1·1	£20.70(a)
19 ele crossed†	3·3	1·8	£34.27(a)
21 element	4·6	2·6	£29.67(a)
21 element ATV	4·6	2·6	£29.67(a)
144/435MHz			
Oscar Special			
9 & 19 element†	3·3	2·0	£34.27(a)
1,250MHz or 1,296MHz			
23 element	1·8	0·9	£25.90(b)
4 × 23 ele antennas—power splitter—stacking frame			£140.00(a)

Power Splitters 50Ω I/P & O/P
2 way 144MHz **£32.62(c)**
435MHz **£31.05(d)** 1250MHz **£26.45(d)**
4 way 144MHz **£37.37(c)**
435MHz **£35.78(d)** 1250MHz **£28.02(d)**
1296MHz **£28.02(d)**

Telescopic Portable Masts
4 × 1m **£18.68(a)**. 3 × 2m **£21.85(a)**
4 × 2m **£33.20(a)**

ANDREW HELIAX LDF4-50 COAXIAL CABLE
Attenuation per 100ft. 144MHz-0.8dB. 435MHz-1.6dB. 1296MHz-2.9dB.
£3.40 per metre(a). 'N' Type connectors for LDF4-50 male or female **£12.00**

†Denotes 50Ω ONLY – all others 50Ω or 75Ω impedance
MICROWAVE MODULES
ROTATORS - COAXIAL CABLES ETC

PLEASE ADD CARRIAGE AS SHOWN (a) £4.00. (b) £1.95. (c) £2.20 (d) £1.10 mainland only
Terms, cash with order. ACCESS, VISA – telephone your card no. **All prices include VAT @ 15%**
FOR FULL SPECIFICATION OF OUR RANGE SEND 30p FOR CATALOGUE
Callers welcome, but by telephone appointment only please

UK DISTRIBUTOR

RANDAM ELECTRONICS (R)

12 Conduit Road, Abingdon, Oxon OX14 1DB. Tel: (0235) 23080 (24 hours)

REG WARD & CO LTD
AXMINSTER, DEVON

ICOM

The South West's largest amateur stockist
Complete range of Yaesu and Icom equipment available from stock plus demonstration facilities.

Now appointed official TRIO agents

Ancillary equipment by Microwave Modules, Datong, Drae, Mutek, BNOS, Welz, Tokyo Hypower, Hansen, Himound, Shure, LAR, Tono and Toyo.

Aerials by Jaybeam, TET, Hygain, G-Whip and Minibeam.

NOW AVAILABLE—FDK AND AZDEN

Plus connectors, dummy loads, rotators, cable, etc.

ACCESS—Instant Credit—BARCLAYCARD

Reg G2BSW | **1 Western Parade, Axminster, Devon. Tel: (0297) 34918** | Rodney G6LUJ

VHF/UHF ANODE BLOCKING CAPACITOR 300pf
3kV Low inductance, low loss, high RF current **£11·00**

GaAsFET S3030 **£8·65**

CHIP CAPACITORS 1n5, 100V and 15n, 50V 13p ea. 10 for £1

LOG BOOK with space for QTH/WAB locator £2.25

Post and packing 50p per order. All prices include VAT

Partnership Microsystems Limited
Tardis House, Cowfold
West Sussex RH13 8DR
Telephone (040 386) 227

JAYCEE ELECTRONICS
JOHN GM3OPW

APPROVED TRIO DEALER

20 Woodside Way, Glenrothes, Fife KY7 5DF
Phone 0592 756962, Telex 727181
Open 5 days—Tues-Sat 9am-5pm

Quality secondhand equipment in stock
FULL RANGE of TRIO and YAESU goodies.
Jaybeam—Microwave Modules—L.A.R.
RSGB books—Daiwa—Welz—TET—BNOS
OUT-OF-HOURS SERVICE Tel 0592 754918

STEPHENS-JAMES LIMITED

G3MCN

Access BARCLAYCARD VISA

TRIO TS-930S
HF TRANSCEIVER

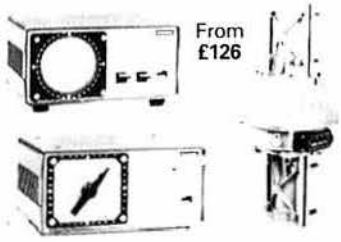
TRIO R-600
GEN. COV. RECEIVER

TRIO PRICES
Full Range of Accessories Available

TS830S	£731.00	R600	£263.00	TL120	£167.67				
AT230	£135.70	R820	£589.95	SP120	£26.45	TW4000A	£469.00	TS530SP	£638.00
SP230	£41.17	PS430	£112.93	PS20	£57.96	TM201A	£269.00	TR9130	£433.22
VFO230	£243.80	TS130S	£559.36	AT130	£93.15	TM401A	£299.00	AT930	£145.00
TS430S	£752.00	R2000	£421.00	AT930	£140.00	TR3500	£250.70	TS930S	£1150.00
		TS130V	£456.32	TR2500	£237.00	VC10	£113.00	TR7930	£305.00

THE ONLY OFFICIAL STOCKIST OF TRIO EQUIPMENT IN THE NORTH WEST

DAIWA Full range of reliable antenna rotators



From £126

AR-2001

Scanning receiver. Frequency coverage continuously from 25MHz to 550MHz. AM-FM.

£325.00

STATION ACCESSORIES (inc post)

SWR 25 Twin meter	£12.75
2-way Antenna switch (V2)	£6.50
3-way Antenna switch (V3)	£10.80
4-way Antenna switch (V4)	£11.00
2-way Antenna switch (VHF)	£15.46
DL50 50 watt dummy load 50ohm	£7.00
DL300 Dummy load	£29.45
DL600 Dummy load	£36.00
DL1000 Dummy load	£49.45
VHF Wavemeter	£27.75
WELZ SP200 swr/power	£82.00
WELZ SP5M swr/power	£41.00
WELZ SP10X swr/power	£28.75
WELZ SP350 swr/power	£57.75
WELZ AC38 ATU	£69.95
Daiwa CN620A swr/power	£65.40
CN630 swr/power	£99.00
CN419 Antenna tuner	£147.00
CN518 Antenna tuner	£226.00
CN410M 3-5-150MHz swr	£44.00
CN460M 140-500MHz swr	£46.00
CL680 1-8-30MHz ATU	£83.00
TV3300 Low Pass Filter	£25.50

Full range of aluminium tubing, wall clamps, brackets "V" bolts for the caller.

TRANSCEIVERS AND RECEIVERS

JST 100 HF Transceiver	£998.00
BELCOM LS202E FM/SSB Handheld	£225.00
FT290R Transceiver	£269.000
BELCOM LS20XE handheld	£139.00

HY-GAIN ANTENNAS

12AVQ 10-15-20m Vertical	£50.60
14AVT/WB 10-15-20-40m Vertical	£64.40
18AVT/WB 10-15-20-40m-80 Vertical	£113.85
TH2 MK3 2 Element Tribander Beam	£169.05
TH3 JNR 3 Element Tribander Beam	£202.40
TH3 MK3 3 Element Tribander Beam	£274.85
205BA 5 Element 20m Beam	£350.00
203BA 3 Element 20m Beam	£178.25
Mini Products HQ-1 Minibeam	£169.00
DCP4 10-40m Vertical	£95.00
DCP5 10-80m Vertical	£133.00
GPV-5 2m Co-linear	£38.50
GPV-7 70cm Co-linear	£31.60
HF5 10-80m Vertical	£59.95
G4MH Mini Beam	£86.50
Diamond CPS Vertical	£115.00

The new TET range of VHF and HF antennas now available

Complete range of Jaybeam Yagi's Co-linear etc available

Complete range of G.WHIP Mobile Antenna's available

DATONG PRODUCTS

PCI Converter	£137.42
VLF Converter	£29.90
SRB2 W. Blanker	£86.25
FL3 Multimode Filter	£129.37
ANF Auto notch Filter	£67.85
RF Speech Clipper	£82.80
D75 Man. Speech Clipper	£56.35
D70 Morse Tutor	£56.35
AD370 Active Antenna	£69.00
AD270 Active Antenna	£51.75

ICS and TONNA RANGE NOW in STOCK

FULL RANGE OF PUBLICATIONS IN STOCK RSGB, ARRL, ETC.

