

October 1984

RADio COMmunication

BEACONS' HOME

The IBA's 900ft, 16,000-ton concrete support tower at its 1,840ft asl site on Emley Moor. It is the highest *building* in the UK, and is surmounted by a 180ft antenna tower. The room at the 900ft level, reached by lift, is home for RSGB beacons GB3MLY and GB3MLE.

Photos: Ray Knight, IBA



Journal of the Radio Society of Great Britain



Amcomm of London

INTEREST
FREE HIRE
PURCHASE ON
MANY
ITEMS

01-422 9585 FOR FAST DELIVERY

2 YEAR
GUARANTEE
ON MANY
PRODUCTS



ICOM

KENWOOD



YAESU



ICOM IC-745



AR 2001



YAESU FT-980 CAT SYSTEM



ICOM IC-751



Heil HMS
Microphone



YAESU 757GX



YAESU
FT-480R



YAESU FT-ONE



YAESU
FT-208R



Special
prices on many
items



ICOM
IC02E



YAESU
FT-203



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 management 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 handful 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, MIDD. HA2 0EN. ENGLAND. (Opp. South Harrow Underground Station)

TEL: 01-422 9585. TELEX: 24263



OCTOBER 1984

VOLUME 60 No 10

RADIO COMMUNICATION

EDITOR

A. W. Hutchinson

Assistant editor

Mrs S. M. Newton

Draughtsman

D. E. Cole

Editorial secretary

Mrs O. M. Ogles

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

EDITORIAL BOARD

D. A. Evans, G3OUF

A. W. Hutchinson

D. S. Evans, G3RPE

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

- 836 Editorial—Post-schedule business
- 837 Computers and the RSGB
- 838 Amateur Radio News
- 841 Council Proceedings. Mobile Rallies Calendar
- 842 RAE Courses 1984–5. Special Event Stations. Other Events. Obituaries
- 843 Members' Mailbag
- 844 The 10-turn "chopstick" helical (Mk2) for Oscar 10, 435MHz uplink—Colin Richards, 9M2CR
- 846 Elliptic lowpass audio filter design using miniature preferred value components—S. Niewiadomski, MSc, BR554049
- 849 A transceiver for the hf bands (Part 5)—Lorin Knight, MIEE, G2DXK
- 856 Technical Topics—Pat Hawker, G3VA
- 862 The New Locator System—John Morris, GM4ANB
- 866 4–2–70—Ken Willis, G8VR
- 869 Microwaves—Mike Dixon, G3PFR
- 870 QRP—Rev George Dobbs, G3RJV
- 871 Computing—John Morris, GM4ANB
- 872 Ephemeris—Bob Phillips, G4IQQ
- 873 The New Schedule
- 877 SWL News—Bob Treacher, BR532525
- 878 The Month On The Air—John Allaway, G3FKM
- 881 HF Propagation Predictions
- 882 How good are our hf propagation predictions?—Ray Cracknell, G2AHU (ex-Z22JV)
- 886 Contest News
- 888 Contests Calendar
- 889 1984 HF National Field Day results
- 894 1984 VHF National Field Day results
- 899 RSGB Slow Morse Practice Transmissions
- 900 Club News
- 903 Members' Ads

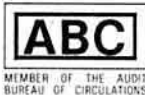
Technical articles on subjects of amateur interest are always welcome and should be sent to: The Editor, *Radio Communication*, 88 Broomfield Road, Chelmsford, Essex CM1 1SS.

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



33,778 copies per
issue average
circulation in 1983

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

© RADIO SOCIETY OF
GREAT BRITAIN 1984



the TH21E & TH41E, hand size handhells.

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

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

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

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

TH21E.....2 metre transceiver.....	£189.00 inc VAT, carr £6.00
TH41E.....70 centimetre version.....	£198.00 inc VAT, carr £6.00
SMC30.....speaker/microphone.....	£21.50 inc VAT, carr £1.00
HMC1.....headset with VOX.....	£25.00 inc VAT, carr £1.00
DC21.....DC power supply.....	£18.98 inc VAT, carr £1.00
PB21.....Nicad battery case.....	£18.58 inc VAT, carr £1.00
BT2.....Dry battery case.....	£9.00 inc VAT, carr £.75
SC8.....Soft case.....	£9.88 inc VAT, carr £.75
EB2.....External battery case.....	£14.58 inc VAT, carr £1.00

the TR2600E & TR3600E, handhells with DCS.

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

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

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

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

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

TR2600E.....2 metre handheld complete with DCS.....	£269.88 inc VAT, carr £6.00
TR3600E.....70 centimetre handheld with DCS.....	£289.00 inc VAT, carr £6.00
BC2.....AC Charger.....	£10.98 inc VAT, carr £1.00
DC26.....DC/DC converter.....	£19.47 inc VAT, carr £1.00
EB3.....External battery case.....	£14.45 inc VAT, carr £0.75
HMC1.....Headset with VOX.....	£25.00 inc VAT, carr £1.00
PB26.....Nicad battery pack.....	£30.50 inc VAT, carr £1.00
SC9.....Soft case.....	£18.50 inc VAT, carr £0.75
SMC30.....Speaker/microphone.....	£21.58 inc VAT, carr £1.00



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

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

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

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

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

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

TM211E.....2 metre FM mobile.....£360.00 inc VAT carr £6.00 with DCS.
TM411E.....70 centimetre FM.....£410.00 inc VAT carr £6.00 mobile with DCS.
CD10.....Callsign display unit.....£105.40 inc VAT carr £6.00

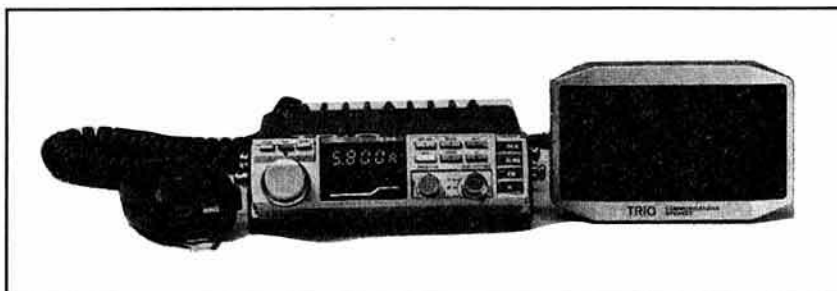
There are facilities to put both VFO's on the same frequency, to operate split using one VFO for receive and the other for transmit. A priority call channel is available as is the ability to go back to a predetermined frequency. The TS711E will scan the band or the memories holding for a brief period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

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

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

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

TS711E.....2 metre base station.....£785.00 inc VAT carr £6.00 transceiver with DCS.
TS811E.....70 centimetre base.....£878.00 inc VAT carr £6.00 station transceiver with DCS.
CD10.....Callsign display unit.....£105.40 inc VAT carr £6.00
SP430.....Matching speaker.....£30.99 inc VAT carr £2.50



the TM211E & TM411E, mobile with DCS.

LOWE ELECTRONICS Ltd

CHESTERFIELD ROAD MATLOCK DE4 5LE TEL 0629 2430/2817



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



PS 50 M
9-15 volts, 5.6 amps
£52.50 inc VAT, carr £3.00

PS 80 M
3-15 volts, 8 amps
£68.25 inc VAT, carr £3.00

PS 120 M
3-15 volts, 12 amps
£82.00 inc VAT, carr £6.00

PS 300
9-15 volts
30 amps max, 20 amps
continuous
£166.00 inc VAT, carr £6.00

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

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

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

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

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

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

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.

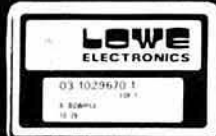
- The use of hybrid IC's and a miniature SSB crystal filter has made the LS202E even smaller than some of the existing FM only handheld portables. The rig measures 62mm wide, 40mm deep and 165mm high, small enough for your jacket pocket and weighs only 520 grammes.

- 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



EMPORIUM NEWS

Good morning.

On the first two pages you will see details on the **new eight transceivers from TRIO**. As those who came to our **Our Day** will know, we have had here at Matlock almost the entire range. I have still not seen the TS811E 70 cm base station. **As is usual for TRIO**, the new rigs are in response to amateurs' requests. **The TS711E** being the answer to, "why doesn't TRIO have a real base station transceiver"—**the TR2600E** and **TM211E** being as current rigs but of higher specification and featuring the new DCS System. **Of course** there are **70 cm versions** of each model, these being the **TS811E**, **TR3600E** and the **TM411E**. You will note that I have not mentioned the TH21E and TH41E models. I never thought I would be so **"bowled over"** by a hand-held rig, but the TH21E has held the entire company fascinated since we unpacked it. **Alan, G3MME**, has asked if he can trade in his TR2300 for one. I believe David G4KFN, out in the showroom, is checking out a price for Alan but obviously he will have to find the rig's box and operating manuals.

I have shown the **TH21E** to several friends in the shop specifically to monitor their reactions as an aid to advertising. **First expletive** when handed the new rig is -----, next they want to know the price and what is included. **When told £189**, including VAT, for the 2 metre rig and £198.00 for the 70 cm version their comment is **"not bad!"** Mike G2AS is actually considering selling his beloved pocket phones so that he can have the 70 cm one. **Anyway**, I intend popping both new rigs, 70 cm and 2 metre in my briefcase when visiting the shops.

I am sorry that the **new location of the London shop** has made things difficult for those living and working in the capital. It was not our intention to create difficulties. The Kings Cross property was held on a short term lease, which has now expired. We cannot stay and have to move. As you are aware, retail premises in central London are expensive and I have been unable to find anything that we could afford closer than **Eastcote**.

The new premises, however, are **spacious and above ground**. I have been **seriously concerned** about Andy's health for sometime now working as he does in the dark and dank of the Kings Cross basement—he has begun to look pale. Andy, now at street level, will be pleased to welcome you to the new shop. His address is **223/225** (there I told you it was

large) **Field End Road, Eastcote**. The telephone number is **01-429 3256**. There is free parking in the street outside the shop and immediately behind is a large car park in which it currently **costs 20p to park for the day**. On my visits to Eastcote I have always been able to find space in the car park, indeed there are usually **more spaces than cars**.



After two false starts, a great deal of time and error and an advertisement in the South Wales Echo, **I have finally found premises in Cardiff**.

Mae gan Caerdydd "Lowe Electronics" ei hun yn awr. Y rheolwr yw Richard "GW4NAD" sy'n dod o Benarth.

Mae'r siop (rhif ffôn 0222 464154) ar y llawr cyntaf o adeilad "South Wales Carpets" 96 Clifton St, Caerdydd.

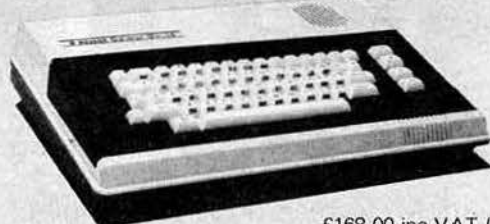
Mae Stryd Clifton ar ochr Heol Casnewydd. Adeilad newydd, Coch ar ddiwedd Stryd Clifton ydi "South Wales Carpets". Gellir parcio yn rhad ac ac ddim ar y stryd tu allan i'r siop.

Located on **Clifton Street**, which is a **left turn off Newport Road**, just before the Infirmary, our shop is found on the first floor of **South Wales Carpets**. South Wales Carpets is at the end of Clifton Street, a red brick building, on the right and easily found. **Free** street parking is available

adjacent to the shop. Enter South Wales Carpets (they know all about Radio Amateurs, one of their fitters is one) follow the signs marked **Lowe Electronics** upstairs—if in doubt ask one of the carpet salesmen—and enter the new Emporium. Our Manager in Cardiff is **Richard, GW4NAD** who comes from Penarth. His father, **Fred**, is also a radio amateur. I am sure Richard will be pleased to see you. In the early days things may be untidy but not to worry. **The most important thing** is to get the shop open and provide a service for the patient folk of South Wales.

Thinking about the features of the new TRIO equipment and the need to handle a **TH21E** or **TH41E** to appreciate its size, I am pleased to announce **the new shop in Wales** and to tell of **our move to Eastcote** of the London Shop. I must stress that to buy equipment from any of the **Lowe Electronics' shops** is to buy it from Matlock with all that that

32K COLOUR GENIE including £57 RTTY software-free



£168.00 inc VAT (carr. £6)

implies. We hope that our shops in **Glasgow, Darlington, Cambridge, London and Cardiff** will provide an alternative to mail order or a long expensive and tiring drive. Certainly you can see the latest equipment, try it out and make your decision untroubled by pressure salesmen. **In fact for good advice** I recommend a chat with either **Sim, Don, Tony, Andy, Richard or David**. As I have said somewhere before, **good advice given as one amateur to another**, not in order to **make a sale!**

Over the years we have visited many Amateur Radio Clubs and made many new friends. We have also shown Clubs round the facilities here at Matlock on Sunday mornings. Although we are now booking well into 1985, if you would like us to visit or have you visit us don't hesitate to give us a ring.

On the opposite page you will see our advert for **DAIWA power supplies**. As many of you know, **DAIWA** equipment, be it meters, switches or rotators are well-made and reliable. The new range of power supplies are made in the same mould. **The range now has models from 5.6 to 22 amps**; carefully built, neatly cased, a **DAIWA** power supply is an asset to any shack. A word of advice. As with rotators, it is best to buy the largest you can afford. The nice thing about the **DAIWA** supplies is **their reliability**. They may cost more than those from other manufacturers but those who have experienced the havoc a faulty power supply can wreak in the average shack will endorse my comments. **If possible buy the best**. If not wait until funds allow. It is false economy to buy a "junk" PSU. In fact it is false economy to buy anything that is not from a reputable manufacturer.

Just a word on the **Revco discone antennae**. Anyone who has a wide band receiver should have a Revcone. Covering 30-500 MHz, compact and well-made, I have nothing but praise for the aerial. **Costing only £25.00**, including VAT, carriage £6.00, the Revcone is a must. Just ask **Don** in Darlington his opinion of the aerial.

It is possible now to obtain an AR2001 receiver without being on the waiting list. Indeed, you should be able to ring up, find that we have one in stock, buy it (and the Revcone) and start listening. **A fascinating receiver** and one for the person who does not want to miss a thing.

Anyway, that's about it for now. I must go and **stake my claim** on the TH21E for this evening's operating. I never thought I would see the day when friendships would crumble over a 2 metre hand-held.

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

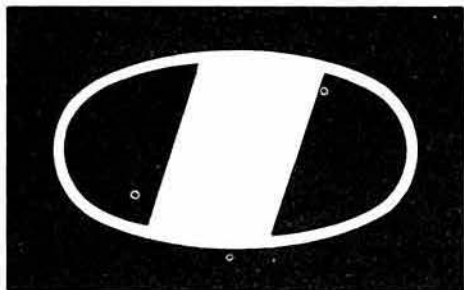
David G8GIY

(Note correct call sign this time—no I have not been banished to 6861Y land!)

HEAD OFFICE AND SERVICE CENTRE
LOWE ELECTRONICS LTD. CHESTERFIELD ROAD, MATLOCK, DERBYS. TEL: 0629 2817 or 2430. TELEX: 377482. OPEN TUES FRIDAY 9 5.30, SAT 9 5
CLOSED FOR LUNCH 12.30 TO 1.30

**For personal attention on the South Coast contact John, G3JYG,
16 Harvard Road, Ringmer, Lewes, Sussex. Ringmer 812071.**

SEND 70p IN STAMPS FOR COMPLETE CATALOGUE AND ANTENNA BOOK
PLEASE SPECIFY ANY PARTICULAR INTEREST AND WE WILL SEND FULL INFORMATION



ICOM

FOR THE SWL...

IC-R70, £565.

The R70 covers all modes (when the FM option is included), and uses 2CPU-driven VFOs for split frequency working, and has 3 IF frequencies. 70MHz, 9MHz and 455KHz, and a 100dB dynamic range. It has a built-in mains supply. Other features include input switchability through a pre-amplifier, direct or via an attenuator, selectable tuning steps of 1KHz, 100Hz or 10Hz, adjustable IF bandwidth in 3 steps (455KHz). Noise limiter, switchable AGC, tunable notch filter, squelch on all modes, RIT, tone control. Tuning LED for FM (discriminator centre indicator). Recorder output, dimmer control.

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

Ever since its introduction the IC-R70 has proved to be a popular and reliable HF receiver making your listening hours a pleasure. Please contact us for further details on this excellent set.



IC-R71E, £649.

For those who like the easy life, the R71E has the option of an infra-red remote control unit, making it a very sophisticated rig indeed, here are some details.

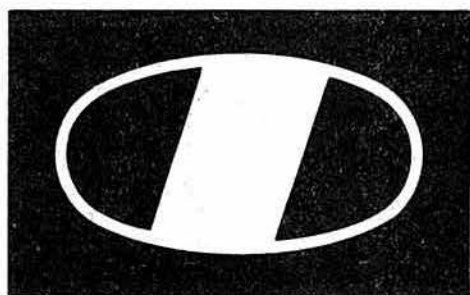
100 KHz – 30 MHz all mode (with FM option).

Quadruple conversion superhet. IF frequencies 70MHz, 9MHz and 455KHz with continuous bandpass tuning and notch filter. Virtually immune from adjacent channel interference with 100db dynamic range. Adjustable AGC, noise blanker and switchable pre-amplifier. Direct keyboard into twin VFO's with 32 programmable memories. 5 year lithium memory backup cell. Memory and band scan with auto-stop. Tuning rates 10Hz, 50Hz and 1 KHz with 6 digit readout. AC mains operation. Auto squelch tape record function.

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



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



ICOM

FOR THE DX'er...

IC-751, £1099.

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

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

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



IC-271H, £819.

The IC-271H is the most advanced 2 meter transceiver available today, it covers the spectrum from 144-146 MHz with FM, SSB, or CW using the most advanced 10Hz PLL system. The IC-271H is suitable for simplex, repeater operation, moonbounce or satellite work, and has features found on no other transceiver.

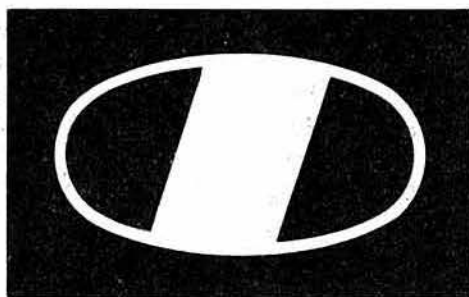
Some standard features include 32 tunable memories, a high visibility fluorescent display, RIT readout, scanning, 12V DC operation with optional AC power supply.

The 271H has a speech synthesizer that announces the displayed frequency, ideal for blind operators, this is an optional extra along with the SM6 desk microphone and 22 channel memory extension with scan facilities.

As you can see from this brief description the IC-271H, (and its 430-440MHz brother the IC-471H) are very versatile sets indeed. More detailed literature can be easily obtained from Thanet Electronics Limited.



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



ICOM

ON THE MOVE...

IC-27E, £319.

This must be the smallest, 2M, FM mobile available today, measuring only 38mm H x 144mm W x 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 5Khz 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 £319 and £25 for the optional speech synthesizer.



IC-02E, £239. IC-04E, £259 (70cm).

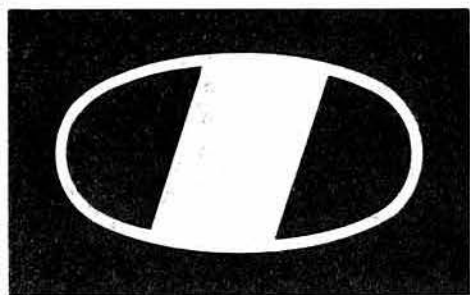
The new direct entry microprocessor controlled IC-02E is a 2 meter handheld jam packed with excellent features.

Some of these features include: scanning, 10 memories, duplex offset storage in memory and 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:- HS 10-SB Switch box with pre-amplifier giving biased toggle on, off and continuous transmit. HS 10-SA Voice operated switch box, with pre-amplifier, mic gain, vox gain and delay. The IC-2E continues to be available.



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



ICOM

FOR COMPUTERS

Tono 5000E, £829.

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

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



Tono 9100E, £729.

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

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



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

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



- **FACTORY APPOINTED IMPORTER**
- **FREE SECURICOR DELIVERY ON ALL MAJOR ITEMS**



Amateur

YAESU

FT-ONE	HF transceiver with gen coverage RX	1569-00	NC-9C	Standard charger (FNB-3)	9-20
FMU-1	FM unit	44-99	MH-12A2B	Spkr mic	17-69
DCL-1	DC lead	10-84	MMB-21	Mobile mount	8-00
RAM-B	Non-volatile MEM	14-49	YH-2	Headset mic	14-49
Kuftone	Curtis Keyer	28-50	PA-3	DC adaptor	16-00
XF-8-9KC	CW filter (600 Hz)	19-35	FNB-3	10-8V batt pack	33-50
XF-8-9KCN	CW filter (300 Hz) narrow	19-35	FNB-4	12V batt pack	38-25
XF-10-7KC	CW FSK (800 Hz)	17-49	FBA-5	Batt case for 6 AA dry cell	6-85
XF-8-9KA	AM filter (6 Hz)	19-35			
FT-980	HF transceiver with gen coverage RX (CAT system)	1329-00	FT-203R	2m synth handie thumbwheel tuning + FNB-3	175-00
SP-980	External speaker with audio filter	61-50	FT-203R	2m synth handie thumbwheel tuning + FNB-4	184-00
FC-757AT	Automatic antenna tuner	245-00	FT-203R	2m synth handie thumbwheel tuning + FBA-5	155-00
FIF-232C	Computer interface RS-232	59-00		(Accessories as for FT-209R)	
FIF-65	Computer interface Apple II	54-00	FT-790R	70cm portable/mobile/base multimode	259-00
FIF-80	Computer interface N.E.C.	105-00	MMB-11	Mobile mount	28-19
XF-8-9HC	CW filter (600 Hz)	29-50	NC-11C	Charger	10-35
XF-8-9HCM	CW filter (450 Hz)	29-50	CSC-1A	Case	4-45
XF-8-9HCN	CW filter (300 Hz)	29-50	YM-49	Spkr mic	19-25
XF-455MC	CW filter (ceramic)	49-00	YHA-44	1/4 wave helical antenna	7-00
XF-455MCN	CW filter (ceramic)	49-00	YH-1	Headset mic	15-75
FT-757GX	HF transceiver gen coverage all modes	719-00	SB-2	Switching unit	14-50
FC-757AT	Automatic antenna tuner	245-00	MF-1A3B	Mobile boom mic	18-95
FP-757	Switched mode PSU - 50% duty	145-00	FT-730R	70cm 10W FM mobile	239-00
FP-757HD	Heavy duty PSU - 100% duty	179-00	YM-49	Spkr mic	19-25
FIF-65	Computer interface Apple II	54-00	YM-1	Headset mic	15-75
FIF-80	Computer interface N.E.C.	105-00	SB-2	Switching unit	14-50
FIF-232C	Computer interface RS-232	59-00	MF-1A3B	Mobile boom mic	18-95
FAS-14R	Remote antenna selector	49-00	FT-708R	70cm synth handie	189-00
MMB-20	Mobile mount	18-50	NC-8A	Base stn. charger/adaptor	56-75
FT-77	HF transceiver 8 band mobile/base 100W	507-55	NC-7	Base stn. charger	34-65
FP-700	Matching power supply	145-00	NC-9C	Standard charger	9-20
FC-700	Matching antenna unit	103-84	YHA-44D	1/2 DC grounded antenna	9-50
FV-700DM	Digital VFO	209-00	YM-24A	Spkr mic	22-50
FTV-700	Transverter frame only	125-00	DA-3	DC adaptor	16-00
FTV-2M	2m module	119-00	MMB-10	Mobile mount	8-45
FTV-70	70cm module	241-00	FNB-2	Battery pack	23-00
FTV-4M	4m module	95-00	FBA-2	Battery pack adaptor (NC8A-NC-7)	3-65
MU-77	Marker unit	10-84	FT-703R	70cm handie thumbwheel tuning + FNB-3	TBA
XF-8-9KC	CW filter (600 Hz)	19-35	FT-703R	70cm handie thumbwheel tuning + FNB-4	TBA
XF-8-9KCN	CW filter (300 Hz)	19-35		(Accessories as for FT-209 - FT-203R)	
FT-726R	Multimode transceiver 2m fitted	774-99	FRG-7700	General coverage receiver	385-00
21/24/28	HF module	209-00	FRG-7700/M	General coverage receiver + 12CH memory	455-00
50/726	6m module	195-00	FRV-7700/A	VHF converter	89-95
430/726	70cm module	259-00	FRV-7700/B	VHF converter	90-75
SAT-726	Duplex module	99-95	FRV-7700/C	VHF converter	84-50
XF-455MC	600 Hz CW filter (ceramic)	49-00	FRV-7700/D	VHF converter	91-74
XF-455MCN	300 HZ CW filter (ceramic)	49-00	FRV-7700/E	VHF converter	94-25
FT-290R	2m Portable/mobile/base multimode	279-00	FRV-7700/F	VHF converter	94-25
FL-2010	10W linear for above	66-55	FRT-7700	Antenna tuning unit	48-25
MMB-11	Mobile mount	28-19	FRA-7700	Active antenna	43-95
NC11C	Charger	10-35	FF-5	Filter	11-25
CSC-1A	Case	4-45			
YHA-15	Helical antenna	5-65	Base station	YAESU antennas	
YM-49	Spkr mic	19-25	RSL-145GP	2m 5/8 ground plane	24-75
YH-1	Headset mic	15-75	RSL-435GP	70cm 5/8 over 5/8 ground plane	36-25
SB-2	Switching unit	14-50	Mobile	Stub mast RSE-2A	4-95
MF-1A3B	Mobile mic	18-95	RSL-3-5	80m mobile whip	13-85
FT-230R	2m mobile 25W FM	269-00	RSL-7A	40m mobile whip	13-50
YM-49	Spkr mic	19-25	RSL-14	20m mobile whip	12-99
MF-1A3B	Mobile boom mic	18-95	RSL-21	15m mobile whip	12-75
SB-2	Switching unit	14-50	RSL-28	10m mobile whip	12-45
FT-209R	2m synth FM handie 350mw/3W	239-00	RSM-2	Gutter clip for above	12-45
FT-209RH	2m synth FM handie 500mw/5W	259-00	RSL-145S	2m 5/8 whip	10-50
NC-15	Base stn charger/adaptor	49-94	RSL-150SS	2m 1/4 whip	4-25
NC-18	Standard charger (FNB-4)	10-35	RSL-435S	70cm 5/8 over 5/8 whip	17-74
			RSM-3R	Gutter clip for above	9-25
			RSM-4M	Mag mount for above	15-00

Electronics UK

• FACTORY BACKED EQUIPMENT
• FREEPOST - MAIL ORDER ENQUIRIES

YAESU

General accessories

YC-500J	Frequency counter	189-75	DCL-230/730	DC lead FT-230/730	6-55
YC-500S	Frequency counter	270-00	FF-501DX	Low pass filter	28-99
YP-150Z	Dummy load wattmeter	103-95	LB	Log book	2-50
SP-55	Mobile ext spkr	16-50	QTR-24D	World clock	34-99
FTC-5	Leather case FT-208/708	32-57	YH-55	Headphones	12-50
DCL-ONE	DC lead FT-ONE	10-84	YH-77	Headphones (lightweight)	12-50
DCL-480	DC lead FT-480R	6-55	MU-7700	Memory unit for FRG-7700	75-00

T.E.T. antennas

HB23SP	2 element tri-band beam 10, 15, 20m	172-50	MV5BH	Vertical antenna 10, 15, 20, 40, 80m	98-99
HB33SP	3 element tri-band beam 10, 15, 20m	231-50	MV3BHR	Vertical antenna 10, 15, 20m + trapped radials	78-00
HB23M	2 element tri-band beam (mini) 10, 15, 20m	169-50	MV4BHR	Vertical antenna 10, 15, 20m + trapped radials	95-50
HB33M	3 element tri-band beam (mini) 10, 15, 20m	230-00	SQ22	Double quad 144 mhz	58-95
MV3BH	Vertical antenna 10, 15, 20m	49-95	SQY06	Swiss quad/yagi 144 mhz 6 element	45-75
MV4BH	Vertical antenna 10, 15, 20, 40m	59-49	SQY08	Swiss quad/yagi 144 mhz 8 element	52-74

ATU's

HC-200	HF bands ATU 200W PEP
HC-400L	HF bands ATU 350W PEP
HC-2000	HF bands ATU 2Kw PEP

Linears VHF

HL-30V	30W 2m linear 0-5-3W input
HL-82V	85W 2m linear 10W input
HL-110V	110W 2m linear
HL-160V	160W 2m linear 10W input
HL-160V25	160W 2m linear 25W input

Linears UHF

HL-20U	20W 70cm linear
HL-45U	45W 70cm linear 10W input
HL-90U	90W 70cm linear 10W input

Tokyo Hy Power

82-95	Pre-amps
149-00	HRA-2 2m mast head pre-amp 95-00
TBA	HRA-7 70cm mast head pre-amp 103-30

NEW! Micro-7

3ch. 70cm handie 1ch. fitted
200mw FM

Pairs of crystals 10-00

£99.00



Hi Mound

HK708	Hand morse key with A.B.S. base	13-67
HK707	Hand morse key with A.B.S. base and dust cover	14-48
HK706	Hand morse key with A.B.S. base and dust cover	15-60
HK705	Morse key with A.B.S. base	14-60
HK704	Morse key, A.B.S. base, dust cover	18-97
HK702	Morse key, marble base, dust cover	29-65
HK808	Morse key, heavy marble base and dust cover	39-00
HK802	Polished brass key with weighted wooden base	82-00
MK704	Squeeze key heavy base required	12-76
MK705	Squeeze key on a heavy marble base	23-78
COK-2	Code oscillator for practice	7-99

Toyo meter

YM1X	3-5-150 MHZ 120 watt SWR/PWR meter	18-80
T430	145/430 MHZ R.F. Thru-line watt meter, 120W	44-65
T30	30 watt 3-5-500 MHZ dummy load	8-05
T100	100 watt 3-5-500 MHZ dummy load	28-18
T200	200 watt 3-5-500 MHZ dummy load	42-26
T435	145/430 MHZ R.F. Thru-line watt meter, 200W	49-35

Baluns

BL40X	50 ohm-50 ohm 1-1 Balun 1 kw pep	14-90
BL50A	50 ohm-50 ohm 1-1 Balun 4 kw (pep)	
	2 kw (cw)	18-69
SA450N	2 way antenna switch, 'N' connectors	16-66
SA450M	2 way antenna switch SO239 connectors	12-65
RF2000	2 KW, 3-5-150 MHZ SWR meter	19-50
5M	PL259-PL259 patch lead 50 cm	2-24
8M	PL259-PL259 patch lead 80 cm	2-36
5MM	PL259-PL259 patch lead 3-8 m	2-99

Insulators

AE/EGG	Ceramic egg insulator	0-40 each
AE/DOG	Ceramic dog bone insulator	0-60 each

**FREEPOST -
MAIL ORDER
ENQUIRIES**

**Amateur Electronics Ltd.
FREEPOST
Birmingham B8 1BR**

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

BRANCHES

NORTHERN

Amateur Electronics UK/Holdings, 45 Johnston St., Blackburn. Tel: (0254) 59595

YORKSHIRE

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

AGENTS

SHROPSHIRE

Syd Poole, G31MP, Newport SALOP (0952) 812134

EAST ANGLIA

Amateur Electronics UK, 31 Cattlemarket St., Norwich. Tel: (0603) 667189

SOUTH WEST

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

NORTH STAFFS

Bob Ainge, G4XEK (0538) 754553

WALES & WEST

Ross Clare, GW3NWS (0633) 880 146

NEW Branch...

EAST MIDLANDS

R. A. S. Notts,
3 Farndon Green,
Wollaton Park, Nottingham.
Tel: (0602) 280267



LEICESTER SHOW S

Bernie – At these prices you may have made a few boobs!

SUPERB 2 METRE BASE STATION



ICOM IC271E

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

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

HOW LOW CAN WE GO!



YAESU FT790R

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

£249
INC. NICADS
AND CHARGER



PRICES CORRECT AT TIME OF GOING TO PRESS
ALL OFFERS SUBJECT TO AVAILABILITY

PERFECT TIMING



ICOM ICR71

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

£625
WITH
AT 1000
AERIAL TUNING UNIT

REACH FOR THE SKY & CATCH A SATELLITE



YAESU FT726R

Multiband base station transceiver. Just compare the following features:

£739 INCL
MUTEK PRE-AMP

FEATURES	FT 726R	TS780	FEATURES	FT 726R	TS780
Choice of bands	yes	no	Limited Band Scan	yes	yes
450 MHz capability	yes	no	Mode Memory	yes	no
IF Shift	yes	yes	Memory Backup	lithium	AA cell
IF Width	yes	no	RX Tone Control	yes	no
CW Filter	option	no	RF PWR Control	continuous	Hi/Low
X-band Full Duplex	option	no	Speech Processor	AF	none
Squelch	all modes	FM only	VOX	no	yes
Memory Channels	11	10	CW Semi break-in	yes	yes

EXTRA-SPECIAL OFFER

FT726R WITH 70cm CARD FITTED £1,053 – WITH
DUPLEXER/SATELLITE MODULE WORTH £100!

ALL PRICES INCLUDE V.A.T.

FREE!

SPECIALS FROM A.R.E.

WORLD BEATER



YAESU FT290R

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

**£269 WITH
MUTEK BOARD
OR NICADS
& CHARGER**

MORE FOR LESS

YAESU FT708R

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



**£179 WITH
NC9C CHARGER!!**

**SAVE £30
ON OLD PRICE**



*I have to compete
with you somehow
Brenda!*

ARE CLUB

Have you joined the Amateur Radio Exchange Club yet? The benefits to all amateur radio enthusiasts are enormous! From priority news about new products to priority opportunities to buy at ARE's amazing prices. PLUS offers that are exclusive and FREE! Contact us for full details.
BRENDA G4VXL and BERNIE G4AOG

R.U. SERIOUS?



ICOM IC745

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

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

THE ULTIMATE



YAESU FT757GX

Compact – dual VFO's – general coverage – 100W O/P. FM/SSB/CW All options fitted incl. CW Filter and electronic keyer.

**£685 WITH
FREE
AERIAL TUNING UNIT**

CLOSED – Mondays. OPEN – Wednesdays

FULL DETAILS: TUES, WED, FRI 9.30-5.30 · THURS 9.30-6.00 · SAT 9.30-5.00



AMATEUR RADIO EXCHANGE LTD

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 29881/2

more on your wavelength



South Midlands

***FREE FINANCE — *2 YEAR GUARANTEE**

Branches at SOUTHAMPTON, LEEDS, CHESTERFIELD,

'YAESU' FOR H.F. EQUIPMENT — 'SMC' AT YOUR SERVICE

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.



FT757GX
FC757AT
FP757GX
FP757HD
FIF80
FIF65
FIF232C

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

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.



FT77
FT77S
FP700
FC700
FV700DM
MKT77
FMUT77
AMUT77

8 Band Rx/Tx 100W output.....£479.00
8 Band Rx/Tx 10W output.....£449.00
Matching AC PSU.....£145.00
Matching antenna tuner.....£103.85
Digital VFO unit.....£209.00
Marker unit.....£10.85
FM unit.....£28.55
AM unit.....£24.00

FT980 "COMPUTER COMPATIBLE"



FT980
SP980
XF455.8MCN
XF8.9HC
XF8.9GA
FIF**
D410004
TST980

Transceiver General Coverage Rx.....£1329.00
Ext. speaker with audio filter.....£61.55
300Hz CW filter (455KHz 8 pole).....£49.00
600Hz CW filter.....£29.50
6kHz AM filter.....£29.50
Computer interface (see FT757GX units)
Interconnect lead FT980-FC757AT.....£26.99
Technical Supplement FT980.....£8.50

FT-ONE 'THE ULTIMATE'



FT ONE
KEYT901
DCT1
RAMT1
FMUT1

Transceiver HF All Mode.....£1569.00
Curtis Keyer.....£28.50
DC Power Cable.....£10.85
Non volatile memory.....£14.49
FM unit.....£44.99

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

FRG7700 COMMUNICATIONS RX



FRG7700 Receiver 0.15-30MHz AM/CW/SSB/FM.....£385.00
FRG7700M Receiver c/w 12 channel memory.....£455.00
MEMG7700 Memory option.....£75.00
FRT7700 Antenna tuner/switch.....£48.25
FRA7700 Active antenna.....£43.95
FF5 Low pass filter 500kHz.....£11.25
FRV7700 VHF Convertors, 8 models, each 3 bands. From £85-£95 each

SIX METRE EQUIPMENT

** Limited availability on these models*



FT680R

FT726R
50/726
FT680R*
FT690R*
FL6010*
50TV*
MMC50/28S
MMA50V
SLNA50S

Main frame unit less modules.....£619.00 inc.
6M module for 726R.....£195.00 inc.
6M mobile 10W O/P.....£359.00 inc.
6M transportable 2.5W O/P.....£259.00 inc.
Matching 10W amplifier for 690R.....£49.00 inc.
6M module for FTV transvertors.....£89.00 inc.
6M down to 10M converter.....£34.90 inc.
6M switched pre-amp.....£34.90 inc.
50 MHz switched pre-amp.....£44.90 inc.

STOCK CARRYING AGENTS WITH DEMONSTRATION FACILITIES

Stourbidge Andrew G4BJY (0384) 390916

SMC N. Ireland (0247) 464875

Neath John GW4FOI

{ (0639) 52374 Day
(0639) 2942 Eve

SMC SERVICE

Free Securicor delivery on major equipment.
Access Barclaycard over the phone.
Biggest branch agent and dealer network.
Securicor 'B' Service contract at £5.00.
Biggest stockist of amateur equipment.
Same day despatch whenever possible.

FREE FINANCE

*On many regular priced items SMC offers.
Free Finance (on invoice balances over £120)
20% down and the balance over 6 months or
50% down and the balance over a year.
You pay no more than the cash price!
Further details on eligible items on request.

GUARANTEE

Importer warranty on Yaesu Musen products.
Able staffed and equipped Service Department.
Daily contact with the Yaesu Musen factory.
Tens of thousands of spares and test equipment.
Twenty five years of professional experience.
• 2 years warranty on regular priced Yaesu products.

Communications Ltd.

TEE—MAIN DISTRIBUTOR FACTORY BACKED

BUCKLEY, STOKE, GRIMSBY, JERSEY, EDINBURGH, N. IRELAND



YAESU FOR VHF EQUIPMENT—'SMC' YOUR SUPPLIER

NEW

FT209R HANDHELD—TWIN CPU's

KEYBOARD ENTRY—SCANNING COMPREHENSIVE LCD DISPLAY

Two 4 bit CPU's: 10 memories (independent Tx & Rx), reverse/simplex (either) by single key touch, scanning; manual-auto band (full or partial) —memory, clear-busy, skip-select, programmable power save system (10 selectable dwell times). Large LCD 1" Digits + 10 special functions, "any angle". Meter; S/battery condition, VOX. 65 x 34 x 169mm.

INCREDIBLE

FT209R (1.8W)	c/w FBA5, YHA14A, CSC10 etc.....	£225.00
FT209R (2.7W)	c/w FNB3, YHA14, CSC10 etc.....	£239.00
FT209R (3.7W)	c/w FNB4, YHA14, CSC11 etc.....	£249.00
FT209RH (2.3W)	c/w FBA5, YHA14, CSC10 etc.....	£235.00
FT209RH (3.7W)	c/w FNB3, YHA14, CSC10 etc.....	£249.00
FT209RH (5.0W)	c/w FNB4, YHA14, CSC11 etc.....	£259.00
CSC10	Soft case (FBA5, FNB3 fitting).....	TBA
CSC11	Soft case (FNB4 fitting).....	TBA

For general accessories see FT203R list.
FNB5, FNB3, FNB4, YH2, MH12A2b, SMC8.9AA, NC15, MMB2*



FT203R & FT703R HANDHELD

"THUMBWHEEL" TINY HANDHELD

Ultra compact 65W x 34D x 153Hmm, synthesised handheld. Computer aided design and component insertion with chip capacitors and resistors has produced this modern marvel: 2.5W RF (10.8v) (3.5W RF (12V)). It has VOX (for use with YH-2 lightweight headset, and built in 'S'/PO meter. Supplied with tone burst, helical and appropriate case.



FT203R	c/w FBA5, CSC6 etc.....	£155.00
FT203R	c/w FNB3, CSC6 etc.....	£175.00
FT203R	c/w FNB4, CSC7 etc.....	£185.00
FBA5	7.2/9V Cell case only (6 x 'AA').....	£6.85
FNB3	10.8V NiCad Pack (425mAh).....	£33.50
FNB4	12.0V NiCad Pack (500mAh).....	£38.25
CSC6	Soft case (FBA5 or FNB3 fitting).....	£6.00
CSC7	Soft case (FNB4 fitting).....	£6.85
YH2	Headphone/Microphone option.....	£14.50
MH-12A 2b	Speaker/Microphone option.....	£17.69
MMB21	Mobile mounting bracket.....	£8.00
SMC8.9AA	Charger (slow) 13A style.....	£8.05
NC15	Charger (quick) and Power Unit.....	£49.95

FT290R & FT790R MULTIMODE



* FT790R limited
offer at
£259

FT690R	Multimode Transceiver 6m.....	£259.00
FT290R	Multimode Transceiver.....	£279.00
FT790R*	Multimode Transceiver 70cm.....	£259.00
SMC2.2C	2.2Ah Nicads 'C' size.....	per set £21.60
SMC8C	220mA Charger (13A Style).....	£9.20
MMB11	Mobile Mount.....	£28.19
CSC1A	Carrying case.....	£4.45
FL6010	6m 10W Amplifier.....	£49.00
FL2010	2m 10W Amplifier.....	£66.25

FT230R & FT730R FM MOBILES



FT230R	2m Transceiver 25W.....	£269.00
FT730R	70cm Transceiver 10W.....	£239.00*
MMB15	Mobile mounting bracket.....	£14.65

* Limited quantity available at this price

KDK 2033 FM MOBILE, 144MHz

Sensitivity better
than .2µV for 12dB
SINAD



NEW £239

144 MHz, 12VDC FM Transceiver.
25W/5W Hi/Lo (both adjustable).
Compact 2 1/8 x 6 1/2 x 7 1/8".
12 1/2 KHz steps (100KHz fast QSY).
Amber LCD 'Sunlight View'. Side Lit Display.
100's of Hz + channel number. Sensitivity
<0.2µV for 12dB SINAD. Single knob
frequency control "Dual". Endless or non
endless dial options.
RIT; 1KHz steps. V.F.O. + memory. Two 5
slot memories A, B, A+B, A x B.