NRD-515 RECEIVER

For the discerning DXER comes the modern NRD-515 general coverage receiver ● Full of all performance advantages offered by any receiver ● All modes of operation PLL Digital VFO ● Solid state ● Up conversion type double conversion ● Frequency coverage 100kHz to 30MHz ● LF/MF bands below 1·6MHz are clearly receivable through the use of a filter/tuned circuit ● Band Pass tuning ● Noise Blanker ● RIR ● Attentuator ● AGC ● Recording terminal ● Mute terminal, etc which permits operation with the NRD-515 transmitter or any transmitter ● Optional: speaker, memory unit, cw filter available. PRICE **£965.00** inc VAT

JRC NSD515 Transmitter. Matching unit to the NRD515 Receiver available shortly. 65 years of experience produces the finest "saperates" available in the world to the Radio amateur who wants the best in Amateur Radio.

Shop Hours: Mon to Fri 9.30am to 5.30pm
Saturday 9.30am to 4.30pm ACCESS and Barclaycard facilities
HP terms arranged. Part exchanges always welcome
We are located on the A574. Turn at the Greyhound Motel on the A580 (East Lancs Road) and we are about ½-mile on right. No parking problems at any time. **SAE FOR S/H LIST.**

STEPHENS-JAMES
LIMITED
47 WARRINGTON ROAD
LEIGH WN7 3EA
ENGLAND
Telephone (0942) 676790

QUARTZ CRYSTALS IN 24 HOURS

ANY FREQUENCY 2·50 MHz FOR £5.50 inc (C.W.O. only)

Ultra-stable, cold weld holders only – No solder or flux – and types equivalent to HC-6/U, HC-18/U, HC-25/U and HC-33/U. State holder required. Tight tolerance, low ageing **commercial crystals** 1-100 MHz also available in 7 day emergency or 2/3 week standard delivery. S.A.E. with enquiries please.

McKnight Crystal Company Limited
Hardley Industrial Estate, Hythe, Southampton SO4 6ZY
Telephone: 0703 848961 Telex: 47506 Crystl G.

ANTENNA TUNER

NEW! 0·1-30MHZ, IMPROVES RECEPTION, switched series/parallel bandpass, adapts to absorption wavemeter, field strength meter, modulation monitor, **£25.20.**

ANTENNA FAULT? Poor reports? Check FAST with an Antenna Noise Bridge, MEASURE resonance 1-160MHz and radiation resistance 2-1000 ohms, GET answers – MORE DX, **£19.60.**

TIME WRONG? MSF CLOCK is ALWAYS CORRECT – never gains or loses, SELF SETTING at switch-on, 8 digits show Date, Hours, Minutes and Seconds, also parallel BCD (including Weekday) output for computer, receives Rugby 60KHz atomic time signals, built-in-antenna, 1000Km range, TIME RIGHT, **£72.70.**

Each fun-to-build kit (ready made to order) includes all parts, case, by-return postage etc, and list of other kits.

CAMBRIDGE KITS

45 (RG) Old School Lane, Milton, Cambridge

SPECIAL BARGAIN OFFER!

SR Standard C78 70CM FM PORTABLE SR

The C78 has all the features possible on a portable rig. Its optional accessories allow it to be used in the car with a power output of 10W.

C78 ONLY.....£179.00 inc VAT

CMB8	Mobile Mounting Cradle with all connections for antenna, power, etc, built in.....	£ 21.51 inc VAT
CPB78	A 10W Linear Amplifier that bolts underneath the CMB8.....	£ 69.50 inc VAT
CLC8	A Carrying Case for C78 with flap-over top for added protection.....	£ 6.95 inc VAT
C12/230	Charger for C78 when Nicads are used.....	£ 7.75 inc VAT

Please allow £2.00 for postage on rigs + £1.00 for postage on accessories.

PHONE FOR DETAILS OF THE OTHER BARGAINS WE ARE OFFERING!

400 EDGWARE ROAD,
LONDON W2.
01-723 5521 Tlx 298765

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

NORTHERN AGENTS:-
JOE BELL, G4PMY
134 CREWE ROAD,
HASLINGTON,
CREWE
Tel. No. 0270-582849

Lee Electronics Ltd

ALTRON

CHOICE OF PROFESSIONALS
TOWERS, MASTS, AERIALS
AQ6-20 Four Band
****Spacesaver****
Beam

6M-20M

Not the same as other lookalikes!! Spot the differences!!

- Unique fully sealed coils for max stability
- Double insulated elements
- Easy trim alloy spokes with locknuts (spares incl)
- Only 1·9M turning radius
- Engineered to BSI Standards
- Resonant length reflector and driven elements for improved VSWR (1:1 min)
- Maximized F/B performance by selective detuning (No gimmick "qaud" needed)
- Minimized wind load and weight (only 8lb wt)

IT'S BRITISH!
ECONOMICALLY PRICED!

£114.50 (UK P&P £4.50)

Send SAE (9×6) for full details of these and many other Altron Products — Callers welcome. Open Mon-Fri 9am-5pm, Sat 9am-12.45pm
WE DESIGN – WE MAKE – WE SUPPLY DIRECT
YOU GET BEST VALUE AND SERVICE – SAVE £££'s
Prices include VAT. C.W.O.
THE ONLY MANUFACTURERS OF ALTRON PRODUCTS

ALLWELD ENGINEERING
UNIT 6, 232 SELSDON ROAD, SOUTH CROYDON, SURREY CR2 6PL
Telephone:
01-680 2995 (24hr)
01-681 6734
Normally despatched within 7 days

IQD

North Street, Crewkerne, Somerset, TA18 7AR
Tel: (0460) 74433 Telex: 46283 inface.g.

FREQUENCY STANDARD, MARKER & CONVERTER CRYSTALS
5·0, 10·0, 10·7 & 38·66667MHz 18U **£2.70**; 1·0MHz 6U or 33U **£2.95**; 100·0kHz 13U or 34U, 116·0MHz 18U **£3.00**; 455·0kHz 6U **£3.50**; 200·0kHz 6U **£3.70**; 1·0MHz hi-stab 6U **£4.25**; 10·0MHz hi-stab 36U **£6.00**

CRYSTAL FILTERS
Super selective 250Hz 8-pole CW filters for FT-101, FR-101, FT-301, TS-520, TS-820, FT-901 & FT-101Z **£22.50** each, and (9MHz types with appropriate carrier crystals):

9MHz SSB	6 pole, BW 2·5kHz at −6dB and 5kHz at −60dB	**£20.50**
9MHz SSB	8 pole, BW 2·4kHz at −6dB and 4·3kHz at −60dB	**£24.00**
9MHz CW	5 pole, BW 500Hz at −6dB and 2·2kHz at −60dB	**£22.50**
9MHz FM	8 pole, BW 12kHz at −6dB and 21·6kHz at −60dB	**£24.00**
10·7MHz FM	8 pole, BW 7·5kHz at −3dB and 17·5kHz at −70dB	**£24.00**
10·7MHz FM	8 pole, BW 15kHz at −3dB and 35kHz at −70dB	**£24.00**
21·4MHz FM	8 pole, BW 15kHz at −3dB and 50kHz at −80dB	**£25.20**

455kHz CFU series ceramic filters, various bandwidths in stock **£1.50**

PLEASE ADD 15% VAT. POST FREE

R.F. POWER AMPLIFIERS

2 metres	Power in	Power out	Preamp included	Kit	Ready built and tested
	1/3w	10/15w	No	£24.50	**£36.50**
	3/5w	30w	No	£29.50	**£39.50**
	1·5/2·5w	50w	Yes	£44.50	**£57.50**
	10/15w	40/50w	Yes	£29.50	**£43.95**
	10w	120w	Yes	£69.95	**£89.95**
	25w	100w	Yes	£59.85	**£78.95**
70 cms	2·5w	10w	No	£29.95	**£39.95**
	10w	40w	No	£52.00	**£64.00**

Kits include case, heatsinks and all parts except connectors.
Preamp Gain—22dB, N.F. <1·5dB, Auto switching changeover.

Kdpek AR1002 Automatic Rotator Console, 3-core **£44.85. Bremi** 10A Regulated P.S.U. **£59.95. Tarren** 13·8v 5-7A Regulated P.S.U. **£19.95. RAMA** Noise Filtered Mobile Speaker **£6.50. Elftone** Mobile Speaker **£4.90.** 15-drawer Plastic Component Cabinet **£5.50. RG** 58/U Cable 25p. per metre. **PL** 259 Plugs 44p. each. (5 for **£2.00**). **PL** 259 Reducers **19p** each.

Prices inclusive, orders under £5 add 60p postage. S.A.E. Full List.

R.F. DEVICES
41 Stainburn Drive, Leeds LS17 4NZ (0532) 680410

Bernie - please mention that we're closed on Mondays and open Wednesdays!

HOW TO RECEIVE

For the best prices, always choose A.R.E. Buy mail order, phone order, or personal purchase – we give you the lot, including Brenda's coffee. And we've always got more than our ads can carry! A special welcome to new licensees – let our expert staff help sort out your equipment needs.

ALL PRICES INCL. VAT

		£
HF TRANSCEIVERS		
0490	YAESU FT757GX	685.00
0130	YAESU FT102	685.00
0100	YAESU FT980	1265.00
0380	YAESU FT77	486.00
2021	ICOM IC745	839.00
2005	ICOM IC751	1099.00
1450	TRIO TS930S	1150.00
1530	TRIO TS430	752.10
VHF TRANSCEIVERS		
1000	YAESU FT230	259.00
—	ICOM IC27E	329.00
5779	FDR 750X	319.00
1932	TRIO TM201A	269.00
VHF MULTIMODE TRANSCEIVERS		
0810	YAESU FT290R	269.00
—	YAESU FT480R	395.00
1020	YAESU FT726R	739.00
2396	ICOM IC271E	649.00
—	ICOM IC290D	499.00
1980	TRIO TS9130	442.52
2M HANDHELD FM TRANSCEIVERS		
0700	YAESU FT208R	198.00
0930	YAESU FT203R	149.00
2480	ICOM IC2E	179.00
2475	ICOM ICO2E	239.00
1680	TRIO TR2500	237.82
2M/70cm TRANSCEIVERS		
1020	YAESU FT726R	739.00
1934	TRIO TW4000	469.00
70cm HANDHELD TRANSCEIVERS		
0710	YAESU FT708R	179.00
1780	TRIO TR3500	256.45
2490	ICOM IC4E	229.00
2476	ICOM ICO4E	T.B.A.
70cm MULTIMODE		
0890	YAESU FT790R	249.00
2440	ICOM IC471	735.00
2450	ICOM IC490E	549.00
HF RECEIVERS		
2250	ICOM ICR70	565.00
2249	ICOM ICR71	649.00
1090	YAESU FRG7700	369.00
1100	YAESU FRG7700M	435.00
1820	TRIO R2000	421.36
1800	TRIO R600	263.12
5573	SONY ICF7600D	179.00
VHF RECEIVERS		
5650	JIL SX200	299.00
—	JIL SX400	598.00
5641	AOR 2001	325.00
—	REVCO SCANNER	258.00
5610	BEARCAT 20/20	289.00
5780	ATC720 HANDHELD	159.00
5781	RX40 HANDHELD	142.00
—	REVCO HANDHELD	248.00
5573	SONY ICF7600D	179.00

		£
ANTENNA TUNERS		
2320	ICOM AT500	399.00
2310	ICOM AT100	285.00
0510	YAESU FC757	231.50
0140	YAESU FC102	179.00
1555	TRIO AT250	273.01
0420	YAESU FC700	98.90
—	AMTEC 300	49.00
1460	TRIO AT930	145.00
5080	WELZ AC38	73.95
RECEIVER ANTENNA TUNERS		
1170	YAESU FRT7700	46.00
—	GLOBAL AT1000	46.00
TELE READERS CW & RTTY/AMTOR		
5280	TONO 550	299.00
5420	TASCO CWR610E	179.50
—	TONO 5000	795.00
5270	TONO 9100	695.00
4780	12" VDU GREEN/AMBER	89.00
4900	ICS AMTOR	265.00
POWER SUPPLIES		
0500	YAESU FP757	149.50
0505	YAESU FP757HD	162.50
0410	YAESU FP700	125.00
2110	ICOM ICPS15	119.00
2392	ICOM ICPS25	89.00
2006	ICOM ICPS35	149.00
5820	BNOS 25 AMP	138.00
5810	BNOS 12 AMP	95.45
5800	BNOS 6 AMP	52.00
4680	DRAE 4 AMP	34.00
4710	DRAE 25 AMP	110.00
LINEAR AMPLIFIERS		
5741	ALINCO ELH230D	69.00
—	ALINCO ELH230G	59.00
5742	ALINCO ELH260D	114.95

INSTANT HP AVAILABLE
WRITTEN DETAILS ON REQUEST

ALL OFFERS SUBJECT TO AVAILABILITY
PRICES CORRECT AT TIME OF GOING TO PRESS

24-HOUR PHONE ORDER SERVICE

To use ARE's Rapid Despatch Mail Order Service, just quote the Stock Number together with your Access or Visa Card number. Your goods will be on their way within 24 hours, subject to availability.

If the particular item you're looking for is not listed here, call us on 01-992 5767 or 092 52 29881 – Brenda & Bernie pride themselves on being able to supply anything connected with amateur radio.

All orders over £100 are sent carriage-free. For 24-hour Securicor delivery, add £6.00. For orders below £100 add £2, or £1 for books. Beam Antennas are sent by Securicor only.

GREAT OFFERS FROM SCARAB SYSTEMS

And now, from U.K.'s leading radio software house, come two professionally produced items which are a *must* for the radio amateur.

Split screen Spectrum RTTY (48K only)
This exciting program and special interface board allows you to compile your answer while still in receive mode. **£37.50** (fully assembled and tested.)

MPTU-1 tone encoder/decoder
This phase lock loop circuit is 100% reliable and extremely sensitive.
£69.70 (all plugs supplied).

SCARAB SYSTEMS

39 Stafford St, Gillingham, Kent. ME7 5EN Tel: (0634) 570441

Please send me:
Spectrum split screen 48K £37.50 ☐ MPTU-1 RTTY/AMTOR terminal unit £69.70 ☐
Free Details of other equipment and programs ☐

I enclose a cheque/postal order for .....
I wish to use my Access/Visa ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Name .....
Address .....
.....
Telephone .....
Signature .....

RC I understand that, if I am not fully satisfied, I can return the equipment with full reimbursement.

VISA

AMATEUR ELECTRONICS UK

UPPINGTON

G2BAR HAM BAND AERIALS
UK's SOUTH WEST BRANCH

Main suppliers of **YAESU MUSEN** equipment. Full Page adverts show Special Buys. Call **Peter G1DFK** and **Bert G2BAR** For your on-the-spot service.