11th memory instant "call" channel.
Memory 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
+ 600KHz split, plus cross memory.
Repeater input listen—press "dial".
Setable, steps, tone, splits, limits.
Simple controls for safe mobile.
CW mobile mount, mic, handbook.

FT 726R MULTIMODE UHF, VHF, HF



FT726R	Transceiver main frame only.....	£619.00
FT726R(2)	Transceiver c/w 2m.....	£775.00
21/24/28	HF module.....	£209.00
50/726	6m module.....	£195.00
430/726	70cms module.....	£259.00
SAT726	Full duplex module.....	£99.75
XF455MC	600Hz CW filter.....	£41.85

GRIMSBY

SMC (Humbeside)
247A Freeman Street,
Grimsby, Lincolnshire
Grimsby (0472) 59388
9.30-5.30 Mon-Sat

STOKE

SMC (Stoke)
76 High Street,
Talkie 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)
4533409-5.30 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
9.00-5.30 Mon-Sat
Closed Wed

EDINBURGH

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

N. IRELAND

SMC (N. Ireland)
10 Ward Avenue
Bangor, Co. Down
Bangor (0247) 464875

HEAD OFFICE: S. M. HOUSE, RUMBRIDGE STREET, TOTTON, SOUTHAMPTON, SO4 4DP, ENGLAND,
& MAIL ORDER Tel: (+44) (0703) 867333, Telex: 477351 SMCMM G, Telegram: "Aerial" Southampton

POWER METERS

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

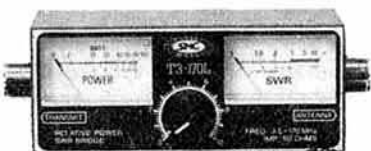
The Hansen range covers 30 quality models with top-of-the-line the FS710. This is a flat frequency response, peak envelope power and average in-line wattmeter with many novel features. Notable being the 'power independent' SWR scale—no forward power calibration knob, just direct reading SWR.



FS-500H

Model	Frequency Range	Power Range	Features	Price
FS710H	1.8-60 MHz	15/150/1500W	PEP Auto SWR	102.95
FS710V	50-150 MHz	15/150W	PEP Auto SWR	102.95
FS50HP	1.8-60 MHz	20/200/2000W	Interval PEP/SWR	99.95
FS50VP	50-150 MHz	20/200W	Interval PEP/SWR	99.95
FS500H	1.8-60 MHz	20/200/2000W	PEP	79.95
FS500V	50-150 MHz	20/200W	PEP	79.95
FS300H	1.8-60 MHz	20/200/1000W	PEP	53.50
FS300V	50-150 MHz	20/200W	PEP	53.50
FS200	1.8-150 MHz	20/200W	PEP/SWR	
FS601M	1.8-30 MHz	20/200W	Internal Battery	57.95
FS601MH	1.8-30 MHz	200/2000W	PEP	58.95
FS602M	50-150 MHz	20/200W	PEP	58.95
FS603M	430-440 MHz	5/20W	PEP	58.95
FS210	1.8-150 MHz	20/200W	Auto SWR/Power Meter	63.50
FS301M	2-30 MHz	20/200W	Head/Display	41.00
FS301MH	2-30 MHz	200/2000W	Head/Display	41.00
FS302M	50-150 MHz	20/200W	Head/Display	41.00
FS711H	2-30 MHz	20/200W	Head/Display	42.35
FS711V	50-150 MHz	20/200W	Head/Display	42.35
FS711U	430-440 MHz	5/20W	Head/Display	42.35
W720S	130-430 MHz	20/200W	Head/Display	41.50
FS7	145.6(432 MHz)	5/20/(200)	Display (200W on 144 only)	46.97
FS5E	3.5-150 MHz	20/200/1000W (1KW HF only)		42.75
FS5S	1.8-150 MHz	20/200/1000W (1KW HF only)		43.75
SWR3E	3.5-150 MHz	20/200/1000W (1KW HF only)		28.75
SWR3S	3.5-150 MHz	F/S Meter ant. switch 20/200W		30.50
SWR50B	3.5-150 MHz	Twin Meter		30.50
FS20DL	3-150 MHz	1/10W Dummy/SWR/Power		43.65
FS20D	3-150 MHz	5/20W Dummy/SWR/Power		43.65
FS800	1.8-150 MHz	6/30/150W Dummy/SWR/Power		125.35
W720S	930 MHz	7.5/15W Head/Display		46.00
JD110	1.5-150 MHz	10/100W	JD	15.85
MP2	50-150 MHz	50/500/1500W	MIRAGE	P.O.A.
S3-30L	Mini (CB Style)		SMC	8.80
T3-170L	3.5-170 MHz	Relative	Twin Meter	16.95
SP300	1.8-500MHz	20/200/1KW	SWR/Power	115.00

T3-170L



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



SMC-HS

HF, VHF, UHF ANTENNAS MOBILE VERTICALS

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



SMC 78F



SMC258

GCD

GCD

SMC-HS MOBILE ANTENNAS

Model	Frequency Range	Power Range	Price
SMC6P2T/PL	Telescopic 2M PL259 fitting 1λ	5.75 0.85	
SMCT144h	Telescopic 2M 1/2 wave BNC	9.95 0.85	
SMC6P2T/BNC	Telescopic 2M PL259 fitting 1λ	6.00 0.85	
SMC2H/PL	Helical 2M PL259 fitting	5.75 0.85	
SMC2H/BNC	Helical 2M BNC fitting	6.00 0.85	
SMCHS430S	70cm 1/2 wave BNC fitting	7.95 0.65	
SMC20W	2M 1/2 wave 0dB 1.6'	2.70 1.85	
SMC2NE	2M 1/2 wave fold 3.0dB 4.3'	7.95 2.00	
SMC2VF	2M 1/2 wave fold 3.0dB 3.5'	13.65 2.00	
SMC78F	2M 1/2 wave fold 4.5dB 5.7'	15.95 2.50	
SMC78B	2M 1/2 wave ball 4.5dB 5.6'	15.95 2.59	
SMC78SF	2M 1/2 wave short 4.7'	15.95 2.50	
SMC88F	2M 8/8 wave 5.2dB 6.5'	21.95 2.50	
SMC118M	Colinear 2M 11/8 7dB 9.7'	33.35 2.65	
SMC258	70cm 2 x 1/2 fold 5.5dB 3.1'	15.60 2.00	
SMC268C	70cm 2 section colinear 6dB	25.95 2.00	
SMC358	70cm 3 x 1/2 fold 6.3dB 4.7'	19.65 2.00	
SMC70N2M	Dual band 2M 2.7dB 70cm 5.1dB (1λ & 2λ)	19.65 2.00	
SMCHS770	144/432 Duplexer 50W	17.85 1.85	
SMC20SE	20M 1.72M 100W PEP	19.95 2.50	
SMC15SE	15M 1.72M 130W PEP	16.75 2.50	
SMC10SE	10M 1.72M 200W PEP	15.95 2.50	
SMC17SE	17M 1.915M 200W PEP	17.95 2.50	
SMC12SE	12M 1.915M 200W PEP	16.75 2.50	
RSL-28b	Yaesu 10M mobile whip	10.65 2.00	
SMCGCCA	Gutter clip 4 mtrs cable	10.95 2.00	
SMCSOCA	Cable assembly 4M	5.65 1.50	
SMCSOCAL	Cable assembly 6M	5.95 1.50	
SMC50CALLR	Cable assembly c/w 5M cable/PL259	6.50 1.50	
SMCROL	Roller, 10mm thick (for SMC50CALLR)	1.15 0.50	
SMCTMCAS	Trunk mount c/w 6M cable	9.95 2.00	
HDTMCA	HD trunk mount c/w 5M cable	15.40 2.00	
SMCSOMM	Magnetic base c/w 4M cable	10.95 2.00	
SMCSOWM	Adjustable wing mount base	4.85 0.90	
SMCGSD	Gutter clip deluxe	5.30 1.50	
SMCBSD	Bumper strap deluxe	10.95 1.50	
HS88BK	Bumper mounted extension for 144 MHz antennae	23.35 2.00	



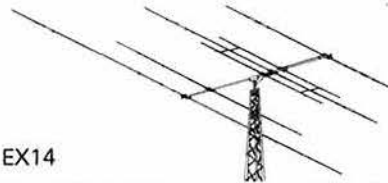
SOMM

HS770

NB: PRICES INCLUDE VAT AT 15%

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

Model	Frequency Range	Power Range	Price
MULTIBAND BEAMS			
EX14	Explorer 10-20m		£335.00 £5.95
TH3JNR	3 Ele 10-20m		£212.00 £3.50
TH5DXX	5 Ele 10-20m		£419.00 £6.70
TH7DXX	7 Ele 10-20m		£545.00 £8.75
TB3	3 Ele 10-20 Jaybeam		£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		£279.00 £5.40
GQ3E	3 Ele 10-20 Quad		£439.00 £9.20
GQ4E	4 Ele 10-20 Quad		£605.00 £10.00
Hyquad	2 Ele 10-15M dipole 20M		£339.00 £6.00
LP1007	Log Periodic 13-20 MHz		£206.05 DIST
3Y1015D20	3 Ele 10/15M Dipole 20M		£179.00 £5.95
DB10/15A	3 Ele 10-15m		£209.00 £4.80



TB3

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



HF5V



HF5R

Model	Frequency Range	Power Range	Price
VERTICALS			
12AVQ	Vertical 10-20m		£54.00 £2.75
14AVQ	Vertical 10-40m		£73.00 £2.75
18AVT/WB	Vertical 10-80m		£119.00 £2.75
18V	Vertical 10-80m taped		£38.50 £2.75
C4	Vertical 10-20m		£69.00 £2.65
SMCHF5V	Vertical 10-80m		£65.00 £2.65
SMCHF5R	Radial Kit for above		£39.85 £2.65

Model	Frequency Range	Power Range	Price
TRAP DIPOLE			
SMCTD/HP	High Power 10-80m		£47.50 £2.65
SMC TD/P	Portable inc coax		£67.50 £2.65

Model	Frequency Range	Power Range	Price
MOBILE			
Tribander	10-20m Slide sw.		£29.33 £1.65
Multimobile	10-20m		£33.92 £1.85
Flexiwhip	10m only		£19.21 £1.85
Extra coils	For above to 160m		£7.25 £1.00
Flexiten	2, 10, 12, 17, 15, 20, 30, 40, 80M		£52.33 £2.35
Bases	For above		£6.90 £1.00

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

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

10M FM CORNER



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

OSCAR 2 10M FM £49.00 inc

ACCESSORIES	INC	P/P
SMCGP27 1 Wave vertical with radials	£25.75	£2.65
SMCVA27 1 Wave vertical no radials	£25.75	£2.65
SMC11V11S Glass fibre shortened ground plane	£32.95	£2.65
SMC10SE 10M Mobile whip	£15.95	£2.00
RSL-28b Yaesu 10M mobile whip	£10.65	£2.00
SMCGCCA Gutter mount and cable	£10.95	£2.00
SMCSOCA 4M cable assembly for 10SE	£5.65	£1.50
FLEXI 10 G. Whip mobile 10-80M	£52.33	£2.35
MULTI-MOBILE G. Whip mobile 10, 15, 20M	£33.92	£1.85
FLEXIWHIP G. Whip 10M mobile	£19.21	£1.85
GW BASE antennas	£6.90	£1.00
SMCT3170L Twin meter SWR bridge	£16.95	FOC
SMC100LP30 Low pass filter	£6.30	FOC
SMCRU12		
04-06 4 Amp DC power unit	£14.95	£2.35
SP55 Extension L/S	£16.50	FOC

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

PUBLICATIONS

I.P.C. (PRACTICAL WIRELESS)	£	P/P
Out of Thin Air	1.25	0.75
Passport to Amateur Radio	1.50	0.75
Wires and Waves	3.00	0.90
Are the voltages Correct	1.00	0.50
Introducing R.T.T.Y.	1.50	0.50
R.S.G.B.		
Teleprinter Handbook	11.65	1.35
Radio Communications Handbook	8.95	2.05
Test Equipment (Radio Amateurs)	4.70	1.30
Amateur Radio Techniques	4.75	1.35
HF Antennas for all Locations	4.75	1.35
Guide to Amateur Radio (Soft)	2.75	0.75
Radio Amateur Operators Manual	4.25	0.75
1983 Call Book (UK)	2.10	0.80
1984 Call Book (UK)	5.00	0.50
R.A.E. Manual (10th Edition)	2.75	0.75
T.V.I. Manual	1.50	0.50
Morse Code for Radio Amateurs	1.00	0.50
VHF/UHF Manual (3rd Edition)	4.25	2.00
VHF/UHF Manual (4th Edition)	8.50	2.00
Prefix Map	2.25	1.25
Great Circle Map	1.50	1.20
Amateur Radio Logbook	2.30	1.25
S.M.C.		
Countries List	0.35	1.20
O.R.A. Map (Special Coating)	1.50	1.20
Transparent Overlay 50Km Rings	1.00	
TAB BOOKS		
Hidden Limited Space Antennas	6.95	0.75
Complete Handbook (Transmitters)	6.95	0.75
Secrets of Ham Radio D.X.ing	5.60	0.75
Complete S.W.L. Handbook	9.95	0.85
S.W.L. Antenna Handbook	8.45	0.75
Guide to Scanners and Monitors	6.95	0.85
Radio Communications Receivers	11.75	0.90
Secret Shortwave Spectrum	6.50	0.75
UNIVERSAL ELECTRONICS INC.		
Clandestine Confidential S.W.	6.35	0.85
World Press Frequencies (RTTY)	6.35	0.85
RTTY Today, Modern Guide	6.35	0.85
MISCELLANEOUS PUBLISHERS		
Amateur Radio (Stokes/Budd)	8.95	1.30
Log Book (Jaybeam)	2.30	1.25
Log Book (Yaesu)	TBA	

Prices include V.A.T. at 15% (where applicable)
Postage extra. U.K. and B.F.P.O. rates for one-off items only shown. N.B. For larger orders (any mix) p/p may be much lower than sum of individual charges.

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.



	Thro'	3 Core	Light Duty	£49.95
FU200	Bell	6 Core	Lighter Duty	£55.50
KR250	Offset	3 Core	Lighter Duty	£59.50
9502B	Bell	5 Core	Medium Duty	£105.00
AR40	Bell	6 Core	Matches KR500	£101.50
KR400	Thro	6 Core	Elevation	£131.85
KR500	Bell	5 Core	5 Position (AR40)	£113.85
AR50	Bell	6 Core	Medium Duty	£121.50
KR400RC	Bell	8 Core	Heavy Duty	£149.50
CD45	Bell	8 Core	Heavy Duty	£173.50
KR600RC	Bell	8 Core	Heavy Duty	£264.50
HAM IV	Bell	8 Core	Heavy Duty	£346.50
KR2000RC	Bell	8 Core	Very Heavy Duty	£332.35
T2X	Bell	8 Core	Digital Readout	£546.25
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 £18.22	Carriage £2.50
	9502b F4200	
KC038	Lower Mast Clamp £12.65	Carriage £2.50
	KR400 600 etc	

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

SCANNING RECEIVER



MS-8400

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

SPECIFICATIONS

Frequency Range:	Low VHF 68,000 MHz ~ 88,000 MHz Mid VHF 108,000 MHz ~ 136,000 MHz High VHF 136,005 MHz ~ 174,000 MHz UHF 360,000 MHz ~ 512,000 MHz
Scanning steps:	5, 10, 12.5 and 25 KHz VHF (10, 12.5 and 25 KHz UHF)
Channels:	40 programmable memories
Modes:	AM or FM selectable
Scan rate:	Approximately 18 channels per second
Scan delay:	2 seconds Priority sampling 4 seconds
Audio output:	12 Watts
Selectivity:	Bandwidth - 60 dB @ ±25KHz
Power supply:	DC 12V ~ 16V 0.6A max
Memory backup:	9 volt, battery (PP3)
Antenna:	Telescopic antenna or External
Loudspeaker:	2.5" x 4" oval speaker
Size:	190(W) x 250(D) x 85(H) mm
Weight:	1.7kg

£249.00 inc.

Price includes free carriage

MORSE EQUIPMENT



MORSE KEYS		P.P.
HK703	Straight Key	£120.00
HK704	Straight Key	£19.95
HK706	Straight Key	£16.65
HK707	Straight Key	£15.50
HK710	Straight Key	£39.95
HK808	Straight Key	£49.95
HK711	Key Mounting	£32.75
BK100	Mechanical Bug	£24.95
MK701	Single Lever Paddle	£28.50
MK702	Single Lever Paddle	£29.75
MK703	Squeeze Key	£28.95
MK705	Squeeze Key	£25.65
MK706	Squeeze Key	£23.50
IKP60	Iambic	£9.95
HK802	de Luxe Brass Key	£85.85
HK803	de Luxe Brass Key	£79.95
HK804	de Luxe Brass Key	£79.95
MHK831	Super de Luxe squeeze & straight key	£189.00

MORSE EQUIPMENT		P.P.
KP100	Squeeze 230/13-8V	£79.50
KP200	Memory 4096 Multi Ch	£169.50
	Mem Back Up 230/13-8V	£156.35
D70	Morse Tutor (Datong)	£115.00
MMS1	Morse Tutor (M/M)	£169.00
MMS2	Morse Tutor Advanced	£135.00
MICROWAVE MODULES - RTTY EQUIPMENT		P.P.
MM2001	RTTY to Video	£189.00
MM4001	RTTY Transceiver	£269.00
MM4001KB	RTTY Tx/Rx keybd	£299.00
MM1001KB	Morse Keyboard	£135.00
MM1000KB	ASCII CW conv c/w keybd	£135.00

PRICES INCLUDE VAT at 15%
Carriage as shown

JAY BEAM

4 METRES		p/p
4Y/4M	Yagi 4 element	7dBd £32.78 £2.65
PMH2/4M	Phasing harness 2 way	£17.82 £1.65
2 METRES		p/p
H0/2M	Halo head only	0dBd £6.53 £1.50
HM/2M	Halo with 24" mast	0dBd £7.48 £1.65
C5/2M	Colinear omni vert	4-8dBd £86.25 £2.65
LW5/2M	Yagi 5 element	7-8dBd £15.53 £2.65
LW8/2M	Yagi 8 element	9-5dBd £19.55 £2.65
LW10/2M	Yagi 10 element	10-5dBd £25.30 £2.65
LW16/2M	Yagi 16 element	13-4dBd £37.95 £3.65
PBM10/2M	10 ele Parabeam	11-7dBd £49.45 £3.65
PBM14/2M	14 ele Parabeam	13-7dBd £60.95 £3.65
O4/2M	Quad 4 element	9-4dBd £31.63 £2.65
O6/2M	Quad 6 element	10-9dBd £41.40 £2.65
O8/2M	Quad 8 element	11-9dBd £71.75 £2.65
D5/2M	Yagi 5 over 5 slot	10dBd £27.60 £2.65
D8/2M	Yagi 8 over 8 slot	11-1dBd £37.95 £2.65
5XY/2M	Yagi 5 ele crossed	7-8dBd £29.50 £2.65
8XY/2M	Yagi 8 ele crossed	9-5dBd £38.53 £2.65
10XY/2M	Yagi 10 ele crossed	10-8dBd £43.80 £2.65
PMH2/C	Harness cir polarisation	£11.50 £1.65
PMH2/2M	Harness 2 way 144MHz	£12.65 £1.65
PMH4/2M	Harness 4 way 144MHz	£31.62 £1.65
70 CM		p/p
C8/70	Colinear Vertical	6-1dBd £92.00 £2.65
D8/70	Yagi 8 over 8 slot	12-3dBd £28.18 £2.65
PBM18/70	18 ele Parabeam	13-5dBd £34.50 £2.65
PBM24/70	24 ele Parabeam	15-1dBd £46.00 £2.65
LW24/70	Yagi 24 element	14-8dBd £31.05 £2.65
MBM28/70	28 ele Multibeam	11-5dBd £23.00 £2.65
MBM48/70	48 ele Multibeam	14-0dBd £37.95 £2.65
MBM88/70	88 ele Multibeam	16-3dBd £55.75 £2.65
8XY/70	Yagi 8 ele crossed	10dBd £44.85 £2.65
12XY/70	Yagi 12 ele crossed	12dBd £55.20 £2.65
PMH2/70	Harness 2 way	£12.07 £1.85
PMH4/70	Harness 4 way	£25.78 £1.85
23cm		p/p
CR2/23CM	Corner reflector	13-5dBd £43.13 £2.65
PMH2/23CM	Harness 2 way	£32.78 £1.65

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

STOCK CARRYING AGENTS WITH DEMONSTRATING FACILITIES

Stourbridge Andrew G4BJY 0384/390916

SMC Northern Ireland 02471 464875

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

WATERS & STANTON ELECTRONICS

18/20 MAIN ROAD, HOCKLEY, ESSEX, Tel: (0702) 206835
12 NORTH STREET, HORNCHURCH, ESSEX. Tel: (040 24) 44765

UNBEATABLE PRICE M750XX SSB-CW-FM 144-148MHz

20 watts output. Digital display.
Dual VFO. Repeater operation.
Noise blanker. 70cms option.
Up/Down mic. R/T.

Send for leaflet.



OUR PRICE £349!

Absolutely complete

NEW CATALOGUE NOW AVAILABLE SEND S.A.E.

TRIO

TS930S HF Tcvr	£1195.00
AT930 ATU	£150.00
SP930 Speaker	£62.96
TS430S HF tcvr	£779.00
PS430 AC psu	£119.00
SP430 Speaker	£31.00
AT250 ATU	£277.00
MB430 Mobile Unit	£12.00
FM430 FM mod.	£36.50
TS830S HF tcvr	£758.00
VFO230 VFO	£258.00
AT230 ATU	£143.00
SP230 Speaker	£43.00
TS530S HF tcvr	£669.00
VFO240 VFO	£95.00
TS130S HF tcvr	£576.00
TL120 200w 1in.	£177.00
MB100A mobile mount	£19.50
SP120 speaker	£27.99
SP140 speaker	£14.49
AT130 ATU	£98.95
PS20 PSU	£57.75
TL922 2kw	£950.00
TS780 2m/70cm	£850.00
TR9130 2m tcvr	£458.00
BO9A base	£49.00
TR7930 2m tcvr	£323.00
TW4000A 2m/70cm	£488.00
TR2500 2m h/hold	£246.00
VB2530 30w amp	£73.90
ST2 charger	£54.90
SC4 Case	£14.50
MS1	£33.90
SMC25 Speaker/Mic	£17.00
PB25 nicad	£26.50
LH2 case	£25.40
BT1 AA case	£5.98
DC25 12v	£17.00
TR3500 70cm h/hold	£265.00
TM401A 70cm	£310.00
TM201A 2m	£279.00
SP50 speaker	£14.95
R600 Rx	£272.00
R2000 Rx	£436.00
VC10 VHF conv.	£117.00
YK88C 500Hz	£33.70
YK88CN 270Hz	£39.48
YK88SN 1.8kHz	£34.48
MC50 mic	£32.98
MC60/S6 mic	£53.59
MC80 mic	£39.00
MC42S mic	£16.00
MC55 Mobile Mic	£39.90
LF30A LPF	£22.49
HC10 Clock	£71.90
DM81 GDO	£75.40

YAESU

FT1 HF Tx/Rx	£1567.00
FT980 HF Tx/Rx	£1329.00
SP980 Speaker	£61.50
FT102 HF Tx/Rx	£719.00
FC102 ATU	£185.00
SP102 Speaker	£55.00
FM/AM	£49.00
FT77 HF Tx/Rx	£479.00
MRKT77 marker	£10.85
FP700 PSU	£145.00
FC700 ATU	£103.00
MMB16 Mount	£14.40
FT757GX HF Tx/Rx	£718.00
FC757AT ATU	£245.00
FP757GX PSU	£145.00
FP757HD PSU	£179.00
FL2100Z amp	£599.00
FT290R 2m Tx/Rx	£279.00
FT790R 70cm Tx/Rx	£259.00

NC11 charger	£10.55
NC nicads	£22.00
CSC1A case	£4.45
YHA/5 Ant.	£5.65
MMB11 Mount	£28.19
FL2010 amp	£66.55
FT208 2m h/hold	£209.00
FT208 70cm h/hold	£189.00
NC9C charger	£9.20
FNB2 pack	£23.00
PA3 12v	£16.00
MMB10	£8.45
FT203R 2m h/hold	£175.00
MMB21 bracket	£8.00
FT230R 2m 25w	£269.00
FT730R 70cms 10w	£239.00
FT726R 2m	£775.00
430/726	£259.00
144/726	£165.00
50/726	£195.00
SAT726	£99.90
FRG7700 Rx	£385.00
FRG7700M Rx	£455.00
MEMO	£75.00
FRT7700	£48.25
FRA Ant.	£43.95
FF5 LPF	£11.25
FRV7700E	£94.25
YM24A mic	£22.50
MH-188	£15.70
YD148A mic	£25.25

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/hold	£239.00
ICO4 70cm h/hold	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
MML435/600	£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	£39.90
SLNA144U	£22.40
SLNA144UB	£13.70
SLNA145SB	£27.00

SELLING YOUR RIG

Cash or part exchange
on all good clean gear.

FOR QUOTATION
TEL (0702) 206835

LOOKING FOR
BARGAINS!

Telephone or send for
our used equipment
list.

3 months warranty

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	£77.00
TB2 2 el. HF	£143.75
TB3 3 el. HF	£212.75
VR3 vertical	£51.75
DC1/WB	£43.00
LR1/2M	£32.20
LR2/2M	£25.30
CS/2M	£86.00
LWS/2M	£15.50
LWB/2M	£19.50
LW10/2M	£25.30
LW16/2M	£37.95
PBM10/2M	£49.45
PBM14/2M	£60.95
5XY/2M	£29.90
8XY/2M	£38.50
10XY/2M	£48.30
Q4/2M	£31.60
Q6/2M	£41.40
Q8/2M	£51.75
D5/2M	£27.60
D8/2M	£37.95
UGP/2M	£13.80
D8/70cm	£28.20
PBM18/70cm	£34.50
PBM24/70cm	£46.00
LW24/70cm	£31.05
MBM28/70cm	£23.00
MBM48/70cm	£37.95
MBM88/70cm	£51.75
8XY/70cm	£44.85
12XY/70cm	£55.20
CR23cm	£43.00

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	£39.95
CDEAR40 HF/VHF	£105.00
9502B VHF	£19.50
9523 bearing	£19.75
KR400RC HF	£121.50
KCO38 clamps	£12.65
KSO65 bearing	£21.50
KR500 elevation	£131.85

FDK

M725X 2m 25w	£239.00
M750XX 2m 20w	£349.00
EXP430 70cm tvtr	£269.00
Palmcomm II 2m h/hold	£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
RH28 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.

AR2001 £345



This popular receiver
covers 25 to 550MHz with
no gaps. Comprehensive
scanning, channel spacing,
and broad and narrow filters
make this a number
one choice. Send for leaflet.

WELZ SP15M "MADE TO MEASURE"



The most famous of all the
Welz products. Covers 1.8
to 160MHz and measures
vswr and in line power.
Scaled 2.5; 20; and 200
Watts this is the ideal shack
meter. **£41.00**

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.

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)

Zone B (Regions 3, 4 and 5)

Zone C (Regions 7, 8, 16 and 19)

Zone D (Regions 6, 9, 17 and 20)

J. Heathershaw, G4CHH (Mrs)

H. S. Pinchin, BSc, MBIM, G3VPE

W. J. McClintock, MSc, G3VPK

L. Hawkyard, G5HD

Zone E (Regions 10 and 11)

Zone F (Region 15)

Zone G (Regions 12, 13 and 14)

D. M. Thomas, GW3RWX

(co-opted)

J. T. Barnes, G1USS

(co-opted)

F. Hall, GM8BZX

REGIONAL REPRESENTATIVES

Region 1 (Cheshire, Cumbria, Gtr Manchester, Isle of Man, Lancashire, Merseyside)

Region 2 (Humberside N of Humber, North, South, West Yorkshire)

Region 3 (Hereford and Worcester, Salop, Staffordshire, Warwickshire, West Midlands)

Region 4 (Derbyshire, Humberside S of Humber, Leicestershire, Lincolnshire, Nottinghamshire)

Region 5 (Bedfordshire, Cambridgeshire, Northamptonshire)

Region 6 (Berkshire, Buckinghamshire, Oxfordshire)

Region 7 (Gtr London S of Thames, Surrey including part of London N of Thames administered by Surrey)

Region 8 (Kent, East Sussex, West Sussex)

Region 9 (Cornwall, Devon)

Region 10 (Dyfed, Gwent, Mid Glamorgan, Powys, South Glamorgan, West Glamorgan)

Region 11 (Clwyd, Gwynedd)

Region 12 (Grampian, Highland, Island Authorities, Tayside)

Region 13 (Borders, Fife, Lothian)

Region 14 (Central, Dumfries and Galloway, Strathclyde)

Region 15 (Northern Ireland)

Region 16 (Essex, Norfolk, Suffolk)

Region 17 (Isle of Wight, Channel Islands, Dorset, Hampshire, Wiltshire)

Region 18 (Cleveland, Durham, Northumberland, Tyne & Wear)

Region 19 (Greater London N of Thames, Hertfordshire)

Region 20 (Avon, Gloucester, Somerset)

B. Donn, G3XSN.

P. N. Butterfield, G4AAQ. Tel 0977 791071.

G. Ross, G8MWR.

M. Shardlow, G3SZJ. Tel 0332 556875.

J. S. Allen, G3DOT. Tel 0582 21151.

F. S. G. Rose, G2DRT. Tel 0494 814240.

R. Sykes, G3NFV. Tel 0372 372587.

M. Elliott, G4VEC. Tel 0795 70132.

R. W. Jones, G3YMK. Tel 040486 468.

E. J. Case, GW4HWR. Tel 0222 810368.

B. H. Green, GW2FLZ. Tel 0492 49288.

M. R. Hobson, GM8KPH. Tel 0796 2140.

A. Givens, GM3YOR.

T. G. Wylie, GM4FDM. Tel 0505 22749.

J. T. Barnes, G1USS. Tel 0247 3948.

A. Owen, G4HMF.

T. M. Emery, G3KWU.

(Post vacant)

R. J. Broadbent, G3AAJ.

N. F. O'Brien, G3LP.

HONORARY OFFICERS

Aerial Planning Panel co-ordinator: (c/o MSO, RSGB HQ)

Audio Visual Library co-ordinator: R. G. Auckland, G2PA

Awards managers: HF: P. Miles, G3KDB; VHF: Jack Hum, G5UM

HF manager: E. J. Allaway, G3FKM

Microwave manager: D. S. Evans, G3RPE

Observation Service organizer: R. J. Osborne, G4FJN

Slow morse practice transmissions organizer: M. A. C. MacBrayne, G3KGU

VHF manager: K. A. M. Fisher, G3WSN

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

ANNUAL SUBSCRIPTION RATES

Corporate member: UK and overseas (Radio Communication by surface mail): **£16.50** **UK associate member under 18: £6.20** **Family member: £6.60**

UK students over 18 and under 25: £9.30 (Applications should give applicant's age at last renewal date and include evidence of student status)

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

(Subscriptions include VAT)

RSGB QSL BUREAU

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

A list of QSL Bureau sub-managers was
published in January issue of *Radio Com-*
munication, and amendments will be
published under "Amateur Radio News".

RSGB NEWS SERVICES

Headline News

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

GB2RS Broadcasts

Sunday news broadcasts from stations throughout the UK using the callsign GB2RS on frequencies
in the 3-5, 7 and 144MHz bands. Details of frequencies, locations and times were last published in
the July 1984 *RSGB News Bulletin*.

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

POST-SCHEDULE BUSINESS

It will have hardly escaped readers' attention that a new amateur licence schedule has recently appeared. As many will recall, one important reason why a change was necessary was that WARC 79 redefined the various transmission modes in a much more detailed way. Strictly speaking, the new schedule should have given all the equivalent modes permitted to amateurs, which sounds awfully simple. However, these would have numbered in the region of hundreds, the precise significance of which would not necessarily have been obvious to the expert, let alone the ordinary amateur.

However, the new schedule is actually easier to understand than the previous version. This came about as a result of RSGB staff and volunteers devoting literally hundreds of man-hours trying to produce a clearer, more useful presentation in plain language with the minimum of anomalies. At the same time, the DTI made great efforts to meet us halfway and not to insist on the easier, and safer, more legalistic approach.

The new schedule is nevertheless based essentially on the old one, and anomalies and grey areas still remain. For example, what is meant by "data" is still a matter for further debate. The new schedule represents a great deal of common sense allied with goodwill. It is hoped that most amateurs will be sufficiently mature to recognize that arbitrary lines often have to be drawn where none should strictly exist, and to accept this as a reality until effort can be spared to clarify the problems.

The next step involves up-dating the licence itself. Here the objective must surely be to encourage the best interests of amateur radio while protecting other services. This, of course, is not simply a licensing matter—it begs pretty fundamental questions about which way we wish amateur radio to develop: do we see it as just another leisure pursuit or a serious technical hobby; quality or quantity. Earlier this year readers were asked for their views on the licence itself. Many hundreds responded and their replies will of course be taken into account. Hopefully, within a year we should have an improved licence more appropriate for the next decade or so.

In parallel with this, there are many other on-going matters being dealt with. Examples are: morse for Class B licensees; the improvement of morse testing facilities; reciprocal and mutual licensing; novice licensing; advanced repeaters for tv, pilot ssb (the first in the world) and packet radio; Raynet and the use of amateur radio in emergencies; 24GHz licensing; Class A/Class B crossband working; cable and satellite tv problems; international greetings messages; the implication of the Telecommunications Act, and 50MHz activity. All these problems demand time and skilled effort. Fortunately it pays off, eventually. For example, on 50MHz we have negotiated another 60 new licences to be issued shortly by the DTI and we now have a 50MHz beacon operating 24 hours a day from RSGB HQ. Things could be a lot worse.

David Evans, G3OUF

COMPUTERS AND THE RSGB

Under the above title the March 1984 issue of *Radio Communication* published a number of questions from the Society's Technical & Publications Committee about the way in which the Society should react in future to microcomputers, and readers were invited to reply and express their views. The purpose of this item is to give a brief summary of the replies and to comment on them in the light of the original questions. The replies also included many other points of interest, but these are best dealt with elsewhere.

To date, some 92 letters have been received, mainly from individuals but several from clubs—including one from a Radio Amateur Micro User Group (contact G4KCS). The correspondents included several retired people who had taken to the "new fangled" computing technology with great enthusiasm. Many had obviously expended much effort on their replies and included much detailed information. Several offered direct help in various directions.

General policy

The majority of those replying welcomed the initiative. To be precise, one reader did not, regarding it as opening the floodgates to a takeover by the computer; and two replied to the effect "about time too". Virtually all were happy with the general policy hitherto adopted by the Society and intended for the future, as summarized in the March item.

Computer listings

Most of those who commented agreed that there should be some limit to the length of program listing that would be published with an article, with longer listings being made available from RSGB HQ. However, a number suggested that the half-page limit proposed (actually approximately half-page) was set rather too low. Perhaps this should be simply a matter for editorial discretion. One reader strongly argued that the programs should be given in their complete form, as other types of articles in which he had no interest were not penalised in the same way. Another emphasized that the listings must be accurate—many published programs are apparently not accurate.

Computer column

This was welcomed by all those who commented on the topic. A large proportion suggested items which could be covered. Many emphasized that the column should cover all computers, a view very much in line with the committee's original thinking. The first of what is expected to be a regular computer feature compiled by GM4ANB appears in this issue (see p871).

Adoption of a preferred computer

As was to be expected, this question attracted much attention. Twenty-three correspondents expressed opposition—in some cases very strong opposition—to the idea, mainly on the grounds of the difficulty in specifying a "preferred" computer, and suggesting instead that it was a better approach to give the basic information which readers could adapt for their particular computer.

Actually, the March editorial emphasized just this approach: it suggested that each article should concentrate on giving a description of the overall function of the program, together with all the relevant information, including the equations employed and flow charts to illustrate the overall function of the program, in sufficient detail to allow the reader to produce or adapt a program to suit his computer.

Many of those who spoke out most strongly against adopting a preferred computer obviously had sufficient expertise that the task of modifying or writing programs presented no difficulties to them, and they were more free to consider the disadvantages of such a policy. However, the question of adoption was raised simply because it was felt that a number of people wanted to take advantage of computers in their amateur radio but were not in the least bit interested in gaining any expertise in computers or programming. Many have confirmed this view—even to the

extent, in some cases, of saying that they would delay buying a computer until the Society's recommendation became known.

A few members suggested that programs be written in a specific language. However, the suggestions included Basic, BBC Basic, 30-hour Basic, (Clive Prigmore, National Extension College Trust Ltd.), Dartmouth, Forth, Microsoft and Pascal. Need one say more?

Sixteen letters recommended the consideration of Basiccode 2, which, incidentally, was developed by PE0JHM. This is a means by which the incompatibility of certain computers can be reduced. Specifically, by using a translation program, a number of computers can be made to talk a common language, namely Basiccode. This means that all the computers can communicate with each other and, for example, receive the Basiccode programs currently being transmitted by the BBC and other stations. The Basiccode 2 handbook/cassette kit costs £3.95 (BBC Broadcasting Support Services, PO Box 7, London W3 6XJ) and at this time is suitable for Apple 2 and 2e, BBC A and B, Video Genie, Sinclair ZX81 and Spectrum.

The main disadvantage of any system such as Basiccode 2 is that it will tend to operate on the "lowest common factor" basis. One consequence is that it makes it less easy for the strengths of a particular computer to be exploited and its weaknesses avoided. Perhaps the main use for Basiccode would be for the simpler programs, with the more sophisticated programs being computer-specific. We clearly need to assess this approach in more detail.

Many correspondents gave details of the computers they used. The totals are summarized in the table. Within the obvious limitations of the sample, it is clear that the BBC B is the most popular: indeed, nearly as many people were using this computer as the rest put together.

Computers used by correspondents

Computer	Number of users	Computer	Number of users
BBC B	32	Texas T199/4a	1
Spectrum/ZX81	12	Electron	1
Dragon 32	5	Sharp	1
Commodore 64	4	Video Genie	1
Commodore Pet	4	Sirius	1
Vic 20	2	Oric	1
Basicom	2	Portable Tandy	1
TRS80	2	NEC or Olivetti	1

As regards the Society selling software, several were keen on its selling items such as cassettes and eproms, although they pointed out the risk of these being copied. Several were unhappy at the commercial risks involved with the Society selling larger items of hardware such as the computers themselves.

All the letters received will now be handed over to someone more expert on computing for further analysis. By way of conclusion, it would seem that the immediate tasks are the establishment of the column (now a reality) and a closer investigation of Basiccode 2. Meanwhile, there seems little doubt that the present exercise has been a reasonable success. Those who contributed are thanked for what, in many cases, were considerable efforts. By way of acknowledgement, they were, in order:

BRS: 32024, 44189, 51490, 52422, 53558 and 84333.
 G3: BGI, BYY, CQE, GCW, GEH, HDL, LST, MAH, MWR, NEP, NPY, NXM, RIR, RMZ, SNO, SRM, UJK, UPO, VBD, VLF, VMR, WZR, XKN, ZPB and ZPF
 G4: AXA, CCH, EGG, ERA, FBZ, GBA, GIG, INP, IOK, JCP, JZP, MAQ, OAK, OOA, RRR, RVD, STK, STY, TBB, TIG and UKL
 G6: AXO, BBH, CSY, MXU, OVL, VRT, WTE, XJZ and YOG
 G8: PX, IEM, JFT, NEO, ONH, SUH, UVD, UYZ and ZRT
 GI: 4LLO
 GM: 3IBU, 4ANB, 4IHJ, 4LVW, 6KJD and 8AOB
 GW: 2HCJ and 3LAD
 G8YCI/EI2BYB, SU1CR, 5Z4DJ, 9M2GZ/PA0CPG and S. & W. Furey

G3RPE

Amateur Radio News

RSGB PRESIDENT 1985

At its meeting on 11 August 1984, Council elected Mrs J. Heathershaw, G4CHH, to be the Society's President during 1985.

Joan Heathershaw has been a Council member for Zone A since January 1980, and is this year's executive vice-President. The Council's first lady member, she thus establishes another "first" as the Society's first lady President.

DTI takes over RIS

The Department of Trade & Industry formally took over direct control of the Radio Interference Service from British Telecom on 7 August 1984. It has also been agreed that the service will be renamed the Radio Investigation Service in order to reflect the nature and scope of its activities more accurately.

The change is essentially a consequence of the imminent privatization of British Telecom, and it will have the effect of bringing the RIS field staff under the direct control of the department of state responsible for radio regulatory matters. The RIS was, of course, previously run by BT on an agency basis on behalf of the DTI and the Home Office. The Government and British Telecom have agreed that the nature of the work of the Radio Investigation Service would not be compatible with BT's commercial interests after privatization.

A press release from the DTI states "The RIS has at present about 260 staff in the field. It investigates interference to authorized radio and television broadcasts, land mobile radio and emergency services and, where possible, takes action to stop it. The service traces illicit transmissions and prosecutes offenders; for example, operators of pirate radio transmitters and illegal citizens band users. It also inspects licensed stations to ensure compliance with licence conditions, and tests controlled equipment. The RIS will from now on be part of the DTI's Radio Regulatory Division. BT staff who wish to stay with the RIS will be assimilated into DTI as civil servants. The new RIS will operate in due course from 37 offices in 20 districts (made up of groups of counties) although meanwhile staff will continue to work from BT regional offices."

When the initial announcement of the changeover was made by the Rt Hon Kenneth Baker MP, Minister for Information Technology, on 13 April 1984, it was also stated that the Government would be reviewing the functions of the RIS in the course of the next 18 months in order to determine what level of resources was necessary. Since then, of course, some

provisions of the new Telecommunications Act have become law and it is difficult to imagine that the scope of the RIS's work will not be markedly increased by the effect of the new legislation. While a few "pirate" medium-wave broadcast stations have closed down, for example, many others have announced their intention to continue their activities. This is a source of worry to the Association of Independent Radio Contractors, which has voiced fears that some independent local radio (ilr) stations will suffer a heavy loss of revenue due to advertisers moving to the "pirate" broadcasters. As has been said in recent issues of *Radio Communication*, the level of other illicit use of radio frequencies (including those in amateur bands) continues to increase: if the provisions of the new Telecommunications Act are to carry any force it is obviously important that the Radio Investigation Service has enough resources to enforce the law, which would seem to imply a considerable increase in its establishment and its financing. However, it is understood that some 20 per cent of RIS staff have left the service to pursue careers elsewhere within British Telecom — at a time when the service requires more, not less, personnel, this cannot be said to be an encouraging sign.

The Society intends to continue to make these points, and others, to the relevant authorities.

Get-away special?