Send 30p in stamps for descriptive leaflets and prices

12/14 PENNYWELL ROAD, BRISTOL BS5 0TJ
Telephone: Bristol (0272) 557732

NEW SAMSON KEYERS

ETM-1C, £32.95 – Use with your own paddles.
ETM-5C, £69.00 – Replaces the popular ETM-3C.
ETM-8C, £124.95 – 8 memories, keypad control.
JUNKER PRECISION HAND KEY, £49.45

All prices include 15% VAT & UK delivery. Please send stamp for leaflets.

SPACEMARK LTD. THORNFIELD HOUSE, DELAMER ROAD, ALTRINCHAM, CHESHIRE (061-928 8458)

VALVES VALVES VALVES

The following valves in matched pairs 6JS6/C, 6KD6, 6JB6/A, 6LQ6, 6HF5, 6146A, 6146B. **YES** the 6JS6/C is Japanese and works in the FT101. Most amateur radio valves including difficult to obtain types **EX STOCK**. Quotations without obligation. If we don't stock your type we may be able to import for you, PLEASE ENQUIRE. REMEMBER over 200 types **EX STOCK**. Sae for list. 'Phone for assistance re types suitable for your equipment. USA and Jap manufacture of popular types available.

DON'T DELAY 'PHONE TODAY 045 75 6114, G4AZM
Wilson, Peel Cottage, Lees Road, Mossley, Tameside, Manchester

THE BEST FROM A.R.E.

SX 400
Undoubtedly the finest VHF/UHF receiver yet developed. Extremely professional in its design. Fully programmable, scan facility, memory facility.

£598 INC VAT.

SONY ICF 7600D
Sony's latest approach to pocket-size communications receivers. Covering from 153 Kc through to 30 MHz. All mode operation including SSB and FM on broadcast band. Keyboard entry for frequency access. Memory facility. Scan facility. A truly portable communication receiver. AC power supply included.

£179
INC VAT.

ICOM IC-R71
The best communications receiver of professional standards yet to be offered to the amateur fraternity. Tuneable from 100 Kc to 30 MHz, all mode with FM option. Memory facility. Optional infra-red remote control unit.

£649 INC VAT.

OK-Brenda says we're closed on Mondays and open Wednesdays!

WOBURN 1984 RSGB SEE YOU THERE

CLOSED–Mondays · OPEN–Wednesdays
FULL DETAILS. TUES, WED, FRI 9.30-5.30 · THURS 9.30-6.00 · SAT 9.30-5.00.

LONDON:
373 UXBRIDGE ROAD,
ACTON,
LONDON W3 9RH
TEL: 01-992 5765/6

NORTHERN:
38 BRIDGE STREET,
EARLESTOWN, NEWTON LE WILLOWS,
MERSEYSIDE WA12 9BA.
TEL: 092-52 29881

ARE — more on your wavelength

AMATEUR RADIO EXCHANGE LTD

QUARTZ CRYSTALS

STOCK CRYSTALS

CRYSTALS FOR 2 METRES
HC25 £2.15 **FOR ONE CRYSTAL**, £1.96 **WHEN 2 OR MORE PURCHASED**
HC6 £2.15 **FOR ONE CRYSTAL**, £2.05 **WHEN 2 OR MORE PURCHASED**

TX CRYSTALS	RX CRYSTALS	CHANNELS IN STOCK
HC6/U 4 & 8MHz 30PF	44MHz SERIES RES	RO TO R7 S11, S20 TO S23
HC25/U 12MHz 30 & 40PF	44MHz SERIES RES	RO TO R7 S8, TO S23 & S32
HC25/U 18MHz 25 & 20PF	14/15 MHz 20 & 30PF	RO TO R7 S8, TO S23 & S32
HC25	SCANNER XTLS (NOT SR9)	RO TO R7 S8, TO S23 & S32

full list available on request, please send SAE

4 METRE CRYSTALS FOR 70.26 IN HC6/U AT £2.40 each
TX 8.78250 RX 29.78000
70CM CRYSTALS £5.00/pr or £2.50 each
For Pye PF1 PF2 & PF70 series Wood & Douglas and FDK MULTI U11
SUB(433.2) SU20 RB0 RB2 RB4 RB6 RB10 RB11 RB13 RB14 RB15.
ALSO for MULTI U11 ONLY SU12 SU16 SU18
CONVERTER CRYSTALS IN HC18/U AT £2.85 each.
22.000, 38.666, 70.000, 96.000, 116.000, 101.500, 116.000
FREQUENCY STANDARDS £2.75 each
HC6/U 200kHz 1000kHz 3.50MHz 5.00MHz 10.000MHz 10.700MHz
HC18/U 1000kHz 7.00MHz 10.70MHz 48.00MHz 100.00MHz
Also HC6/U 200kHz 455kHz £3.25 each.
TONEBURST, I.F. & MPU CRYSTALS IN HC18 £2.25 EACH
7.168MHz (For 1750 HZ Tone), 10.245 (for 10.7 I.F.)
3.2768 5.0688 14.3180 15.00000
YAESU CRYSTALS for FT101's FT901 & etc £4.000 each
Many available ex stock (A list is available on request pse send S.A.E)

MADE TO ORDER CRYSTALS

FUNDAMENTALS

FREQUENCY RANGE	PRICE
5 TO 50kHz	£21.00
50 TO 150kHz	£11.00
150 TO 500kHz	£7.80
160 TO 999kHz	£11.90
1 TO 1.5MHz	£10.75
1.5 TO 2.0MHz	£5.10
2.0 TO 6.0MHz	£4.75
6 TO 21MHz	£4.55
21 TO 25MHz	£6.50
25 TO 30MHz	£8.50

OVERTONES

	FREQUENCY RANGE	PRICE
3rd OVT	21.00 TO 65.00MHz	£4.55
5th OVT	60.00 TO 110.0MHz	£5.10
5th OVT	110.00 TO 125.0MHz	£7.40
7th OVT	125.00 TO 175.0MHz	£10.00

DELIVERY 2.0 TO 175.0MHz 2 to 3 weeks
5 TO 999.9kHz 6 to 8 weeks
1 TO 1.499MHz 3 to 4 weeks

Unless otherwise requested fundamentals will be supplied for 30pf load capacitance and overtones for series resonant operation.
HOLDERS: – PLEASE SPECIFY WHEN ORDERING – else HC25/U supplied for XTLS above 3MHz HC13/U 6-200kHz HC6/U & HC33/U 170kHz-175MHz HC18/U & HC25/U 2-175MHz
DISCOUNTS: Price on application for 10 + units to same frequency/spec. or bulk purchases of mixed frequencies. We supply FREE xtals for use in UK repeaters.
COMMERCIAL CRYSTALS: available on fast delivery and at competitive prices.
Please send for list stating interests
EMERGENCY SERVICE: for XTALS 1 to 125MHz. Add the surcharge for each XTAL.
Days refer to working days. 4 days + £12, 6 days + £7, 8 days + £5, 13 days + £3.
CRYSTALS SOCKETS HC25 £0.20 ea. HC6 £0.25 ea. MINIMUM ORDER CHARGE £1.50 unless ordered with crystals
TERMS: Cash with order post Inc. to UK & Ireland. Cheques & PO's to QSL LTD
A stamped addressed envelope with ALL enquiries please.

QSL QuartSLab MARKETING LTD.

ALL PRICES ARE EX VAT PLEASE ADD 15%

P.O. Box 19 Erith Kent DA8 1LH

Telephone: 01-318 4419 24Hr Ansafone: Erith (03224) 30830
Telex: 8813271 GECOMS – G (Attention QUARTSLAB)

HATELY ANTENNA TECHNOLOGY (GM3HAT)
DIPOLE OF DELIGHT

Remarkable Behaviour – 50 ohm Coax-fed – No Antenna Tuner – No Traps
(i) Fully Balanced (ii) Quiet (iii) Efficient (iv) Multiband or Monoband

For Details: See RAD COM Advertisements Dec '83 to May '84
Or Write with SAE or 2 IRC's for Air Mail Overseas

Eight versions now available. Prices homologized (some reduced) UK & DX
UK includes VAT and 1st Class Post.
DX, exempt VAT, but AIR MAIL post and exchange included.

MULTIBANDER's	DD 7/14/21/28L	length 21m (69ft)	**£58.00**
	DD 10/18/24	length 15m (50ft)	**56.00**
	DD 14/21/28L	length 10.7m (36ft)	**46.50**
DUAL BANDER	DD7/21	length 21m (69ft)	**28.00**
MONOBANDER's	DDM10	length 15m (50ft)	**23.50**
	DDM14	length 10.7m (36ft)	**15.50**
	DDM21	length 7m (24ft)	**11.50**
	DDM28	length 5.8m (19ft)	**11.50**

HATELY ANTENNA TECHNOLOGY,
1 Kenfield Place, ABERDEEN AB1 7UW, Scotland
Proprietor: Maurice C. Hately, MSc, MIEE, Chartered Electrical Engineer (GM3HAT)

J. BIRKETT 25 THE STRAIT, LINCOLN. Tel: 20767

MULLARD HF-VHF POWER TRANSISTOR 587 BLY @ £3 each. **TRANSMITTING VARIABLES** 320pf., 100 To 200 Watt **@ £4.60. TYPE 831 EDDYSTONE TRANSMITTING VARIABLE.** 30 + 30pf (60pf) **@ £2.60. ITT 10.7MHz CRYSTAL FILTERS** B.W. ± 6KHz **@ £5** each. **VARIABLE CAPACITORS.** Direct Drive. 10 + 10 + 20pf **@ £1.15. 2GHz STRIPLINE NPN TRANSISTORS** useful at 1296MHz. **3 for £1.15. SEIMANS 800MHz NPN TRANSISTORS** BF362 **@ 25p,** MULLARD BFY90 **@ 60p. GENERAL PURPOSE FETS SIMILAR TO 2N 3819** Type U1897E **@ 7 for £1. 12 GPO CODED NPN TRANSISTORS SIMILAR TO BFY51** For **50p. X BAND GUNN DIODES** With data **@ £1.65. X BAND TUNING VARACTOR DIODES** 2pf or 4pf **@ 1.65** each. **X BAND PIN DIODES** Same Package as Gunns. **@ 3 for £1.60. 500mW AUDIO AMPLIFIER LM 386** With Circuits for **75p. DISC CERAMICS** 0.01uf 50v.w. @ 20p doz., O.luf 25v.w. @ 5p, 0.47uf 32v.w. @ **5p. 100 PIV 10Amp BRIDGE RECTIFIERS @ 95p** each. **ITT WP SERIES MINIATURE SINGLE LAYER CERAMIC PLATE 1000pf 100v.w. @ 35p doz. VMOS POWER TRANSISTORS VN10KM** @ 50p, VN90AA @ 80p, WM211 **@ 40p. SPECIAL SUB-MINIATURE luf 18v.w., CERAMIC CAPACITOR** size 6 × 5 × 2mm **@ 15p** each. **TOYOCOM CRYSTAL FILTER 10.7MHz** B.W. ± 7.5KHz With 2 Transformers **@ £4.60. ITT CRYSTAL FILTER** 1.4MHz 3KHz Type 538ACB **@ £5. VERNITRON 10.7MHz CERAMIC FILTERS** at **6 for £1. UNMARKED 40Amp TO3 Case NPN TRANSISTORS 100 Volt @ £1.15. 2N4123 NPN TRANSISTORS 250MHz at 25 for 75p. WOOD AND DOUGLAS KITS** available For Callers and by Post.

ACCESS and BARCLAYCARD accepted, Post 50p, Over £5 free.

CLASSIFIED ADVERTISEMENTS

Classified advertisements **25p** per word, minimum **£4.00**
Box Number £2.00 extra to wordage or minimum.
Semi-display 1/8 page 2¼" × 3½" (57 × 91mm) **£76.00**
3/32 page 1⅛" × 3½" (42 × 91mm) **£59.00**
1/16 page 1" × 3½" (26 × 91mm) **£41.00**
Please write clearly. No responsibility accepted for errors.
Latest date for acceptance—7 weeks before 1st of issue month.
All classified and semi-display advertisements MUST be prepaid.

Copy and remittance to: **M. J. HAWKINS G3ZNI, RSGB Advertisements, PO Box 599, Cobham, Surrey KT11 2QE.**
(Cheques should be made payable to RSGB.)

Members' Ads must be sent to the editor at Chelmsford.

FOR SALE

QSL CARDS printed to your own specification on white or coloured gloss card. Send S.A.E. for sample pack to: The Caswell Press, 11 Barons Way, Woodhatch, Reigate, Surrey.
AMIDON TOROIDAL CORES, ferrite rings for TVI filters, ferrite beads. Send SAE for data and prices. SMC (TMP electronics), Unit 27, Pinfold Works, Pinfold Lane, Buckley, Clwyd.
QSL & LISTENER CARDS. Quality printing on coloured and white gloss card at competitive prices. SAE for samples. S. M. Tatham, "Woodside", Orchard Way, Fontwell, Arundel, West Sussex.
G5RV TYPE AERIALS. Half-size £13.00, full-size £14.95. New hard drawn copper aerial wire. 140ft 14swg, £7.90; 50 metres 16swg, £6.90. Soft enamelled copper wire 10 metres 12swg, £3.50. 50 metres 1.4mm, £5.75. Ceramic egg insulators. Large 50p, small 40p. Guy rope, 4mm polypropylene, 50 metres £3.95. 4mm nylon, 50 metres £6.90. All items post paid. S. M. Tatham, 1 Orchard Way, Fontwell, Arundel, West Sussex.
PERSONALISED QSL CARDS, 1000 £13.75, 5000 £46.20. Sae for samples. Q/Cards, 89 Derwent Street, Blackhill, Consett DH8 8LT.
50m (165ft) AERIAL WIRE. Strong PVC covered copper only, £4.40 inc postage. W. H. Westlake, Clawton, Holsworthy, Devon.
QSL CARDS. Gloss or tinted cards. SAE for samples to Twrog Press, Penybont, Gellilydan, Blaenau Ffestiniog, Gwynedd.
CREED TELEPRINTERS 444(TP15) complete with perforator and reader. Tested working. Available to Raynet members only. £40. Details Mike Watson G8CPH, Ipswich (0473) 831448.
PAG RTTY TERMINAL UNIT KIT. PLL, AFSK, auto start stop. Complete with PCB, power supplies, case components; £56. Details Mike Watson G8CPH, Ipswich (0473) 831448.
ONE WAVE METER to cover 143MHz to over 2500MHz. Alpha keys. Twin or single paddle types. P. Sergent, 6 Gurney Close, Costessey, Norwich. (0603) 747782.
PHONE-ATLAS GAZETTEER—Find where that UK telephone number originates quickly—£2.20. With maps, £5.40. RWW, PO Box 11, Romsey SO5 8XX.
AIRCRAFT COMMUNICATIONS HANDBOOK (Europe) including UK spot MF, HF, VHF, UHF frequencies. Military, civil, ATC, Airports, Long Range Stations, Beacons, Callsigns, Co-ordinates, Broadcast times, etc. £6.95 inc p&p. PLH Electronics, 70 Vallis Road, Frome, Somerset BA11 3EJ.
QUALITY QSL CARDS, quick delivery, vast range of designs and colours. Large SAE to J. S. Coates, Dept RC, 57 Worrall Street, Morley, Leeds LS27 0PJ.
MERCURY (QUICKSILVER) £3.25 per 100 gram bottle post free. Two or more, 10% discount. Also buyers of all precious metals. Cash/goods sent by return of post. Melcol Metals Ltd, Wood Street, Ilkeston, Derbyshire. (0602) 302402. Callers welcome.
G2VF D.I.Y. LOOP ANTENNAS. Long, medium and short wave. Details SAE to Rylands, 39 Parkside Avenue, Southampton.
24 HOUR DISPLAY PHILIPS L.C.D. CLOCKS, easy to read, ideal for logging QSOs. Alarm function to remember that sched. Accurate ± 30 sec/month. £11.50 inc VAT & post (UK). C.W.O. Mike Sesemann G4WII, Comparts Ltd, Edward Road, Coulsdon, Surrey CR3 2XA.
STATION LOGBOOKS, £2.25. Mobile minilogs, 80p. Callsign window stickers, £1.80. QSL cards, SAE samples. Springwood (G3OYI), Springfield Avenue, Honley, Huddersfield.
"RAYNET" YELLOW REFLECTIVE TABBARDS with RAYNET front and rear similar to Police and Ambulance, etc. £6.90 inc p&p. Details Mike Watson G8CPH. Ipswich (0473) 31448.
ULTRA-SLIM SLIM-JIM for 2 metres, plus 4M cable with PL259. £7.00 plus £1 postage. Cheques to Berkshire Communications, PO Box 31, Bracknell, Berks RG12 4TG.