If all goes according to plan, NASA will launch space shuttle mission 41G on 1 October 1984. This flight will be carrying the Marshall Club Amateur Radio Experiment (MARCE) into orbit. MARCE is part of what is known as a get-away special, which is essentially a facility whereby small self-contained experiments can be carried on shuttle missions. In fact, this particular get-away special is sponsored by the Alabama section of the Institute of Aeronautics & Astronautics, which paid the fee and asked the club to consider the following objectives: (a) demonstrate the feasibility of amateur radio data communication from the space shuttle cargo bay during a shuttle mission, on a non-interference basis with the orbiter and its payload; (b) encourage broader participation among amateur radio enthusiasts in space research; and (c) involve education groups, from primary schools and upwards, in order to emphasize space communication opportunities.

The intention of the MARCE is to transmit information on the mission elapsed time and the operational status of the three other experiments in the get-away special package by transmitting data via a 435MHz downlink. The data will be transmitted by voice in the English language in two separate formats, with the Marshall Club's callsign, WA4NZD, at the beginning and end of each transmission: the downlink

frequency will be 435.033MHz and the mode fm.

Three transmission cycles of 8h are planned: each cycle will consist of a 30s or 45s transmission every 4min, and the first 8h cycle will begin when the experimental package is first turned on. There will be two message formats, of the following types:

Format A—"QST QST QST FROM WA4NZD TIME 00000 STATUS 10 DATA 012 014 014 014 015 012 225 135 255 FROM WA4NZD OUT".

Format B—as above plus further hexadecimal data.

The first of the 3h transmission periods will be activated at 1 day 10h 0min m.e.t. (mission elapsed time, ie the time which has elapsed since the shuttle lifted off), the second at 2 days 9h 30min, and the third at 3 days 9h 45min. The experiment will be switched off at 7 days m.e.t. precisely.

The MARCE should be interesting for listeners on the 430MHz band, and we look forward to hearing some of the results. The mission should also prove useful for those who are interested in both satellite operations and future shuttle missions carrying astronauts who are also licensed amateurs and who will be operational from the shuttle: it will assist in optimizing antenna systems and receivers.

If necessary, special news bulletins will be broadcast from RSGB headquarters on the normal frequencies and modes at 5pm during the shuttle flight.

3.5MHz dx window

At the recent IARU Region 1 conference it was agreed that the portion of the 3.5MHz band reserved for inter-continental dx working (which is currently 3,790–3,800kHz) should be extended by 15kHz. The new "dx window" is therefore 3,775–3,800kHz and the footnote to the Region 1 band plan has been amended accordingly.

From a practical point of view there is obviously no objection to the use of frequencies within the "window" for local contacts at times of the day or year when the band is clearly incapable of supporting long-distance propagation. A good rule of thumb is to assume that dx working is possible from 2h before sunset until 2h after sunrise *except* during December and January: in these months dx working is possible for the full 24h day. Observation of this formula will ensure that both UK and European stations can have dx contacts without suffering unnecessary interference from local stations.

More deregulation

The DTI's apparent interest in deregulating parts of the radio spectrum wherever possible has been demonstrated with its proposals for exemption from licensing of four categories of low-power radio devices. A wide range of products is affected, and the press release dated 31 July 1984

WOBURN MOBILE RALLY 1984

mentions such items as garage door openers, radio microphones, aids for the disabled and anti-shoplifting tags. The proposals are contained in a Green Paper ("Proposals for the Exemption of Licensing of Four categories of Low Power Radio Devices—a Consultative Document") available from the Radio Regulatory Department, and the four categories considered are telemetry and telecontrol for general purposes, some speech communication equipment such as radio microphones and aids for the disabled, doppler and field disturbance devices for security and control applications, and emergency alarms for the disabled and infirm.

Nothing in the document suggests that frequencies within amateur bands will be affected by the proposals. According to the document "In most cases the Government intends to continue to require type approval of low power devices . . . it is for consideration whether a standard mark should be introduced which, together with the type approval number issued by the department, would be stamped on the body of the equipment . . ." This, of course, reflects the provisions of one of the sections in the new Telecommunications Act, which grants precisely this power of requirement.

Paragraph 7.2 of the document states that "Further consideration will be given, in the context of the planning of Bands 1 and 3, to the possibility of making a frequency or frequencies available for general use by equipment below a certain power, and a separate consultative document has been issued which covers this point. (Green Paper, Cmnd. 9241, *Rad Com* August 1984, p652.) "This question will be addressed at the appropriate time." It is not thought that this statement has any bearing on the Society's desire for an amateur allocation in Band 1, ie at 50MHz.

GB4DD follow-up

Readers will recall that the July 1984 issue of *Radio Communication* carried details of a message of goodwill sent to HRH Prince Philip, Duke of Edinburgh, by the special event station GB4DD (at the London Air Traffic Control Centre, RAF West Drayton), established to commemorate the 40th anniversary of D-Day. His Royal Highness was humbly requested to convey a message of goodwill to several European heads of state (*Rad Com* July p556) and some replies have now been received.

From the President of the Republic of France, M Francois Mitterand, to HRH Prince Philip, Duke of Edinburgh:

"The President of the Republic was very touched by the message addressed by the radio amateur station in London to the seven heads of state meeting on 6 June at the Normandy beaches to commemorate the 40th anniversary of the Allied landings. He asks His Royal Highness, the Duke of Edinburgh, who kindly passed the message to him, to thank on his behalf the operators of GB4D-Day."

From the Grand Duke of Luxembourg to the London Air Traffic Control Centre:

"For the attention of station GB4D-Day. The Grand Duke of Luxembourg warmly thanks

This year's RSGB mobile rally at Woburn Abbey proved to be one of the largest in terms of the numbers of traders who booked stands and of visitors who attended the rally. Well over 80 traders arrived during the early hours of Sunday 5 August, many of them having travelled overnight to reach Woburn from places as far apart as Devon and Yorkshire.

First arrivals on the previous afternoon had been members of the Exhibition & Rally Committee and RSGB HQ staff, and they erected over 300 tables to a previously formulated plan and the RSGB stand at the car park end of the marquees. This year there were four marquees: the two largest, covering an area of nearly 10,000ft², were for traders; while the two smallest housed a trader with his own stands, and the members' mart.

Four members of the Exhibition & Rally Committee stayed on site overnight, a night which will be remembered for the torrential rain hammering down on the marquee accompanied by vivid flashes of lightning and loud rumbles of thunder. One of the committee members kept the books company in the RSGB van, and almost read the whole of the new *Call Book* with the help of the lightning flashes.

After a 7am breakfast in the E&R committee chairman's caravan, the committee members were kept busy showing traders where their tables had been erected; at the same time HQ staff and their helpers were placing books and other goods on the RSGB stand. By 10am, the official opening time, the marquees were already filling with visitors, and all the tables in the members' mart were rented to would-be salesmen. RSGB affiliated societies present included AMSAT, RAIBC, and the Birmingham branch of BARTG.

the radio amateur station GB4D-Day for the kind message of goodwill which it considered addressed to him on 6 June 1984, on the occasion of the 40th anniversary of the Allied landings in Normandy. This thoughtful attention has pleased him a great deal (cette gentille attention lui a fait grand plaisir)."

From the office of the King of the Belgians to the organiser, GB4DD:

"Dear Sir. The King has read with great pleasure the message you sent him on 6 June at the occasion of the 40th anniversary of D-Day and in remembrance of the solidarity, the gallantry and the sacrifices of all the nations engaged in this memorable war operation. His Majesty has very much appreciated the kind thoughts expressed to him and has asked me to thank you heartily for it as well as all those associated with the sending of this message—J van Ypersele, Cabinet du Roi."

The London Airways ARC subsequently sent the following message to Prince Philip: "Your Royal Highness. The operators of amateur radio station GB4D-Day are honoured that Your Royal Highness, in your capacity as patron of the Radio Society of

Almost all the well-known traders came along to support the rally, and a sprinkling of new names made a first-time appearance. Items for sale ranged from individual components to the latest black box, although many second-hand bargains were also available. By mid-morning the marquees were tightly packed with visitors looking for that "bargain" and purchasing books at the RSGB stand. A queue for tables in the members' mart developed but fortunately the weather was fine and tables were erected in front of the members' mart marquee to cater for the overflow. A small marquee which had been erected by the Woburn authorities to sell refreshments was kept busy all day.

The talk-in station provided by the Dunstable Downs RC was kept busy directing the mobiles from far and wide to the rally, and during the afternoon even more visitors crowded into the marquees. But in spite of the crush at times, good humour was very evident. The rally provided an excellent opportunity for "eye-ball" QSOs between radio amateurs, many of whom had previously only communicated with each other via the ether. The RSGB stand also became a focal point for the staff to chat with members; the conversations ranging from the price of black boxes to hopes that the 50MHz band would be made available to all UK amateurs in the not-too-distant future.

A vote of thanks must go to: the Exhibition & Rally Committee, with chairman Norman Miller at the helm; HQ staff and helpers on the RSGB stand; all the traders; Dunstable Downs Radio Club; the visitors who helped to make the rally a success, and especially to John, G3DOT, who helped with the tables on the Saturday and at the bookstall on the Sunday.

Great Britain, undertook to relay our Message of Goodwill, sent on behalf of all radio amateurs of the nations involved in the D-Day Landings, to the Heads of State visiting Normandy. We wish to express our sincere thanks to you for this honour."

Home-brewing?

The Society is sometimes asked for advice on obtaining new components for home construction, especially with reference to the fact that although one well-known professional source—RS Components Ltd, also known as Radiospares—does not supply to the private individual, their part numbers are commonly specified in technical and constructional articles. The Society knows of three companies which have extensive catalogue ranges and who sell to the private individual:

MS Components Ltd, Zephyr House, Waring Street, West Norwood, London SE27 9LH (Tel 01-670 4466); STC Electronic Services, Edinburgh Way, Harlow, Essex CM20 2DF (Tel 0279 26777); and Maplin Electronic Services, PO Box 3, Rayleigh, Essex SS 8LR (Tel 0702 552911).

All these accept telephoned orders payable by means of credit cards. Although

MIDLANDS VHF CONVENTION 1984

British Telecom Training College
Yarnfield, Nr Stone, Staffordshire

Saturday 13 October from 1030

Admission £1.30

Bookstall

Measurements

Bring & buy

Computers

Exhibition

Lecture programme includes

"Improving your 144MHz dx"—G8VR

"Yagi antenna design"—G3SEK

Extensive free car-parking. Talk-in SU8 & S22

Bar and lunch-time snacks

Evening buffet (£4.50—advance booking essential)

Details from G3UBX, 18 Langley Road, Merry Hill, Wolverhampton, WV3 7LH

the Society can in no way endorse these companies, headquarters staff who are keen constructors and who have had dealings with them report that they give good service to the individual.

Asia Telecom 85

The International Telecommunications Union and the Telecommunications Authority of Singapore have announced that they will jointly organize "Asia Telecom 85". This is an exhibition and conference, which will take place between 14 and 19 May 1985 in Singapore, largely concerned with the needs of telecommunication infrastructures in the region. There will also be a special session of the ITU World Telecommunication Forum, which will informally discuss issues and problems in telecommunication developments. Emphasis is expected to be placed on mobile communications, especially cellular radio, and on integrated digital networks.

David Rankin, 9V1RH, who is secretary of IARU Region 3, is co-ordinating amateur radio's attendance at Asia Telecom 85.

PSSB repeater becomes operational

GB3SF, the world's first amateur pilot ssb repeater, was switched on at 1800gmt on 14 August 1984. It is located at the Metallurgy Building of the University of Sheffield, in the centre of the city, and operates on channel RS37, ie the output is on 145.785MHz and the input on 145.185MHz. The input and output modes are both pilot ssb (pssb), with the pilot carrier 16dB below the total p.e.p. output. The power level supplied to the single antenna, which is a 3dB colinear at about 120ft agl, is about 5W p.e.p., and the unit's coverage is expected to be similar to that of the adjacent 430MHz fm repeater GB3US.

Several successful contacts have already taken place, and users have apparently been pleasantly surprised at the ease with which contacts have taken place. No equipment modification is needed in order to receive the repeater's output as "normal" ssb, although in this mode of operation the full benefits of the pilot ssb system are not realized. Transmission to

the unit requires some carrier to be reinserted, to a level which is no lower than 16dB below the total p.e.p. output.

GB3SF has initially been licensed for an experimental period of one year, and various amateur and professional bodies have expressed great interest in the results of the project. As much operational experience as possible is required during the experimental period, and reports and comments would be greatly appreciated by the repeater keeper, Dr A. J. T. Whitaker, G3RKL.

Raised in the House

In reply to a question put on 19 July 1984 by Mr Frank Haynes, MP for Ashfield, concerning difficulties experienced by emergency services in the Nottingham area from users of illicit cb equipment using high-power amplifiers, the Parliamentary Under-Secretary of State for Trade & Industry, Mr John Butcher, said that he fully understood the MP's concern. He added that "... When the RIS is within the ambit of my department after the transfer we shall see what we can do to address the priorities. We shall certainly put the problem of interference to emergency services as a top priority for the work of whoever will sponsor and administer the department. ... I offer him the reassurance that, under the new Telecommunications Act, for the first time we shall have powers to confiscate illegal equipment—radios, aerials not to specification, boosters used unfairly, a.m. radios and so on. We shall be able to take the equipment away as evidence which we (could) not do at the moment."

Cable problems in Canada

Early in July the Canadian Cable Television Association, the Canadian Amateur Radio Federation and the Canadian Radio Relay League agreed on a set of guidelines and reporting procedures for the control of cable television leakage and ingress. However, the British Columbia FM Communications Association have expressed "... shock and dismay" at what they feel to be a "... sellout of Canadian amateurs". They feel that the resolution gives clearance to cable television companies to continue

causing interference to licensed radio amateurs, and in their letter of refutation state that "Unless amateur radio reacts promptly to repudiate this sellout to the cable industry, it will seriously undermine any attempt to force the cable industry to live up to its obligations, now or in the future. If (you) think we're plagued with problems now, when a relatively few cities have mid-band interference, wait a few years. By then much of the 220 and 440MHz bands may be unusable, and even our hf bands will be cluttered up with leakage from two-way interactive systems to allow shopping and banking at home etc."

Technical articles addenda

The author of "Design of L-networks for matching antennas to transmitters" (*Rad Com* August 1984) advises that in the second equation in the right-hand column on p665, the divide sign should be a minus sign.

The author of "Design of an 85W broadband hf linear amplifier" (*Rad Com* May 1984, pp390-3) has advised the following amendments to the components specified:

1. R3 should be 330Ω 0.5W.
2. T1, T2, T3. Neosid Ltd have discontinued handling small orders. Alternative ferrite cores of suitable magnetic properties are T1, twin-hole bead, code A0001X001, K1 material, size D, Electrovalue Ltd, 28 St Jude's Road, Englefield Green, Egham, Surrey TW20 0HB; T2, Fair-rite core 12.5mm diameter, stock No 55-01101, and T3, Fair-rite core 25mm diameter stock No 55-01401, Cirkut Holdings plc, Park Lane, Broxbourne, Herts.

SSTV news

Since the sstv news feature *SSTV Scene* was last published in *Radio Communication* two years ago, only one member has written to enquire when it would reappear. As it is necessary to economise on the space available for regular features, it is felt that members interested in this mode will be adequately served by including sstv news items in the appropriate spectrum feature, ie *The Month on the Air* or 4-2-70. Any sstv news items should therefore be sent to either G3FKM or G8VR respectively.

JOTA lists

The 27th Jamboree-on-the-Air takes place on 20-21 September 1984 and, as in previous years, the Society has produced a list of all participating stations. To receive a copy, please send an envelope marked "JOTA LIST" to the membership services department at headquarters. A Jamboree-on-the-Air report form will also be sent out with each list; these have been produced by the Scout Association and will be used to judge the success of this year's event. It would be appreciated if they could be completed and returned to the Association after the event, to the address that is given on the form.

Erratum

In the item "GB2RS frequencies" (*Rad Com* September 1984, p743), 145.550MHz (channel S22) should have been 145.525MHz (channel S21).

COUNCIL PROCEEDINGS

A brief report on the Council meeting held on 26 May 1984

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

Apologies for absence were received from Dr Evans and Messrs Thomas and Willis.

Call Book entries

There was some debate over the right of an amateur to enforce the omission of his/her call sign from the *Call Book*. Comparison was made with the "ex-directory" category for telephone subscribers.

Mr Cornish suggested that the wording of the amateur radio licence application be examined to see if this point was covered.

Honorary treasurer's report

Mr Cornish reported that the VAT contribution had now been agreed by Customs & Excise with regard to the RSGB subscription.

The treasurer then commented on the accounts to 31 March 1984, and answered several questions related to them.

The President thanked Mr Cornish for his report.

Secretary's report

(a) The Green Paper on the future of Bands 1 and 3 had been received, and the outlook for the 50MHz band in the UK was optimistic.

(b) Discussions with the DTI were continuing on: the licence schedule; guidelines for the possible use of cw by Class B licensees; and the Morse test. The proposals which would be put forward on the Morse test would be discussed by the Forward Planning Group.

(c) An RSGB team had revisited Milton Keynes and had established that the cable tv system there was now operating in such a way as not to cause any problems to amateurs in the area using the 144MHz band.

(d) The Society had been informed that, following a recent meeting of CEPT countries in Madrid, it was likely that a series of mutual licensing agreements would be made between CEPT member countries. These agreements would take the place of the earlier suggestion of a common CEPT licence.

(e) The Society had recently received its biggest single book order from the ARRL, and coupled with the sale of over 6,000 *Call Books* in three weeks, had provided a significant stimulus to book sales.

(f) The question of whether interference/breakthrough was material to planning situations, was discussed in some detail. The secretary would report on a particular case when further discussions had taken place.

(g) An analysis of the 1983/84 membership statistics to date showed that membership continued to rise at over six per cent per annum.

Recommendations arising from committee minutes

Finance & Staff

"Video library—that existing library material should be reviewed and new videos commissioned." Mr O'Brien gave the background to this recommendation, and after some discussion various actions which were to be undertaken were agreed.

The recommendation was approved unanimously.

Membership & Representation

"That it be a condition of affiliation to RSGB that the title of the society, club, group or other body shall include the words 'amateur radio' within the title and must not refer either directly or indirectly to cb or other similar non-amateur radio activity."

Mr Pinchin explained this recommendation, which had been tabled in order to cope with the growing number of applications from cb-oriented clubs.

The recommendation was approved unanimously, with the following addition: "Any exception to this rule must be approved by the RSGB Council."

Membership and representation

Reduced subscriptions in respect of nine members, and a waived subscription for one year in respect of one member were noted.

IARU matters

The President announced that the majority of national societies had now voted in favour of the new constitution and so it had already been passed. It was agreed to vote "aye" but, having regard to the points of concern raised by the IARU Committee, the secretary was asked to record the Society's substantial reservations in his reply to IARU headquarters.

The President welcomed Mr M. Appleby, G3ZNU, to the meeting and invited him to report on the IARU Region 1 Conference.

Mr Appleby commenced by apologising for the absence of Mr Hughes, G3GVV, who was unable to attend the Council meeting. He said that the conference had gone very well: it had been mainly one of consolidation and agreement, rather than one of formulating any major changes. He gave details of the main decisions taken, plus the results of the election of the Region 1 Executive Committee. In summing up, Mr Appleby said that RSGB should be pleased with the conference but there remained much hard work to be done in implementing resolutions.

Mr Appleby answered several questions regarding the organization of the conference.

The President thanked Mr Appleby for his attendance.

Mr Smith introduced a paper which raised the possibility of the IARU secretariat being located at RSGB HQ. While there was general agreement on the concept of this proposal, Council recognized the financial commitments involved, as well as the vast amount of experience which existed within ARRL.

The secretary referred to the development of the IARU Region 1 secretariat, with which it was hoped that RSGB HQ would become more closely involved in the near future. As a result, Council might or might not feel that it wanted to take on the IARU HQ role.

It was agreed that serious long-term consideration should be given to the proposal in Mr Smith's paper, an assessment of costs involved being a first step.

Zone F vacancy

It was unanimously agreed to co-opt Mr J. T. Barnes, G13USS, to serve on Council as member for Zone F for the remainder of 1984 following the resignation of Mr I. Kyle, G18ZY.

Waived subscriptions

Mr Holmden voiced his continuing concern that the Society was by-passing the Articles of Association in not insisting on unanimous approval of all waived subscriptions.

This opinion was noted, and Mr O'Brien assured Mr Holmden that the matter was being carefully looked at by the Finance & Staff Committee and the Society's solicitors.

Society for the Preservation of Amateur Radio Standards

A report from Mr Griffiths, G3STG, was tabled. This group, confined mainly to Norfolk, was noted and would continue to be monitored. Council was asked to pass any further information to the Raynet Committee chairman.

Metres and megahertz

Mr Jessop introduced a paper which advocated the consistent use of metres in Society publications. The short discussion which resulted indicated that while the inconsistency was recognized, it was felt that the use of metres could not, and should not, be enforced.

Subscription payments for past-Presidents and vice-Presidents

Mr Jessop explained that honorary vice-Presidents received complimentary membership to the Society, and he felt that something tangible should also be bestowed upon the Society's past-Presidents and vice-Presidents.

After a short discussion, Mr Jessop proposed that past-Presidents and vice-Presidents be given the option of free RSGB membership. This was seconded and passed, with seven in favour of the proposal and four abstaining.

Spectrum managers' reports

Dr Allaway, hf manager, had submitted a report summarizing hf topics discussed at the IARU Region 1 Conference.

Mr Fisher, vhf manager, also reported on the IARU Region 1 Conference. It was noted that RSGB had undertaken to co-ordinate vhf and uhf frequencies within Region 1, and this would be dealt with by the Licensing Advisory Committee in conjunction with the IARU Committee.

Raynet Ltd

The President referred to a letter which he had sent to Mr Lundegard, G3GJW, dated 19 May, in which was reported a request from another member of Council, Mr Smith, G4AJJ, to call a special meeting of Council under Article 24, to expel Mr Lundegard from the Society. The President repeated his written request to Mr Lundegard to transfer the shares, books, seal etc of Raynet Ltd, to the Society. Mr Lundegard responded that he saw no reason to change his mind over the requested transfer and said that he felt that he was under no obligation to do so.

The President asked Mr Lundegard if he intended to put Raynet Ltd in trust for the Society. Mr Lundegard said that he would have been prepared to do so four years ago, but felt that he had been treated like an outcast by Council for four years. He added that his actions over Raynet Ltd had been done for good reasons and he would not now respond to bullying tactics. The President assured Mr Lundegard that his letter had not been intended to be of a bullying nature, but an open opportunity for Mr Lundegard to respond to a further request for the proper transfer of Raynet Ltd to the Society. The President said that he did not wish to take up any more time on this matter at this meeting.

Addendum

In "Council Proceedings" *Rad Com* May 1984, p385, add to the section, "Membership and representation": *Mr Holmden voted against reduced and waived subscriptions.* This correction to the minutes of the Council meeting held on 14 January was agreed at the following meeting of Council.

Mobile Rallies Calendar

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

21 October

Hornsea ARC Radio, Computer and Electronics Exhibition. Floral Hall, Hornsea. Amateur radio display, special event station, junk and bring & buy sales. Details from sec G4NJP.

28 October

Aycliffe & Shildon ARC hamfest, junk sale and bring & buy. Elm Road Working Men's Club, Elm Road, Shildon. Opens 12 noon to 5pm. Junk sale starts 1pm. Details from E. Bate, 5 Elm Road, Shildon, Co Durham DL4 1BH.

3 November

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

3 November—The rally of the Street & DARS/Lions Club has been cancelled

9 December

Leeds & District ARS Annual Christmas Rally, Pudsey Civic Centre. Open 11am. Talk-in on S22. Free admission. Rally sec G4ONW, QTHR.

12 May 1985

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

26 May 1985

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

9 June 1985

Elvaston Castle Mobile Rally, Elvaston Castle Country Park, 5 miles south-east of Derby on the B5010. Organized by the Nunsfield House ARG.

25 August 1985

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

RAE Courses 1984-5

(See also *Rad Com* July, p560; August, p655 and September, p745)

Courses which have already started may accept late enrolments.

Barking. Westbury Recreational Centre, Westbury School, Ripple Road, Barking. Organized by Barking R&ES. Details from G8IZW, tel 01-594 2471.

Basilidon. College of Further Education. Course commenced September. Details from Sam McCarr, G4LJL, tel Basilidon 289281 or 20801.

Burton-on-Trent. Rolleston Evening Institute, Forest of Needwood High School, Rolleston-on-Dove, Burton-on-Trent, Staffs. Course commenced September. Details from tutor Alan Turner, G4IMJ, tel QTHR, tel 0283 46392.

Fareham. Adult Education Centre, Wickham Road, PO16 7DA. Fridays, 7-9pm, commencing 2 November. Details from the centre, tel 280709, or the tutor, G3CCB, tel 288139.

Glasgow. The Nautical College, Thistle Street, Glasgow. Course commenced September. Details from the college secretary.

Orpington. Ramsden School for Girls, Tintagel Road, Orpington, Kent. Classes commenced 20 September. Thursdays, 7.30-9pm. Details from G8TKV, QTHR, tel Orpington 31123.

Salisbury. College of Technology, Department of Engineering & Computing. Wednesdays and/or Thursdays, 6.30-9pm. Course commenced September. Details from course tutors H. Tupling, G2HNN, or W. Grinstead, G4XPQ.

Southampton. Glen Eyre Further Education Centre. Details from the centre, tel 766916.

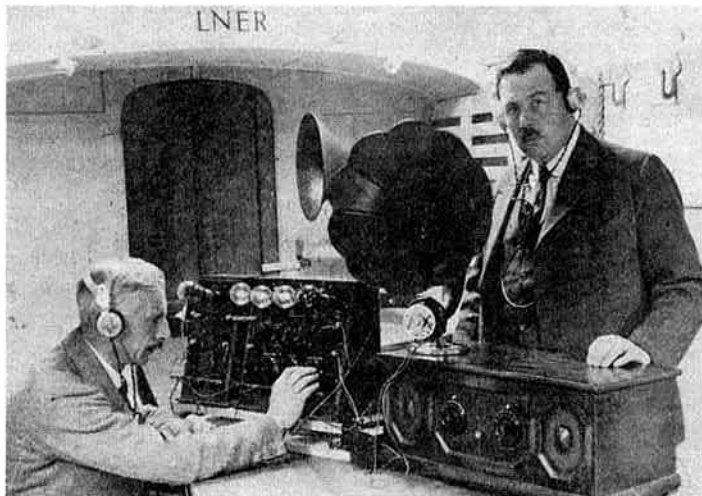
Stranraer. Community Education Centre, Lewis Street, Stranraer. Thursdays, 7.30pm. Classes commenced 6 September. Details from Neil MacDonald, GM4LQS, QTHR.

MORSE CLASS

Beckenham. Adult Education Centre, 28 Beckenham Road, Beckenham, Kent. Beginners and intermediate morse class. Tuesdays, 7.30-9.30pm. Course commenced 18 September. Tutors Steve Palmer and Peter Grant. Tel 01-650 1383 or 01-464 5745 for details.

Special Event Stations

The photo shows Leslie McMichael, 2FG, on the right, and Benjamin Hesketh, 2PG, who is adjusting the equipment, which bears the "MH" trademark of their company in Slough. It was taken 60 years ago during the first experiments in radio communication on board a train!



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

29 September-26 October, GB8HCC

The station will be operated by G8WPL and G8WPR to celebrate the building of Heaton Chapel Church. Operation will be on 144, 432MHz and 1.3GHz ssb, and some 144MHz fm. QSL cards should be sent to G8WPL or G8WPR, from whom further details may also be obtained.

30 September-6 October, GB4KMI

Southampton University RC will be operating this station on as many bands as possible between 1.8 and 144MHz, during Freshers' Week. Details from GJ6WEX, Secretary, SURC, c/o Students' Union, Highfield, Southampton SO9 5NH.

13-14 October, GB0KTC

The station will operate on all bands from 0900-1700 each day to commemorate the 500th anniversary of Dundee's twin town, Wurzburg, in

West Germany. Details from John, GM4WEQ, tel 0382 552362.

19-21 October, GB2DSG

The station will celebrate the 27th Scouts Jamboree on the Air. It will be operated from the Denmead Village Scouts HQ, Tanners Lane, Denmead, Hants. QSL cards will be available via the bureau. Operation will be on as many bands and modes as possible, 1.8 to 432MHz. For further details contact G4WQZ (ex-G8IRS, QTHR). Tel 0705 264288.

20 October, GB0DMS

Derby & DARS will be operating this JOTA station on behalf of the 134th Derby (Mackworth) Scouts. It will operate from 10am to 7pm on hf, 1.8-28MHz, and 144MHz. Visitors will be welcome. Details from Mike Sharp, 37 Twyford Road, Barrow-on-Trent, Derbys.

21-22 October, GB4EVE

The station will celebrate the twinning of Evesham with Melsungen in Germany. It will operate on all hf bands if possible, and also perhaps on 144MHz. Special QSL cards will be available. Details from Mike Butler, G4UXC, QTHR.

17-18 November, GB0LMC

This station will be operated by members of the McMichael ARS in Stoke Poges, Bucks, from 0900 17 November to 1700 18 November on the 1.8 to 432MHz bands, concentrating on UK contacts. QSL cards will be issued via the bureau or via G2FG, QTHR. It will commemorate the birth 100 years ago of Leslie McMichael, who held the callsign MXA from 1913 until the first world war, and who was one of the founders of the London Wireless Club (later to become the RSGB) in July 1913. He became the first vice-chairman in 1914 and then secretary in 1919. The following year he was licensed as 2FG, and allowed to use up to 10W on 180m. The licence allowed him to contact only three named stations! In 1921, on behalf of the Wireless Society of London he successfully petitioned the Postmaster-General to allow the broadcasting of speech. This led to the establishment of the Marconi Company's station 2MT—which broadcast speech and music for nearly a year—and, soon after, to the formation of the BBC.

Leslie McMichael was one of the few honorary members of the RSGB, and died on his birthday in 1951.

Other Events

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

13 October—Midlands VHF Convention. British Telecom Training School, Stone, Staffs.

13 October—Open meeting for RSGB members in Region 20. Lecture Theatre, Queens Building, University of Bristol, commencing 2.30pm.

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

23 March—RSGB National VHF Convention, Sandown Park Racecourse.

13-14 April—RSGB National Convention, National Exhibition Centre, Birmingham.

OBITUARIES

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

Mr N. J. Collins, G4GGA

Nigel Collins was lost at sea last November. He was working as a radio and electronics engineer for Marconi Marine and was aboard the *Mobil Refiner* off South Africa. While working there he made many friends within SARL.

Mr H. B. Fox, G3JNQ

Bert Fox died on 27 August, aged 88. He had been active on the hf bands both on ssb and cw, and had many friends through his contacts. He was also a keen WAB net operator on 1.8MHz, and would always help and advise newcomers to the hobby.

Denis Heightman, G6DH

Denis Heightman died suddenly while out sailing on 5 August, aged 72. He was a pioneer of vhf and uhf development and on 5 November 1947 made the first 50MHz transatlantic QSO on telephony with W1HDQ. As far back as 1935, G6DH had reported a curious "hiss phenomenon" that he and the late Nellie Corry, G2YL, had observed on the uhf bands when their beam antennas were pointed at the sun. Dr R. L. Smith-Rose, in a speech he made in January 1956 at the fourth annual dinner of the London UHF Group, placed on record that the science of radio astronomy is partly based on this phenomenon first observed by G6DH and G2YL. Denis was a most competent constructor of radio equipment to truly professional standards. He was president of the IERE in 1978 and 1979.

Mr Dan Johnson, G3UQX

Dan Johnson died on 29 August. His work at the Charles Keene Technical College in Leicester brought him into contact with many potential and actual radio amateurs. He was the licence holder of the college station, G4CKC. Both in this capacity and for the great encouragement he gave to RAE students he was widely admired and respected in the east Midlands. Both his wife Joan, G6XRR, and his son Michael, G6AJE, became licensed amateurs largely through his encouragement and example.

Mr R. F. Leat, G4TRL

Bob Leat died on 4 August, aged 55, with his hand on the key in a QSO. Although only recently licensed, he was an accomplished operator, technician and member of the Salisbury R&ES. He was always ready to help others and his cheerful friendliness will be sadly missed, especially by newcomers to whom he gave so much help.

Mr D. Markland, G2BNZ

Dan Markland died on 8 July. He had been a long-serving member of Bury RS.

Also:

Mr C. J. Allerton, G4EEK;

Mr M. Beerling, G2CJC, on 15 June;

Mr L. Bolam, G8YQE, on 24 July;

Mr W. Bridgen, G6WU, in August;

Mr D. L. Brough, G8JKH, on 19 June;

Mr B. J. Broughton, G3XBR, on 28 April;

Mr L. S. D. Christian, G3HQP, on 6 May;

Mr S. Gornall, G4OFS, on 4 July;

Mr W. T. Horn, G3BNY;

Mr H. Joslin, RS31565, on 14 March;

Mr S. Keidan, GW4CZM, in 1983;

Mr H. Riding, G3LED, on 31 January;

Mr T. Say, G8TUA, in May; and

Mr D. F. Watkins, GM6FXK, on 1 July.

RADIO COMMUNICATION October 1984

Members' Mailbag

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

ARTIFICIAL AERIAL LICENCES

Sir—I know that occasionally the details of the chronology of licences has appeared in *Radio Communication* and other publications, but it may not be generally appreciated that prior to 1939 the holder of a "full" call relinquished his artificial aerial licence, which was occasionally re-issued by the Post Office.

I have often wondered about previous holders of the "2ABC" which was issued to me at the end of 1938, and which was held in abeyance so that I became G2ABC some years after the war was over.

Many years ago now, someone gave me a blank QSL card as used by 2ABC—ie one of the previous holders of the call—with the address 44a Nursery Lane, Ovenden, Halifax, but unfortunately no name was printed on the card. At that time these cards were printed by 2CDT, Elland. Also I have gleaned the information that in 1926, the AA call 2ABC was issued to a Mr E. Schofield of Lincoln.

It would be interesting to know any details about holders of 2ABC, particularly if their G2, G5, G6 or possibly G4 + 2 or G3 + 2 are still on the air. I feel sure that they cannot be current, otherwise I am sure someone would have mentioned it in QSO.

I look forward to hearing from anyone with any news of holders of "2ABC".

Ron A. Ledgerton, G2ABC

PS. I am reminded that when I first became G2ABC a very notable amateur, whose callsign I had better not mention, thought it was a silly call for a pirate to use!

Any offers to Mr Ledgerton direct, please

MARITIME MOBILE

Sir—I read with interest the letter from G2BQ in your May issue concerning amateur radio afloat for yachting enthusiasts. I would like to put the case for amateur radio on deep sea ships.

Surely it is about time that something was done about the British amateur maritime mobile licence. After many years of paying between three and four times the normal amateur licence fee to hold both my normal amateur licence and my maritime mobile licence, the last straw came from the Home Office in October 1982 when I was sailing on ss *Oriana* as first radio officer. A group of American radio amateurs were given written permission by the Home Office to operate from ss *Oriana*, a British ship, using their American licences. Apparently permission had originally been granted by the Home Office for American amateurs to operate with their American licences from mv *Island Princess*, also a British ship, in 1980. It may be possible to imagine my annoyance at this situation when I, as a British radio amateur and a radio officer employed by the company which owns both of these ships, had to go through all the procedure of letters of permission, forms filled in, DTI inspection arranged and passed and an extra licence fee of approximately three times the normal fee paid, to obtain my maritime mobile call.

Surely there can be no more worthy reason for an amateur radio station than when it is used on board ship where it can be used as a safety of life at sea back-up for the ship's main radio installation. In all of the ships I have sailed in, which includes two of the world's largest passenger vessels, each carrying more than 2,500 souls, all the radio equipment is installed in one radio office. Should this radio office be put out of action by fire, collision, flood etc, the vessel would lose all of its long-range communication facilities. Apart from the radio office there is the bridge vhf, but its 40-50-mile range would not be of much use in the middle of the South Pacific. Passenger vessels also have one or two lifeboats fitted with radio, but usually it is impossible to raise the masts and rig the antenna when the boat is in the stowed position. To lower the radio boat, raise its mast and rig the antenna is a lengthy, hazardous operation even in calm weather conditions—in inclement weather it becomes well nigh impossible.

An amateur radio station set up away from the radio office and with its own antenna could be an invaluable back-up on any ship. As most modern amateur transceivers will operate from 12V dc, the station could also easily be made independent of the ship's mains in an emergency. For these reasons one would think that amateur radio at sea would be actively encouraged, but in fact quite the reverse is true. The small handful of British/MM licences in existence bears witness to the tortuous path of red tape and heavy expense that has to be trodden by the intending seagoing radio amateur. Incidentally, while I was on *Oriana*, my annual/MM licence fee was approximately three times as much as the normal ship's radio station licence fee, even though the ship's station included some £100,000 worth of equipment and had six radio officers to man it. Also, like any ship, a DTI surveyor has to spend at least one day every year examining the equipment in the annual radio survey.

Surely a simple letter of permission from the master of the vessel would suffice without any extra licence or fee being necessary. Most radio amateurs with/MM licences are also the ship's radio officer. However, when this is not the case, perhaps there should be a ruling that the amateur installation be checked by the ship's radio officer to ensure that no serious interference to the ship's normal radio communications was caused.

It was following the frustration of the 1982 ss *Oriana* incident that I allowed both of my amateur licences to lapse. However, I am now in the process of renewing them both. I have paid my £15 for the privilege of being able to take my morse test again, so that is the first step on the long road.

Maybe it would be a lot easier if I applied to the FCC for an American amateur licence which would allow me to operate on British ships.

Paul Barry, ex G3RJS, ex G3RJS/MM, CRO mv Sea Princess

The principle of SOLAS (Safety Of Life At Sea) is of overriding importance, and it seems that there is a strong case for amateur radio operations to be facilitated on board deep-sea ships as back-up. Even some space shuttle missions carry amateur radio as back-up—as was demonstrated to US senators during Owen Garriott's STS9 flight. As mentioned elsewhere in this issue, the Society, in conjunction with the DTI, is currently involved in a full review of the amateur radio licence which is expected to take about one year to complete. The matter of the maritime mobile licence will be fully discussed with the DTI, and we hope that some of the illogical and out-of-date restraints and conditions in the licence can thereby be removed.

OLYMPIC MEMORIES

Sir—I read with interest the *RSGB News Bulletin* item regarding the 1984 Olympic Games station NG840. This brought back memories, because as far as I am aware I was the only G station to contact the Olympic Games station, W6USA, back in 1932. This took place on 30 June 1932 at 0500gmt, when W6USA replied to a "Test dx" call from me on the 14MHz band. Conditions were poor at the time as we were at the bottom of the sunspot cycle—much the same as we are now!

The station was operated by old-timer Don, W6AM, famous for his antenna farm. By a strange coincidence I was called by him recently on 14MHz and was reminded of our QSO back in 1932. He told me that he would again be one of the operators at NG840, and hoped to make another QSO to celebrate a gap of 52 years.

My set-up in 1932 was a self-excited oscillator, ie tptg, "locked" to a crystal source, à la the late C. W. Goyder, G2SZ, of Mill Hill School fame. I held a so-called high-power licence—50W—in those days. The tptg oscillator used a Marconi LS5B valve which with 50W input went very red in the face! No forced-air cooling in those days. The receiver, needless to say, was the simple two-valve

Reinartz known as an O-V-I with headphones. I hope that some of us were able to make it to NG840 in Los Angeles before the 1984 Olympic Games ended.

H. E. Whatley, G2BY

THANKS TO "SLOW MORSE"

Sir—I feel that I should write to express my appreciation of those who organize and send the RSGB Slow Morse Practice Transmissions. I have listened to, and copied, a number of stations during the last two years; without them I feel that it would have been difficult to pass the test and to qualify for the A licence. Many thanks to all!

G. H. Reece, G4YGL

Sir—After reading certain letters in *Radio Communication* and other radio magazines, of how new hams and others find that they are not made welcome on the air I felt I must write to you. Why? Because since August 1983, I have been made welcome on KN and the other repeaters and on simplex channels, especially by the G2, G3s, G4s etc, who also gave helpful tips to help to get things right!

On 13 July 1984 I passed the morse test, and on 19 July the G4 callsign was issued—who said Chesterfield was slow? Most of all, although I have sent my thanks personally to those concerned, I know credit is due to the RSGB slow morse stations; notably, Chelmsford, Braintree and Colchester on 144MHz, and Locking and Catterick on hf, which gave me terrific help, and also to the Ipswich Radio Club for their help.

We do hear of the RSGB being "pulled to pieces" for various reasons, but those who don't belong are the worse off, and many who could get help in different ways are at a loss.

So many thanks for the RSGB and its members who give their services free and simply for the benefit of their fellow hams or swls.

Ernie, G4YUG

The RSGB Slow Morse Practice Transmissions organizer and his stalwart team will be delighted to see the letters from Messrs Reece and Whitfield: they receive relatively little feedback. We note the G4 callsigns with interest!

STANDARDS

Sir—In the continuous squabbles in your letters column about the current form of the RAE, one point is missing. I taught the RAE for my local radio club for several years before and after the transition from a written answer to a "ballot box" paper, and I must point out that the newer paper is harder. It was no problem for someone with several years' experience to predict the old RAE questions within reasonable statistical variance. One year in fact my "six best hopefuls" all came up, resulting in an unprecedented pass rate. With the new paper, however, there is no substitute for trying to give a thorough well-based knowledge of radio theory, as no part of the syllabus is unexamined, hence my average 90 per cent pass rate dropped to 70 per cent. No-one can be lucky when he has no choice of questions and many more to do. There is now no substitute for knowing your stuff.

May I suggest that the "declining standards" of 144MHz band operation is caused by increasing band occupancy promoting the "I only talk to my friends" syndrome. Hence the newer callsigns, often being unwelcome in the nets of their predecessors, develop their own standards. They are different standards, but I will not admit them to be *de facto* a decline.

Nigel V. Hewitt, BSc, G8JFT

NOVICE LICENCE

Sir—I would like to see a novice licence. It should be a straight-forward fm licence that would only allow the novice operator the use of fm simplex 144 and 432MHz repeaters. Power limits for the novice licence should be 50W.

Colin Watson, BR546598

The 10-turn "chopstick" helical (Mk2) for Oscar 10 435MHz uplink

by COLIN RICHARDS, 9M2CR*

THE Mk1 VERSION OF THIS LOW-COST high-gain antenna (see *Rad Com* June 1981) proved its worth with Oscar 7 Mode B and Oscar 8 Mode J. Oscar 10, with its magnificent 8h window and giant dx-stride, highlights the advantages of an antenna offering 14dB gain and guaranteed RHC polarisation. The Mk2 version provides an additional bonus of direct feeding with 50Ω coaxial cable and perfect matching to the helical's normal 140Ω characteristic impedance. With just 20W input to the helical, you reach the AMSAT-recommended maximum eirp of 500W out. Add to that the fact that it is light, durable and easy to point—the sum total is an attractive inducement to any satellite worker prepared to tackle a simple construction job in the workshop.

Let's start with a parts list:

One 6ft 4in length of 1 by 1in square timber.
Forty (two bundles of 20) Chinese chopsticks, plain wood type.
25ft of good-grade RG58 coaxial cable.
One bicycle wheel rim, 25in aluminium.
One piece 3 by 3ft fine aluminium mosquito mesh.
One 6ft length of 2 by 0.5in aluminium angle (0.063 thick).
One SO-239 coaxial socket.

The 6ft 4in timber boom should be seasoned and straight, and planed smooth to its 1in by 1in cross-section. The Chinese chopsticks should be the common plain wood variety (not bamboo): the upper half of this chopstick is square section, merging to a slightly-tapered circular cross-section for its lower half—total length is about 10in. The chopsticks are pushed into holes drilled in the boom at quarter-turn intervals. They serve as spacers for the helix, which is RG58 cable—clean to handle, and easy to smooth into shape.

Construction

Start by pre-drilling the boom for the chopstick spacers. Make a clear mark 3in from one end of the boom to mark the eventual plane of the reflector, with a short stub of boom sticking out at the back. Now look at Fig 1 and, using a 0.25in diameter bit, drill the first hole "horizontally" for chopstick B, at a point 0.37in from the reflector line. The next hole, for chopstick C, is drilled "vertically", 1.37in from chopstick B. The next hole for chopstick D is drilled "horizontally", 2in from chopstick C. Then the next hole is drilled "vertically" for chopstick E, at a point 3in from chopstick D. These are special spacings for the first, "skewed" turn (explanation later). From now on it's straightforward and uniform, with 1.68in spacing between each chopstick—alternating horizontal, vertical, horizontal and so on—to the end of the boom.

The reflector mount

Cut two 25in lengths of the 2 by 0.5in aluminium angle section. Nest one length inside the other to form a shallow U-section, and bolt them firmly together; we call this the brace. Cut a 1 by 1in aperture with a chassis-punch at the exact mid-point of the brace. Cut two 6in pieces of the same aluminium angle. Fix them "back-to-back" centrally inside the shallow U-section brace, as shown in Fig 2. The 2in wide webs of these pieces will fit snugly against the 1 by 1in aperture through which the boom will be pushed. Position the timber boom so that the 3in end-section protrudes through the boom, with the "reflector mark" lined up with the brace surface. Square the brace and the boom carefully, drill two 0.25in holes through the webs and the boom, and bolt together firmly. Mark off a point inside the U-section brace 4in above the boom, and use a circular chassis-punch to mount the SO-239 socket here, with its receptacle-end facing backwards.

The reflector

Take the bicycle wheel rim and drill two 0.12in holes at 1in spacing right through the hollow rim section. Drill two similar holes at a point diametrically opposite to the first pair. Bring the rim up to the brace-plus-boom unit you have just constructed; put the rim over the main boom—not the 3in end section. Centre the rim and its drilled holes against the aluminium brace, mark and drill four matching holes in the brace.

Before retiring and settling in Malaysia in 1976, Colin was an engineer with the British Post Office for 40 years. Of these, 26 were spent on secondment to developing countries in Africa and Asia, planning and, in many cases, building and running training centres for the national telecoms administrations. He has worked in Kenya, Tanzania, Pakistan, Burma, Libya, Zambia, Nepal, Singapore, Bangladesh, Kuwait, Saudi Arabia, Iraq, Mozambique and Malaysia—collecting several exotic call signs on the way. He is a member of the IARC at ITU headquarters, Geneva, and has, of course, worked 4U1ITU on Oscar 10. He is keen on Amator, tennis, classical music and reading. He says he is a squash player and a violinist with a promising past!



Before fixing the rim to the brace we must fit the aluminium mesh to the rim. Take the sheet of mesh and smooth it flat. Stretch it across the rim and bind the mesh to the rim at intervals with fine wire. Switch from side to side—bind one point, then go diametrically across and bind a point on the other side. Then switch back to the first side again. In this way, with gentle tension, you can get the mesh uniformly taut and flat over the rim.

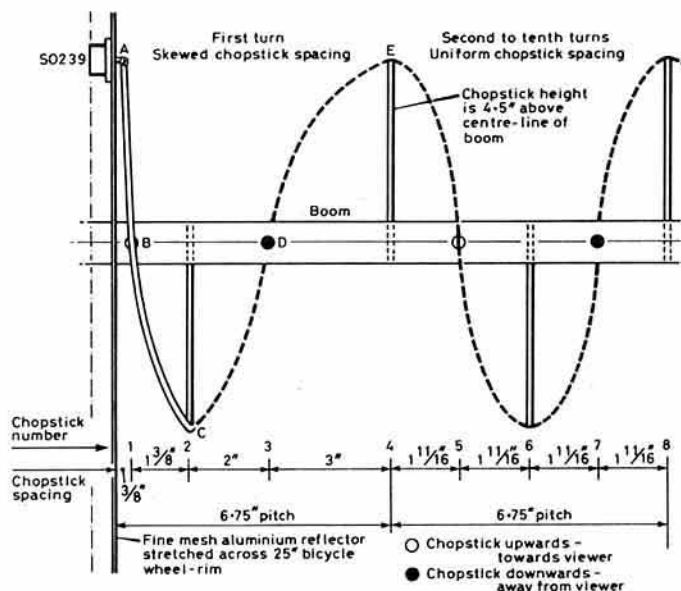


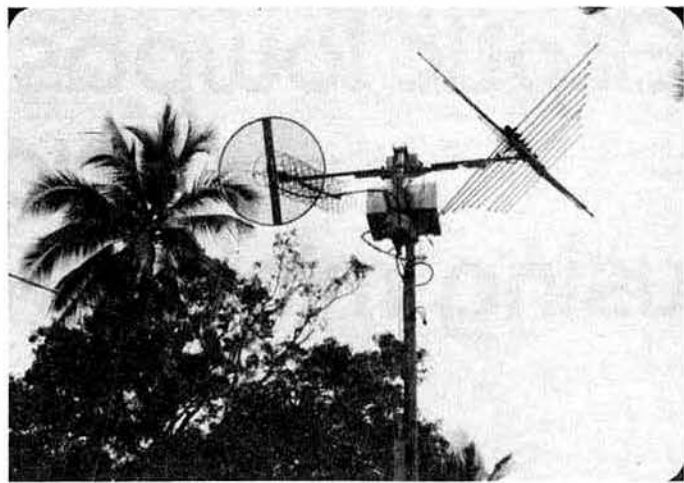
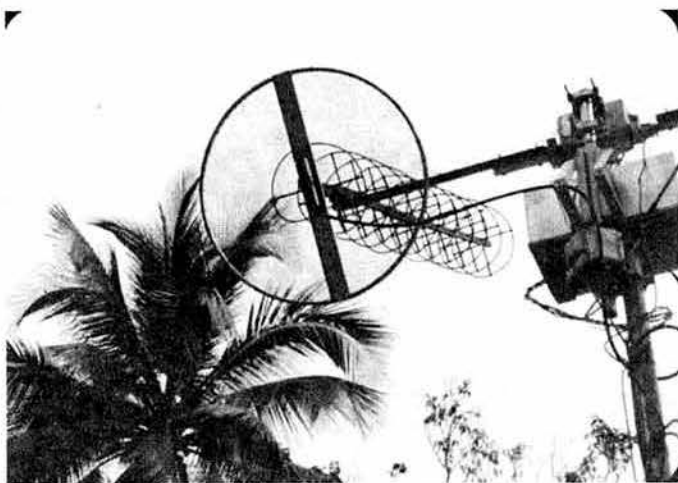
Fig 1. Dimensions of the antenna. Gain 13-14dB, beamwidth 40°

Now cut a 1 by 1in hole in the exact centre of the mesh; this is where it slips over the boom. Cut another 1 by 1in hole at a point 4in from the centre hole. This allows the back-end of the SO-239 socket to clear the mesh. Carefully thread the rim and reflector over the boom with the mesh side facing the brace; line up the rim with the brace, and fix it firmly with four 0.12in diameter machine screws, lock-washers and nuts. Now we're all set to deal with the helix.

The helix

Clamp the boom-plus-reflector unit on your workbench so that you can get at it conveniently. Put a drop of glue into each drilled hole and push the chopsticks in firmly, one by one, starting at the reflector end with chopstick B. Give a small twist as you push the chopstick in, so that the square sides

*73 Jalan Pantai, Port Dickson, Malaysia.



The author's antennas showing, at left, the "chopstick helical"

of the chopstick are roughly in line with the path that the RG58 helix will take when you mount this later. If you follow Fig 1 carefully, chopstick B will have its square end towards you, C will have its square end down, D will be on the other side of the boom, E will point up. Just follow this pattern—towards, down, away, up—for the remaining nine turns.

Chopsticks are about 10in long, and when pushed through the boom, about 4in will protrude on the other side. These bits should be carefully sawn off. The helix diameter is 9in, so make a mark on the last four spacers on the boom at a point 4.5in from the centre-line of the boom. Drill a fine hole at these marker points and string a thread from first to last spacer in each of the four rows. This enables you to mark the other chopsticks to show where they should be cut off. Trim all chopsticks to the correct length with a fine saw; after trimming, file a U-shaped depression in the top, in line

with the helix path. Drill a small hole 0.125in below the tip, so that a piece of waxed thread may be used to bind the RG58 helix in place.

Take the 25ft length of RG58 and strip the end half-inch, removing sheath and dielectric; then twist the sheath and centre-conductor together and solder them. Solder this "sideways-on" to the SO-239 connector inner, as shown in Fig 1, then bring the RG58 over chopstick B, tie loosely in place, then to chopstick C, around the back to chopstick D, and then up to chopstick E. Tie the RG58 loosely in place at chopstick 5 and go back and "shape" the first complete turn A-B-C-D-E so that it is a 9in diameter helix, albeit with "skewed" spacing. The quarter-turn A-B runs very close to the reflector, and we will turn our attention to that as a final step in the proceedings. Continue winding the RG58 helix around the chopstick spacers, shaping the helix neatly and binding in place as you go. When the 10 turns are in place, snip off the surplus, leaving just 1in free. Strip the end half-inch and solder inner to sheath as at the reflector end. Dab both ends with epoxy-resin to seal the sheath, and put a touch of glue at each chopstick end to keep the binding thread in place. We're almost ready to go!

Final stage

Fix the boom (at its balance point) to your antenna bracket, which is probably a cross-boom through your vertical rotator to the 144MHz beam on the other side. If you cannot get at the reflector-end of the helical for final adjustment, mount the helical antenna temporarily—clear of obstructions. RG8 is adequate for feeding the chopstick helical (but keep feeder lengths *short*) so fit the PL-259 plug and fix the feeder to the socket at the back of the reflector. Use an swr meter designed for 450MHz and make your first swr check with transmitter running.

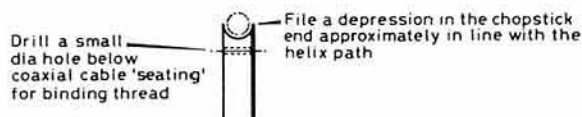


Fig 3. Seating the RG58 coaxial cable at chopstick ends

The chances are that it will be quite near 1:1. If not, try gently moving the last quarter-turn of the helix nearer, or farther away from the reflector. Small movements are quite critical. When you achieve your near 1:1, tie the mid-point of the last quarter-turn to the reflector mesh with a small rubber or plastic washer of appropriate thickness. That's all there is—you are ready to go!

Check the gain? You don't even have to guess, or rely on another station's subjective report. Just access Oscar 10 and see what your own downlink registers on your own receiver. You should be agreeably surprised.

Conclusion

The skewed spacing used for the first-turn chopsticks follows impedance-transformation principles suggested in articles in *QST* June 1981, and *Orbit Magazine* No 10.

Please remember that Monday is QRP day—AMSAT suggests no more than 100W crip—and that means only 4W into your chopstick helical!.

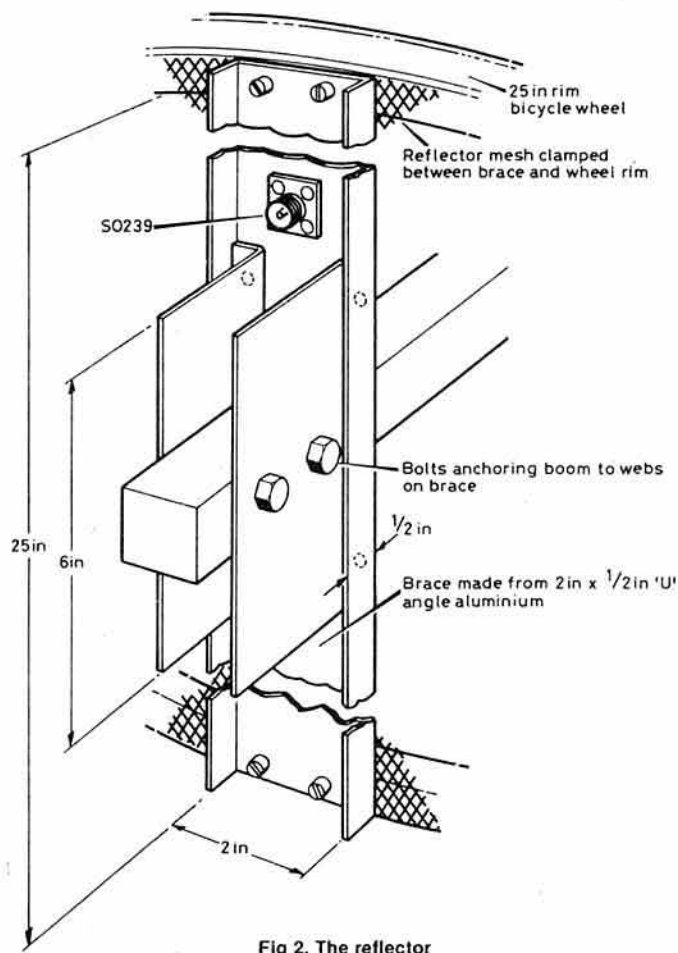


Fig 2. The reflector

Elliptic lowpass audio filter design using miniature preferred value components

by S. Niewiadomski, MSc, BRS54049*

Stefan (Stef to his friends) Niewiadomski is a 32-year old professional electronics engineer, mainly involved with digital circuit design. His interest in radio and electronics began in his early teens, and he obtained a BEng in 1973 and, more recently, an MSc in modern electronics. At present his main interest in electronics is circuit simulation by computer; outside electronics his interests include walking and playing snooker.

A RECENT ARTICLE in *Radio Communication* [1] introduced amateur constructors to methods of designing elliptic lowpass filters using tables of normalized component values. The final values of the capacitors and inductors are obtained by scaling the normalized values to obtain the correct frequency response and input and output impedance. Almost invariably, the values obtained do not correspond to preferred values which are easily available to amateurs.

More recently, a second article [2] indicated that specific designs could be realized using surplus 88mH inductors. However, these inductors are not well suited to modern construction techniques on printed circuit boards, and the effect of using a single preferred value component for each capacitor was not investigated.

Additionally, neither article investigated the effect of finite values of Q for the real inductors which have to be used in any application.

This article is divided into three parts:

1. An investigation into the use of preferred value capacitors and inductors using computer simulation techniques, taking a filter published in the *Radio Communication Handbook* as an example.
2. An investigation into the effect of low- Q inductors by simulation and practical tests.
3. A brief description of other factors which should be considered when assessing an audio filter for use in a radio receiver.

Computer simulation of preferred value designs

Initially a lowpass design published in the *Radio Communication Handbook* (Fig 4.67(a)), shown here in Fig 1, was simulated on an Apple 2 microcomputer using a network analysis program [3]; the first column of the table in Fig 1 lists the component values recommended in the *Handbook*. The capacitor values can be obtained by connecting several smaller values in parallel (four are suggested for C1) and the inductors must be handwound, each with several hundred turns of wire. The results are

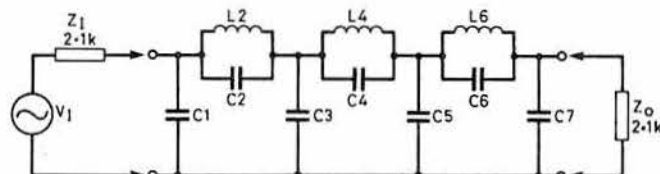
plotted in Fig 2: (a) shows the passband response, and (b) the response from 2.5 to 10kHz.

It can be seen that up to 2.5kHz the passband ripple is 0.18dB and the ultimate stopband attenuation is more than 60dB. One interesting property of such an "ideal" elliptic filter can be seen: the ripples in the passband are of equal amplitude, as are the peaks of minimum attenuation in the stopband. Books which present tables of elliptic filters tend only to give these equi-ripple designs.

The values of the capacitors and inductors of this filter were rounded to the nearest preferred value to investigate what effect this would have on the response. Some were rounded up and others down and the second column of the table in Fig 1 shows the values obtained. The modified network was simulated, and the results are also shown in Figs 2(a) and (b) for comparison with the unrounded component response.

Surprisingly, the performance of the filter has changed very little. The passband ripple has increased slightly and the ripples are no longer equal in amplitude. In the transition region and the stopband the performance is very similar to the unrounded component response. A change in the frequencies of maximum attenuation has occurred, as would be expected by the changes in the resonant frequencies of L_2/C_2 , L_4/C_4 and L_6/C_6 . The peaks of minimum attenuation in the stopband are now unequal, though the ultimate stopband attenuation still levels out at approximately 60dB.

To the ear, the performance differences of the two filters would be undetectable. These results seem to suggest that if the amateur intends to build this filter the values of the inductors (and hence the number of turns of wire on the pot cores) and the capacitors are not critical. This fact alone makes the filter easier and cheaper to construct as the sets of parallel capacitors are not required.



Component	Theoretical values	Rounded values	Component	Theoretical values	Rounded values
C1	37.26nF	39nF	C6	13.53nF	15nF
C2	3.871nF	3.9nF	C7	29.85nF	27nF
C3	51.87nF	56nF	L2	168.2mH	180mH
C4	19.06nF	18nF	L4	124.5mH	120mH
C5	46.41nF	47nF	L6	129.5mH	120mH

Fig 1. *Radio Communication Handbook* Fig 4.67(a)

*29 Mackinley Avenue, Stapleford, Nottingham NG9 8HU.

Practical components

Obviously, preferred value capacitors are easily and cheaply available to all amateurs. As far as I am aware, there is only one source of preferred value prewound inductors easily available in the UK: Toko manufacture their 10RB and 10RBH range in the E12 series of values from 1mH to 1,500mH, and these are available from Cirkit Holdings. Being only 14mm high and 10.5mm in diameter, they are ideally suited to printed circuit board mounting in compact modern equipment. The only potential drawback of these components is their relatively low Q at audio frequencies. For example, the 47mH component is quoted as having a dc resistance of 52Ω [4] and the Q at 1kHz is given by:

$$Q = \frac{2\pi fL}{R} = \frac{2 \times \pi \times 10^3 \times 47 \times 10^{-3}}{52} = 5.68$$

Examination of a 47mH Toko inductor after removing its outer ferrite casing revealed a wire size of approximately 40swg. The Q of an inductor wound by hand on a ferrite core depends on the gauge of wire used, but would typically be much greater than the value obtained above. A theoretical explanation of the effect that finite-Q inductors have on the performance of tuned circuits is given in the 1983 *ARRL Handbook* [5]. The effects will now be investigated using simulation and practical tests.

Simulation of filters using lossy inductors

To investigate the effects of low-Q inductors, a filter was designed with the specification shown below Fig 3. A five-pole filter was found to be capable of meeting these requirements, and the circuit of this filter, with a resistor in series with each inductor to represent its finite Q, is shown in Fig 3. The component values listed in the first column of the table in Fig 3 are the theoretical values obtained. These were then rounded to the nearest preferred value. L4 has the theoretical value of 43mH, which is exactly midway between the preferred values 39mH and 47mH. In the interests of standardization, the value of 47mH was chosen.

The results of the simulations are shown in Figs 4(a) and (b). It can be seen that the theoretical values meet the filter design criteria of the Fig 3 table. The passband ripple is 1dB, the cut-off frequency is 3kHz and the stopband attenuation is 55dB. The two frequencies of high attenuation in the stopband are 4,780Hz and 7,200Hz.

Also plotted on Figs 4(a) and (b) are the results for the real, lossy inductors and rounded values. The effects of these changes are:

- a non-zero insertion loss at all frequencies;
- increased ripple in the passband;
- greater rounding of the passband edge;
- slight shifts in cut-off and high-attenuation frequencies;
- non-infinite attenuation at high-attenuation frequencies;
- stopband attenuation less than the design aim.

A practical test

To check the validity of the simulation results of Fig 4, the filter with the component values in the second column of the Fig 3 table was constructed. Siemens metallized polyester capacitors with 10 per cent tolerance and Toko 10RB inductors (five per cent tolerance) were used.

The frequency response of the filter was measured using a Hewlett Packard 3585A spectrum analyser and Bryans 25000 XY pen plotter in the configuration shown in Fig 5. The spectrum analyser has an output impedance of 50Ω, so series resistance was added to obtain the correct source impedance for the filter of 1kΩ. A 1kΩ resistor was used to terminate the filter output, and the output voltage was monitored with a 1MΩ input impedance probe. To prevent the possibility of dc flowing through the inductors, a 100μF capacitor was placed in series with the input. The Toko inductors are sensitive to saturation by dc, so steps should always be taken to prevent any dc component in their drive current.

The spectrum analyser was set to generate a frequency source from 20Hz to 10kHz while monitoring at the source frequency. The ratio of the output to input voltage (expressed in decibels) is calculated by the analyser and displayed on the screen of the instrument. Results were plotted by the pen plotter under the control of the analyser on the axes of Figs 4(a) and (b) so that they could be compared directly with the simulation results.

In the passband the experimental results compare with the simulated results of the real inductors to within approximately 1dB. In the transition region between the passband and stopband, good agreement can be seen between the theoretical values simulation, the real inductors simulation and the practical results. When the stopband region is reached, the practical results indicate an ultimate attenuation of approximately 55dB, but the first peak in minimum attenuation (at about 5.5kHz) is only 50dB. The points of very high attenuation in the stopband are not realized in the simulation

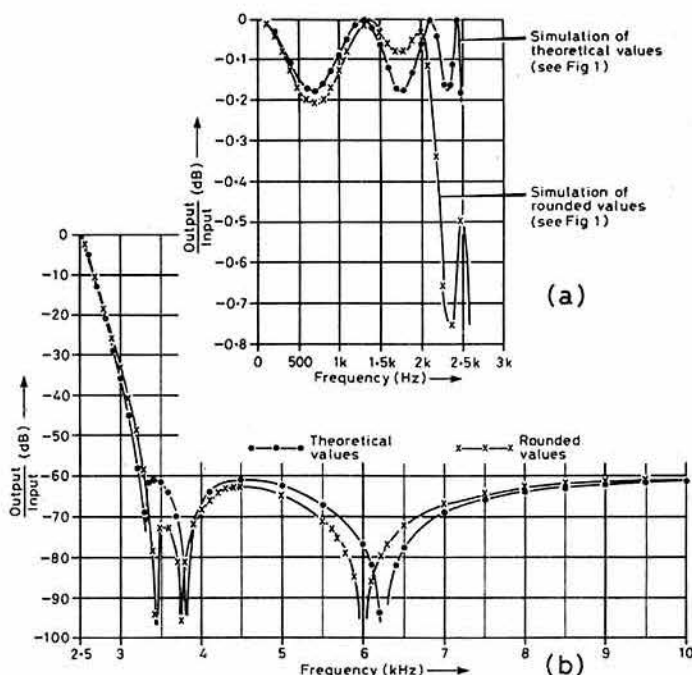


Fig 2. (a) Passband response of Handbook filter. (b) 2-5-10kHz response of Handbook filter

with real inductors and the practical results, particularly the first peak at approximately 4.5kHz.

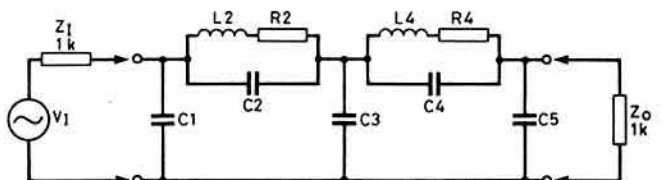
The differences between the simulation results with real inductors and the practical results are most probably due to the difference between the nominal values of the components and their actual values. At higher frequencies the model of the low-Q inductors as a pure inductor in series with a constant value resistor becomes less accurate. Skin effects and the interwinding capacitance of the inductors become more significant. Another effect is coupling between the input and the output of the filter because of imperfect layout. This effect cannot be modelled easily.

Further points for consideration in receiver design

Though not strictly within the terms of reference of this article, there are other factors which should be taken into account when assessing a filter for use in a radio receiver for speech. The two main factors which are most likely to affect the level at which the user of a receiver perceives a signal other than the filter response are:

- the transfer function of electrical power input to sound pressure output of the loudspeaker or headphones (assuming that the audio amplifier has a flat response—a reasonable assumption), and
- the variation with frequency of perceived loudness by the human ear.

The usual method of mounting a loudspeaker in a receiver's metal case



Component	Theoretical values	Rounded values	Component	Theoretical values	Rounded values
C1	0.1048μF	0.1μF	L2	52.3mH	47mH
C2	9.4nF	10nF	L4	43.0mH	47mH
C3	0.1336μF	0.12μF	R2	0Ω	52Ω
C4	25.8nF	27nF	R4	0Ω	52Ω
C5	91.9nF	0.1μF			

Input impedance 1kΩ
Output impedance 1kΩ
Maximum pass-band ripple 1dB
Cut-off frequency 3kHz
Minimum stop-band attenuation 55dB
Frequency of high attenuation 4.5kHz

Fig 3. Five-pole filter to specification shown

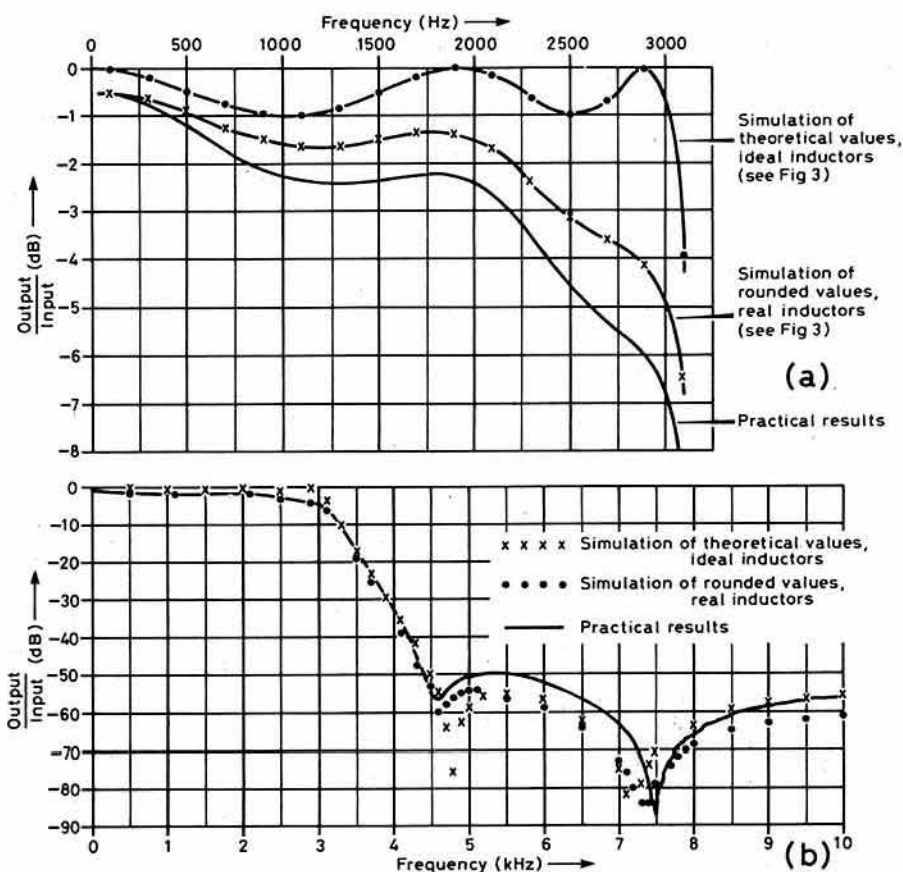


Fig 4. (a) Passband response of Fig 3 filter, including practical results. (b) 0-10kHz response of Fig 3 filter including practical results

is far from ideal. Typically a 4in loudspeaker in free air exhibits a 9dB ripple from 1 to 3kHz in its sound pressure output [6]. In a metal case with no baffle the resonances produced are too complex to predict analytically.

Experiments performed to measure the thresholds of audibility for pure tones [7] indicate that the human ear exhibits approximately 8dB variation in the range 1 to 3kHz, being more sensitive at middle frequencies. This variation increases as the age of the subject increases.

These two factors tend to negate efforts to minimize the passband ripple of the audio filter. In this context it is thought that passband ripples of up to 3dB are insignificant for speech communication.

Conclusions

Computer simulation studies and laboratory measurements have been presented which show that elliptic lowpass audio filters can be constructed using preferred value inductors and capacitors. While the performance is

not as good as can be achieved using precision inductors and capacitors, it is still acceptable for most applications. The use of preferred value inductors in particular will lead to a considerable reduction in cost and volume when compared with the use of handwound ferrite pot-cores. The only range of such inductors easily available to the amateur to my knowledge is quite acceptable despite the lossy nature of these components.

Though not described in this article I have found that highpass and bandpass audio filters of all types can also be constructed with great success using these miniature preferred-value components.

When choosing an audio filter to follow the detector stage in a receiver, other factors may well make the passband ripple of the filter not as important as might be first thought.

Radio amateurs should therefore consider trying this alternative approach to filter construction, and only if this fails to give the desired performance should the more expensive alternative be used.

References

- [1] "An introduction to elliptic filters for the radio amateur", J. Wilkinson, G4HGT, *Rad Com* February 1983.
- [2] "Simplified elliptic lowpass filter construction using surplus 88mH inductors", E. E. Wetherhold, W3NQN, *Rad Com* April 1983.
- [3] "Basic program performs circuit analysis", R. Steincross, *EDN* 1 September 1982.
- [4] *Ambit components catalogue*, Summer 1983.
- [5] 1983 *ARRL Radio Amateur's Handbook*, pp2-34 to 2-36.
- [6] *Mullard technical handbook*, book 3, part 5, AD4090/X series loudspeakers, August 1978.
- [7] *Telecommunication by speech*, D. L. Richards, Butterworths, 1973, p83.

Other useful publications

Simplified modern filter design, Philip R. Geffe; Iliffe.
Handbook of filter synthesis, A. I. Zverev; Wiley.
Filter design and evaluation, G. E. Hansell; Van Nostrand Reinhold Company.

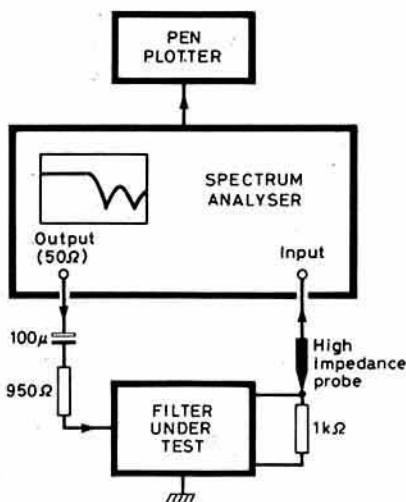


Fig 5. Test set-up to measure filter response

A TRANSCEIVER FOR THE HF BANDS

by Lorin Knight, MIEE, G2DXK*

Part Five

THIS FINAL PART considers the remaining modules required to get the basic transceiver unit fully operational on TRANSMIT and RECEIVE.

S-meter

Before going on to get the transmitting side operational, the constructor may want to get the S-meter working. (If, however, he is using the S-meter movement for his rf test meter, he will have to manage without the S-meter for a time because he will still need the rf test meter for a while longer.)

Fig 55 shows the circuit of the S-meter module (PCB16). Basically the S-meter measures the agc voltage on RECEIVE and the alc voltage on TRANSMIT. On RECEIVE the agc voltage is +5.6V with no signal, dropping to around +2V with an S9+60dB signal. R1802 is adjusted to give full scale deflection with no signal and the forward voltage drop of the three diodes, D1802, D1803, D1804, causes the meter current to fall to zero when the agc line drops to around +2V. The S-meter is mounted upside down so that full scale deflection is at the left of the scale.

On TRANSMIT the agc line drops to 0V and the alc line (at 0V during receive) rises to +4V with no alc action, or to some lower voltage if the alc is operating. R1801 is adjusted to give full-scale deflection with no alc.

Figs 56 and 57 give constructional details of the S-meter board. This mounts directly onto the terminals on the meter movement, and thus holes "A" and "B" will need to be drilled to suit the particular movement being used. A 100µF capacitor (C1801) is connected across the meter to provide

some damping. The pcb also holds the dropping resistors (R1804, R1805) for the two l.e.d.s which are mounted close to the meter.

With its original 100µA scale, the S-meter will only give a notional indication of signal strength; 100µA will represent S0, something like 50µA will indicate S9, and something like 10µA will indicate 40dB over S9. On TRANSMIT, 100µA will indicate no alc, while something like 40µA will indicate the maximum desirable amount of alc. No doubt the enthusiastic constructor will later make his own paper scale to paste over the printed scale.

Additional circuitry for TRANSMIT

Fig 58 shows the circuits of the modulator, the tone generator and the t/r switching, while Fig 59 shows the antenna changeover switches and the transmitter preamplifier.

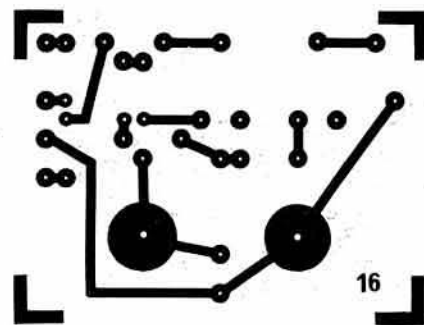


Fig 56. Etching pattern for S-meter board (PCB16)

Starting with the modulator (PCB10), TR1301 and TR1302 amplify the output from the microphone. Adequate gain is available for the commonly-available mobile-type microphones and, by choosing suitable values for R1301, C1301, C1302 (see the components list), one can either use a low impedance (around 500Ω) microphone or a high impedance (around 50kΩ) one. C1301 and C1305 give a low-frequency cut off around 300Hz, while C1304 and C1308 give a high-frequency cut off around 3kHz.

The output of TR1302 feeds into a balanced mixer circuit which uses two

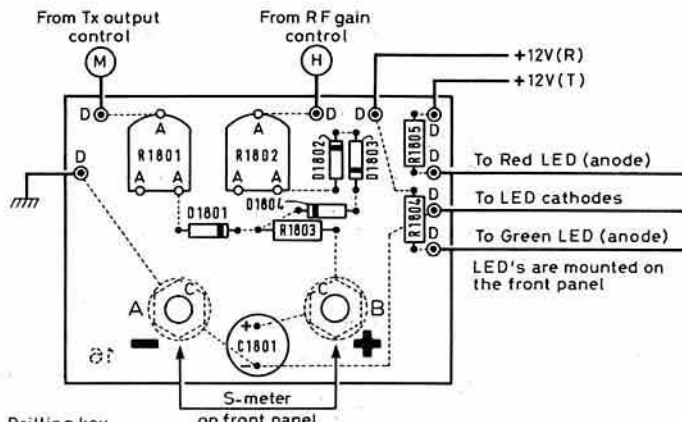


Fig 57. Component layout of S-meter board

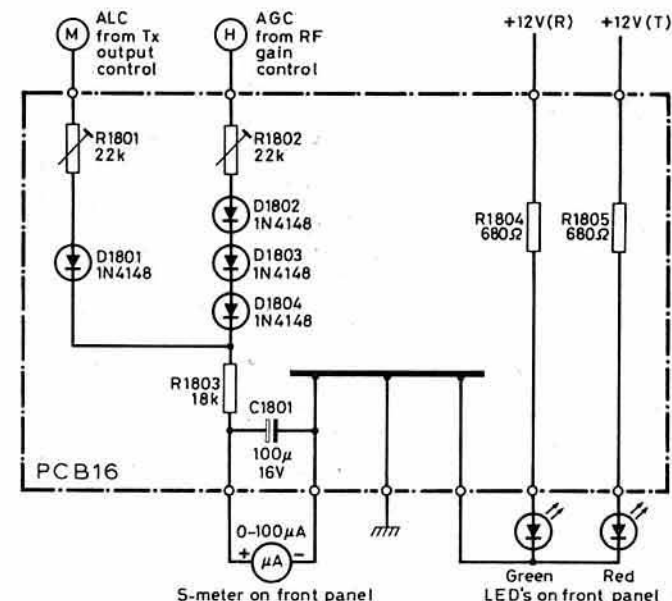


Fig 55. Circuit of S-meter module

*177 Baldock Road, Letchworth, Herts SG6 2EJ

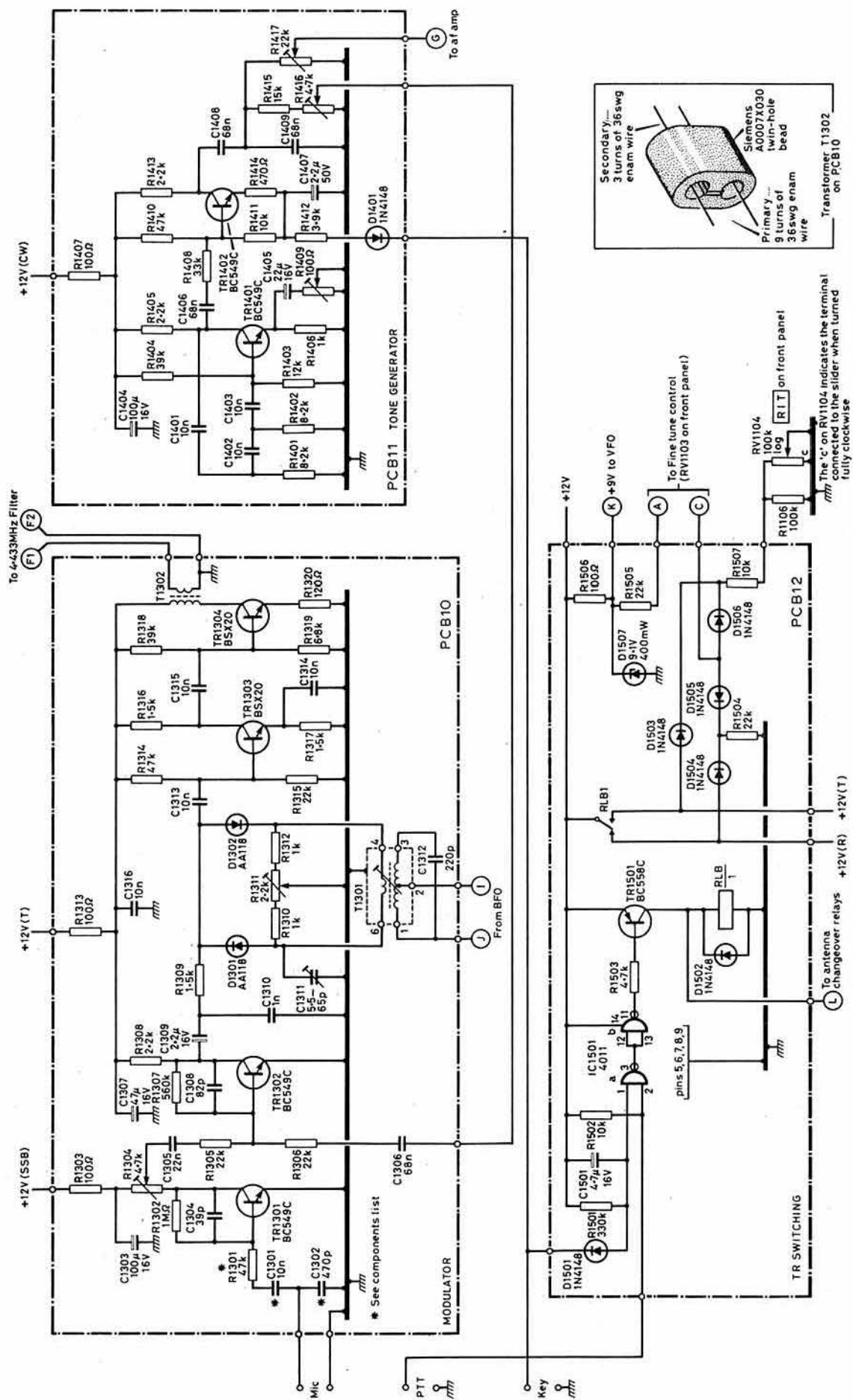
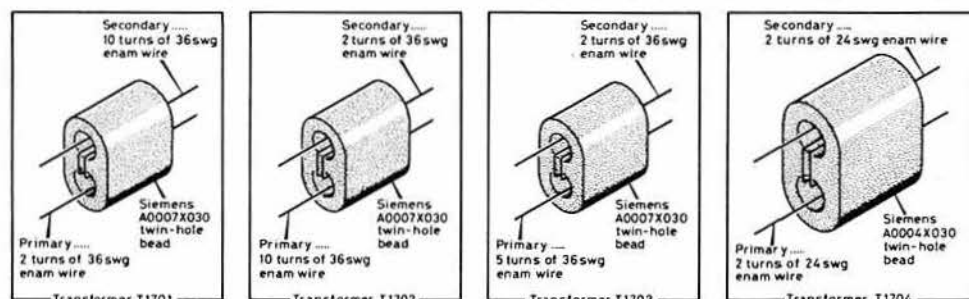


Fig 58. Circuit of modulator, tone generator and transmit/receive switching



matched AA118 diodes, D1301, D1302. The 4,433kHz input to the mixer comes from the bfo via the tuned transformer, T1301. The resultant dsb suppressed carrier signal is amplified by TR1303 and TR1304 before being fed to the 50 Ω port of the 4,433kHz filter. The output impedance of the modulator is considerably higher than 50 Ω ; this deliberate mismatch being introduced to limit the loading which the modulator places on the filter.