HOLIDAY ACCOMMODATION

FAIRMOUNT HOUSE—THE HOTEL TO SUIT EVERYONE. Wonderful food, lovely bedrooms (most en suite), quiet sunny gardens and a welcoming atmosphere. Old-timer G6GR operates the Yaesu-equipped shack—visitors welcome. Special offers this year, including free accommodation for children. Dogs are welcome, too. Please ask for brochure and details from Mr and Mrs Tolkien, Fairmount House Hotel, Herbert Road, Chelston, Torquay TQ2 6RW. Tel (0803) 605446.
IBIZA—QRV in EA6 at Inge's (EC6KO) and Dieter's (DL7AEA) apartments. PO Box 73, San Antonio, Ibiza. Phone (0034 71) 34 11 38.
BOURNEMOUTH "DOLBADARN" PRIVATE HOTEL, 8 Grand Avenue, Southbourne BH6 3SU. Between sea and shops. Residential licence, room radio, call and teamaking facilities. Excellent food. Dinner, Bed and Breakfast from £10.50 daily. Bed and Breakfast from £7.50 daily. (0202) 424826. E. W. & J. W. Batten (G3BKN).

COMPUTER SOFTWARE/HARDWARE

BBC MICRO RTTY PROGRAM. Now available on EPROM. Split screen, type ahead. Cassette and instructions, £7.50. Disk £9.50. P J Harris G3WHO, 10 Appleby Close, Great Alne, Alcester, Warks. Tel (078 981) 377.
SINCLAIR QL PROGRAMS supplied on microdrive cartridge. Morse Tutor £9.50, QTH Locator £9.50 or both for £14. RTTY £14, Repeater Map £14. SAE details. Cheques to Vomek Software, 11 The Dell, Stevenage, Herts.
BBC MICRO MORSE PROGRAM. Random letters, numbers or both. Pre-prepared text files or type to screen. (Disc version has Random Access Files!!) Transceiver PTT and keying via User Port. Send SAE for program specs. Cassette £5.00, disc £8.50. G. MacKenzie GM4NUN, 278 Ayr Road, Newton Mearns, Glasgow G77 6AQ.
SPECTRUM MORSE READER 16/48K. Decodes onto screen. No interface required. Tracks approx 8/30wpm. Cassette £6.00. Morse Tutor, variable speed, variable spacing, £4.50. Both, £10.00. J. E. Price, 4 Housman Walk, Kidderminster.
BBC MICRO SOFTWARE. RTTY transceive program in ROM which is entered simply by typing "*RTTY". Terminal unit pcb's, kits and built boards now available. Sophisticated morse teacher, slow morse broadcast software, morse beacon. Written by professional software designers. Watch this space for further announcements. Send large SAE for detailed technical specifications. GOC Software Limited, "CQ Cottage", Longhill Lane, Audlem, Cheshire CW3 0HU.
RTTY SOFWARE Vic20, CBM64, Atom, Dragon. Split screen, type ahead, any baud rate, saveable memories, etc. Dragon Amtor system (not requiring AMT-1) should be available when this ad appears. Large SAE for details. Grosvenore Software, G4BMK, QTHR. (0323) 893378.
MORSE TUTOR CBM 64, VIC20, SPECTRUM, ZX81-16k. Superb program from absolute beginner to any test standard. Random letters, figures, words, plain language. Any amount, any speed. Tape £6. Technical Software (GW3RRI), Fron, Cesarea, Caernarfon, Gwynedd. (0286) 881886.
LOCATOR CBM64, VIC20, SPECTRUM, QTH or G4ANB locator or lat/long. Distance, beam and reciprocal headings, VHF contest points, long path details. Tape £6. GW3RRI see ad above.

AMATEUR RADIO INSURANCE SCHEME

"ALL RISKS" INSURANCE for portable/mobile/base station amateur radio and ancillary equipment. A service for RSGB members only. Also public liability and equipment insurance for affiliated clubs and societies. Details and leaflets from Nick Gibson, Amateur Radio Insurance Services Ltd, 19 Quarry Street, Guildford, Surrey. Tel: 0483 33771.

MISCELLANEOUS

COURSE FOR CITY & GUILDS, Radio Amateurs Examination. Pass this important examination and obtain your licence, with an RRC Home Study Course. For details of this and other courses (GCE, Career and professional examinations, etc) write or phone—THE RAPID RESULTS COLLEGE, Dept JT5, Tuition House, London SW19 4DS. Tel: 01-947 7272 (9am-5pm) or use our 24hr Recordacall service, 01-946 1102 quoting JT5.

INDEX TO ADVERTISERS

SALES ENGINEERS

Zettler Relays are currently seeking two experienced Sales Engineers to further increase their penetration in the UK market.

Preferably with experience in relay sales or associated products, the successful candidates will be expected to sell to manufacturers in both the Telecommunication and industrial sectors.

A generous salary is offered together with company car and contributory pension scheme.

Telephone or write for application form.

Zettler Relays,
Brember Road,
Harrow,
Middx.,
HA2 8AS.

Telephone: 01-422 0061

SERVICE ENGINEER

Zettler require a Field Service Engineer to join an established team based at our Harrow Works and covering an area up to 100 miles radius.

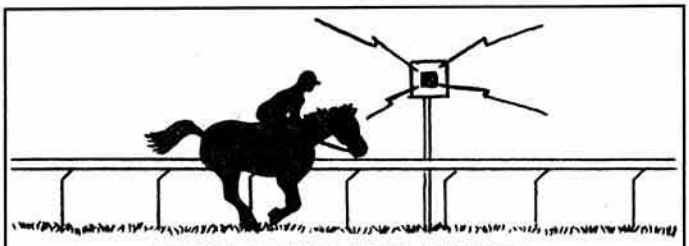
The Engineer will be responsible for the service and maintenance of fire detection and alarm systems installed in clients' premises throughout our operating area. Full product and field training will be given. Some time will also be spent at our works testing and servicing equipment. It is anticipated that as his experience grows the engineer will become involved in prototype and special project work as well as system commissioning and fault finding.

The successful applicant, male or female, aged up to 28, should have a sound electrical background and preferably some electronic experience. A clean current driving licence is essential.