851

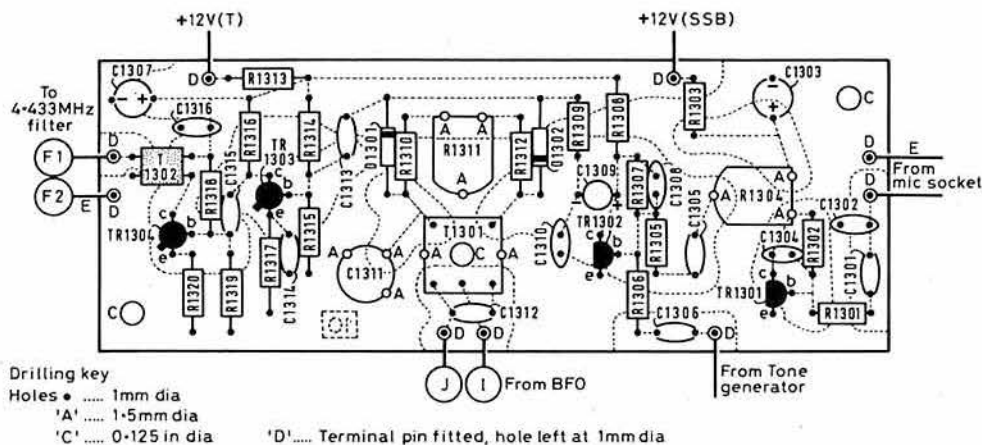


Fig 62. Component layout of modulator board

The tone generator (PCB11) consists of an 800Hz oscillator (TR1401) followed by a keyed buffer stage (TR1402). Two outputs are provided, that from R1416 feeding the modulator and that from R1417 feeding into the af amplifier in the receiver section. C1407 controls the rise and fall time of the keying envelope.

The t/r switching board (PCB12) operates as follows: On RECEIVE, TR1501 is cut off and relay RLB is unenergized. Thus the 12V(R) line is at 12V while the 12V(T) line and the line (L), which goes to the antenna changeover relays, are both at 0V. TR1501 is driven by two NOR gates, IC1501a, IC1501b. When the key is down, pin 1 of the ic is taken to 0V, pin 3 rises to +12V and pin 11 goes to 0V, causing TR1501 to conduct. When the key is released, the potential at pin 1 starts to rise toward +12V at a rate determined by R1501 and C1501; it will be about 1s before this potential reaches the threshold required to switch pin 3 back to 0V and switch off TR1501. On ssb the ptt switch on the microphone pulls pin 2 of the ic down to 0V and causes TR1501 to conduct. There is no capacitive loading on pin 2, and TR1501 ceases to conduct immediately the ptt switch is released.

The other circuitry on PCB12 is concerned with the incremental tuning of the vfo. For a clearer understanding of its operation it is helpful to consider Fig 60, which shows the complete incremental tuning arrangement.

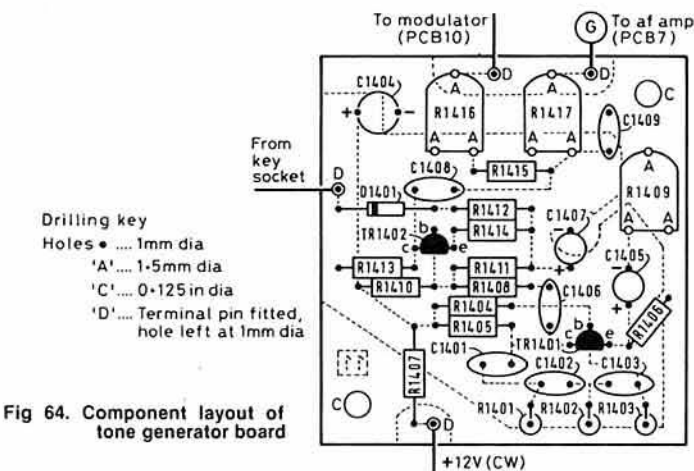


Fig 64. Component layout of tone generator board

On TRANSMIT, D1506 and D1504 are not conducting, and thus the bottom of the FINE TUNE control is connected to earth via D1505 and 22k Ω . The incremental tuning voltage, V, will then be about +4.8V with the FINE TUNE control set centrally, and it will vary by approximately $\pm 1V$ as the control is swung between its extremes.

On RECEIVE, D1505 and D1503 are not conducting, and now the bottom of the FINE TUNE control is connected to earth via D1506 and the network, R1507, R1106, RV1104. Provided that RV1104 is set centrally, this network will look like 22k Ω and the incremental tuning voltage will be the same as for TRANSMIT. But, by varying RV1104 from its central position, V can be varied from its TRANSMIT value. The use of a log-law potentiometer for RV1104 with the fixed resistor shunt gives a somewhat more linear control of frequency than would be obtained with a linear-law potentiometer.

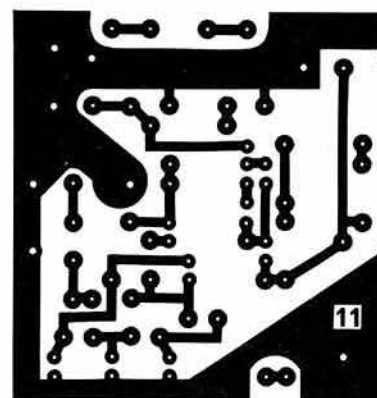
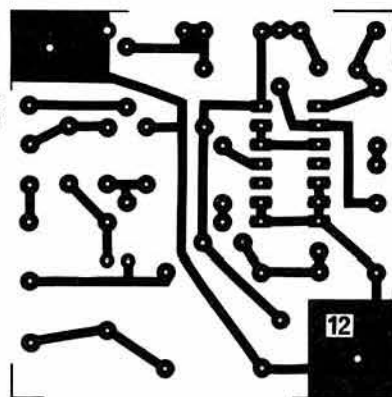


Fig 63. Etching pattern of tone generator board (PCB11)

Fig 65. Etching pattern for t/r switching board (PCB12)



The operation of the antenna changeover relay units (PCB13 and PCB14) is quite straightforward. On RECEIVE, line (L) is at 0V, the relays RLC and RLD are not energized, and the antenna socket is connected through to the bandswitch. On TRANSMIT, when the relays are energized, the band switch is connected to the input of the transmitter preamplifier and the output of the latter is connected to the antenna socket. The antenna changeover (B) module contains a BA243 switching diode. On TRANSMIT this diode conducts, earthing the link wire between the two relays in order to prevent that wire introducing any capacitive coupling between output and input of the transmitter preamplifier.

Now to the transmitter preamplifier itself. The first stage has a dual-gate mosfet, TR1701, the gain of which is controlled by varying the voltage on gate 2. This is followed by two stages of amplification using 2N3866 transistors. The 2N3866 is an inexpensive medium-power vhf transistor which normally gives quite a high gain at hf. Occasionally, however, one can be unlucky enough to get one with a somewhat lower gain at hf.

TR1702 has negative feedback from collector to base (via R1708 and C1706) to ensure stable operation, and it has additional feedback provided by R1709 which improves linearity. TR1703 has similar negative feedback arrangements. It operates with a higher collector current and has a 'stiff' fixed bias supply provided by R1710 and D1701. Wide-band transformers are used which give satisfactory operation from 1.8 to 30MHz.

TR1704 provides the automatic level control (alc). With no rf input the base of TR1704 is at approximately +4.6V and its emitter at +4V. Thus, provided that the TX OUTPUT control is set at maximum, +4V is applied to gate 2 of TR1701, putting that transistor in the condition of maximum gain. Any rf output from the transmitter preamplifier is rectified by D1702 to produce a negative potential at the junction of D1702 and D1703. When this potential exceeds 5.4V the 10V zener diode, D1703, will start to conduct, pulling the base of TR1704 below +4.6V. This, in turn, will pull gate 2 of TR1701 below +4V, reducing that transistor's gain. In practice this results in the alc starting to operate quite gently at about 0.4W output and starting to bite quite hard around 0.5W.

It is possible to squeeze considerably more power out of a 2N3866. However, in this application it was decided to limit the output to 0.5W in order to minimize the risk of distortion and of spurious outputs due to overloading.

Table 5. Incremental tuning control voltage applied to vfo

	Minimum	Fine tune control Centre	Maximum
Transmit	3.8V	4.8V	6.2V
Receive, rit maximum	5.4V	6.3V	7.2V
Receive, rit centre	3.8V	4.8V	6.2V
Receive, rit minimum	2.2V	3.9V	5.6V

Construction of modules

All the additional modules are built on single-sided copper-clad glass-fibre board, with the exception of the transmitter preamplifier (PCB15) which uses double-sided board.

The modulator (PCB10). Fig 61 shows the etching pattern and Fig 62 shows how the board is drilled and the components mounted. Note that the two diodes, D1301, D1302, need to be matched. It will be adequate to start with four or six diodes and choose those which are most similar in their forward and reverse resistance.

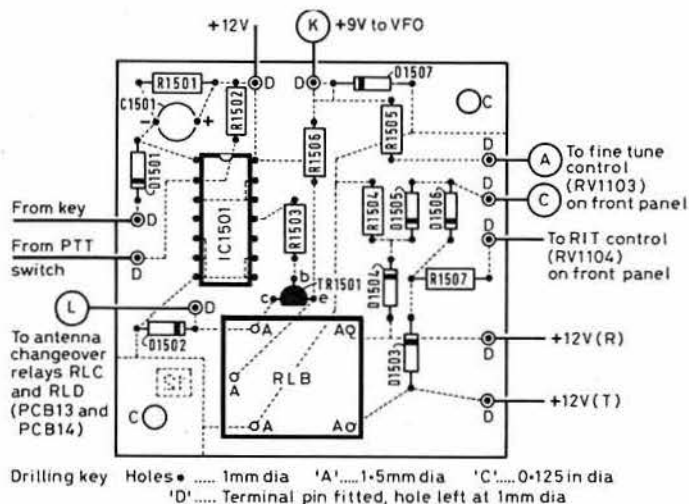


Fig 66. Component layout of t/r switching board

The tone generator (PCB11). Figs 63 and 64 give details. If required the values of C1401, C1402 and C1403 can be changed to give a different audio frequency.

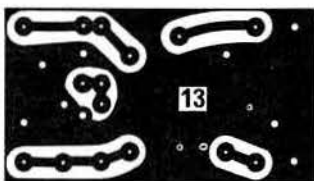


Fig 67. Etching pattern for antenna changeover (B) board (PCB13)

TR switching (PCB12). Figs 65 and 66 give details of this pcb. A 14-pin ic socket should be used to mount IC1501 and, as always when handling cmos devices, care must be taken to avoid any static discharge which might damage the ic. If the cw facility is not required, IC1501 can be omitted and a wire link taken between the connections which would have gone to pins 2 and 11 on the ic.

Antenna changeover relays (PCB13 and PCB14). Details of these boards are given in Figs 67, 68, 69 and 70.

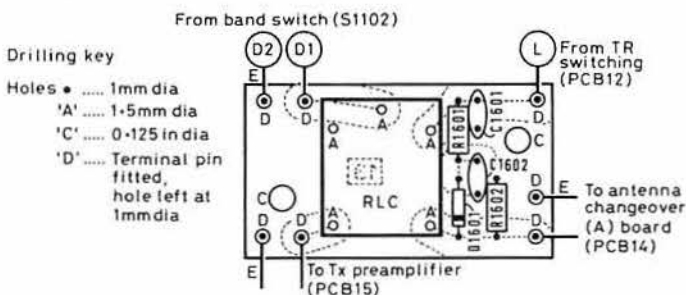


Fig 68. Component layout of antenna changeover (B) board

Fig 69. Etching pattern for antenna changeover (A) board



Transmitter preamplifier (PCB15). This module uses double-sided board. The underside is etched as in Fig 71. The upper side is used as a ground plane and does not have any copper etched off. It is necessary, however, to remove a little copper from the rim of each hole to ensure that wires passing through do not short to earth. This can be done using a suitable twist drill or a spot face cutter.

The components are all mounted on the groundplane side as shown in Fig 72, with the exception of R1701 which is soldered onto the wiring side. TR1703 requires a clip-on heatsink, and it will be found easier to fit this before mounting the transistor on the board. When mounting components on the board, care should be taken to ensure that there are no short circuits from components to the groundplane or to the heatsink.

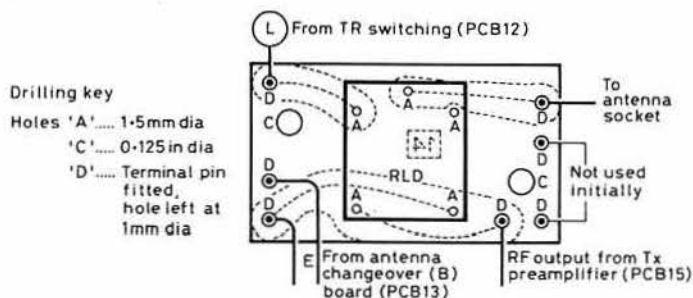


Fig 70. Component layout of antenna changeover (A) board

Commissioning the t/r switching

The t/r switching module (PCB12) should be fitted as shown in Fig 15 and wired up as shown in Fig 58. Note that this means removing some of the temporary wiring put in earlier, namely:

- the +9V supply for the vfo will now be taken from PCB12 instead of by a resistor from the +12V line;
- the FINE TUNE control (RV1103) will now be connected to PCB12 instead of by resistors to +12V and 0V;
- the +12V(R) supply for the various receiver pcbs will now be taken from PCB12 instead of from the +12V line.

For the moment there will be no connection to the +12V(T) output of PCB12 or to the output (L) which will energize the antenna changeover relays.

Switch on and check that TR1501 is conducting, ie that point (L) is at 0V. Check also that the +12V(R) line is switched to +12V. Then short the ptt input to earth and check that TR1501 conducts; point (L) should then be at about +11.3V and relay RLB should have switched the +12V(T) output to +12V. Shorting the key input should produce similar results, except that there will be a delay of about 1s after removing the short before switching back to the RECEIVE state.

If TR1501 is not switching as it should, this will probably be due to a fault in the circuitry surrounding the ic. With the ptt switch open, pin 3 should

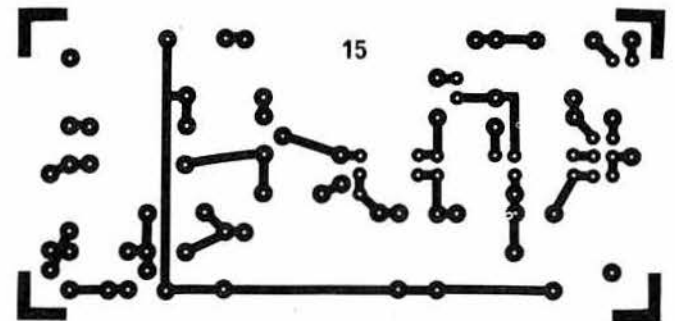


Fig 71. Etching pattern for the wiring side of the transmitter preamplifier board (PCB15). The pcb uses double-sided material, the other side being used as a groundplane

COMPONENTS LIST FOR THE REMAINING MODULES OF THE BASIC TRANSCEIVER

PCB10	
C1301*	10nF mylar
C1302*	470pF subminiature ceramic plate
C1303	100µF 16V single-ended electrolytic
C1304	39pF subminiature ceramic plate
C1305	22nF mylar
C1306	68nF mylar
C1307	47µF 16V single-ended electrolytic
C1308	82pF subminiature ceramic plate
C1309	2-2µF 16V low-leakage electrolytic (or tantalum)
C1310	1nF subminiature ceramic plate
C1311	5-5-65pF Mullard miniature film dielectric trimmer (Maplin Electronic Supplies, Electrovalue)
C1312	220pF subminiature ceramic plate
C1313, 1314, 1315, 1316	10nF mylar
R1301*	47kΩ
R1302	1MΩ
R1303, 1313	100Ω
R1304	4-7kΩ subminiature preset (horizontal)
R1305, 1306, 1315	22kΩ
R1307	560kΩ
R1308	2-2kΩ
R1309, 1316, 1317	1-5kΩ
R1310, 1312	1kΩ
R1311	2-2kΩ subminiature preset (horizontal)
R1314	47kΩ
R1318	39kΩ
R1319	6-8kΩ
R1320	120Ω
TR1301, 1302	BC549C
TR1303, 1304	BSX20
D1301, 1302	AA118 (matched pair)
T1301	4R (see Fig 8)
T1302	Wound with 36swg enam wire on Siemens A0007X030 twin-hole bead (Electrovalue)

* The values for C1301, C1302 and R1301 are suitable for 50kΩ impedance microphone. For a low-impedance microphone use the following values: C1301, 68nF; C1302, 1,000pF; R1301, 6-8kΩ

PCB11

C1401, 1402, 1403	10nF mylar
C1404	100µF 16V single-ended electrolytic
C1405	22µF 16V single-ended electrolytic
C1406, 1408, 1409	68nF mylar
C1407	2-2µF 50V single-ended electrolytic
R1401, 1402	8-2kΩ
R1403	12kΩ
R1404	39kΩ
R1405, 1413	2-2kΩ
R1406	1kΩ
R1407	100Ω
R1408	33kΩ
R1409	100Ω subminiature preset (horizontal)
R1410	47kΩ
R1411	10kΩ
R1412	3-9kΩ
R1414	470Ω
R1415	15kΩ
R1416	4-7kΩ subminiature preset (horizontal)
R1417	22kΩ subminiature preset (horizontal)
TR1401, 1402	BC549C
D1401	1N4148

PCB12	
C1501	4-7µF 16V low leakage electrolytic (or tantalum)
R1501	330kΩ
R1502, 1507	10kΩ
R1503	4-7kΩ
R1504, 1505	22kΩ
R1506	100Ω
TR1501	BC558C
IC1501	4011
D1501-1506	1N4148
D1507	9-1V 400mW zener
RLB	12V spdt relay, KUIT-A (Cirkit Holdings plc)

PCB13

C1601, 1602	10nF mylar
R1601, 1602	1kΩ
D1601	BA243
RLC	12V spdt relay, KUIT-A (Cirkit Holdings plc)

PCB14

RLD	12V spdt relay, KUIT-B (Cirkit Holdings plc)
-----	--

PCB15

C1701, 1702, 1703, 1704, 1705, 1706, 1708, 1711, 1713	10nF mylar
C1707, 1709	68nF
C1710	1nF subminiature ceramic plate
C1712	22µF 16V single-ended electrolytic
R1701	56Ω
R1702	4-7kΩ
R1703	150Ω
R1704, 1706	220Ω
R1705	1-8kΩ
R1707	100Ω
R1708	1kΩ
R1709	4-7Ω
R1710	470Ω 0-5W
R1711	470Ω
R1712	2-2Ω
R1713	10kΩ
R1714	100kΩ
R1715	3-3kΩ
R1716	2-2kΩ
T1701, 1702, 1703	Wound with 36swg enam wire on Siemens A0007X030 twin-hole bead (Electrovalue)
T1704	Wound with 24swg enam wire on Siemens A0004X030 twin-hole bead (Electrovalue)
RFC1701	2-5t of 34swg enam wire on ferrite anti-parasitic bead
TR1701	40673
TR1702, 1703	2N3866. TR1703 has a type 5F clip-on heatsink (Maplin Electronic Supplies, Electrovalue)
TR1704	BC549C
D1701	1N4002
D1702	AA118
D1703	10V 400mW zener

PCB16

C1801	100µF 16V single-ended electrolytic
R1801, 1802	22kΩ subminiature preset (horizontal)
R1803	18kΩ
R1804, 1805	680Ω
D1801, 1802, 1803, 1804	1N4148

All resistors are 0-25W unless otherwise stated

be at 0V and pin 12 should be at +12V; with the ptt connections shorted, pin 3 should be at +12V and pin 11 at 0V.

As a check on the incremental tuning control circuitry, one should check the dc control voltage applied to the vfo. With a very high resistance meter the voltage should be close to that given in Table 5. With a lower resistance meter the measured voltage will be lower; for example, with a 10kΩ/V meter the reading will be about 10 per cent lower than shown. If necessary, the position of the RIT knob on its shaft can be adjusted to ensure that, with the RIT knob set to the centre line, the voltage on RECEIVE is exactly the same as that on TRANSMIT.

It is advisable at this stage to check that, in performing the additional commissioning work, nothing has been disturbed elsewhere—and that the receiver still works. While on RECEIVE one can also check the operation of the FINE TUNE and RIT controls. Each should give a frequency swing of around ±1 to ±2kHz.

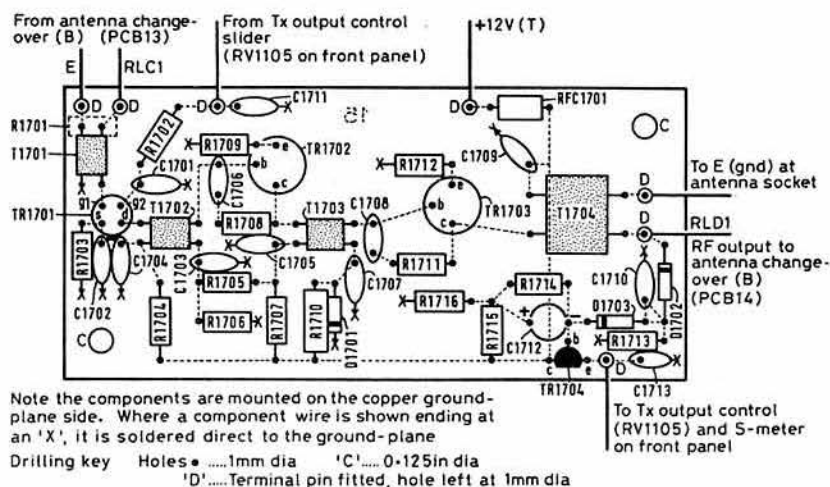
Commissioning the modulator and tone generator

It is recommended that the next modules to be commissioned should be the modulator (PCB10) and the tone generator (PCB11). The latter can be omitted, of course, if one is not interested in having the facility to transmit cw. Fit the pcbs as shown in Fig 15 and connect up as in Fig 58. The rfc

which had been temporarily connected between points (I) and (J) should now be removed. The connections from the output of the modulator to the 4,433kHz filter should be made with miniature twin-lead (eg two sections peeled from a length of miniature ribbon cable). Plug a morse key (or switch) into the key socket and a microphone with ptt switch into the microphone socket.

The tone generator, if fitted, should be tested first. Turn R1409 and R1416 fully anticlockwise and R1417 fully clockwise. Depress the key and, using the rf test meter converted to read af, check the af voltage at the slider of R1417 (or at the adjacent terminal pin). The meter should read somewhere around 0-3V. Turn R1409 to a point a little short of that which causes TR1401 to stop oscillating and the meter reading to fall to zero; this will ensure a clean sine wave from the oscillator. Set R1416 so that on TRANSMIT the sidetone heard through the loudspeaker is similar in amplitude to a typical cw signal on RECEIVE. The frequency of the sidetone should be approximately 800Hz.

The modulator can now be commissioned. Connect the rf test meter (converted back to read rf) to the junction of D1401 and R1410. Switch to SSB and close the ptt switch (or switch to cw, disconnect the tone generator from the modulator and depress the key). Tune T1401 for maximum meter reading, which should be somewhere around 0-25V. Now transfer the meter to the collector (can) of TR1404, where the measured voltage should be somewhere around 0-5V. Re-adjust the tuning of T1401, if necessary,



and then adjust the balance controls, C1311 and R1311, to reduce the measured output to a minimum. This is only a preliminary balancing operation; later, when the transmitter preamplifier is working, it will be possible to obtain a more precise balance.

Commissioning the transmitter preamplifier and antenna changeover switches

Should the transmitter preamplifier not be capable of producing 5V output, one should first look for a fault in the module or in the wiring to it. Should no fault be found one should try changing one or other of the 2N3866s. One might just have been unlucky enough to get one of those with low rf gain.

Operating

Technical Topics

by Pat Hawker, G3VA

IN THE AUGUST 77, I took the risk of stirring things up by listing a few of the many factors that may or may not be contributing to something of a malaise in our hobby, as conducted today in the UK. Admittedly, I recognized that not everybody agrees that the hobby has changed significantly or even that some of the changes have been for the worse. It was certainly not my intention to condemn all use of factory-built equipment, justifiable today on many grounds, including the time it would take to design and build equipment of comparable complexity and flexibility, and the severe difficulties this would impose on the many who are in no way connected professionally with radio or electronics.

Apprentices to a craft

Clearly there are many who are entirely content with things the way they are and do not hanker after the days when an amateur station usually comprised a room full of bulky equipment and test gear, some home-made, some factory-built though possibly greatly modified; often suitable only for one or two bands, one or two modes, and requiring a host of auxiliary units such as antenna matching or tuning units, frequency meters, monitors etc. Rigs that were often unreliable and temperamental and with which dx contacts came only rarely.

Gone, it would seem, are the days when a newcomer was happy to spend the first years marvelling that a few watts of hf could put a signal round Europe with a simple wire antenna. Yet in retrospect this was surely a valuable experience, an apprenticeship that led often to proficiency in and knowledge of the craft.

Indisputably the putting together and use of relatively crude and simple equipment taught us a good deal about the theory and practice of radio communication. You had to read the *Guide*, the RSGB or ARRL handbooks; you waited eagerly each month for the technical articles in the *T&R Bulletin*, *Television & Short-wave World* and later *Short Wave Magazine*. Without both theoretical and practical knowledge you had little chance of putting out a good signal; you gained something that does not come from simply scanning advertisements!

Until 1946, the would-be British amateur (or more correctly "experimenter") did not have to take any technical examination, but this was of little consequence since he or she was unlikely to get very far unless he took a lively technical interest in what he was doing. Today, anyone with a fat bank account can buy everything needed to guarantee an efficient hf or vhf station, though much of this will be of a technical complexity that is in no way covered by the RAE. It is *not* the change to "multichoice" that has brought about the divergence between what a newcomer has to learn to get a licence and the equipment he actually uses, but changes in the technology.

In many countries there remains a real *incentive* to learn the theory as well as the practice of radio communication. Compare our "once and for all" RAE with the graduated incentive licensing of, say, the USA or the USSR. Even that old hurdle "25 watts and cw only for the first year", introduced along with the RAE in 1946, vanished many years ago. Today cw seems to be regarded both by newcomers and the licensing authorities as little more than a near obsolete system forced on would-be hf operators only in order to comply with international regulations.

Should we worry at the degree to which we are out-of-step with so many other countries? It would be difficult, and probably highly unpopular, to attempt to introduce a full scheme of incentive licensing into the UK if it meant reducing the facilities currently available to those who have passed

THIS MONTH

Apprentices to a craft
A voluntary "advanced" RAE?
Multipath on vhf and uhf
The low-budget hf station
Receivers of top performance
Digital hf receivers soon?
Vintage receivers—not yet museum pieces
Use and abuse of preamps
More high-current psu lore
Dual voltage psu
Dangerous substances
Nostalgia corner
Tips and topics

the RAE or those (like myself) who never had to take it. Yet surely something needs to be done to reduce the pressure on 144MHz, the acceptance that a Japanese handheld plus repeater is, for many, "amateur radio"!

A voluntary "advanced" RAE?

Martin Atherton, G3ZAY, a member of the Society's HF Committee, has firm views on the need to devise an active programme that would encourage more study of the technical side of radio, at a level beyond that of the present RAE. As he puts it:

"As anecdotal support for my contention that something needs to be done about technical standards, I offer the fact that membership of the long-established Cambridge University Wireless Society has dropped from about 120 to 10 during the past 12 years. I understand the position is

similar at Oxford, and I have not heard many of the other university club stations on the bands recently either. Although our hobby is doing well in terms of numbers, fuelled by converts from cb, I wonder how many would know a Smith chart from a weather chart?"

The decline in interest among students could be part of the drift to digital electronics, but one must share G3ZAY's fears for the future unless something is done to revive a greater interest in the technical side of the hobby. G3ZAY has developed his ideas in the form of a proposal for "an advanced amateur radio examination" that would be taken voluntarily, akin to the advanced driving test. While I would personally prefer to see more emphasis on "learning by doing" as part of a well-thought-out incentive-licensing scheme, his proposals deserve careful consideration. *Something* must be done unless we are content to become part of a radio sport based virtually entirely on "blackbox domestic appliances"—painting by numbers!

To quote G3ZAY's proposals:

"The hobby of amateur radio has traditionally laid emphasis on 'self-training' in the practical and theoretical aspects of radio communication. It is this educational aspect and the concomitant creation of a pool of skilled radio technicians in every country permitting the hobby that has won for it the international respect and privileges it now enjoys. (This rather overlooks the continued demand in many countries for skilled radio telegraphists even though radio operating as a profession is under threat from keyboard systems—G3VA.)

"Increasingly, however, and particularly by new entrants, the hobby is being regarded merely as a form of international conversational club. Weight is lent to this view by the simple entrance exam which, as is now admitted by the UK authorities, is designed *only* to ensure that participants can be let loose in the electromagnetic environment without wreaking havoc.

"National and international conversation, dxing etc are extremely important aspects of the hobby, but if they are allowed to become the dominant ones, amateurs around the world will find it increasingly difficult to justify their operating privileges to their governments.

"The RSGB must take steps to ensure that new amateurs are helped and encouraged to learn more about the technical side of their hobby. One such step should be the introduction of an advanced radio examination, in broad terms equivalent to A-level GCE, and occupying the same sort of position as the advanced motoring test in the driving community.

"The introduction of such a test would have the following advantages:

- * The creation of a syllabus would provide a list of topics for amateurs to

focus their studies on. A small proportion will inevitably go on to develop a burning interest in a topic which they might never have discovered but for the exam syllabus.

- * Clubs could arrange lecture programmes around the syllabus.
- * The amateur technical press could publish coherent series of articles based on the syllabus.
- * The existence of an exam (even if no extra operating privileges resulted from passing it) would provide a target for study, and competitive rivalry would motivate many people to enter, in much the same way as they now compete for DXCC etc.
- * The RSGB could profitably sell a study guide.
- * The RSGB could use the exam programme to illustrate that amateur radio really is different from cb in having high technical standards and in fostering interest in the technical aspects of radio communication."

G3ZAY has formulated a number of suggestions on how such an advanced-level examination could be organized, administered and run, but he feels that the important first step is to obtain the support of the Society and its members. While preserving the voluntary nature of such an examination he considers that both the Society and DTI could reserve the option of taking the possession of an advanced-level "pass" into account when considering applications by individuals or groups for new or supplementary facilities.

The recent, devastatingly-graphic BBC television programme "The Biggest Epidemic" on the enormous number of avoidable road casualties included a strong plea for making the advanced driving test compulsory. It was pointed out that, at present, drivers are let loose on the roads with virtually no experience of motorway driving, driving in bad weather conditions and the like. Much the same could be said for the RAE pass. Once this has been gained, the UK amateur is immediately granted full privileges, using high-power transmitting equipment of which he may have only the haziest knowledge.

In years past, when newcomers got on the air with simple equipment and needed to refer frequently to the amateur radio handbooks to succeed in making contacts, there was perhaps less need for any form of incentive licensing. Yet the UK is almost alone among the major nations in that it does not find some form of incentive licensing necessary to encourage amateurs to take seriously the "self-training" aspects of the ITU definition of the amateur service.

Multipath on vhf and uhf

It is, or should be, well recognized that a major problem for the operators of rtty or other digital systems on hf is multipath propagation; that is where signals reach the receiver after travelling over different paths of not precisely the same length, and thus dispersed in time. This can be brought about by reflections from more than one ionized layer simultaneously, by reception of "one-hop" and "two-hop" signals, or even by simultaneous reception over the long and short round-the-world paths. For commercial rtty/data communications, where operators expect to have reasonably clear channels, multipath is often much more of a problem than interference from other stations. Manual cw, where operators can adjust their speed of sending to suit path conditions, still has a significant advantage over machine telegraphy, including ARQ or automatic repetition of errors such as the Amtor system.

On vhf/uhf, the effects of multipath are most clearly seen on tv screens in the form of "ghosts". This form of multipath is usually associated with signal reflections from hills, high buildings, gasholders, cranes etc. However, since the reflected signals often arrive from directions appreciably different from the direct ray, ghosts can usually be minimized by careful choice and installation of directional antenna arrays, taking full advantage of the nulls between the sidelobes to knock down the unwanted signal.

Fortunately for speech communication on ssb, a.m. or fm, multipath distortion is much less noticeable than its effect on rtty, although the very deep fades when operating mobile are often due to the interaction of the direct ray with the ground-reflected signal. In the August *TT* (p679) it was noted that Oracle and Ceefax teletext signals, using 7Mbit/s digital bursts in the vertical flyback period, can in certain circumstances act as a sensitive detector of tropo conditions. With the increasing interest in high-speed data/packet radio systems, it is worth exploring in a little more detail why tropo ducting can cause outages and degradation of digital links operating at vhf, uhf and shf.

Fig 1 shows a path profile which can give rise to multipath problems on terrestrial microwave links. While ground/sea reflections are well-recognized, the third path that depends on bending or ducting in the troposphere exists only during conditions of enhanced or anomalous propagation conditions, though over some sea paths these can exist for up

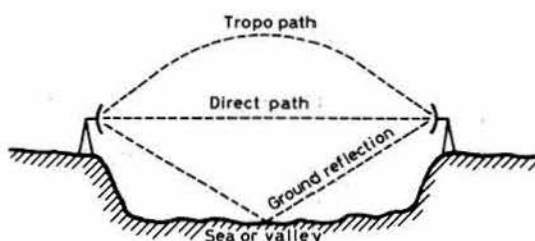


Fig 1. Showing how multipath propagation can exist on some microwave-link profiles, giving rise to significant time differences between the direct signal and either or both the ground (sea) reflected indirect ray and the tropospheric path during conditions of enhanced propagation. Tropo-multipath is difficult to counter by using diversity reception and might prove a major problem on very-high-speed digital transmissions. It is one reason why broadcast teletext signals can provide a sensitive indication of the existence of tropo openings. (see August *TT*)

to 10 per cent or so of the time. Television viewers, some 20 years ago, forced the broadcasters to recognize the existence of tidal fading resulting from the reception of uhf signals directly and after being bounced off of a constantly changing level of tidal water. Horizontally-polarized signals were found to be significantly more subject to severe tidal fading than vertically-polarized signals.

Similarly, it has long been recognized that under tropo conditions viewers towards the fringe of a service area may suffer either a reduction or an enhancement of signals. Since the time differences tend to be very small, tropo-reflected indirect rays seldom result in any visible ghosts on the picture. However, even short-term echoes can, as I noted in the August *TT*, seriously impair reception of high-speed digital data transmissions as used in teletext. From an amateur radio viewpoint, this does suggest that the problem of tropo-multipath may prove significant with any form of high-speed packet radio or other form of digital transmission.

There is, for example, considerable evidence that British Telecom Research at Martlesham has been surprised, and even dismayed, at the extent of this problem on some of their experimental 140Mbit/s digital microwave links at frequencies of 4GHz and above.

In fact, this is another example of how, in the general rush from analogue to digital techniques, new problems are emerging that are proving more serious than expected. Whereas an analogue system normally degrades "gracefully", a digital one is either all go or all no-go with a critical threshold.

The low-budget hf station

Michael Moon, KA7QZK, in "No-budget hamming" (*QST* July 1984, pp54-5) shows how, by not setting his sights impossibly high initially, he was able to get back on the air for a total outlay of \$88.40. From his log-cabin in the mountains of western Montana his inexpensive rig is bringing him plenty of interesting contacts on 3.5MHz and 7MHz cw using secondhand equipment, including a three-valve transmitter, a general-purpose receiver, a few crystals for the required bands and a 390ft wire antenna about 20ft high. Now he is busy "modernising" his rig by building a low-power solidstate vxo transmitter on which he does not reckon to spend more than about \$35.

As he puts it: "Don't get me wrong. I'd like to have one of those whistles-and-bells, 14-memory, triple-vfo transceivers as much as the next guy. But my philosophy has always been this: you don't need an ocean-going yacht to enjoy a good afternoon's fishing."

The point KA7QZK is making, and surely it is an important one, is that with some ingenuity, a willingness to learn enough theory to understand what needs to be done, and how to modify and maintain basically simple equipment, with a bit of scrounging and make-do thrown in, it is still possible to slash the cost of that first (hf) amateur station—and to enjoy doing so.

Stirred by such thoughts, and those of Peter Hopwood, G3UKL, in the August *TT*, I recently fished out of the cupboard an ancient receiver originally built in 1946, based very loosely on one of the very first tuner "kits", as marketed by Tobe Deutschmann in 1936. This had proved a useful test-bed for some ideas I had in the 'fifties and 'sixties, intended to provide a reasonably-effective cw-only receiver for the 1.8, 3.5, 7 and 14MHz bands (few people in 1936 worried about 28MHz; and there were then no amateur bands between 14 and 28MHz).

With a single rf stage and an i.f. of 465kHz, it required a converter for other bands and a preamplifier contributing a further two signal-frequency tuned circuits to reduce "image" responses, but it had the merit (in my eyes) of using three 455kHz crystal filters in conjunction with the three i.f.

transformers, two of which had triple windings. The tuning rate was well under 10kHz/revolution of the tuning knob.

I had finally "retired" the set around 1972, and it took some time to repair the ravages of time and to put together a new preamplifier using one of the later high-gain variable- μ rf pentodes (EF183). It is not, and never was, a really "hot" receiver by normal standards, yet in its time it brought me a satisfactory number of dx contacts.

It was therefore interesting to find that it still copes quite adequately with present-day band conditions on the cw segments. I found, in some tests, that it retains for me the merit of being largely "my own thing", since I cannot believe anybody else has ever put together a receiver duplicating its unusual features. Not an ocean-going yacht but still capable of fishing for dx! But, above all, the sort of receiver that is capable of teaching one something about the do's and don'ts of the craft of receivers. Today one would tackle the job in a different way, but it underlines the old belief that the future of homebuilt receivers must be aimed at a special-purpose receiver rather than a whistles-and-bells, all singing, all dancing design, inevitably now too complex to be tackled lightly.

Receivers of top performance

For those whose thoughts run more on steam-yachts than dinghies, I feel that the Sherwood Engineering receiver measurements (Table 1, p677, August 77) deserve a little more background information than I had available when commenting on the data supplied by Peter Lonsdale, G3PVX.

As mentioned in the notes under the table, the test procedures were based on those described in "Present-day receivers—some problems and cures" by Robert Sherwood, WB0JGP, and George Heidelman, K8RRH, *Ham Radio* December 1977, pp10-5 (Sherwood Engineering Inc, 1268 South Ogden Street, Denver, Colorado 80210, USA, are apparently willing to supply reprints of the article on request).

I have now read this excellent article and realize that one or two of my comments in the August 77 were possibly misleading. The Sherwood CF600/6 cw filter which contributed so much to the excellent cw-mode dynamic range shown in Table 1 is not a replacement for the R4C main selectivity filter but rather a replacement for the first i.f. filter (5.645kHz) and so providing what the authors call a narrowband "i.f. window" but which in the UK would normally be termed a *roofing filter*, with the main selectivity filter (of bandwidth suitable for the desired mode) located further down the i.f. strip and, in the case of the Drake R4C/CF600, following a second mixer arranged to provide passband tuning: Fig 2.

The normal roofing filter in the R4C has a bandwidth of 8kHz, although many professional communications receivers with this configuration tend to use a 12kHz filter in order to cope with up to four multiplexed 3kHz speech channels, as used in independent sideband (isb) communications circuits.

In effect the great improvement to the narrowband dynamic range of the R4C made possible by fitting a 600Hz bandwidth CF600/6 filter boils down to the long-recognized problem of achieving optimum gain distribution: see Figs 3 and 4.

Ideally no stage of a receiver should ever be driven into non-linearity by any signals outside the bandpass of the *final* determining selectivity filter, which basically is the reason why af filtering is often so much less effective than might be expected.

On the other hand, if all selectivity is concentrated into a single block-type crystal filter located as near to the front-end as possible, so that unwanted strong signals are not built up into impossibly strong signals, it should be possible to achieve a narrowband dynamic range almost the same as for the conventional 20kHz measurement procedure. That this *can* be done is proved by one or two of the modern designs listed in the August Table 1. What the Sherwood authors really dislike is where there is a very wide difference between the narrow and wideband dynamic range.

It needs to be said that there is a problem with a single selectivity filter located near the front-end of the receiver and where much of the high gain follows this filter; it is that the high gain in the later wideband circuits much reduces the maximum snr ratio on the af output signals unless further filtering is fitted; this can be af filtering provided that the wideband noise does not affect the linearity of any intermediate stages.

Again, one notes that the extremely high ultimate rejection (140dB) of the R4C/CF600 really reflects the use of two cascaded narrowband filters, and is not, as suggested, due to any exceptional ultimate rejection of the CF600 filter.

The 1977 *Ham Radio* article also stresses that a really good product detector should produce *no* af output in the absence of oscillator injection, though this is only seldom found in practice; envelope detection in unbalanced (and sometimes in balanced) product detectors is a well-recognized bane of direct-conversion receivers.

But perhaps of equal significance, the article also emphasizes that it is by no means as simple as sometimes suggested to improve factory designs, for example by fitting packaged ring-mixers such as the MD108, unless detailed steps are taken to ensure that the correct injection-oscillator levels are provided. Altering just one part of a design may result in unexpected knock-on effects. Fig 2 shows how Sherwood Engineering believe that the Drake R4C should be modified to provide top competition-grade cw performance.

This includes extra gain after the selectivity filters and an i.f. shunt. WB0JGP and K8RRH note that many receivers have just sufficient overall gain when used with an ssb filter but when the (usually optional) narrowband cw filter is fitted—with its greater insertion loss and reduced noise-bandwidth, allowing the receiver to cope with input voltages below what is possible for ssb—there may be a distinct lack of overall gain.

My own feeling is that, particularly for homebuilt receivers, there is much to be said for designing the whole receiver to suit one specific mode. Almost

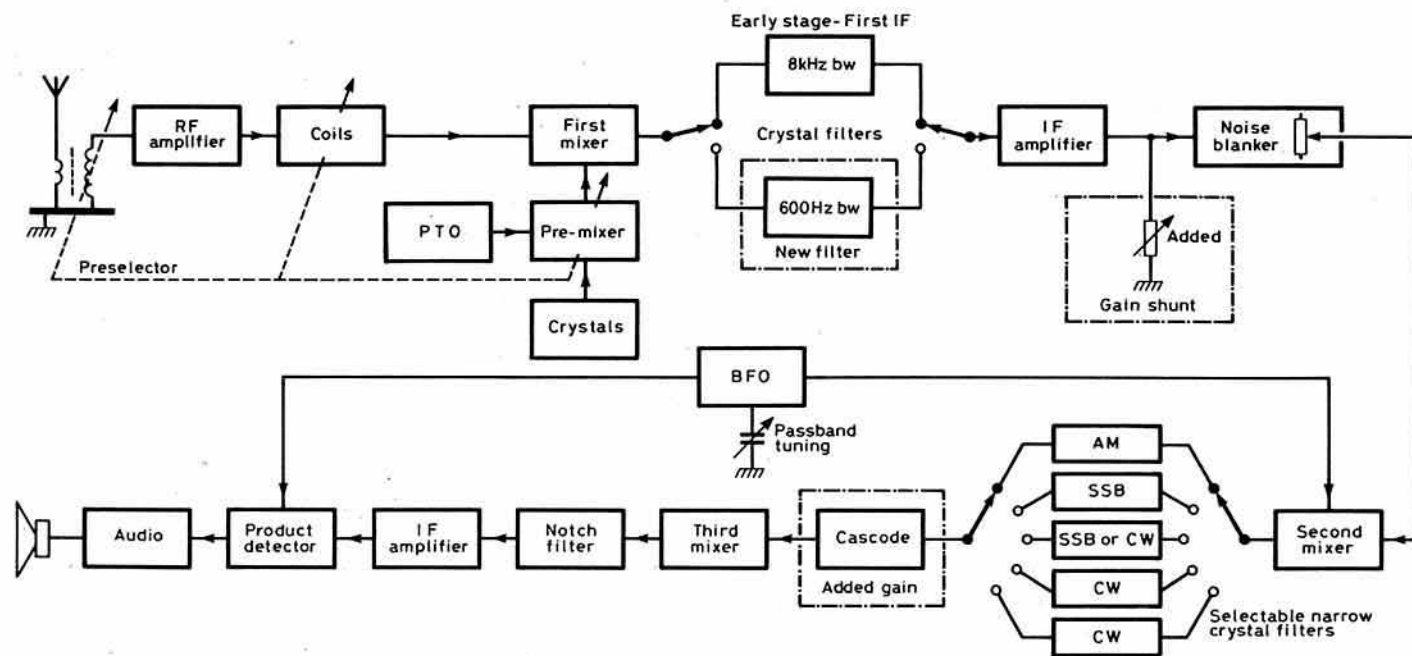
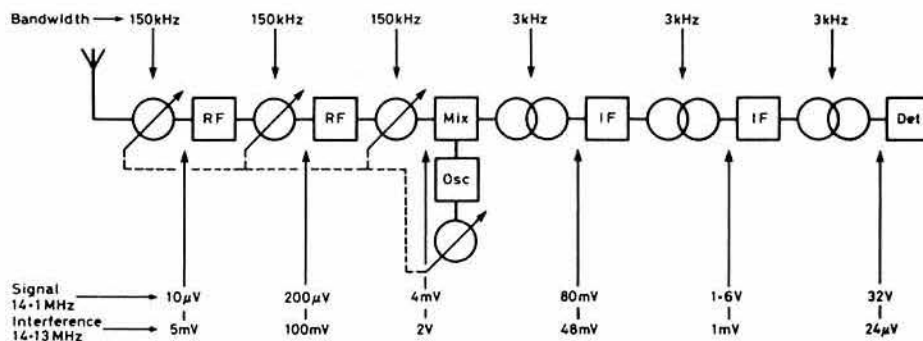


Fig 2. Block diagram of a Drake R4C modified by the Sherwood team to provide improved narrowband dynamic range by fitting a CF600 filter and redistributing the gain

Fig 3. The problem of mixer non-linearity producing cross modulation, intermodulation, blocking etc in a single-conversion receiver arises largely because high-gain rf stages build up unwanted signals to a high level at the mixer, although subsequently (after the damage has been done) the unwanted signal may be greatly attenuated relative to the wanted signal by the i.f. filtering



invariably, factory receivers are designed to appeal to as many users as possible: ssb, a.m., nbfm, cw, rtty etc. In practice this usually means an ssb receiver with the other modes provided almost as an afterthought. At present the dedicated cw enthusiast is often having to pay for a flexible design geared primarily to ssb, when what he would really like is an entirely narrowband receiver which would be simple to use and without lots of gimmicks that take time to adjust. Such a receiver needs to be tuned "on the nose" with a low-noise oscillator, very low knob tuning rate in terms of kHz/revolution, and preferably with distributed selectivity filtering spread over as many stages of the receiver as possible.

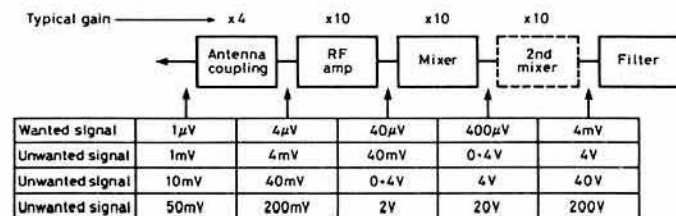


Fig 4. The problem shown in Fig 3 tends to be even worse in a double-conversion design having a further stage providing gain before the selectivity filter(s)

One final point that is emphasized in the *Ham Radio* article: performance measurements on receivers are normally made at 14MHz. At this frequency (and above) the practical value of good tracked pre-mixer selectivity is unlikely to show up with spacings of 20kHz or even 100kHz. Good pre-mixer selectivity really comes into its own below about 4MHz, and can be of real practical value to those seeking optimum performance on, say, 3.5MHz. Remember that a receiver is only as good as its performance on your favourite bands in your shack, no matter how impressive its technical specification appears.

Digital hf receivers soon?

As noted in *TT* recently, there are nowadays a lot of people who believe that analogue techniques are rapidly on their way out and that unless a piece of equipment includes at least one or two microprocessors it is not worth considering. This is not a view to which I subscribe but it is only fair to report that the digital enthusiasts can now chalk up another victory. Rockwell-Collins are soon to start delivering to the Canadian Department of Defence a new military hf receiver, Model HF-2050, claimed as the first production-model hf receiver to use digital signal processing and filtering in the entire i.f. strip and incorporating either four or five signal processing microprocessors, depending on options, to perform i.f. functions such as conversion and filtering. The front-end remains analogue, but after the first mixer an analogue/digital converter samples the 3MHz i.f. signal at 12-million samples/s; following digital processing the signal goes through a digital/analogue converter at a rate of 16,000 sample/s to provide the af output.

Collins are to supply Canada with just over 1,000 of these receivers under a \$6.5-million contract. A lot of work on digital signal processing has been done in the UK by firms such as Racal, including a sophisticated signal analyzer shown at Racalex in 1982.

Collins have not released full technical details or specification but claim the new receiver uses about 2,000 components, compared with about 3,500 in a comparable analogue receiver, with cabinet dimensions and pcb area some 30 per cent lower, and the design more suited to automatic component insertion. The lower component count also increases the estimated mean-time-between-failures to around 5,000 hours, several times greater than for analogue.

The characteristics of the digital filtering remain obscure, but it is claimed their use "will result in a 1,000 per cent drop in time-delay distortion as compared with using mechanical or crystal filters". The bandwidths of the digital filters are variable under software control.

For those determined to get into digits, how about using G3EUR's idea below and then digitally processing the 455kHz output from a vintage receiver? That way you could have your µP cake with vintage port!

Vintage receivers—not yet museum pieces

John Brown, G3EUR, offers a valuable suggestion for those devotees of the HRO/AR88 and similar mechanically-superb receivers who wish to use their vintage sets as regularly as he does, yet hate the thought of modifying them extensively to take advantage of modern techniques including high-grade bandpass filters.

"Just add a wee buffer stage fet and a coaxial socket to bring out the 455kHz i.f. signal from the mixer stage to a separate modern ssb/nbfm/product-detector/filtered-audio pcb in a screened box. Then enjoy using the front-end of the old receiver for the amateur bands, yet at the same time retaining the use of all of the original receiver for general coverage, hf broadcast stations etc."

George Hook, G2CIL, emphasizes that receivers such as the HRO and AR88 were built to very high standards and represented many weeks' earnings in the days before we converted to Monopoly money and an exchange rate in which a dollar is worth almost as much as a pound sterling, and often rather more when it comes to importing equipment.

His HRO manual, dated 1941, listed the American prices (during wartime, HRO receivers were reserved in the UK for key services, etc) as follows:

HRO standard ac model with four coil assemblies, 1.7 to 30MHz....\$330
Power pack.....\$29
Loudspeaker in cabinet.....\$18
Five extra coils to cover 50kHz to 2MHz.....\$147

In other words, a total of some \$524 or (at the then exchange rate of about \$4 to the pound) over £130 at a time when average wages were around £4 per week. In the 'thirties it was possible to buy an HRO-Senior (four-coil assemblies) for around £60, but average wages were around the £2.50 mark and the exchange rate almost \$5 for each pound sterling.

Use and abuse of preamps

It is not so many years since many amateurs first cut their teeth in home-construction by building a small external preamplifier in order to "hot-up" an old receiver on the higher hf bands. Such a unit could be put together in an evening, and the only major problem for the newcomer was making his amplifier stable enough not to burst into tptg oscillation.

In those days most of us found that a simple preamp could transform a receiver that was a fairly indifferent performer on 21 and 28MHz, and sometimes even on 14MHz, into a real dx-chasing set-up. Even some of the better designs could be significantly improved on 28MHz.

This was primarily because most of the relatively early valve sets used noisy multi-electrode valves as first mixers. These usually had an equivalent noise resistance of several hundred thousand ohms, so that one needed quite high gain before the mixer in order to achieve a satisfactory noise floor on 21 and 28MHz. Many models failed to achieve that with a single rf stage, and some even with two stages.

Provided that a suitable variable-mu valve was used, the addition of a preamp giving appreciable gain seldom seemed to have really adverse effects unless you lived very close to another amateur using the same band at the same time.

Today, the rf preamp is regarded rather differently. As Doug De Maw, W1FB, puts it in "Receiver preamps and how to use them" (*QST* April 1984): "Don't attempt to restore a flagging (modern) receiver that once had good sensitivity. If you do you may initially tune through the band and revel in your new found 'secret weapon' of 18dB or so extra gain. But then, all at once, the receiver starts producing garbled signals and all manner of blurs and spurious responses that don't belong there! . . . you find an S9 + 30dB local signal and conclude he must have something wrong with his rig . . . You hear him on several frequencies and his splatter is all across the band."

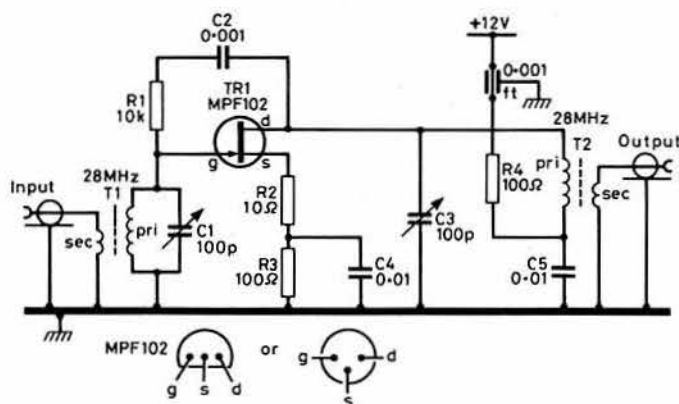


Fig 5. Example of a Jfet single-band preamplifier for 28MHz or 21MHz using degenerative feedback to improve stability in the high-gain common-source configuration. C1, C3 100pF mica compression trimmers (nominally set about 45pF). T1, T2 0.6μH with 1-5t link windings. Typically 12t of No 24 enam on T50-6 powdered-iron toroid cores (for 21MHz add two turns to main windings). MPF102, 2N4416 are among the suitable Jfet devices

As W1FB explains, the fault is likely to be that extra gain driving the receiver into severe non-linearity. Your "secret weapon" tends to misfire in conditions where really strong signals (including 7MHz and even 15MHz broadcast signals) exist anywhere near the frequency to which you are listening. As Table 1 of the August *TT* showed, most modern receivers, when up to scratch, have more than sufficient sensitivity to bring in signals just above the external noise level. A high-gain preamp will simply tend to overload the receiver on strong signals.

The preamp (eg Fig 5), however, still fulfils a very useful role when using a receiver that never had good sensitivity on the higher bands but can cope well with reasonably strong signals (ie most receivers built before about 1960 that are still worthy of serious consideration).

W1FB has formulated some useful guidelines:

- (1) Always make provision to bypass the preamp on the bands or occasions when it is not needed.
- (2) Preamps *do* help when the first stages of the receiver have high noise; but remember that *useful* hf sensitivity is limited by the external noise: With a typical antenna and in an area not plagued by electrical noise, a 15dB noise factor is low enough on all bands up to and including 7MHz: 10dB in most locations for bands up to 30MHz. These figures may shock operators more used to vhf/uhf bands where far greater sensitivity (lower noise factors) is virtually essential.
- (3) Preamps may help when the *overall* gain of a receiver is insufficient, although it should be recognized that the preamp has an adverse effect on the gain distribution; more useful is more gain *after* the selectivity filter(s). It is worth noting that some modern receivers designed primarily for ssb lack overall gain when using a narrow cw crystal filter.

A few low-cost modern receivers have a noise factor of 15 to 25dB and can be improved with a preamp. There are also, it seems to me, certain other situations not mentioned by W1FB, in which the concept of a preamp can be well justified provided that its gain is kept very low. The first is to improve pre-mixer rf selectivity, using a number of loosely-coupled tuned circuits (preferably but not essentially tracked); the preamp then acts rather like a passive preselector but with active devices providing just enough gain (or perhaps a shade more) to compensate for coupling losses and so overcome insertion loss. To be of any real use requires a minimum of two high-Q tuned circuits and is more likely to be effective on bands below 7MHz.

Another situation in which a preamp can prove of real value is to improve the matching between the antenna feeder and the first stage of a receiver. It is sometimes forgotten that for many years most communications receivers were designed to match around 400Ω rather than 50Ω coaxial feeder; 400Ω was chosen to provide a compromise between high and low impedance connections. The simplest way to improve the match in such circumstances is to use a ferrite toroid transformer, but a preamp can also do the trick.

Then there are the older, usually single-conversion, receivers with a first or only i.f. of around 455kHz. For such receivers a low-gain preamp can very significantly reduce "image" responses.

Perhaps one should add that a perfect match between an antenna and an amplifier does not necessarily improve sensitivity, though this is of practical importance only at vhf and above.

W1FB, however, points out that poor impedance matching between

antenna/preamp/receiver can have unfortunate effects: over-coupling results in lowering the Q, under-coupling can result in instability.

He lists the following semiconductors as being suitable for hf preamps: bipolar 2N5179, 2N3572, 2N5031, 2N2857; Jfets and igfets 3N211, 40673, MFE 3004, 2N5484, MPF102 and 2N4416.

My feeling is that when dealing with an old valve receiver there is much to be said for using a thermionic device in the preamp, since it then becomes possible to use a variable-μ valve (for which there is still no solidstate equivalent) with its readily adjustable gain and good linearity. Valve types such as the EF183 are still fairly readily available, or can be recovered ex-equipment. While secondhand power valves need to be regarded with some circumspection because of possible loss of emission, small-signal valves of reputable make tend to remain good performers over many years.

More high-current psu lore

John Brown, G3EUR, earned himself a lasting place in the list of outstanding innovative designers by his wartime work on SOE's "suitcase" hf transmitter-receivers, including the B2. But more recently he spent many years as chief development engineer of Avel-Lindberg Ltd, concerned with various forms of modern power supply systems, including inverters, dc-dc converters, no-break systems, toroidal transformers etc. It is in this later capacity that he has recently set out a number of notes on several current matters of concern to *TT* readers, including the long-running high-current psu saga, constant-voltage transformers etc.

On the question of protection circuits in 12V power supply units, including questions raised recently in *TT* on crowbar protection, he writes: "(1) Having worked with thyristor inverters (dc-to-ac up to 25kW) and switches (static no-break up to 25kW), I have never experienced a thyristor (scr) that failed open-circuit; always, as post-mortems showed, to short-circuit. This seems inherent in the design of these devices.

(2) However, I have found in commercially-made gear, crowbar thyristors fed via pcb tracks where the tracks *did* act as fuse links. Also thyristors that failed to fire because the gate circuit was o/c.

(3) Generally, I agree also with DUAIE's warning about "worst-case" 2N3055 devices used as pass transistors. Investigating failures, I have found the chip size to vary as much as 3:1 in area, corresponding to performance and to price of "bargain devices".

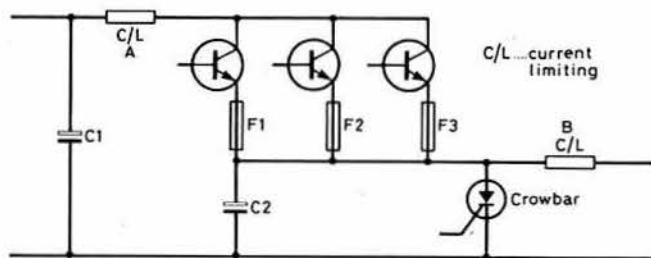


Fig 6. Diagram illustrating a number of the suggestions made by John Brown, G3EUR, in connection with heavy-current power supply units. See text for explanation

(4) When several pass transistors are used in parallel, even with current-sharing resistors, it is highly likely that only one device will fail at one time. So why not fuse the transistors individually? This significantly reduces the crowbar problem: Fig 6. Five-amp fuses of professional quality are fairly reliable in blowing at those currents and times indicated in makers' specifications. For example, use 3 × 5A for a 15A psu, 6 × 5A for a 30A psu.

(5) It is worth considering carefully the optimum position of the current-limiting sense resistor and whether the objective is to limit the current into the load or primarily to set a safe limit for the psu. At G3EUR, I tend to favour position A (Fig 6) for the latter, while position B is essential for setting a limit to the load current.

(6) When one considers the peak currents that can be drawn from modern electrolytic capacitors when these are short-circuited, it is necessary to have enough series R to avoid fusing the thyristor crowbar circuitry; even if this is rated at 1,000A peak it could still not be sufficient. However, usually the resistance of the associated wiring (provided that it does not act as a fuse) provides enough series resistance, unintentionally in most cases. But remember that beefy thyristors need gate currents of 100mA or more to turn them on fast.

(7) Fig 6 illustrates yet another problem that may be overlooked. If C2 has a very large value it will certainly absorb "fast mains spikes" (mains transients) as well as help to blow the fuse on the instantaneous collector/emitter breakdown of a pass-transistor, but then it may be better to put the

crowbar on the load side of the current-limiting resistor. The pd across a turned-on thyristor at peak current will not be much over 5V, if adequately rated.

(8) The tendency to use more than 1,000 μ F/A values for C1 can do damage before any primary relay can operate, but a resistor in position A, whether or not used as a current limiting sensor, does help the surge/sc problem of staying within limits of the components. The pass transistors will act as current limiters simply because there is usually not enough base drive available."

All these points—and others made previously in *TT* and elsewhere—go to showing the many problems that need to be taken into account when designing and building high-current power supply units.

Despite his familiarity with the problems, John Brown admits that his favourite power source for his TenTec Omni-C transceiver is the arrangement mentioned by G4JNT (*TT* August, p676): a float-charged car battery using a relatively simple charger. This not only avoids nearly all the problems involved in well-regulated and protected mains psus, but also has an advantage not mentioned by G4JNT: the battery carries over during any mains or psu breaks, thus maintaining clocks, memory circuits etc: ie forming a no-break arrangement, an advantage that was in fact mentioned decades ago when the suggestion of using a battery in this way was first mentioned in *TT*.

It also seems to me that the long-established dislike of using messy, acid-spilling lead-acid car batteries indoors can now be completely overcome by using the now-available fully-sealed, maintenance-free batteries that have been mentioned a number of times in *TT*. I have to confess that in my youth I once inflicted considerable domestic damage on a long-suffering household when an old 2V accumulator stored away on top of a wardrobe somehow overturned and the acid spilt out, unnoticed until after the damage was done.

But to return to G3EUR's notes for those prepared to tackle a battery-free form of high-current psu. He writes:

"One could go on, but the moral surely is: work it out, then try it out under simulated disaster conditions before putting it into service powering an expensive and easily damaged load:

- (1) Use a dummy load with an overvoltage indicator (zener diode plus i.e.d. in the absence of a storage scope or sample/hold voltmeter).
- (2) Place the contacts of a hefty, heavy-duty relay or starter-solenoid or similar device across a pass transistor.
- (3) Energize the relay, thus short-circuiting the pass-transistor.
- (4) Afterwards check *all* components for any adverse results of the test."

In a recent test along these lines, G3EUR found that everything survived *except* the "250V 3A" toggle switch in the primary of the mains transformer. The contacts welded together and the switch would no longer open, in spite of the fact that during the test the switch had not been used but remained "on".

Further notes by G3EUR on constant-voltage transformers will appear in *TT* later.

Dual voltage psu

Paul Gaskin, G8AYY, notes that many ex-professional coaxial and other electromechanical relays have 24–26V dc operating coils. They cannot be operated reliably off 12V dc and hence require a special psu (in the past *TT* has provided some ideas for overcoming this problem). He writes:

"Recently while designing a 13V, 1A stabilized psu for a 1.3GHz transverter, it occurred to me that the 20V approx dc supply before the series-pass regulator would be sufficient to operate a pair of coaxial relays having 24V dc coils if the psu had the spare current capacity.

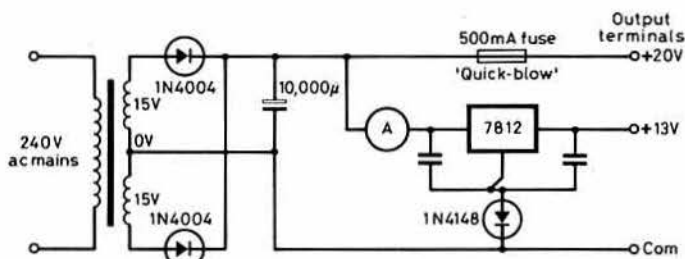


Fig 7. Simple means of obtaining a higher voltage output from a regulated 12V psu suitable for operation of 24V relays etc

"The idea has been tried successfully, with details as in Fig 7. The 20V dc output has even been used to supply an external 12V regulator fitted in a masthead preamp so that the preamp and antenna changeover relay

(energized on receive) can be supplied and *controlled* over a single switched 20V dc feedwire (0V return via the braid of the coaxial cable).

"This technique would appear to be applicable to many 12–13V dc stabilized supplies and could often save the cost of a separate 24V dc psu."

Dangerous substances

As long ago as *TT* March 1977, attention was drawn to the dangers of such substances as polychlorinated biphenyls and chlorinated naphthalenes. It was then pointed out that "of all the chemicals commonly found in electronic equipment, the group of compounds known as polychlorinated biphenyl probably constitutes the single greatest danger to health. These compounds, colourless liquids at room temperature, have been widely employed to impregnate the dielectric of capacitors (particularly high-voltage paper types) and as cooling fluids in large transformers . . . Skin contact with polychlorinated biphenyl causes brownish discolouration and a severe acne called chloracne. Ingestion and absorption through the skin (which occurs whether the skin is broken or not) can lead to systemic symptoms such as fatigue, nausea and vomiting, and to respiratory problems and liver damage . . . If simply dumped they can leach into waterways and lie on the bottom for years . . . they tend to concentrate in fish . . . the only disposal method yet developed appears to be incineration at extremely high temperatures."

Chlorinated naphthalenes, it was noted, are other, but less well-known classes of compounds which pose a similar health hazard. They are waxes and have been used in small paper capacitors.

To bring this continuing story up to date, it may be worth noting that polychlorinated biphenyl is also known as Askarel, and trade names include Aroclor and Pyroclor. Dielectric impregnated capacitors with the trade name Duconol contain polychlorinated biphenyl, whereas Visconol and Nitrogol capacitors use mineral oils *not* containing the substance.

Generally, polychlorinated biphenyl is an oily liquid with a distinctive odour similar to burning pvc. Never attempt to destroy it by burning, as it releases highly toxic vapours when heated. Great care needs to be taken over disposal, and only a very limited number of companies in the UK are authorized to destroy this dangerous material by very high temperature incineration.

The IBA safety team has pointed out that polychlorinated biphenyl impregnated capacitors were used in some of the 405-line vhf television transmitters now being taken out of service, some of which may find their way into the amateur service.

John Hazell, G8ACE, recently examined some ex-equipment boards being disposed of cheaply at a mobile rally. To his horror he noted that some of the tops of the transistors had apparently been deliberately snipped off—leaving exposed a white powdery substance that he identified as highly toxic beryllium. Let us hope this was a "once-off" hazard.

Nostalgia corner

Mel Geddes, Z23JO (ex G2SO, VQ1/VQ2/VQ3/VQ4JO etc), writes: "Have just read '30 miles at night on hf' (*TT* June). Like G3GWD (ex VQ4CW) I used a B2 for some years, off and on. Had a lot of fun using one at G2SO after the war. Came out here in 1950 and worked with a B2 on 3.5/7/14MHz cw. Got all over the place. In 1956 had consistent RST599 from W stations. In August 1956 a six-week trip to Zanzibar as VQ1JO using 14MHz only, but again world coverage, with 100ft thin wire antenna from the hotel to a pawpaw tree. In 1958 on a safari around East Africa operated from the side of the road using an aog ("Act of God") antenna, usually thrown over any convenient tree! My best contact with a B2 was with a ZL on 3.5MHz cw. Although the tuning was pretty grim for amateur bands, enjoyed working the B2 from East Africa, working from different mains voltages and from batteries. Truly a remarkable piece of gear!"

One cannot help wondering why so many newcomers now turn up their noses at the idea of a simple crystal-controlled cw transmitter, though the B2 receiver needs modifying for bandspread on the amateur bands—and one would miss a crystal filter!

Tips and topics

TT in June and August gave some information on the constant-voltage transformers made by the American firm Sola and in the UK by Advance under the name "Volstat". Too late for the August issue, I received a letter from Sola-Banner (Europe) Ltd, 28 Lurke Street, Bedford MK40 3HU (telephone Bedford (0234) 40094) explaining that Sola-Banner is the European subsidiary of Sola Electric of Chicago. Catalogue E668R covers "Sola power protectors for line voltage stabilization" as available in the UK. While I suspect that many of these products are intended for large computer installations and above the price acceptable for heater stabilization of amateur radio equipment, there does appear to be a comprehensive range of constant voltage stabilizers of the type already described. □

The New Locator System

John Morris, GM4ANB*

FROM 1 JANUARY 1985 vhf, uhf and microwave operators will be using a new locator system.

If you don't know what a locator system is, then you obviously haven't taken part in any vhf contests or dxing during the last decade. For the uninitiated, a locator system is, most importantly, a way of giving the location of your station, to within a few kilometres, as quickly and efficiently as possible. During the last decade or so it has become commonplace for stations making dx contacts on the vhf bands and above to exchange their locators, partly to allow the distance to be calculated, but also because collecting locator squares has become a popular sport. In most contests it is part of the rules that locators must be exchanged, again to allow the distance, and hence the score, for the contact to be calculated.

Until recently it was only in Europe that a locator system was in widespread use. The system, commonly called the "QRA" but in recent years more correctly termed "QTH locator", was invented somewhere in middle Europe, and gradually spread to the whole continent. Unfortunately it was never really designed for more than local use, and was stretched to serve even Europe. Now other parts of the world—notably North America—are becoming interested in the idea of a locator system, but there is just no way that the "QRA" can be persuaded to reach across the Atlantic. It is also a rather complicated system, and not too easy to calculate.

The solution is to change to a new system, and that is just what we are doing. A single locator system, designed by amateurs to suit the special requirements of amateur radio, has now been adopted by all three regions of the International Amateur Radio Union. The IARU is the international organization of national radio societies, such as the RSGB, and through these societies represents the radio amateurs of the whole world.

The adoption of the new system means that, for the first time ever, amateurs all over the world will have a single, well-defined way of telling each other their locations with a minimum of fuss and bother.

Common questions

Q. What difference will this make to operating?

A. Once the changeover is complete there should be little difference on the surface. Instead of sending one string of characters—such as YN27e—you will send a different string—such as IO83QP. After a short while the new system should become just as familiar as the old one, and you will turn your beam south (or whatever) just as automatically on hearing "IO83QP" as you do now on hearing "YN27e".

Q. Is my hard-earned collection of squares totally useless, so that I have to start collecting all over again?

A. No. The new system was deliberately designed to have a certain amount of compatibility with the old one, so that square collections, lists, awards and so on can continue as before. The "big squares" are all in the same places, they have just been given different names. Conversion from old to new squares is quite simple, and will be explained.

*6A Morlich Grove, Dalgety Bay, Nr Dunfermline, Fife KY11 5UX.

Q. How do I find my new locator?

A. There are four ways of doing this. The first is to read and understand the description of the system, and work it out for yourself. The second is to follow the step-by-step procedure given in this article, using nothing more than pencil, paper, a calculator, and a few minutes' time. The third is to use a computer, either your own or perhaps one brought along to the local club. A program to calculate locators from national grid references will be listed. The fourth is to use the "locator line" telephone service, details of which can be found at the end of the article.

Q. What about maps?

A. Maps are already well into preparation, and should be available from the RSGB by the time this is published.

How the system works

The world is divided along lines of latitude and longitude into *fields*. Each field covers 20° of longitude from west to east and 10° of latitude from south to north, and it takes 324 of them to cover the world. The fields are labelled by two letters, each in the range "A" to "R". The first letter gives the longitude of the field, starting from 180°W, and working eastwards. The second letter gives the latitude of the field, starting from 90°S and working northwards.

For example, take field "AA". The first "A" shows that the field covers 180°W to 160°W. The second "A" gives the latitude covered by the field as 90°S to 80°S. At the opposite end of the earth is field "RR", which runs from 160°E to 180°E and 80°N to 90°N.

Most of Britain and Ireland is in field "IO", which covers 20°W to 0°W and 50°N to 60°N. The Channel Islands, Isles of Scilly, and the Lizard Point in Cornwall are in field "IN", which covers 20°W to 0°W and 40°N to 50°N. Most of the Shetlands (roughly from Sandwick northwards) are in field "IP", which covers 20°W to 0°W and 60°N to 70°N. That part of England east of Greenwich, including Norfolk, Suffolk, Essex, Kent, most of Cambridgeshire and parts of other counties is in field "JO", which covers 0°E to 20°E and 50°N to 60°N.

Each of the fields is divided, again along lines of latitude and longitude, into 100 *squares*. These are arranged as a 10-by-10 grid, so that each one covers 1° of latitude and 2° degrees of longitude. Two digits, each "0" to "9", are used to label the squares. The first gives the longitude within the field, starting from the west, and the second the latitude, starting from the south.

For example, take square "IO00". The field letters, "IO", show that it is somewhere in the range 20°W to 0°W and 50°N to 60°N. The first "0" says that the square is at the western end of the field, so that it covers 20°W to 18°W. The second "0" puts the square at the south of the field, giving its latitude coverage as 50°N to 51°N.

It may be noted that the locator squares coincide with the old "QRA" squares. Thus square "IO83" is exactly the same as the old "YN" square; new "JO01" is the same as old "AL"; new "IN79" is the same as old "XJ"; new "IO86" is the same as old "YQ", and so on.

Each of the locator squares is finally divided into a 24-by-24 grid of sub-squares. Each of these covers 5' of longitude and 2.5' of latitude. They are labelled using two letters, each in the range "A" to "X", starting from the southwest corner of the square. The first of the sub-square letters gives the longitude, and the second the latitude.

A full locator reference consists of the two field letters, two square digits, and two sub-square letters. To give a full example, take locator "IO83QP". The "IO" part means that it is in field "IO", ie 20°W to 0°W, 50°N to 60°N. The "83" part means that it is in square "IO83", which has its southwest corner at 4°W and 53°N. The "Q" says that the longitude is between 1°20' and 1°25' east of this. The "P" gives the latitude as somewhere between 37.5' and 40' north of the southern edge of the square. Thus the area covered by locator "IO83QP" is from 2°40'W to 2°35'W and 53°37.5'N to 53°40'N. So, if you happen to live in Chorley in Lancashire, your locator is IO83QP.

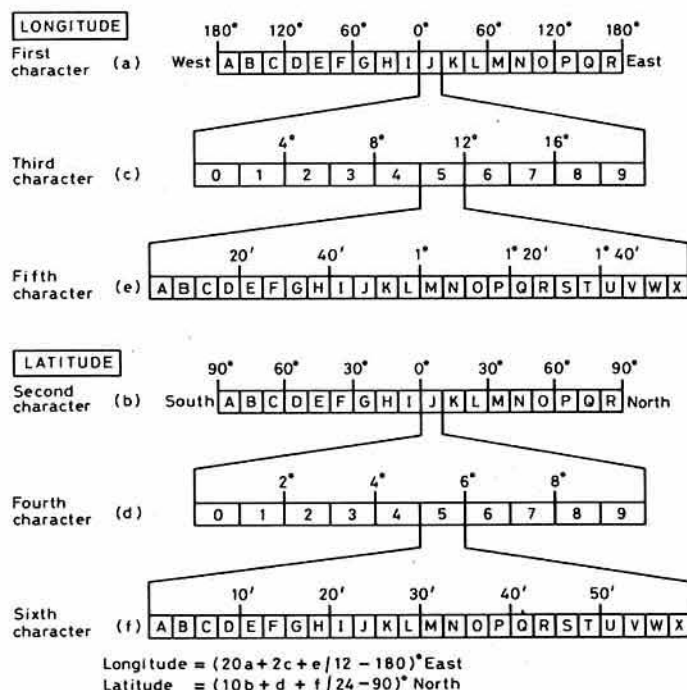


Fig 1. The new system has six characters, derived from the latitude and longitude

Fig 1 shows how the locator is built up from fields, squares and sub-squares. It may be noted that all of the longitude defining characters—the first, third and fifth—run from west to east, while the latitude defining characters—the second, fourth and sixth—go from south to north. In addition, at all levels the east-west size, in degrees, is always twice the north-south size.

In distance terms, each sub-square is about 4.6km from south to north: The east-west size varies with latitude, but in the middle of Britain (55°N) it is about 5.3km. If you take the accuracy of the system as being the farthest you can get from the middle of a sub-square without actually leaving it, this gives a maximum error of about 3.5km (at 55° latitude), which is quite adequate for most normal operation.

Names

On the air the system should be called simply "locator", with no "QTH", "QRA" or anything else. For example, you might say "My locator is IO83QP", or ask of another station, "What is your locator?". On cw the recommended abbreviation is "LOC", so that the cw equivalent of "What is your locator?" is simply "LOC?"

The various divisions of the locator, fields, squares and sub-squares, have just those names. A vhf dx chaser might claim to have "worked 300 squares", or, for the real enthusiast, "20 fields".

Just to confuse matters, amateurs in North America seem to have taken to the name "grid system". So if you get the question "What is your grid?" then what is wanted is your locator.

Table 1. Number to letter conversion table for hand calculation of a locator

0 A	4 E	8 I	12 M	16 Q	20 U
1 B	5 F	9 J	13 N	17 R	21 V
2 C	6 G	10 K	14 O	18 S	22 W
3 D	7 H	11 L	15 P	19 T	23 X

Finding your locator by hand

The following step-by-step procedure can be used to calculate your locator from your latitude and longitude, using nothing more than pencil, paper and a simple calculator.

First of all you must find your latitude and longitude. The latitude should be rounded down to the next half of a minute south, and the longitude to the next whole minute west. If you use an Ordnance Survey map for this you should note that the grid lines do not run exactly north-south and east-west, and should not be used. Instead a long straight-edge should be used to read the scales at the edges of the map. The centre page from a large newspaper folded across the corners works quite well.

Having established your latitude and longitude the procedure is as follows:

1. First deal with the longitude. Convert the longitude to decimal degrees. This is done by dividing the minutes part by 60 and adding the result to the degrees part.
2. If you are east of Greenwich, add 180.
3. If you are west of Greenwich subtract the value from 180.
4. Divide the result by two.
5. Now divide the value obtained by 10, and note the figures to left of the decimal point. These give the first letter of the locator, on the basis of 0=A, 1=B, 2=C and so on, as shown in Table 1.
6. Multiply by 10, and note the single digit immediately before the decimal point. This is the third character of the locator.
7. Take just the fractional part of the value (the part to the right of the decimal point), and multiply it by 24. The figures to the left of the decimal point give the fifth character of the locator, once again using Table 1.
8. Now follow a similar process for latitude. Convert the latitude to decimal degrees.
9. If you are north of the equator, add 90.
10. If you are south of the equator subtract the value from 90.
11. Divide by 10, and take the second letter of the locator from the digits to the left of the decimal point, using Table 1.
12. Multiply by 10, and note the digit to the left of the decimal point. This is the fourth character of the locator.
13. Take the fractional part, and multiply by 24. The figures to the left of the decimal point give the last letter of the locator, again using Table 1.

As an example, take Edinburgh Castle. From the map, its latitude is somewhere between 55°56.5'N and 55°57'N, and its longitude between 3°11'W and 3°12'W. Rounding to the next half minute south and whole minute west means that latitude 55°56.5'N and longitude 3°12'W are taken. The instructions above are then obeyed. In the following example the steps taken are described on the left, and the result on the calculator shown on the right.

- | | |
|---|-------------|
| 1. Take the minutes of the longitude. | 12. |
| Divide by 60. | 0.2 |
| Add the degrees of the longitude. | 3.2 |
| 2. The longitude is not east, so do nothing. | |
| 3. The latitude is west, so subtract from 180. | 176.8 |
| 4. Divide by 2. | 88.4 |
| 5. Divide by 10. | 8.84 |
| To the left of the decimal point is "8", so from Table 1 the first locator character is "I". | |
| 6. Multiply by 10. | 88.4 |
| The digit immediately left of the decimal point is "8", so the third character of the locator must also be "8". The locator so far is thus "I-8-...", where "-" means a character yet to be determined. | |
| 7. Take the fractional part. | 0.4 |
| Multiply by 24. | 9.6 |
| To the left of the decimal point is "9", so the fifth character must be "J". The locator becomes "I-8-J-..." | |
| 8. Take the minutes part of the latitude. | 56.5 |
| Divide by 60. | 0.94166666 |
| Add in the degrees part of the latitude. | 55.94166667 |

9. The latitude is north, so add 90. 145-9416667
 10. The latitude is not south, so do nothing. 14-59416667
 11. Divide by 10.
To the left of the decimal point is "14", so the second character of the locator is "O". The locator becomes "IO8-J-". 145-9416667
 12. Multiply by 10.
The digit to the left of the decimal point is "5", so the fourth character of the locator must also be "5", giving "IO85J-". 145-9416667
 13. Take the fractional part. 0-94166666
Multiply by 24. 22-59999984
To the left of the decimal point is "22", so "W" is the last character of the locator.
- The full locator for Edinburgh Castle is thus IO85JW.

Square conversions

As has been mentioned, the new locator squares cover exactly the same areas as the old locator "big squares"; only the names have changed. This means that lists and awards can continue uninterrupted. If you have previously worked ZL square under the old system, then you have worked IO91 square under the new system.

Converting squares from old to new systems is fairly straightforward, and if you are a square collector it is worth sitting down and converting your lists of squares worked and confirmed.

There are several ways of doing this. The easiest is to use a computer program, and a simple one is given later in this article. It is almost as easy to use the small card maps of the old and new systems. For each conversion simply look up the square on the old map, find the corresponding square on the new map, and read off the new square name.

Failing all else, Table 2 can be used. This table only works for the area 40 to 66°N, 12°W to 40°E, but should be adequate for most contacts. To use it, find the first letter of the old locator square in the first column. The first and third characters of the new square can be read off from columns (2) and (3). Then find the second letter of the old locator square in column (4), and read off the second and fourth characters from columns (5) and (6). The procedure is more complicated to describe than to do.

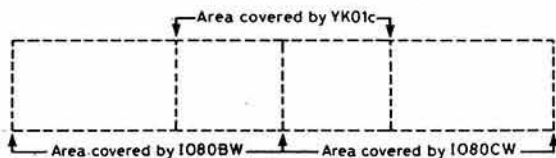


Fig 2. At the sub-square level the old and new systems do not match up, making most attempts at translation from one to the other ambiguous

For example, take old square "BI". Find "B" in column (1) and read off "J" and "1" from columns (2) and (3). Then look up "I" in column (4) and read off "N" and "8" from columns (5) and (6). Thus old square "BI" corresponds to new square "JN18".

Converting locators

A couple of computer programs have been published that claim to convert old locators to new ones and, regrettably, more will probably appear in the next few months. Why regrettably? Simply because *this conversion is just not possible without quite a high probability of error.*

```

5 REM *** NGR to Locator. John Morris, GM4ANB, 1984. ***
10 DIM T(9):CA=ASC("A"):CS=ASC(" "):C0=ASC("0"): REM Constants
20 PI=3.14159265: REM May not be needed if a PI is available
30 PRINT: PRINT "NGR to locator conversion *"
100 PRINT: INPUT "NGR":N$: GOSUB 500: IF EF>.5 GOTO 170
110 T2=INT(N): T3=INT(600*(N-T2)+.5)/10: REM Pretty print
120 PRINT: PRINT T2;"degrees":T3;"minutes north"
130 T1=ABS(E): T2=INT(T1): T3=INT(600*(T1-T2)+.5)/10
140 T$="east": IF E<0 THEN T$="west"
150 PRINT T2;"degrees":T3;"minutes ":T$
160 GOSUB 1000: PRINT: PRINT "Locator ":L$: GOTO 100
170 PRINT: PRINT "Sorry, that is not a valid NGR": GOTO 100
500 PT=1: L=LEN(N$): EF=0: REM NGR to lat/long initialise
510 FOR J=1 TO 9: REM Get characters, skipping spaces, first
520 T1=-1: IF PT<=L THEN T1=ASC(MID$(N$,PT,1))
530 PT=PT+1: IF T1=CS GOTO 520
540 T(J)=T1: NEXT: REM Ascii array 'T' is now full
550 FOR J=1 TO 2: REM Check leading letters are both o.k.
560 T(J)=T(J)-CA: IF T(J)<0 OR T(J)>26 OR T(J)=8 THEN EF=1
570 IF T(J)=8 THEN T(J)=T(J)-1: REM 'I' is not used
580 NEXT
590 FOR J=3 TO 8: REM Now check all 6 digits are there
600 T(J)=T(J)-C0: IF T(J)<0 OR T(J)>9 THEN EF=1
610 NEXT: REM Complete NGR now examined. Should be now left
620 IF T(9)=0 THEN EF=1: REM Check end of input reached
630 IF EF>.5 THEN RETURN: REM Give up if an error found
640 TA=INT(T(1)/5): TC=T(1)-5*TA: REM Deal with 500km square
650 TB=INT(T(2)/5): TD=T(2)-5*TB: REM Deal with 100km square
660 E = -1000+500*TC+100*TD+10*T(3)+T(4)+T(5)/10: REM Eastings
670 N = 1900-500*TA-100*TB+10*T(6)+T(7)+T(8)/10: REM Northings
680 T1=(N+5548.79)/6371.28: REM Use transverse Mercator trig
690 T2=2*ATN(EXP((E-400)/6389.70)): REM To convert to lat/long
700 E=ATN(-COS(T2)/(COS(T1)*SIN(T2)))*180/PI - 2
710 N=SIN(T1)*SIN(T2): N=ATN(N/SQR(1-N*N))*180/PI
720 RETURN: REM NGR to lat/long conversion complete
1000 N=N/180+.5: E=E/360+.5: L$="": T=CA: F=18: GOSUB 1020
1010 T=C0: F=10: GOSUB 1020: T=CA: F=24: GOSUB 1020: RETURN
1020 N=F*(N-INT(N)): E=F*(E-INT(E)): L$=L$+CHR$(T+E)+CHR$(T+N)
1030 RETURN: REM Lat long to locator conversion complete

```

PROGRAM 1

Table 2. Square conversions

(1)	(2)	(3)	(4)	(5)	(6)
A	J	0	A	N	0
B	J	1	B	N	1
C	J	2	C	N	2
D	J	3	D	N	3
E	J	4	E	N	4
F	J	5	F	N	5
G	J	6	G	N	6
H	J	7	H	N	7
I	J	8	I	N	8
J	J	9	J	N	9
K	K	0	K	O	0
L	K	1	L	O	1
M	K	2	M	O	2
N	K	3	N	O	3
O	K	4	O	O	4
P	K	5	P	O	5
Q	K	6	Q	O	6
R	K	7	R	O	7
S	K	8	S	O	8
T	K	9	T	O	9
U	I	4	U	P	0
V	I	5	V	P	1
W	I	6	W	P	2
X	I	7	X	P	3
Y	I	8	Y	P	4
Z	I	9	Z	P	5

Key: (1) Old square first letter
 (2) New square first character
 (3) New square third character
 (4) Old square second letter
 (5) New square second character
 (6) New square fourth character
 See text for details.