The Company offers an attractive benefits package, service car, four weeks' annual holiday and contributory pension scheme.

Telephone to write for an application form to:-

The Divisional Director,
Zettler UK Division,
Brember Road,
Harrow, Middx., HA2 8AS.
Tel. 01-422 0061



IT'S THE WINNER

FOR AMATEUR RADIO

The Sussex Mobile Rally

(A RALLY WHICH CATERS FOR THE WHOLE FAMILY)

SUNDAY 15th JULY

10.30 AM–5.00 PM

BRIGHTON RACEGROUND
RACEHILL, BRIGHTON, E. SUSSEX

ENTRANCE £1 (UNDER 14 & DISABLED FREE)

FREE PARKING FOR OVER 4,000 CARS
OVER 20,000 SQ. FT. EXHIBITION AREA UNDER COVER

MANY ATTRACTIONS FOR THE WHOLE FAMILY
AND THE USUAL TRADE STANDS

Advance tickets for Clubs can be obtained from:

Mr. S. Sims, G8NFZ
71, Green Street,
EASTBOURNE,
East Sussex,
BN21 1QZ

at 12 for £10 on receipt of an S.A. E.

THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY
ELECTRONIC SERVICE UNIT
CHIEF TECHNICAL OFFICER (COMPUTING)

Applications are invited for the above position, which becomes vacant at the beginning of 1985.

Duties include planned maintenance and repair of an extremely wide range of electronic equipment, upkeeping of servicing records, advisory service to academic staff, supervision of technical staff, and training of Technical Officer trainees.

The Electronic Service Unit is housed in recently enlarged air-conditioned quarters, and has a wide range of modern test equipment. Computer facilities are available.

Applicants should be qualified to Technician Engineer level and should have substantial experience of electronic workshop technique and management. Experience with microprocessor-controlled equipment and microcomputers would be an advantage.

Salary: Chief Technical Officer (Computing) K20,520 per annum (K1 = Stg 0.8177) (Level of appointment will depend upon qualifications and experience).

The initial contract period is for approximately three years. Other benefits include a gratuity of 24% taxed at 2%, appointment and repatriation fares, leave fares for the staff member and family after 18 months of service, settling-in and settling-out allowances, six weeks paid leave per year, education fares and assistance towards school fees, free housing. Salary protection plan and medical benefit schemes are available.

Detailed applications (two copies) with curriculum vitae, together with the names and addresses of three referees and indication of earliest availability to take up appointment should be received by: The Registrar, Papua New Guinea University of Technology, Private Mail Bag, Lae, Papua New Guinea by *30 July 1984.*

Applicants resident in the United Kingdom should also send one copy to the Association of Commonwealth Universities (Appts), 36 Gordon Square, London WC1H 0PF, from whom further information may be obtained.

RSGB MAIL-ORDER PRICE LIST

RSGB books

	Non-members' price	Members' price
A Guide to Amateur Radio (19th edn)	£3.44	£3.10
Amateur Radio Awards (2nd edn)	£3.41	£3.07
Amateur Radio Operating Manual (2nd edn)	£5.22	£4.70
HF Antennas for All Locations	£6.91	£6.22
Microwave Newsletter Technical Collection	£6.83	£6.15
Morse Code for Radio Amateurs	£1.31	£1.18
RSGB Amateur Radio Call Book (1984 edn)	£7.14	£6.43
Radio Amateurs' Examination Manual (10th edn)	£3.42	£3.08
Radio Communication Handbook (5th edn) Vol 2	£9.16	£8.24
Radio Communication Handbook (Vols 1 and 2 combined, paperback)	£10.91	£9.82
Teleprinter Handbook (2nd edn)	£13.84	£12.46
Television Interference Manual (2nd edn)	£2.13	£1.92
VHF/UHF Manual (4th edn)	£10.31	£9.29

RSGB logbooks

Amateur Radio Logbook	£2.77	£2.49
Mobile Logbook	£1.14	£1.03
Receiving Station Logbook	£2.72	£2.45

RSGB maps, charts and lists

HF Awards List and Countries List	48p	43p
Great Circle DX Map (wall)	£2.12	£1.91
IARU Region 1 Beacon List	35p	32p
IARU QTH Locator Map of Europe (wall)	£1.43	£1.29
QTH Locator Map of Western Europe (wall)	£1.43	£1.29
QTH Locator Map of Europe (card for desk)	76p	68p
UK Beacon List	35p	32p
UK Repeater List and maps	45p	41p
World Prefix Map in full colour (wall)	£2.17	£1.95
Meteor Scatter Data	£3.24	£2.92

RSGB members' sundries (members only)

Radio Communication Easibinder	—	£4.50
RSGB badge car sticker	—	49p
RSGB belt (real leather)	—	£7.57
RSGB hf contest log sheets (100)	—	£2.10
RSGB vhf contest log sheets (100)	—	£2.10
RSGB teeshirt (extra large only)	—	£3.13
RSGB tie (coffee, maroon, green or blue)	—	£3.03
RSGB station callsign plaque*	—	£9.50
Standard callsign lapel badge*	—	£1.96
De-luxe callsign lapel badge*	—	£2.80
Lapel badge (RSGB emblem, pin fitting)	—	59p
Mini lapel badge (RSGB emblem, pin fitting)	—	68p
Members' headed notepaper (50 sheets) quarto	—	£1.00
Members' headed notepaper (50 sheets) octavo	—	57p

**Delivery approximately five weeks*

Miscellaneous

"Amateur radio" (two colours) car sticker	62p	56p
DX Edge (HF propagation prediction aid)	£13.98	£12.58
"I'm on the air with amateur radio" (four colours) car sticker	84p	76p
"I'm monitoring ·5 are you?" (two colours) car sticker	62p	56p
QSL card holders	£1.23	£1.11
Radio Communication back issues *(As available)*	£1.01	91p
Radio Communication bound volume, 1980 (Parts 1 and 2)	£14.93	£13.44
Radio Communication bound volume, 1981	£14.93	£13.44
Radio Communication bound volume, 1982	£15.93	£14.34
Radio Communication bound volume, 1983	£16.90	£15.21
Smith charts, pad of 25 (Chartwell D7510)	£2.23	£2.01

Other publications

	Non-members' price	Members' price
Active-filter Cookbook (Sams)	£12.71	£11.44
All About Cubical Quad Antennas (RPI)	£5.69	£5.25
Amateur Single Sideband (Ham Radio)	£5.46	£4.91
Amateur Television Handbook (BATC)	£2.55	£2.30
Amateur Television Handbook Vol 2 (BATC)	£2.77	£2.49
AMSAT-UK Technical Manual (AMSAT-UK) (Includes all revises and updates, including Oscar 10 data sheets)	£14.37	£12.93
Antenna Anthology (ARRL)	£3.83	£3.45
ARRL Antenna Book (ARRL) (New edn)	£8.78	£7.90
ARRL Electronics Data Book (ARRL)	£4.47	£4.02
Beam Antenna Handbook (RPI)	£6.83	£6.15
Better Short Wave Reception (RPI)	£6.83	£6.15
Care and Feeding of Power Grid Tubes (Varian)	£5.69	£5.25
CMOS Cookbook (Sams)	£13.07	£11.76
Complete DX'er (W9KNI)	£7.77	£6.99
Complete Shortwave Listener's Handbook (Tab)	£12.21	£10.98
English-French QSO Language Instruction (out of print)	—	—
FM and Repeaters for the Radio Amateur (ARRL)	£4.30	£3.87
G-QRP Club Circuit Book	£4.19	£3.77
Hints and Kinks for the Radio Amateur (ARRL)	£4.47	£4.02
How to Troubleshoot and Repair AR Equipment	£10.47	£9.42
IC Op-amp Cookbook (Sams)	£11.76	£10.58
International VHF FM Guide	£2.45	£2.21
Knowing Your Oscilloscope	£9.85	£8.87
Newcomer's Guide to Simplex and Repeaters on 2m (UK FM Group)	£1.06	95p
Radio Amateur Callbook (1984 USA listings) (ARCI)	£16.93	£15.24
Radio Amateur Callbook (1984 DX listings) (ARCI)	£16.23	£14.61
Radio Amateurs Handbook 1984 (ARRL)	£11.65	£10.49
Radio Amateurs Handbook 1984 (ARRL) (Hardback)	£15.53	£13.98
Radio Frequency Interference (ARRL)	£4.18	£3.76
Satellite Experimenters Handbook (ARRL)	£9.90	£8.91
Satellite Tracking Software for the Radio Amateur (AMSAT-UK)	£4.47	£4.02
Secrets of Ham Radio DXing (Tab)	£7.92	£7.13
Semiconductor Data Book (Newnes)	£7.97	£7.17
Shortwave Propagation Handbook (Cowan)	£7.79	£7.01
Simple Low-cost Wire Antennas	£6.83	£6.15
Solid State Design for the Radio Amateur (ARRL)	£7.87	£7.08
Television for Amateurs (BATC)	£2.23	£2.01
UHF-Compendium Parts 1 and 2	£14.43	£12.99
Understanding Amateur Radio (ARRL)	£4.73	£4.26
VHF Propagation Handbook (Nampa)	£3.75	£3.38
Weekend Projects for the Radio Amateur (ARRL)	£4.95	£4.46
World Atlas (RACI)	£3.35	£3.02
World Radio TV Handbook 1984	£12.25	£11.03

ORDERING INFORMATION

NON-MEMBERS. Use left-hand price columns. Note that members' sundries are only available to members of RSGB.
MEMBERS. Use right-hand price columns. It is essential that you quote your call sign or BRS number so that you can be recognised as a member.
PRICES. These include postage, packing and VAT where applicable. For airmail despatch, please ask for price before ordering. Goods are obtainable, less p & p, at RSGB headquarters between 10am and 4pm, Monday to Friday.
POSTAL TERMS. Cash with order. **Stamps and book tokens cannot be accepted.** Cheques and postal orders should be crossed and made payable to "Radio Society of Great Britain". Our Giro account number is 5335256. Please write your name and address clearly on the order, and allow up to 28 days for delivery.

MORSE INSTRUCTION AIDS

G3HSC rhythm method of morse tuition		
Complete course (Two 3-speed lp records and one ep, plus books)	£6.99	£6.29
RSGB morse course Stage 1 (to 5wpm)	£3.84	£3.46

On all overseas orders for G3HSC course, including orders from Eire, add £1.12 for additional packing and postage from supplier

MAGAZINE SUBSCRIPTIONS

QST (including ARRL membership). One year	£21.24	£19.12
Two years	£42.48	£38.23
Three years	£63.72	£57.35
By air via KLM (to W Europe only) one year	£30.35	£27.31
Ham Radio Magazine (per annum) (incl air delivery)	£19.00	£17.10

ORDER FROM

RSGB Publications (Sales),
Alma House, Cranborne Road, Potters Bar, Herts EN6 3JW

(Raynet supplies should be obtained from Mrs J. Balestrini, Merrivale, Willow Walk, Culverstone, Gravesend, Kent)

ARROW

NOW AT:—

5, The Street
Hatfield Peverel
Nr. Chelmsford
Essex, CM8 3YL.
Tel. Chelmsford (0245) 381673/381626

ARROW opened their new showroom on March 30th and it has been voted a 100% smash hit by their customers. On the opening day nearly 500 customers arrived to toast the newest and largest Amateur specialists in Essex and East Anglia.

Some comments made by customers:—

"Wow this is the best in the country".

"Great—particularly your own customer car park"

"Good luck Arrow—just what we wanted".

"You have got it all here and every rig is set up for comfortable testing"

COME AND SEE US OR GIVE US A RING.

We offer:—

THE BEST DEALS

THE BEST SERVICE

FRIENDLY STAFF KEEN TO HELP.

Same friendly service at:—

Arrow Electronics (Scotland)
51 Hyndland Street, Glasgow.
Tel. 041-339 6445

Arrow Electronics (Wales)
14 Carreg-Y-Gad, Llanfair-P.G,
Anglesey, Wales
Tel. (0248) 714657

YAESU MUSEN

AUTHORISED YAESU

FT77

YAESU MUSEN

Utilizing a new CAD/CAM method, Yaesu presents . . .
THE FT77
A milestone in simplicity, economy and reliability in HF radio.

The FT77 is an all solid state no tune transceiver for SSB and CW operation on ALL amateur bands between 3·5 and 30MHz. FM or AM operation is possible with appropriate option. Nominal power output for SSB and CW is 100 watts (85 watts on 10 metres, 50 watts on FM).

Employing all the latest engineering and manufacturing techniques the FT77 is intended to offer the essential modern operating features in the most economical, reliable and compact HF transceiver available today.

Reliability and quality control have been increased to a degree beyond that previously attainable in amateur equipment, while production costs have been reduced considerably, due to the new CAD/CAM (computer aided design/computer aided manufacturing) system. Computer-designed circuit board layouts ensure the high level of reliability in the smallest possible space, while automatic (robot) parts insertion and soldering vastly improve quality control and reduce costs.

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

The extremely compact size and simple control layout make the FT77 ideal for mobile operation, or as the heart of a complete base station with the optional FP700 AC Power Supply, FV700DM Digital Scanning VFO and Memory System, FTV700 V/UHF Transvertor and the FC700 Antenna Tuner.

The low price of the FT77 coupled with the expansion capabilities presented by these accessories, make this transceiver the perfect choice for those new to amateur HF communication, or as a practical second rig for old timers.

Ask your authorised Yaesu dealer for a full colour leaflet or better still call in to him and try one out today!

GENERAL

FREQUENCY COVERAGE
Rx/Tx; 10-80M (*All* 8 bands)

FREQUENCY RESOLUTION
100Hz (Digital Readout)

FREQUENCY STABILITY
Better than 100Hz/½ Hr After warm up
Better than 300Hz during ½ Hr warm up

MODES OF OPERATION
J3E (USB/LSB), A1A (CW), G3E* FM (Tx & Rx)

POWER REQUIREMENTS
13·5VDC; 1A Rx, 20A Tx

DIMENSIONS (Excluding/Including Projections)
250/340D × 245/248W × 100/115H (mm), 6Kg (13·3lb) Nett

RECEIVER

SENSITIVITY

J3E/A1A (SSB/CWW)	**10dB S + N/N; 0·3μV (2·4KHz)**
A1A (CWN)*	**10dB S + N/N; 0·15μV (600Hz)**
G3E (FM)*	**12dB SINAD; 0·7μV (12KHz)**

CIRCUIT TYPE
J3E/A1A (SSB/CW); Single Conversion (8987·5KHz)
G3E (FM)* ; Double Conversion (8981·5 & 455KHz)

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'*

SOUTH MIDLANDS COMMUNICATIONS LTD
SM HOUSE, RUMBRIDGE ST
TOTTON, SOUTHAMPTON SO4 4DP

SMC

YAESU MUSEN'S ONLY AUTHORISED UK DISTRIBUTORS

G3FIK

AMATEUR ELECTRONICS UK
504-516 ALUM ROCK ROAD
ALUM ROCK,
BIRMINGHAM 8

Printed in Great Britain for the RADIO SOCIETY OF GREAT BRITAIN, Alma House, Cranborne Road, Potters Bar, Herts EN6 3JW
by E T Heron (Print) Ltd, Silver End, Witham, Essex