PROGRAM 2

```
10 CA=ASC("A"): C0=ASC("0"): V1=9.01-CA/10: V2=13.01-CA/10
20 PRINT:INPUT "Old square":S$
30 E=V1+ASC(MID$(S$,1,1))/10: IF E>11 THEN E=E-2.6
40 N=V2+ASC(MID$(S$,2,1))/10
50 F=C0+10*(E-INT(E)): D=C0+10*(N-INT(N)): E=E+CA: N=N+CA
60 PRINT "New square ":CHR$(E);CHR$(N);CHR$(F);CHR$(D):GOTO 20
```

PROGRAM 3

```
5 DIM T(6)
10 INPUT L$: GOSUB 1000: PRINT N,E,EF: GOTO 10
1000 EF=0: IF LEN(L$)<6 GOTO 1080
1010 FOR J=1 TO 6: T=ASC(MID$(L$,J,1))
1020 L=ASC(MID$("AA00AA",J,1)): H=ASC(MID$("RR99XX",J,1))
1030 IF T(L OR T)H THEN EF=1
1040 T(J)=T-L: NEXT
1050 E=T(1)*20+T(3)*2+T(5)/12-180+1/24
1060 N=T(2)*10+T(4)+T(6)/24-90+1/48
1070 RETURN
1080 EF=1: RETURN
```

The new system was deliberately designed to be compatible with the old at the square level, so that lists and awards could continue without hiatus.

This compatibility does not extend to the sub-square level. The smallest squares of the two systems are just not the same. This means that any conversion from old to new locators can quite easily get the wrong answer, and often will.

The technique these programs normally use is to convert from old locator to latitude and longitude, and then from latitude and longitude to new locator. What this overlooks is that an old locator small square does not correspond to just a single point, but to an area of typically 20 or 25km². There is nothing to say that all of this area has to be in the same new locator sub-square. Indeed, often part will be in one sub-square, and part in another.

For example, old locator YK01c covers longitude 3°48'W to 3°52'W. In the new system part of this area is in IO80CW (3°45'W to 3°50'W), and part in IO80BW (3°50'W to 3°55'W). Obviously the old locator just does not give enough information to decide what the new locator is (Fig 2).

An equally compelling reason for working out your new locator from scratch, rather than trying to convert from the old one, is that a surprisingly large number of stations have their old locator wrong. The old system is somewhat complicated, making it all too easy to make mistakes in calculating it. Even one ex-vhf manager of the RSGB will admit, when suitably relaxed, to having sent the wrong locator for several years. Worse still, other stations in the vicinity simply copied and used the same wrong locator!

The message, therefore, is to sit down and work out your new locator from scratch, a matter of 5min at most. That is the only way to be sure that you have it right.

Computer programs

The new locator system is very well suited indeed to computers, rather more so than the old system. There are already several programs around that will do various things with the locator, such as contest scoring, distance and bearing calculation, and so on, and no doubt many more will be appearing in the near future.

The three programs listed here are designed to aid the process of adapting to the new locator system.

Program 1 converts from national grid reference (ngr), as used on Ordnance Survey maps, to locators. For good measure it also gives latitude and longitude.

It is quite an intricate program, so be careful with the typing. All REM statements can be left out if desired. If your computer has a built-in "PI" function line 20 should be omitted. If it uses "string slicing" rather than the MID\$ function (eg Sinclair Spectrum), then the "MID\$(NS,PT,1)" in line 520 should be changed to "NS(PT)". If the "ASC" function is not available, then the equivalent function, which returns a numeric value corresponding to a character, should be substituted throughout. Apart from these points the program uses very basic Basic, and there should be few problems getting it going on most computers.

The input to the program consists of a full ngr. This is two letters, giving the 100km national grid square, followed by three digits giving the eastings and three giving the northings. The details of how to work out your ngr can be found on any 1:50,000 Ordnance Survey map. Spaces can be freely interspersed through the input to improve clarity.

To check that the program has been entered correctly, here are a few ngrs and their corresponding locators:

SD 562 183	IO83QP
NT 252 735	IO85JW
SU 477 947	IO91IP
TQ 276 679	IO91WJ

If you are a member of a radio club, once you have the program running correctly you might like to take your computer and the local OS map along to a meeting to give others the chance to find their locators.

There is not space here to describe fully the program's operation. Briefly, lines 10 to 30 perform various initializations. Lines 100 to 170 are the main loop, and are reasonably straightforward. Lines 500 to 720 make up a subroutine which converts from ngr to latitude and longitude. The subroutine at lines 1000 to 1030 converts from latitude and longitude to locator. You may wish to extract this latter routine for use in your own programs. Its inputs are the latitude, in °N, in N, and longitude, in °E, in E. It returns the six character locator in L\$.

Program 2 is a very simple utility to convert from old locator squares to new ones. Typing in XJ should give IN79; YQ should produce IO86, and so on. It is only valid for the region 40 to 66°N, 12°W to 40°E. Beyond this area the old locator repeats itself. A computer program to handle the repetition can be written, but for the few contacts involved it is probably easier to use a map. If necessary change the ASC and MID\$ functions as for Program 1.

Program 3 is listed only for the sake of the subroutine at lines 1000 to 1080. It converts from locator to latitude and longitude, and is specifically intended to be lifted and used in your own programs. For example, if you have a contest scoring program, then somewhere in it will be an old locator to lat/long conversion routine. By replacing that routine with the one given, and making a few other patches, the program should start working with the new locator.

The input to the subroutine consists of the six character locator string in L\$. On exit the latitude of the middle of the sub-square, in °N, will be in N, and the corresponding longitude, in °E, in E. Errors are flagged by EF. If the locator string was acceptable, EF will be zero. If something was wrong with the locator, EF will be set to one, and of course the values of N and E will be meaningless.

Note that for some computers the ASC and MID\$ functions will have to be changed in a similar way to that already described for Program 1.

"Locator Line"

If you are having trouble working out your locator then telephone "Locator Line". For the next few months I will be setting aside one evening per week (holidays excepted) to sit by the telephone, computer at the ready, to calculate locators.

Before calling make sure you have your full ngr ready. A full ngr consists of two letters plus six digits. Instructions on how to find it can be found on the 1:50,000 Ordnance Survey map of your area.

The service will operate most Sundays, from 7 to 9pm. The number to ring is 0383 824 456. Give your callsign (just for the record) and ngr, and I will give you the corresponding locator. If the ngr is not available it will also be possible to work from latitude and longitude.

Anyone calling outside those hours will get an extremely rude answer, and a massive phone bill waiting for me to fire up the computer! ☐

4-2-70

by Ken Willis, G8VR*

Tropo

Many operators will have noted that a hot summer and high-pressure belts do not of themselves guarantee excellent tropo. However, there have been a few openings of merit, one of them over the weekend of 25/26 August when conditions were very good on a N-S path and the Shetlands were worked from Kent. G4FRX (Hampstead) has a very poor take-off to the north, his signals having to penetrate a million tons of clay rising 200ft above his antenna only half a mile away. Nevertheless, he worked Northumberland, a county he has been chasing for a long time, and was surprised how easy it was (59 both ways) in what was a very good opening by all accounts. Over the same weekend, G6TNZ, on holiday in a caravan in Lincolnshire used a FT790R and a "rubber ducky" antenna on 432MHz, holding the rig at arm's length in a horizontal (antenna) position, and worked one Belgian and three Dutch stations. He also heard a GM4 working an OY on 432MHz(?) (Information, please, for the record book).

During August FOGAL was much in demand from YG square, although most of the time he was there conditions were rather flat.

Sporadic-E

By now we can assume that the Es "season" on 144MHz has passed. In many ways it was a remarkable one, consisting of three major events plus a host of minor openings, some of them lasting only a few minutes. In these respects, one could say that it was a typical year, but what made it so memorable was the fact that the three major openings were from quite different parts of Europe (and the USSR) so anyone who was lucky enough to catch them all will have added some very unusual call signs to the log. The events of 8 June (to the USSR and Poland) and 30 June (to Southern Spain and Portugal) have already been reported in 4-2-70. One further piece of information to come in, however, is that on 30 June GM4IPK (Edinburgh) worked, among other EAs, I0SNV/EA9 in Ceuta, North Africa (XV04e), which is surely a "first" GM-EA9 contact. In fact Andy had never worked EA on 144MHz before this event, but this time he worked every station from that country that he heard, 21 in all.

The third major event occurred on 6 August around lunch-time when many operators were at home and able to take advantage of it. It started around 1130gmt and lasted almost 2h, and a remarkable path opened up between Yugoslavia, Romania and Bulgaria with a seemingly endless supply of stations at the far end clamouring for contacts.

Ela, G6HKM (Essex) was monitoring S20 on a newly-acquired TW400A using an indoor $\lambda/4$ antenna when a foreign voice was heard breaking the squelch—and not the usual French or Dutch. She went hot-foot to the shack in the garden to a Trio 9130 and 17-element Tonna and worked seven YUs in KD, KE, KF, ID and JC to bring her total to 116.

Bob, G6HUN (Berks), used only 3W into a similar antenna with his particular "hole in the ground" and worked 13 YUs, LZ2XU (MD) and YO7DL (LE) for three new countries and nine new squares. He says: "What an opening!", and incidentally he has now worked 21 countries and 88 squares using his 3W.

Further to the north, G6LUZ (Cheshire) had seven YU contacts, while in London, Jim, G8LFB worked 12 YUs and LZ1AB (LC). Henry, G3TVW (near Bishop's Stortford), said that after 20 years operating on vhf, this was the first big opening which he had been lucky enough to catch, and using only 10W into a 10-element Jaybeam he worked nine YUs and heard LZ1KDP in Sofia. He was "amazed at the signals, most stations end-stopping his S-meter". Gloria, G4UYL (Kent), worked seven YUs for six new squares, John, G4CMU, had 13 YU contacts and also worked LZ1KDP, LZ1AB, Nigel, G4JIF, was alerted by a phone call, and the first station he heard was 17KOE. No-one else has reported anything from Italy, though G6HUN reported hearing Hungary and Greece. Nigel worked about a dozen YUs and reported, as others did, that there was a lull during the event which therefore seemed to be in two distinct phases. These are typical of many reports received and serve to indicate how widespread was the event and how many stations were active at the time. In the Channel Islands things started up a little later, but when they did, GJ4ICD, in an

amazing session between 1220 and 1336gmt, worked 104 QSOs in 75min, averaging four stations/min at the peak. His tally was seven YO's, 62 YUs, 12 OK's, two LZ's, 14 HG's, three OE's and one Italian. The best dx was LZ1DJ in MC square at 2,260km. His neighbour GJ6TMM worked seven HG's and YO2FP in KF square. This was a truly unusual Es event, but it must be said that the vastly increased activity on the 144MHz band throughout Europe and adjoining countries has really changed the nature of Es inasmuch as very few openings go unnoticed these days, and when they occur stations at the far end have the equipment and operating experience to take advantage of them. Here's to next year and even greater openings!

50 and 70MHz

A little bit of history was made at 1400gmt on 23 August when RSGB headquarters staff activated the new beacon on 50.05MHz. Thanks to a telephone call from John Nelson, G4FRX, G8VR was privileged to hear the first emissions from this installation using an indoor dipole, and the signal from the 15W erp from crossed dipoles was predictably 5 and 9 plus. The beacon not only transmits its call sign, GB3NHQ, but also its locator in "Maidenhead" form, IO91VQ.

It will be very interesting to hear how this beacon is copied, not only in the UK but wherever there are 50MHz enthusiasts, especially as authorization has been granted for operation 24h every day. This should greatly assist propagation checks. Jeremy, G3IMW (London N4), finds it a "very nice clean signal" and hopes that, as well as indicating 50MHz conditions, it may also let the GM operators on 70MHz know when the band might be open to the south. While on the subject of beacons, G3IMW is glad that the 70MHz beacon GB3ANG is again operational; he copied it very well over the August Bank Holiday weekend but found little activity on the 70MHz band despite the good conditions which obviously prevailed.

Another possible "first" on 50MHz was achieved on 24 June by "the other Jeremy", G3NOX, when he worked two-way on the band with W6JKV/P/OX in Greenland. Signals were 59+ both ways, and several other permit holders worked this station, reception being best, it appears, in the south. It is interesting how many different countries have been worked two-way on this band already, despite the fact that there is no general allocation of 50MHz throughout Europe and neighbouring countries.

Fascinating items of news related to this band keep filtering through. For example, G3LTF (Harlow) reported having had auroral contacts on 50MHz with GW3LDH on 28 March this year, and with G13RXV on 5 April, both believed to be first "post-tv era" auroral contacts between these countries.

Many Class B operators listen on 50MHz, and it is a pity that they are precluded from fully taking part in the current experiment. Roland Jeffery, G6DSA, has compiled lists of signals heard during each month since May using his Wood & Douglas converter into a TS200G and a dipole at 30ft. His repeated reports of receiving beacons ZB2VHF and GB3SIX, as well as special stations such as W6JKV, indicate a high level of dedication and provide valuable statistical data for the Propagation Studies Committee. Another listener, Brian Williams, GW8CCA, had just completed a homebrew converter on 25 July, lined it up on a borrowed signal generator, and was amazed to hear ZB2VHF on 50.035MHz using an E-W facing dipole in his loft. He is now making a three-element out of some curtain rail. Old-timers will chuckle at this activity, the sort of thing they did many years before black boxes appeared on the scene. Having some project such as this can be very rewarding after the mayhem on the 144MHz band, and serious monitoring on a particular band can provide both entertainment and a wealth of useful data.

In the past, reports from Dave Newman in Coalville were a feature of any commentary on 50MHz. Dave moved and had to relinquish his permit, but has now set up again at Bardon Hill, Leics, using a five-element Yagi on a 12ft boom at 70ft into a IC551 transceiver. On 5 August on 28MHz he copied beacon VE3TEN, and next day both this beacon and the WIAW (ARRL) slow morse transmissions. He sensed that a 50MHz opening was "on the cards" and later (6 August) heard ssb on 50.109MHz and cw on 50.103MHz, but no call signs. Dave made contact with K4GOK on the 28MHz liaison channel and suggested that he send on 50.100MHz. They

*11 Old Downs, Hartley, Kent DA3 7AA

immediately had a crossband contact, followed by similar contacts with K2MUB, W3JO, W1AYS, W2CAP/1, WB2MA1, W1QXX, WB2CMI and K1JRW, all between 2132 and 2205gmt. W2IDZ was heard, but not contacted, on cw. K2MUB told Dave that he had heard GB3SIX for 20min earlier that evening, so the value of the beacons is obvious. Dave says that GW3LDH and G3USF both heard some of the USA signals on this occasion. Dave wonders whether ms-assisted Es contacts "across the pond" might be possible around the time of the Perseids since this shower occurs in the middle of the Es "season".

Graham Kimbell, G3TCT, has sent in a report on sporadic-E observations at 50 and 70MHz which will be detailed in a later issue if space permits. It is another example of serious monitoring which merits a fuller presentation.

G3UKV totally disagrees with the comments attributed to G3UGF in the August 4-2-70. He believes propagation on 50 and 70MHz to be very similar, except that F2 is rarely of use to 70MHz operation even in high sunspot years. He goes even further and says that many years of listening on both bands has led to the conclusion that similarities between them are probably greater than between any other two amateur bands. To précis a mass of information from G3UKV, he has found openings on 70MHz to GM very scarce this year so far. EI2CA in UO and EI2CA/P in VO were heard via ms but not worked. He finds the beacon EI4RF very useful, and comments that its beam heading alternates N and SE each half-minute. The IRTS HQ station EI0RTS broadcasts local news at 1130am on Sundays during summer months on 70MHz. For propagation markers, he suggests Gdansk (70-310MHz) and Ceske (Czechoslovakia, 70-07MHz).

Repeater news

Mike Dennison, chairman of the Repeater Management Group, reported that the following repeater proposals were due to go to the licensing authority by the end of August:

VHF: GB3GD R1 (Isle of Man). Information supplied by GD6OXG. The GB3AS group has agreed to move from R1 to R0, and the GB3GD (Leicester Data) group to change call sign to GB3RY to facilitate the licensing of the Isle of Man repeater. Thanks are due to all concerned for this co-operation.

UHF:	GB3AN GB3DC GB3LF GB3LR GB3NW GB3OV	RB4 RB11 RB14 RB11 RB* RB*	Anglesey (GW4KAZ) Sunderland (G6LMR) South Lakeland (G6MGP) Lewes, E Sussex (G4TBM) Hendon, N London (G4GRS) Huntingdon (G4NVS)
-------------	--	---	--

*These channels still under discussion

All these are subject to RSGB and DTI vetting, and uhf channels may be changed if there are objections from the primary users of the band.

Mike also says that the reference in 4-2-70 August to a passive reflector on GB3BI is denied by the group! I saw the information in an article in *Central Scotland and Borders FM News* by Alasdair, GM3AXX, but perhaps I anticipated his future plans—or was he just indulging in a piece of late April foolery?

Hans Field, G4XFD, who is an honorary member of the Schluctern & DRS (W Germany) was asked to find a suitable transmitter/receiver for the society to use as a repeater. With the help of Don Payne, G3NCP, one was located and purchased last Easter. Members of the Mid-Cheshire ARS (G8XMZ, G6EPV, G6HZJ and G3DSA) assisted Hans in shipping the equipment to Germany last autumn, and a licence for operation of the repeater was granted around Christmas. The repeater signs DB0NQ on 432MHz, channel not stated. It comprises a Pye base station with logic designed and built by DG8FAC. The antenna is a 5λ/8 groundplane at 15m agl, fed by gas-filled coaxial cable. The location is at the clubhouse at the Hotel Acisbrunnen, which is owned by DF8ZS. Access is by 1,750Hz tone, time-out is 10min, the squelch of which can be opened by a further 2,300Hz tone. Plans are afoot to put the repeater into beacon mode during unused periods, and also to send propagation information data when called via a 2,800Hz tone—the logic is already built into the machine to facilitate this. Visitors to the site will be welcome, and overnight accommodation can be arranged. The Mid-Cheshire ARS will be visiting later this year for "another weekend of beer and radio"—they obviously have their priorities sorted out!

In the Aylesbury Vale Repeater Group newsletter, sent by Mike Marsden, G8BQH, a possible "first" is reported, namely that GB3VA has changed its locator in the message format from ZL15j to IO91LT, the "Maidenhead" version. Between 9 April and 5 May maintenance was required on GB3VA which involved some down-time. The GB3AV machine still functions well using the old equipment, but GB3AV Mk3 is due to be operational soon.

Further to the north, Robin Waitt, GM6LJE, writes from the Anglo-Scottish Repeater Group to say that further work has been carried out on GB3EV (by G4EXD) so that it is now "in full song". Activity is reported as a little slow, however. Due to uncertainties in the electricity supply to the site, a large 12V battery is to be installed with float-charging facilities, so

winter power cuts should not affect the repeater. Robin also says that a rebuild is in hand for GB3AS incorporating a tone-plus-audio access to minimize spurious keying. GM6LJE, QTHR, is secretary of the group and would welcome enquiries from potential members.

GB3BB (near Brecon) is probably the only repeater ever to have been inaugurated by a radio society president, having been switched on by Bob Barrett, GW8HEZ, RSGB President. It is located in a permanent building, erected for the purpose, with a 40ft tower for the antenna system. Operation is on channel R4 with 25W erp from a Jaybeam 3dB gain colinear fed by Andrews LDF4-50 feeder via a six-section cavity filter (three receive, three transmit). Access is by standard 1,750Hz toneburst initially, or by carrier only between first and second "pips". It will not operate for tone deviations less than ± 0.6kHz. Time-out is set at 1.5min, and in beacon mode (when not carrying traffic) it sends GB3BB every 5min. The group secretary is Ken Mottley, GW6SML.

George Smith, G8AOJ, who is technical manager of the Stockland Hill Repeater Group (Devon), has sent information on their repeater GB3SH (RB11). Fine summer weather permitted improvements to be made to the uhf repeater, with two new Jaybeam four-stack dipole arrays installed and the effective height of both transmit and receive antennas doubled. A Wood & Douglas GaAsfet preamplifier is at the masthead for receive, and coverage has improved considerably, especially in the deep valleys close to the site. The loan of a power amplifier has meant that the full 25W erp has been radiated. Coverage maps are in course of preparation, and the repeater fully complements the other three repeaters in the area, namely GB3EX, SD and VS, though unfortunately some deep valleys will remain unserved. Logic remains the same; a double pip plus a 4min time-out to prevent latch-up from users of GB3NF (Southampton). George recommends switching off auto toneburst during lift conditions as this might otherwise cause a nuisance by tripping other repeaters. A 5min Identifier ensures that visitors to the area are alerted to the presence of GB3SH. Contributions to finance further improvements would be welcomed by G4DOQ, G6WZA and G8AOJ, all QTHR.

Some repeater call sign changes recently authorized are GB3WS (previous call sign GB3BP, North Sussex) and GB3WK (previously GB3YJ, Leamington Spa). Site changes for GB3PY into the city of Cambridge, and GB3SK moving from Folkestone to Canterbury, were also approved. Both are uhf repeaters.

RTTY award

After five years of endeavour, Phil Hodson, G8RBY (Leics), has received the first-ever 10-plus-40 award for 144MHz rtty operation. To achieve this he has "missed an awful lot of dx calling 'CQ' for half an hour at a time on rtty during fantastic Es openings". He says that unfortunately no-one appears to use rtty during Es events! Phil was greatly helped by Ray, G4NJW, and Kevin, G6SSX, who for the past three years combined holidays with rtty operation from squares not worked by G8RBY; in May they put XJ on the map for what is believed to have been the first-ever rtty operation from that square. In July they went to Buckie (ZR) to give Phil his 40th square, and under flat conditions they completed a contact in 41min. Ray used 65W into 14 elements and Phil only 32W into two 16-element Tonnas. The ZR round-trip was 1,060 miles! Other rare squares included in Phil's award were CS, HP, FM, XM, XN and XJ.

Aurora

Despite lower auroral activity, it is well to do everything possible to keep in touch with such events, however weak or rare, so that a general picture can be built up to aid forecasting. Andy Steven, GM4IPK, is a seagoing radio and electronics officer who follows long periods at sea with relatively long leave-time at home which he devotes almost entirely to vhf activities using four 16-element Tonnas on 144MHz. In a very detailed report covering 20 May to 20 August, he outlined his tropo, aurora, Es, ms and eme work which netted him an amazing number of rare squares and countries and provided a wealth of information for the propagation student. From his location in Edinburgh he is well placed to observe auroral activity since he has an almost all-sea path to typical auroral zones. He also finds that he can detect auroras with his large antenna system which are inaudible to single-Yagi stations, not altogether an advantage since this sometimes means that there is no-one at the other end to be worked!

Andy listens continuously for beacon GB3LER when in his shack, especially during the afternoon and early evening, and has been surprised how often the beacon will go auroral at his "comparatively southern-GM QTH". He says the effect may last only for minutes, but if one is quick enough and anyone is QRV, contacts can be made. Because of his big antenna system, Andy only alerts others in his warning net if GB3LER reaches strength S2A at his location, though he often hears it less strongly. There are also occasions when GB3LER is not detectable, yet OY9JD can

be heard calling CQA at 59A on 144-300MHz with little distortion and "very nearly a hint of direct-path signals". Andy says that the "tropo effect" of auroral signals is very interesting, as are auroral-tone ms reflections from GB3LER, usually after auroral openings when to all intents and purposes the event has faded out. Since Andy cannot receive GB3LER at all via tropo, it is an excellent signal for him to monitor, though he suggests that a beacon dedicated for auroral detection would, if located in OY, be invaluable for GM stations (as an aside, G8VR favours a 50MHz beacon for auroral detection located in a northern part of GM or GI, since for the weaker auroras 50MHz would be expected to be stronger and go auroral earlier than 144MHz, generally speaking). Andy's comments provide much food for thought, especially the reports of OY stations being heard, indicating that the action is north of them. We have previously commented on the fact that many auroras occur too far south for the more northern OY, TF, LA, SM stations to access them. Knowledge of the beam headings of OY9JD when he is being heard aurorally by southerly stations is valuable in locating the position of the active patch. Andy caught auroras on 2318-0100gmt 20/21 May when LA9BM and OY9JD were worked, the latter beaming 045°, Andy looking due north. Also between 1615 and 1758gmt on 22 May, some GMs were worked, plus G4KUX in ZO square. Between 1503 and 1528 on 23 May Au was present at GM4IPK while tropo was good to LA at the same time.

From John Dunlop, GM6LNM, come reports of auroras, mostly very weak and confined to hearing beacons with Au tone, on 3 June (1800gmt), 18 June (1525-1755gmt) and 1 July (2200gmt, GM3DOD copying Au on 50MHz).

For the record, Scottish stations report further auroral activity on 16 and 29 July, 1, 14 and 19 August, some of them big ones.

Dave, G4DHF, caught some of the auroras while on expedition to XS square operating as GM4DHF/P. Between 1730 and 1840gmt 29 July, OZ, LA, SM6, GM and EI6ASE were worked in a weak event. At 0243gmt 1 August, OY9JD was heard calling the expedition, off the back of its beams. Some time was spent listening to Swedish beacons via Au, and then Europe seemed to wake up at 0350gmt and many contacts were made with UR2, OH, LA, DF, ON and SM1, 3, 4, 5, 6 and 7. This event faded at 0616gmt, but a second, more intense phase occurred between 1442 and 1825gmt. Over 100 stations were worked through "incredible" QRM, and at the same time the expedition's 432MHz station GM4SIV/P worked, via Au, G3LTF, G3LQR, PAORDY, PA0FRE and PA0WWM, the best dx being 931km. Auroral contacts on 432MHz are not exactly commonplace, so this was a great achievement. GM4SIV/P used 400W to four 21-element Yagis. On 144MHz, GM4DHF/P used the same power into four nine-element Tonnas.

Expeditions

Chris, G4KDX, will be operating from near Truro in Cornwall until 12 October on the 144MHz band. He intends to go into the rare XJ square (The Lizard) from time to time. Unfortunately this news came too late for the September issue, but he should already be QRV from the location when this appears in print.

Mike Dixon, G3PFR, the *Microwaves* contributor, was dismayed when he went to the well-known Merryton Low contest site to find it cluttered by debris, presumably from VHF NFD. Two lengths of scaffolding hammered into the ground, a pile of broken glass and bottle tops, squashed beer cans, a broken QQVO6-40 were typical items of rubbish left by the previous occupants. Mike says that in his view the two prime requisites of a good contest station are a clean site and a clean signal. Seems a fair comment!

Richard, GD3YEO, has compiled a most interesting report on the IoM club expedition to Calf of Man (XO76c) between 15 and 17 June 1984. Using the call GD4IOM simultaneously on hf and vhf (144MHz), some 29.5 pages of the log were filled with vhf contacts, representing 700-plus stations worked. All will be confirmed using a special card sent via the bureau; direct cards should go to the QSL manager for the expedition, GD3AHV, QTHR. On vhf 400W to a 17-element Yagi at 200ft asl was used by the team. The party included GD4RAG and his wife (chief cook!). GD6OXG, GD6NDE, GD4GNH, GD3LSF, GD5UG, GD4PTV, GD4BGK, GD3YEO and swl Hadyn. Some video recordings were made which may subsequently be available to clubs. The pile-up on vhf was persistent, with six to eight calls sometimes arising from a single QRZ. The weather was very good, which was lucky since it would not have been possible to land the equipment on the small jetty had sea conditions been rough. They commend the operating techniques of most stations calling them, but for the future suggest that if each station gives his call a couple of times, then the expedition operators can compile a list which can be read off quickly giving the maximum number a chance of a complete contact. This system is much used by hf band expeditions of course. Other vhf expeditions please note.

Meteor scatter

August was the month of the Perseids shower, which is generally expected to peak around 12 August. However, since August is a popular month for holidays there are typically many expedition stations active between the first weekend in August until after the shower, and this creates extra ms activity so one is never sure whether contacts are due to sporadic meteors or to the Perseids. This year was no exception, and some choice QTH locators were activated for those fortunate enough to have skeds or to make contacts on the random-calling channel.

Listening over a period between 4 and 13 August, it was not very obvious at this location when the peak occurred, but reports received suggest that it was in the early hours of 12 August that things became really good for long and strong reflections.

John, G4NQC (London), started his activities on 4 August and carried on until 14 August. He worked, in this full period, HG4XT (JH), I3LGP (GF), SM3COL (IW), SP6FUN (IL), Y41YL (HO), SP9EWU (JK), I1KTC (EF), YU3FM (HG) (this with a burst of 1min 48s on ssb), YU7AR, YU6BLM/6 (JB), LA8OW (DU), LA1K (EY), HG1W/0 (LH) and OE8FNK/8 (GG). He also had six incomplete contacts on random ssb when the distant station in every case did not give his full callsign.

Ian, G4YUZ (Herts), who was previously G6DFT, had a total of 23 skeds, 17 on cw in the period 4 to 12 August, but only eight were completed with nothing heard at all from seven. His best was SM4IVE (HT) from whom a burst of 40s at 20dB over 9 was received. Others worked were YU3ES (GF), DL3MBG (GI), I3LGP (GF), SM5MIX (HS), OK1OA (HK), Y41YL (HO) and I4VOS (FE). Ian's linear became unserviceable during this period, and he had to revert to a 80-90W amplifier loaned by G4IJE.

Here at G8VR, three contacts brought as many new squares and one new country in contacts with DL8NBN/TK (ED-Corsica), LA1K (EY) and LA1TV (ET). The Corsica expedition had the disadvantage of a very long callsign but overcame this in my QSO by using missing information procedure which enabled the QSO to be completed in under the hour.

Terry, G4MUT, who has just got going on ms, had three skeds: the first with HG4KTB from whom nothing was heard; the next with EA3IH (BB) which was completed in 1h thanks to a 30s burst; while the last was with YU2JL (IC), a 1h sked which was incomplete due to lack of time, since things were going well at the end of the hour.

All the above were on 144MHz of course, but Malcolm, G4MKF (Newbury), arranged two skeds on 70MHz, one with Laurence, GM4DMA, and the other with Chris, GM3WOJ. The first, with GM4DMA, was on 1 August, but it coincided with an aurora during which they chatted for 20min on ssb. Another sked was arranged for 2 August at 1900gmt, which was completed on ssb in about 1.5h. The sked with GM3WOJ was at "peak" time of 1115gmt on 10 August. They completed in 15min including an exchange of 73s. Malcolm also says that Paul, EI2CA, gave rise to much ms activity in his expeditions to UO and VO squares on 11 and 12 August, operating on 70MHz. There were several bursts up to 20s with many stations, including G4MKF, completing in a single burst by the use of "break" procedure. Malcolm wishes to thank Paul for giving so much fun to so many 70MHz operators (and some rare squares too!).

The most remarkable report of Perseids operation came from Geoff, GJ4ICD, who said that he started his ms operation on 11 August and through skeds made many contacts with YU, I, DL, HG, IT9, EA etc, but "things went mad" in the early hours of 12 August and 72 contacts were made on random ssb. He said I4VOS was putting in 2min bursts at one time. Geoff felt that it was the best Perseids shower for some time. Some more ms information next month if space permits.

From here and there

Reg, GW8VHI, suggests Oscar 10 as the alternative vhf net (145-945MHz). He says the eme operators use it, and he has fixed up ms skeds through it, so why cannot the vhf fraternity?

Ian Keyser, G3ROO, who is the ssb manager of the G-QRP Club, draws attention to the fact that 28,885kHz has for years been the international QRP calling frequency, and with low power accurate netting is important. This frequency is also the one used for crossband working, particularly by operators with 50MHz permits, and considerable QRM has been experienced from high-power stations making long CQ calls on the channel. Since many of the QRP stations are crystal controlled on 28,885kHz, Ian says that while no claim is made to the channel, could not the crossband operators move 10kHz or so, especially as the calling channel has been used by QRP men all over the world for more than 10 years?

If you work G4XEK (Staffs) don't assume that he is a relative newcomer to amateur radio. Bob's previous calls include W5MJQ, G5CIQ, G5BEX, VE7ACN, DL4OZ, F0BLB and K2GMO. He also remembers G8VB and the "Night Owl net" in the 'forties having been on the air for nearly 40 years! He is thinking of trying ms with his four 14-element Parabees. □

QRP

by Rev George Dobbs, G3RJV*

Yeovil QRP Convention

The Yeovil Amateur Radio Club is holding a QRP Convention at Preston School, Monks Dale, Yeovil on Sunday 14 October. The convention opens at 0930, with talk-in on S22 by G8YEO/A from 0900. The entrance fee is 50p including a prize draw. Full details were given in last month's *Radio Communication*, p 743.

This is the first time, as far as I can recall, that a local club has mounted a specialist convention on low power operation, and the event deserves a lot of support.

A new transceiver with QRP capabilities

Some readers may recall the Ten-Tec Century 21, a reasonably priced cw-only transceiver sold by the Ten-Tec Corporation from 1977 to 1981. This transceiver was a good, no frills, hf transceiver, which sold 7,000 of the analogue version and 500 of the digital version during its production life. Production ceased in 1981, and Ten-Tec have now replaced this model with the new Ten-Tec Century 22. This is a direct-conversion cw transceiver covering the 3.5, 7, 10, 14, 21 and 28MHz bands. The transceiver has a six-pole active filter with tunable notch, a rit control, rf as well as af gain controls, and a front-panel drive control which allows powers of 2 to 60W to be directly read on the swr/power meter. It uses the usual Ten-Tec full break-in, is housed in the same size of case as the popular Ten-Tec Argosy transceiver, and weighs 6lb. The USA price for the transceiver is \$390, which will make it a direct competitor to the new Heath HW9 transceiver.

Contests

VK Versus the Rest of the World Contest, 1984

0000 17 November to 2400 18 November

Sponsored by the CW Operators QRP Club, this contest is directed to all cw enthusiasts world-wide. Contestants may work dx or own country for scoring. QRO stations are invited to participate, but must submit contest logs with QRP stations only to qualify for the QRO section of the contest. QRP stations must add "QRP" for identification. CW only. Contest call "CQ QRP". Bands 1.8-28MHz (not WARC). Station categories: QRP single-operator, multi-band or single band; QRP multi-operator, multi-band or single band; QRO single-operator, multi-band or single band. Period categories: full period, 48h; half period, any 24 consecutive hours, within the contest period. Exchange: all stations six digits comprising RST followed by serial number, commencing with 001 up to 999, then commencing again. Scoring: QRP station (ie indicated output power into antenna not exceeding 5W), each contact shall score points as follows—up to 1W, six; 1-2W five; 2-3W four; 3-4W three; 4-5W two. QRO stations, using more than 5W output to antenna, one point per contact (QRO/QRP only allowed). Every contact in a different IARU zone counts as a multiplier on each band. Field stations using battery/solar/wind/hand-generated power (motor generators excluded) multiply the grand total score by 1.5. Station to be erected not before the day prior to contest date. Stations may be contacted once only on each band, in each 24h period. Separate log sheets required for each band. Each logged QSO to show: date, time (gmt); station worked, exchange, sent/received; multiplier; power output; and points claimed. Grand total score = total points from all bands \times total multipliers from all bands (\times bonus score). All entries must have a front summary sheet showing: calculation of grand total score; name and address; callsign; signature; and declaration "I certify that all entries in my contest log sheets are true and honest". Entrants are requested to include a brief description of station equipment, and any comments/suggestions. Field stations are requested to include a brief description of operation/location/conditions etc. Certificates will go to the QRP single-operator and multi-operator in each country with the highest grand total score in each section, to the QRO operator in each country with the highest grand total score in each section, and to the highest scoring CW Operators QRP Club member in each section. Entries to be sent to: Contest Manager, PO Box 109, Mt Druitt, NSW 2770, Australia, to arrive by 26 February 1985.

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

The HA-QRP Contest 1984

0000 1 November to 2400 7 November 1984

3.5 to 3.6MHz, cw only. Call "CQ Test QRP". Exchange consists of callsigns, RST, QTH and name. The time difference indicated in participants' logs must not exceed 3min. Every complete QSO with own country counts one point, and with other countries two points. A station may only be worked once during the contest. There are single- and multi-operator categories. Final score is QSO points multiplied by the number of different DXCC countries worked. The power amplifier of the transmitter used must have less than 5W input power. Logs should show date, time, callsign, signal reports, QTH, name of operator, and also include details of the power amplifier. They should be posted before 21 November to: Radiotechnika szerkesztosege, Budapest Pf 603, H-1374, Hungary. All participants will receive a Memorial Leaf, and outstanding scorers will receive the magazine *Radiotechnika* free for one year.

New address

Please note my new address given at the foot of the preceding column. ☐

MICROWAVES

(Continued from p869)

rf output) in order to obtain correct modulation characteristics. This is best set up by using a second receiver to listen to the audio quality transmitted; for the setting of the deviation controls (mic gain and tone level) interact with the Gunn voltage setting, ie the modulation sensitivity and linearity varies with the Gunn voltage and at some settings no modulation at all may be possible! Alternatively, reception of an unmodulated carrier will produce audio output when the receiver local oscillator (also the transmit oscillator in the in-line mixer) is modulated. Usually about 100mV of audio is needed for satisfactory modulation. Again these features are taken into account in the "universal" board.

If it is later planned to run separate transmit and receive oscillators, then the constructor would be well advised to build two independent regulator/modulator circuits into the equipment at this stage with arrangements to switch off the transmit Gunn during reception, but leaving the receive Gunn running continuously in the interests of stability. Plan ahead!

Operating news

Indicative of the increasing interest in, and occupancy of, the microwave spectrum, Jack Hum, G5UM (microwave awards manager) has sent details of yet more awards on 1.3GHz. Arthur Williams, GW8FKB (XN square), receives the Five Squares Award for operation from Anglesey using a home-built transverter and 2C39 power amplifier delivering 8W to a 35-element quad loop. He says he will be "chasing the Supreme before long", and has already been sent the claim forms. G6CSY and G4TAW (both of Orpington, Kent) receive 1.3GHz Distance Awards (Nos 77 and 78 respectively) and 10 Square stickers Nos 33 and 34. G4PRJ/P, operating from Beachy Head, receives No 35. Claim forms for all these awards are available from Jack on receipt of an sae.

Microwave lectures and measurements

A number of members of the RSGB Microwave Committee have expressed their willingness to give lectures on microwave topics to affiliated societies, the only proviso being that travel is restricted to a sensible distance. I can cover the nearer parts of Lancashire, Cheshire, Greater Manchester, Merseyside and adjacent areas from my QTH in mid-Cheshire. Barry, G8AGN, based in Sheffield; Mike, G3JVL, in Hampshire, and Julian, G3YGF, in Wiltshire, have all indicated their availability, while Chris, G8CIU, in Kent, has indicated that he can cover S London—all are QTHR. Other requests will be considered "on merit". It would be helpful if club secretaries planning a programme could address their formal requests to their nearest committee member—with plenty of warning and alternative dates, please!

Microwave workshop at Sheffield

Barry, G8AGN, has arranged a microwave workshop at the Dept of Electrical Engineering, Mappin Street, Sheffield, commencing about 1030am on 17 November. The objective is particularly to offer excellent facilities for alignment, realignment and checking of 10GHz equipment in preparation for the move in operating frequencies. Further details from G8AGN, QTHR. ☐

Computing

by John Morris, GM4ANB*

WELCOME TO THE FIRST *RADIO COMMUNICATION* "COMPUTING" FEATURE. Computers are playing an ever-increasing part in many amateurs' shacks. Their uses include scoring contests, rtty terminals, cw sending and receiving, propagation prediction, calculating distances and bearings, helping in circuit design, and many, many more.

For me the greatest fun of computers in the shack is experimenting with computer programs, or software. Writing and then using a good computer program gives as much satisfaction as a solid bit of home-construction. The advantage of writing software is that there are no component costs, and you can experiment to your heart's desire.

The emphasis in this new feature will be on software, but the hardware side will not be completely neglected. If you have any ideas or comments, or requests for subjects you would like to see covered, then drop me a line.

Calculating distances

In 4-2-70 recently (*Rad Com May, August*) there has been some discussion about discrepancies between the calculations by different computer programs of the distance between two locator squares. The example quoted was from ZK02a to YT75j, and the results obtained ranged from 896 to 906km.

The first thing to note about any calculation using locators is that it is impossible to get an accuracy of better than a few kilometres, simply because a locator does not give the exact position of a station.

centre of the earth to the equator is about 6,378.14km, but to the Poles it is rather smaller, about 6,356.76km. If we take the average of these, 6,367.45km, we get a great circle distance of 902.7km.

A third source of error is the simple formula used to calculate the great circle angle. As the earth is not exactly a sphere its actual shape should be taken into account. The full calculation is rather tortuous, but gives a result of 904.2km.

How important are these sources of error? I tried the experiment of putting stations in the four corners of the two locator squares and calculating the distances, using the simple spherical formula, between all possible pairs. The results came out to anything between 879.6 and 907.7km, up to 5km different to the calculation based on square centres. This possible error cannot be removed without better knowledge of the station positions.

By comparison, an analysis of the possible error from assuming that the earth is spherical shows that in the worst possible case it is about 0.5 per cent. Within Europe, and using 6367km for the earth's radius, it is rather smaller, about 0.2 per cent, or about 2km over the distance being considered.

The moral of all this is that for most locator to distance calculations the spherical earth approximation between square centres, using an earth radius of 6,367km, is quite adequate, but the result can be anything up to 5km out because of the lack of precision of the locator. If one station's position is known accurately then the possible error reduces to 2.5km, or 0.2 per cent or so of the distance, whichever is worse.

```
10 PI=3.14159265: F=PI/10800: MN=1E10: MX=0
20 INPUT "LOCATOR 1":Q$: GOSUB 200: E1=E: N1=N
30 INPUT "LOCATOR 2":Q$: GOSUB 200: E2=E: N2=N
40 FOR I1=0 TO 1: E=F*(E1-2+4*I1)
50 FOR I2=0 TO 1: N=F*(N1-1.25+2.5*I2)
60 FOR I3=0 TO 1: EP=F*(E2-2+4*I3)
70 FOR I4=0 TO 1: NP=F*(N2-1.25+2.5*I4)
80 DX=COS(N)*COS(NP)*COS(E-EP)+SIN(N)*SIN(NP)
90 DX=6367*ATN(SQR(1-DX*DX)/DX)
100 IF DX<MX THEN MX=DX
110 IF DX<MN THEN MN=DX
120 NEXT I4, I3, I2, I1
130 PRINT "MAX=";MX,"MIN=";MN,"MEAN=";(MX+MN)/2: GOTO 10
200 E=60*(ASC(MID$(Q$,1,1))-ASC("A")): IF E/1200 THEN E=E-1560
210 N=48*(40+ASC(MID$(Q$,2,1))-ASC("A"))
220 T=VAL(MID$(Q$,3,2))-1: T$=MID$(Q$,5,1)
230 N=N+E*(7-INT(T/10)): E=E+60*(T/10-INT(T/10))
250 IF T$="A" OR T$="B" OR T$="H" THEN N=N+4
270 IF T$="G" OR T$="J" OR T$="C" THEN N=N+2
280 IF T$="B" OR T$="C" OR T$="D" THEN E=E+4
290 IF T$="A" OR T$="J" OR T$="E" THEN E=E+2
300 N=1.25*(N+1): E=2*(E+1): RETURN
```

The usual technique is to work from the square centres. For YT75j this is 59° 3.75'N 3° 6'W. The ZK02a square centre is 50° 58.75'N 1° 42'W. To calculate the distance, we first find the great circle angle between the two points. This is the angle between the points measured from the centre of the earth, and is given by the standard formula:

$$\cos G = \sin N \sin N' + \cos N \cos N' \cos (E-E')$$

In this formula N and E are the latitude and longitude of one station, and N' and E' the latitude and longitude of the other. G is the angle we are after. Plugging in the positions above, the great circle angle comes out to about 0.14177 radians. To get the distance, the angle, in radians, must be multiplied by the radius of the earth.

This is where another source of error comes in. The earth is not a perfect sphere, and so there is no single figure for its radius. The distance from the

This month's program can be used to experiment with the effect of locator uncertainty. It calculates the 16 possible distances between stations in the extreme corners of their squares, and finds the maximum and minimum.

The program is in Microsoft Basic. Conversion to other dialects will consist mainly of modifying the string handling in the locator conversion routine (lines 200 to 300), and perhaps omitting the definition of PI in line 10.

Oddbits

After all the well-publicised delays, my Sinclair QL has finally appeared. (No, it hasn't got a bit hanging out of the back.) Initial reactions are: an excellent number-crunching machine (moon location goes very fast), but like so many new computers sadly devoid of simple i/o that can be used for interfacing to other equipment. The Basic is superb, but the keyboard is definitely Sinclair. □

*6A Morlich Grove, Dalgety Bay, Near Dunfermline, Fife KY11 5UX.

EPHEMERIS

Satellite news and views

by R. O. Phillips, G4IQQ*

THERE HAS BEEN a flurry of activity during recent months which I can but attempt to summarize in the following paragraphs. There are at present a total of seven active amateur satellites operating to various and, in some cases, varying degrees of performance. These provide for a wide range of interest both for the transmitting and the receiving operator in the amateur frequencies from hf to microwave. The wide range of proposals for future projects would appear to safeguard the continuing availability of an active space segment for many years to come. There is, however, one disturbing element which may develop into a significant division between those who build and those who use amateur satellites. The spacecraft designers and constructors are obviously looking to try new ideas, and indeed it is their enthusiasm which has led to the variety of transponder configurations available to us over recent years. The user community has, by and large, been able to follow such developments without too many problems, since commonly used frequencies and modulation techniques have been employed. The current trend is towards higher frequencies, perhaps satellites in geostationary orbit, and the greater use of digital communication techniques, all of which offer tremendous challenges. The danger, as I see it, is that the demands on the user will increase so significantly that few will be able to participate. One way to avoid this situation arising would be for much improved communication between the two camps—builders and users. It seems pointless to launch a satellite then sit back and watch the reaction to it, particularly when new operating methods and procedures are required.

It is to be hoped that the numerous construction groups around the world take into account the views of the users of the amateur satellite frequencies when developing their new spacecraft designs. These same users will, of course, need to make their views known in the appropriate quarters.

Oscar 10

After many months of operation on the original schedule, it has been decided that a major revision is required to ensure both the continued high performance of the satellite and an improved service to users. The main driving force behind the changes is the major eclipse season which began in early September. This results in periods of up to more than 1h when the spacecraft falls within the earth's shadow and consequently no power is generated from the solar cells. Closely coupled with this is the additional problem that the prevailing orbital geometry produces a low angle of incidence of sunlight on the solar panels and, again, reduced output. Many commercial spacecraft are able to point their solar arrays independently of the spacecraft antennas, but Oscar 10 does not have such a feature. Consequently, the only method available to increase solar illumination is to alter the direction of the spacecraft axis with respect to the earth. This goes some way to solving one problem, but as a consequence the antennas are no longer providing maximum gain towards the earth, resulting in degraded performance.

Returning to the revised schedule, each orbit of the satellite will now provide time for both Mode B and Mode L operators. The timing for the new schedule, which is related to the time of perigee, ie mean anomaly = 0, is given below:

Mean anomaly	Time (min)	Status
0-90	0-246	Mode B
90-107	246-292	Mode L
107-218*	292-596	Mode B
218-235	596-642	Off
235-256	642-700	Mode B

Note: Satellite apogee occurs at MA = 128, see *Ephemeris* August 1984.

In simple terms, the satellite orbit will now provide two periods of Mode B operation, each of approximately 5h, 46min for Mode L, and a 46min break in operations. The Mode L activity is still quite low and so should result in low power drain, consequently there should be two periods in each orbit during which time the spacecraft batteries can be re-charged.

The schedule is of course subject to change depending on how successful the measures are to maintain an acceptable power budget. A major contributing factor will be the discipline of operators to keep power levels to the minimum.

In addition to the above changes it has been decided that the General beacon on 145.810MHz could be made much more useful and provide users with up-to-date information concerning the satellite. The proposed new format will, as before, be based on a 30min cycle as follows:

Time (min)	Transmission
0-5, 30-35	CW
5-15, 35-45	PSK
15-20, 45-50	RTTY
20-30, 50-60	PSK

The cw message will contain a header with four elements: age level, mean anomaly, message serial number and spacecraft identifier, ie AMSAT Oscar 10. The remainder of the 5min period will be used to provide a text message which, it is said, will be updated every week.

The 400 baud psk format will remain essentially the same as before, but there are moves to make more information, and perhaps hardware details, available to users interested in decoding the data. The major new addition is the rty transmission which will employ the 50 baud, 170Hz shift standard. The 5min message will contain all the information of the cw transmission plus some of the telemetry data previously available only on the 400 baud psk transmission.

International co-ordination

Representatives of a number of satellite construction groups met in the UK during July to review various aspects of the current amateur space programme as well as possibilities for the future. One proposal to arise from the meeting was for the formation of an International Amateur Satellite Service Co-ordination Committee whose mandate would be as follows:

1. Establish technical and operational standards for the amateur satellite service.
2. Plan and co-ordinate the orbital operations of each portion of a system which may be released by the groups which launched the system.
3. Interface with the International Amateur Radio Union to ensure that the best interests of all radio amateurs are given due consideration in this planning process.

Views on the proposal will be sought from all amateur satellite societies throughout the world. This development appears to provide a solution to many of the co-ordination difficulties that exist; however, the difficulty of establishing the roles and responsibilities of the various interested parties should not be underestimated. One particularly sensitive area might be the question of interfacing with the IARU, especially in the area of resolving possible conflicts between terrestrial and satellite operators.

Satellite proposals

Several positive actions have taken place relating to the Phase 3C satellite. AMSAT-DL has received details from the European Space Agency of the cost for carrying the satellite on the development flight of the Ariane 4 launcher. It is expected that a decision to go ahead will be taken, always assuming that the costs associated with the launch (mainly integration and testing) which amount to 290,000 European Accounting Units—approximately £200,000—can be met. The Phase 3C satellite will be similar to the existing Oscar 10 with the following exceptions: modified kick motor using plasma propulsion technology; improved Mode L transponder; S-band beacon; packet radio and beacon unit.

The Swedish Amateur Satellite Group, AMSAT-SM, has circulated for comment a wide-ranging proposal for a Swedish amateur radio satellite—SWASAT. The proposal is very much at the conceptual stage rather than specific hardware configurations. AMSAT-SM is adopting an all-digital approach which would support simple station equipment and mailbox facilities. Particular emphasis is placed on the educational aspects of the projects, with wide participation of schools and universities anticipated. No details are available concerning frequency bands or launch dates, but these will be reported when available.

Finally on the satellite proposal scene, another idea emerging from the meeting of the group of satellite constructors was for a Phase 4 geosynchronous satellite system. The idea would be for the simultaneous launch of three satellites to be equally spaced around the geostationary satellite orbit serving the USA, Europe and Asia. The current proposal is for at least one Mode L transponder on each satellite. Such a venture would require considerable effort, and a joint venture between perhaps the USA, Federal Republic of Germany and the UK is foreseen. Again comments are being invited. □

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

THE NEW SCHEDULE

Background

Many members will no doubt remember the confusion which arose in February 1982 concerning the schedule to the amateur licence. The Home Office, as it then was, produced a new schedule to the amateur licence without any consultation with the RSGB: they considered that the changes which had been made were of a minor nature and were required following the decisions made at the 1979 World Administrative Radio Conference. The new schedule contained a number of errors and ambiguities, of which probably the most notable was the omission of any distinction between the privileges accorded to Class A and Class B licences in the version of the schedule published in the *London Gazette* on 12 February!

With the benefit of hindsight, the episode was a useful one since it brought some relatively new members of the Home Office staff into immediate contact with the Society, and a sound working relationship was formed as a result. The RSGB's relationship with the Home Office and, later, with the Department of Trade & Industry which took over its radio regulatory functions is now considered to be closer and more productive.

Action to correct the position was swift. Following an emergency meeting with the Home Office, a further notice was published in the *London Gazette* which corrected the position with regard to Class B licensees. Further meetings then took place and a great deal of work was carried out by the Society's volunteers and staff in order to assist in devising a new "temporary" schedule which was at least workable.

However, the key word is "temporary". The original intention of the abortive new schedule had been to incorporate changes and amendments which had become desirable following the 1979 World Administrative Radio Conference. Some other minor changes were introduced at the behest of the engineering arm of the Home Office, the Directorate of Radio Technology, notably the method of specifying the permitted power which could be used by radio amateurs. A new unit, the "dBW", was standardized for this purpose, and reference to the power permitted to be supplied to the antenna was introduced for the first time. After the misunderstanding created by the "new" February 1982 schedule, the most important priority was to devise a schedule which incorporated some of the alterations necessary after WARC 1979. The most important change was the method of describing classes of emission, which had been completely revised at WARC 1979 and which the UK licensing authority, the Home Office, felt was desirable to introduce into the schedule to the amateur licence. The schedule which resulted was the "temporary", though workable, one published on 16 April 1982 and which remained in force until 10 September 1984.

The long-term requirement was for a schedule which accurately reflected the outcome of WARC 1979 in that it would contain the new and considerably more complex designations for classes of emission, as well as other minor changes. It was also felt that since a complete revision of the schedule was inevitable, the opportunity should be taken to simplify it wherever possible and remove sundry anomalies which had accrued over the years. With this in mind, a joint Radio Regulatory Division/RSGB Working Group was set up, with a brief to carry out the very detailed and intricate work involved in producing a completely new schedule to the amateur licence. In the course of the period between the publication of the "temporary" schedule of 16 April 1982 and the present day, several hundred man-hours have been spent on the production of a new one: the culmination of the group's efforts is the new schedule which was published on 10 September 1984 and which was described in the supplementary *RSGB News Bulletin* enclosed with the September 1984 issue of *Radio Communication*.

The new schedule

It should perhaps be said straight away that, from the Society's point of view at least, the new schedule (ie the one which came into effect on 10 September this year) is not perfect. It resolves many of the anomalies and infelicities which were left over from the earlier one, and for the first time presents the radio amateur with a clear picture of what may or may not be done in the various amateur bands. However, as with everything else in human affairs, the new

schedule does not represent the acme of perfection, and one or two minor improvements remain to be made. The chief difficulty in this respect is that some of the terms and conditions of the amateur licence itself (as opposed to the schedule, which is essentially a technical supplement to the licence and which lists such things as the power and the types of transmission which can be made in the various bands) are less relevant to present-day technology and operating practice than perhaps they might be. This means that before the schedule itself can be made as near perfect as possible, the body of the licence requires some attention.

Rather than delay publication of the new schedule, the DTI decided to make it effective from 10 September 1984; however, its publication would be concurrent with the formation of another DTI/RSGB Working Group whose task would be the examination and revision of the amateur radio licence as a whole. In the course of the next 12 months or so, the new working group will examine the amateur licence in detail, with a view to revising, updating and simplifying it wherever possible. When this work has been completed, further amendments to the schedule will become possible.

The Society has been instrumental in the production of the new schedule, and it is heavily involved in assisting the DTI on the revision of the licence as a whole. Members will recall from earlier issues of *Radio Communication* that input to the working group on aspects of licensing is very welcome, and the Society intends to do its best to ensure that the licensing conditions under which UK radio amateurs operate are as favourable and liberal as possible. In general terms the Society takes the view that it wishes to see as much deregulation as possible in order to give full rein to the experimental and creative nature of the amateur and amateur satellite services.

Looking at the new schedule—an analysis

The new schedule and its associated footnotes were reproduced in their entirety in the supplementary *RSGB News Bulletin* referred to above, and for the purpose of the present analysis the schedule is repeated here without its footnotes. The first thing which will be noted is that the new schedule is much easier to use: operators may refer instantly to the status of a particular amateur band allocation in the UK, and the maximum power which may be used and the types of transmission which are permitted are shown in plain English. The definitions of the types and classes of emission given in the right-hand column of the schedule are set out in section B of the footnotes, and Section I relates these to the new designations of emission which were defined at WARC 1979 and set out in Article 8 of the 1982 edition of the ITU Radio Regulations. This is a much better arrangement than in the old schedule, where only the designations of emissions were given and there was sometimes difficulty in deciding whether or not a particular type of transmission fell into a permitted category.

It is worth noting at this point that the status of the amateur service and the amateur satellite service in particular bands are listed in separate columns in the new schedule for greater clarity; it is easy to see at a glance whether a particular frequency band is allocated to the latter as well as the former. The amateur satellite service does not simply refer to satellites in the sense of the Oscar or the RS series: allocations to that service cover any signal sent to or from space. For example, future space shuttle missions carrying amateur radio could only legally be worked from the UK in bands allocated to the amateur satellite service. Note also that two allocations to the amateur satellite service cover earth-to-space operation only, and one, in the 5-8GHz band, permits only space-to-earth transmissions.

Another feature of the new schedule is that it is common to Class A and Class B licences and its format is identical. However, this does not mean that Class B licensees may use all the frequency bands mentioned in the schedule! Footnote A sets out the difference between the two licence classes, which is that "... holders of the Amateur Radio Licence (B) are not permitted to use frequencies below 144MHz, nor may they use the type of transmission known as morse (whether sent manually or automatically)".

THE NEW SCHEDULE

Frequency bands in MHz	Status of allocations in the UK to: The Amateur Service	The Amateur Satellite Service	Maximum power Carrier PEP	Permitted types of transmission			
1.810-1.890	Available to amateurs on a basis of non interference to other services.	No allocation.	9dBW 15dBW	Morse Telephony RTTY Data Facsimile SSTV			
1.850-2.000				Morse Telephony Data Facsimile SSTV			
3.500-3.800	Primary. Shared with other Primary services.	No allocation.	20dBW 26dBW	Morse Telephony RTTY Data Facsimile SSTV			
7.000-7.100	Primary.	Primary.					
10.100-10.150	Secondary.	No allocation.					
14.000-14.250	Primary.	Primary.					
14.250-14.350		No allocation.					
18.068-18.168	Available to amateurs on a basis of non interference to other services. Antennas limited to horizontal polarisation, maximum gain 0dB with respect to a half-wave dipole.	No allocation.	10dBW —	Morse, A1A only			
21.000-21.450	Primary.	Primary.	20dBW 26dBW	Morse Telephony RTTY Data Facsimile SSTV			
24.890-24.990	Available to amateurs on a basis of non interference to other services. Antennas limited to horizontal polarisation, maximum gain 0dB with respect to a half-wave dipole...	No allocation.	10dBW —	Morse, A1A only			
28.000-29.700	Primary.	Primary.	20dBW 26dBW	Morse Telephony RTTY Data Facsimile SSTV			
70.025-70.500	Secondary basis until further notice. Subject to not causing interference to other services. Use of any frequency shall cease immediately on demand of a government official.	No allocation.	16dBW 22dBW				
144.0-146.0 *	Primary.	Primary.	20dBW 26dBW				
430.0-431.0	Secondary. This band is not available for use within the area bounded by: 53°N 02°E, 55°N 02°E, 53°N 03°W, and 55°N 03°W.	No allocation.	10dBW c.r.p. 16dBW c.r.p.	Morse Telephony RTTY Data Facsimile SSTV Television			
431.0-432.0	Secondary. This band is not available for use: a) Within the area bounded by: 53°N 02°E, 55°N 02°E, 53°N 03°W, and 55°N 03°W. b) Within a 100km radius of Charing Cross, 51°30'30"N 00°07'24"W.						
432.0-435.0	Secondary.	No allocation.	20dBW 26dBW				
435.0-438.0		Secondary.					
438.0-440.0		No allocation.					
1240-1260	Secondary.	No allocation.					
1260-1270		Secondary. Earth to Space only.					
1270-1325		No allocation.					
2310-2400							
2400-2450	Secondary. Users must accept interference from the ISM allocations in this band.	Secondary. Users must accept interference from the ISM allocations in this band.					

The new schedule also takes formal account of the post-WARC allocations at 10, 18 and 24MHz. None of these bands need have been released to UK amateurs before 1989; however, the licensing authority was prepared to allow amateurs in Great Britain access to them after representations from the RSGB.

In the 10MHz band the amateur service is a secondary user, and the schedule states that the six standard types of transmission (morse, telephony, rtty, data, facsimile and sstv) are permitted. However, it has been agreed in IARU Region 1 (which includes the UK) that the 10MHz band should only be used for morse and other

narrow-bandwidth transmission modes such as rtty. Given that the band is only 50kHz wide, and the desire that no interference should be caused to the primary user—which is the fixed service—IARU Region 1 feels that the present restrictions to narrowband modes only are in the best long-term interests of the amateur service.

At the present time the amateur service in the UK does not have formal status as far as the 18 and 24MHz allocations are concerned—in other words, the status of "primary" or "secondary" user is not yet applicable to the radio amateur, and access to these bands is given on a basis of non-interference to other services. The

THE NEW SCHEDULE

Frequency bands in MHz	Status of allocations in the UK to: The Amateur Service	The Amateur Satellite Service	Maximum power Carrier PEP	Permitted types of transmission
3400-3475	Secondary.	No allocation.	20dBW 26dBW	Morse Telephony RTTY Data Facsimile SSTV Television
5650-5670		Secondary. Earth to Space only.		
5670-5680		No allocation.		
5755-5765				
5820-5830				
5830-5850	Secondary. Users must accept interference from the ISM allocations in this band.	Secondary. Users must accept interference from the ISM allocations in this band. Space to Earth only.		
10000-10450	Secondary.	No allocation.		
10450-10500		Secondary.		
24000-24050	Primary. Users must accept interference from the ISM allocations in this band.	Primary. Users must accept interference from the ISM allocations in this band.		
24050-24250	Secondary. This band may only be used with the written consent of the Secretary of State. Users must accept interference from the ISM allocations in this band.	No allocation.		
47000-47200	Primary.			
75500-76000				
142000-144000				
248000-250000				

amateur service will acquire the right of primary or secondary user by 1989 at the latest, but until then the schedule defines the type of antenna which may be used: "Antennas limited to horizontal polarization, maximum gain 0dB with reference to a half-wave dipole." Together with a power limitation of 10dBW, the intention here is to minimize the possibility of interference to the primary and secondary users of the 18 and 24MHz bands: radio amateurs using them must be prepared to change frequency or close down if other users begin transmissions. Note that morse (A1A) is the **only** mode of transmission for which amateurs are licensed in the 18 and 24MHz bands and other modes must **not** be used. This is different from the situation on 10MHz, whereby amateurs in Region 1 are asked not to use other modes for the sake of efficient utilization of a small allocation and the requirement for sharing.

Taking an example, suppose that it is wished to remind oneself of the status of the amateur service in the 28MHz band. The schedule specifies the exact size of the allocation as 28-29.7MHz, and the second column of the schedule states that this allocation to UK amateurs carries primary status. The next column to the right shows that the amateur satellite service also has primary status; the schedule here making the point that the amateur service and the amateur satellite service are separate entities as far as the Radio Regulations are concerned.

The next column to the right shows that the maximum carrier power permitted is 20dBW and the maximum peak envelope power is similarly 26dBW—the meaning of these terms is examined later in this article. Finally, the permitted types of transmission are what could be called the "standard six"—morse, telephony, rtty, data, facsimile and sstv.

Power

The "dBW", despite its inclusion in the current RAE syllabus, may be an unfamiliar unit to some. The use of the decibel and its associated notation makes calculations involving gain and loss much easier as far as the electronic engineer is concerned—the important point about decibel numbers is that they indicate ratios as opposed to absolute values. In the case of units which are used to define power, such as the dBW, the number indicates the ratio of the power to which the number corresponds to a given fixed level of power: for the unit of the dBW the reference power is 1W. In this

system of notation, therefore, a power level of 1W would be expressed as "0dBW", indicating that the ratio of 1W to the reference level of 1W is 1:1 and the logarithm of 1 is 0.

From the basic definition of the decibel it can be seen that each time a power level is doubled it can be said to have increased by 3dB. It follows that a power level of 2W could also be expressed as 3dBW; similarly, 4W is equivalent to 6dBW. The carrier power output in the band 1.81-2MHz is given in the new schedule as 9dBW, and since this is 3dB more than the figure of 6dBW which has just been shown as being equivalent to 4W, it follows that the carrier power limit in this band is 8W.

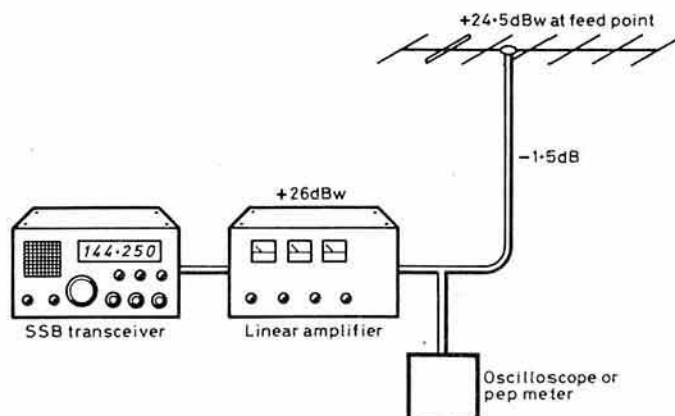


Fig 1. Transmitter power in dBW is reduced by a factor corresponding to the feeder loss. In the example quoted, the linear amplifier's output can be increased by 1.5dBW over the maximum licensed power limit of 26dBW (ie to 27.5dBW) in order to supply 26dBW to the antenna

Table of equivalents

dBW	Watts	dBW	Watts
9	8 approx	20	100
10	10	22	160 approx
15	32 approx	26	400 approx
16	40 approx		

THE NEW SCHEDULE

One other major change to the manner in which power is specified is also contained in the new schedule. Apart from relating all amateur power restrictions to output power, as opposed to the pre-1982 situation whereby non-ssb modes had their power limits defined in terms of dc input power to the final amplifier, Footnote C states: "Maximum power levels refer to the rf power supplied to the antenna." This means that it would be quite legitimate to take an accurate power meter on to a roof or up a tower and measure the power being supplied to the antenna as close to it as is physically possible. Provided that this was less than the maximum power limit set out in the schedule, it would be quite in order to run whatever power was necessary at the transmitter to produce the required level. Normally, of course, this is likely to be impracticable. Amateurs wishing to run the maximum licensed limit of power will need to establish the feeder loss on the basis of its length and the published data for the loss in that length at the frequency of interest. The transmitter should then be adjusted to produce a measured power output corresponding to the legal limit for the band in question plus an element for feeder loss.

As an example, consider the case of a station wishing to use the full licensed power level for ssb work in the 144MHz band. The amateur has established that there are 65ft of UR67 coaxial cable between the transmitter and antenna: reference to page A7 and A8 of the RSGB *VHF-UHF Manual* shows that the attenuation of this particular installation at 144MHz will be about 1.5dB. From the schedule, the maximum peak envelope power which can be used in this band is 26dBW, and it follows that the power level for which the transmitter should be set up is $26 + 1.5\text{dBW}$, ie 27.5dBW .

If a calculator possessing logarithmic functions is available, this can be quickly translated into watts. Simply divide the dBW figure by 10 and take its antilog. In the example, the antilog of 2.75 is 562.34132: in practice this suggests that the linear should be set up to produce 560W P.E.P. output. In this way the legal limit of power is observed.

Notes on individual bands

1.81-2MHz (160m or "top band"). Note that rtty can only be used between 1,810 and 1,850kHz.

3.5-3.8MHz (80m). The amateur service is a primary user but the band is shared with other primary users, namely the fixed and mobile services. In practice, various maritime users who commonly utilize upper-sideband transmissions will be heard in this band. There is no allocation to the amateur satellite service.

7.0-7.1MHz (40m). Both the amateur and amateur satellite services have primary status in this band. However, various broadcast stations such as Radio Tirana and Radio Peking continue their use of frequencies in this band despite strong international pressure.

10.1-10.15MHz (30m). The amateur service has secondary status in this band at present, but is expected to have primary status in 1989. Note that although the permitted types of transmission as far as the schedule is concerned are the same as those in other hf bands, there is a voluntary agreement within IARU Region 1 to use the 10MHz band for morse and rtty only, and UK amateurs are requested to observe this restriction. There is sometimes confusion between this **voluntary** restriction and the **obligatory** restriction of the type of transmission to morse (A1A) only which applies in the 18 and 24MHz bands—see later section. Power levels of 20 and 26dBW may be used in the 10MHz band, which is not the case with the other "post-WARC" allocations.

14.0-14.35MHz (20m). Both the amateur and amateur satellite services have primary status between 14,000 and 14,250kHz; however, there is no allocation to the amateur satellite service between 14,250 and 14,350kHz.

18,068-18,168kHz (18m). This band falls into the same "post-WARC" category as the 10 and 24MHz bands, in that it should become available to the amateur service on a primary basis in 1989. However, there is a difference between the current status of the amateur service on the 10MHz band and on the 18 and 24MHz bands. As outlined above, the amateur service currently has formal secondary status at 10MHz: however, the 18 and 24MHz bands are, to quote the schedule, "Available to amateurs on a basis of non-

interference with other services". In other words, amateur access to these bands has been arranged nationally by agreement, as opposed to internationally agreed formal procedures involving the ITU. This being so, note the restrictions set out in the schedule: only morse (A1A) transmissions are permitted, and antennas must be limited to those which are horizontally polarized and which have a gain of 0dB relative to a half-wave dipole. Effectively, this implies that a half-wave horizontal dipole is virtually the only antenna which may be used for the 18 and 24MHz bands—beams, vertical antennas etc, are **not** permitted under the terms of the schedule.

Note also that the restriction on the type of transmission is embodied in the schedule and is obligatory in these bands: this is **not** the same as the **voluntary** restriction to morse and rtty operation which has been agreed throughout Region 1 for the 10MHz band. Note the 10dBW power restriction in both the 18 and 24MHz bands. **21,000-21,450kHz (15m).** Both amateur and amateur satellite services have primary status in this band.

24,890-24,990kHz (13m). See notes on 18,068-18,168kHz.

28,000-29,700kHz (10m). Both amateur and amateur satellite services have primary status in this band.

70.025-70.500MHz (4m). Amateur status resembles that in the 18 and 24MHz bands insofar as it is available to UK amateurs under a national agreement. However, the amateur service (not the amateur satellite service) does possess secondary status "until further notice", the primary user being the Ministry of Defence. Interference must not be caused to other users, and the clause in the schedule stating that "use of any frequency shall cease on demand of a government official" must be noted. The power limitations in this band are 16dBW carrier and 22dBW p.e.p. respectively.

144-146MHz (2m). This is the lowest frequency band which may be used by Class B licensees, and both amateur and amateur satellite services have primary status.

430-440MHz (70cm). For the first time the schedule shows clearly that the amateur service has overall secondary status in this band, as is the case with all other amateur bands higher than 430MHz in frequency apart from small allocations at 24GHz and above 47GHz. The primary users of the 430MHz band are radiolocation (eg Syledis) and the Ministry of Defence: the Society, in common with other national societies in IARU Region 1, feels that the 430MHz region is an inappropriate one for systems such as Syledis. At the recent IARU Region 1 Conference in Sicily it was resolved that the national societies in countries bordering the North Sea should approach their licensing authorities with "... an urgent request to reconsider, both nationally and in the appropriate national co-operative bodies, the frequency allocation for the Syledis system in view of its incompatibility with the long-established amateur activity in this band", to quote the words of the IARU recommendation. As well as Syledis, users of the 430MHz band may hear continuous carriers, speech transmissions using military procedures and data transmissions. All of these emanate from MoD's Mould system, and frequencies used for this purpose **must** be avoided. Note also the geographical restrictions and power limitations in the 430-431 and 431-432MHz sections of this allocation: these relate to the London area and a rectangle centred on North Yorkshire.

1,240-1,325MHz (23cm). The amateur service has overall secondary status in this band, and the amateur satellite service has secondary status for earth-to-space transmissions on 1,260-1,270MHz only.

2,310-2,450MHz (13cm). The amateur service has secondary status overall, and the amateur satellite service has secondary status at 2,400-2,450MHz only. Note the comment in the schedule that "Users must accept interference from the ism (industrial, scientific and medical) allocations" in the latter part of the band.

Other microwave bands essentially carry similar types of restriction, and the schedule should be read before operation is commenced. Use of the 24.050-24.250GHz band is subject to the written consent of the secretary of State for Trade & Industry, and forms on which to apply for such consent are available from the membership services department at RSGB headquarters on receipt of a second-class stamp.

Finally, note that above 47GHz the amateur and amateur satellite services have primary status. □

SWL News

by Bob Treacher, BRS 32525*

Overseas news

Stan Porter, ORS45992, is still surprised at the continuing lack of dx entries to the 1984 Countries Table. He believes that many listeners may be reluctant to submit low scores. Whatever the reason, if the table has but one entry by the turn of the year the separate listing will not be repeated for 1985. Stan was enjoying his new idyllic location, but with winter prevailing everything has to be batted down as the "mwera" is quite strong and whips up the lake quite extraordinarily. His 14AVQ is down and listening is currently on a long-wire. His QTH is only 35 miles from 7Q7LW and 180 miles from John Lord, 7Q7-002. Stan had been quite busy in July logging ZL2ADX and ZS5BH on 10MHz. On 28MHz TA1ARC was the best on offer, while 14MHz provided TL8GE/ST0, WH6O/KH4, 4K1GAG and ET3PS. 7MHz produced T31AT and T32AF. Of the special Olympic stations YO00 was heard.

Worst QSL?

How about a competition for licensed amateurs? It would be to let me know of the worst listener card they had received. G3ZAY and G3CWI are the first to provide entries. As VK9LX and VK9LW respectively they both received direct postcards from an Italian swl with no equivalent to an RS no. He simply reported "QSO 24.7.84 S9R5 Wkg EU"—no more, no less. As G3ZAY rightly indicates—no information, no ircs . . . no use. It is this type of "report" that sparks off the well-versed arguments about worthless listener reports. I hope that no British swls are guilty of sending such rubbish through the worldwide bureaux, but no doubt my illusions will be shattered by some kind licensed amateur!

HF news

Robert Small, BRS8841, started his latest report with news of super dx on 3.5MHz in the shape of G4GJT/P on Lundy Is! On 14MHz, KH6JEB/KH7, FY9IS, WP4ATF/KP5, W0PU/SV9, T32AB, NB5L/PJ3, HH2Q and DV1ZI were logged. The VU7WCY cards had come through safely courtesy of VU2GDG. Other cards received came from BY1QH, CE0ZIJ, KH6JEB/KH9, KK9A/V2A and V85HG. Robert was anxiously awaiting the normal upturn in conditions which the autumn traditionally brings.

Cliff Adams, BRS10906, also managed to add 4K1GAG to his log. This station is located on a USSR base on South Shetland. In the farthest north was 4K0B on a USSR Arctic floating base. Around Europe SP6LHI/OH0 and OZ1FT/OY were added. Cliff is now getting good reception on 14MHz from a new four-element beam.

Brad Bradbury, BRS1066, visited the Derby Mobile Rally in August, but because of the pleasant weather we had in July and August he had been largely inactive. 10MHz provided DF3GX/PJ4 and 18MHz came up with OY8ML.

Martin Parry, BRS2543, found 7MHz in good shape, logging HR, HS, OD5, VK9L, ZD7 and 5X5 in the early part of August. 21MHz was poor but occasional forays onto the band found A22, HK0 and 9Y4.

Paul Crankshaw, BRS48909, reported 28MHz in good condition to Europe on 5 and 6 August, which boosted his "miserable" band score to 92 in 1984. Paul still needed EI, GI, HB0, JW, JX, TF, UA2 and CX in 1984.

David Whitaker, BRS25429, minus triband beam for chimney repairs, surprised himself by hearing KH6JEB/KH7 and 5WIDZ on 14MHz with a long wire "not far off the ground". He also reported good 7MHz conditions, mentioning much of the dx heard by Martin, '52543. He also logged JY9CL and HS0JUA (QSL via JA1SDV). He found that Z21EV was putting a good signal into Europe on 3.5MHz. On the QSL scene, UL7MAP provided Dave's 77th confirmation on 1.8MHz, and VU7WCY was No 336 confirmed all-time.

Douglas Johnstone, BRS54163, had caught many VKs, both on long and short path. V2AZM, 8R1RBY and VP5WJR were copied at around 2300. All these were on 14MHz.

*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								
BRS8841	240	86	181	209	145	134	40	795
BRS2543	226	101	147	187	141	132	46	754
BRS48909	224	92	152	186	140	123	48	741
BRS25429	215	108	134	175	119	132	53	721
BRS44395	—	92	143	126	92	60	45	558
BRS10906	198	71	134	159	77	88	11	540
BRS31879	172	100	112	120	86	67	36	521
BRS1066	169	69	129	131	83	53	53	518
BRS50134	149	4	8	13	106	103	36	270
BRS18529	—	1	56	46	57	88	14	262
ARS53844	—	—	—	—	88	96	30	214
BRS44984	—	23	36	65	42	40	0	206
RS49875	94	31	50	42	28	20	3	174
BRS44083	109	26	35	61	18	17	1	158
DX listings								
ORS45992	226	119	147	199	72	60	4	601

1984 UHF/VHF TABLE

Station	QTH loc	70MHz		144MHz		432MHz		Total via*
		Squares	DXCC	Squares	DXCC	Squares	DXCC	
BRS2543	YN	25	7	56	17	14	6	125 a,b,c,d
BRS32525	AL	—	—	57	21	21	7	106 a,b,d
BRS25429	ZN	—	—	43	14	—	—	57 a,b
BRS62088	AL	—	—	17	7	8	3	35 a,b,d
RS49875	YN	—	—	13	5	2	2	22a
BRS18529	AL	—	—	9	3	—	—	12a
FE8957	BF	—	—	9	2	—	—	11a

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

VHF news

Some tropo, some sporadic-E and some meteor scatter to report this time, although 1984 has still been a very poor year for 144MHz dx so far.

Martin, '52543, had built a passive ssb audio-filter which he found valuable in VHF NFD where a good score was claimed. On tropo, he heard GJ4OUW/P for a new country and new square on 70MHz, while on 432MHz he found a good signal from GB2XQ (XQ80d). 144MHz gave Martin EI3VED/P (VM76e), and PE1IML (CM55d) and GM4DHF/P (XS80d) were logged in late July. EI2VRO/P (VL38h) was logged during the Society's Low Power Contest. Martin also caught probably the last Es of the year on 6 August between 1245 and 1317. Blue with envy, I shall give the stations which Martin logged: YU2IQ (HE77h), YU2FM (ID33g), YU6ZCR, YU5QG, YU2SYA/2 (IF35a), YU1UN (ID20h), YU2SNA (IF35c), YU1EN (JE37f) and YU2CCB (IF34b). This opening took Martin past the 100 squares heard all-time mark.

The big news from Dave, BRS25429, is that he is now equipped for 432MHz and is determined to give your scribe and '52543 a run for their money! An MM converter and 19-element F9FT Yagi are ready and waiting for a good tropo lift. The chimney repairs mentioned earlier also meant little vhf activity for Dave, but on the QSL front IOKHY (GB14a) and PA00OM (DN54g) were new. Y24UN/A (GK17a), OZ1FBV (FO40a), SM4HXR (GT32e), Y38ZA (HN01e) and LA9DI (FT62g) were gratefully received.

In AL square, HB9s were audible during the morning of 29 July. On 4 August F6HMQ/P (X150b), F1KSL/P (C147d) and F6KBF/P (CH29f) were entered into the log, and on 10 August EI2VNS (WM58c) and one solitary OZ (ICTC, EP24h) were on the band. Apart from entering the low power events and finding some good G-dx, EI2VPX/P (WL02j) was all of note on tropo up to 13 August. However, the Perseids meteor shower did provide some good reflections between 11 and 13 August. Bursts were heard from DG5MCL, EA3ADW, F1JG, F1EKU, F6CJG, F6EOQ, F8OB, I3LGP(GF), IK4VCO, OE3OBC, OK3LQ, YU3C, YU3ZV and YU7AR. Best dx however was HG1W/0 whose reflections were S9 late on the evening of the 13th, when my xyl, BRS62088, also copied his signals well. Up in YN, Martin, '52543, also listened to the event and caught DF2ZC, FIBLL (CD), F1JG (CD), F6ECU, HG5A, I4VOS (FE), Y21PL and YU3ZV on 144MHz, with the HG, I and Y2 providing all-time new countries on the band. On 432MHz ms reflections were copied from EI2CA/P in VO square.

G6AMN wrote concerning mention of F6CJG in my August piece to report that Guy most certainly can be heard during good conditions. In 1983, G6AMN worked him while using only a four-element quad in the loft.

Colin Watson, BRS46598, wrote from his holiday location on the Solway coast reporting reception of a number of distant fm repeaters.

Finale

News, views and scores for the December issue should reach me by Tuesday 23 October, with late news items by Tuesday 30 October.

The Month on The Air

by John Allaway, G3FKM*

SOME MISUNDERSTANDING of our rights on the two "WARC" bands 18 and 24MHz has arisen following the publication of the IARU Region 1 hf band plans in the *Rad Com* Operating Guide supplement in *Radio Communication* January 1984. GW3AHN has drawn attention to some amateurs in the SW of England who insist that this table means that ssb is allowed, but seem to have forgotten that so far we only have permission to use both bands on a very limited basis—10W input of cw only to a horizontal dipole antenna. The IARU plan has been drawn up in anticipation of full release of the bands sometime between now and 1989.

G4SFO reports that his callsign is being used by a pirate calling himself "Steve". This happens mostly on 144MHz but also on the hf bands on ssb occasionally. GM4ELV is similarly being troubled by QSLs for contacts he has not made.

Aemar Higgins, G13YMT/E18DQ has offered to act as QSL manager for any UK/dx station who may require this service. Please contact Aemar at 1 Cairnshill Park, Cairnshill Road, Belfast BT8 4RG.

More piracy—this time from Australia, where VK3BH is receiving QSL cards for alleged 14MHz cw and Oscar 10 contacts. Please send information to Bert Horan, 1 Greive Street, N Balwyn, 3104 Vic, Australia.

Propagation—28 and 14MHz

Paul Williams, K1SSO (147 Trinity Avenue, Glastonbury, Ct, 06033, USA), has written to ask for volunteers to make schedules with him on 28MHz to carry out an experiment. He points out that at the present stage in the sunspot cycle the direct path from the NE USA to Britain is often closed but paths over the equator are usually open. He would like to demonstrate that advantage can be taken of side-scatter and the equatorial path to communicate on the USA-Europe path indirectly. Antennas with gain will probably be needed. Paul is available at weekends and can also arrange to be available during weekdays as his office is very near his home.

The NCDXF beacons on 14,100kHz are attracting considerable attention and are providing much interest. The IARU Region 1 Conference discussed the project, and member societies were asked to suggest to their members that it would be a good idea if 0.5kHz either side of the beacon network's frequency could be left clear of transmissions. W6RQ says that reports of reception of all eight beacons in sequence, using a simple dipole or vertical antenna, are valuable. Some observers are correlating their records with the solar terrestrial reports from WWV (at 18min after each hour). The latter gives the solar flux (an indication of sunspot activity), the A-index (a 24h measure of disturbances of the earth's magnetic field), and the K-index (also a geomagnetic index but on a 3h basis and on a different scale). With a low A-index several beacons may be audible, and with it high perhaps only one, but that at good signal strength. More reports are sought for the programme, and anyone interested is invited to contact the N California DX Foundation Inc, PO Box 2368, Stanford, Ca, 94305, USA. Copies of logging sheets are available from G3FKM (sae please).

USA band plan changes

On 20 July the FCC announced that the parts of the 3.5, 21 and 28MHz band available for phone use by USA amateurs would be extended from 1 September. The segments are: 3,750–3,775kHz (Extra class), 3,775–3,850kHz (Extra and Advanced classes), 3,850–4,000kHz (Extra, Advanced and General classes), 21,200–21,225kHz (Extra class), 21,225–21,300kHz (Extra and Advanced class), 21,300–21,450kHz (Extra, Advanced and General classes). The phone band on 28MHz will extend down to 28,300kHz and all three classes are allowed down to this frequency.

In addition the FCC announced that amateurs in Hawaii, Alaska and other areas "near Region 3" will be allowed phone operation in the 7,075–7,100kHz band. It seems that it was agreed that further expansion into the small Region 1 allocation would be "detrimental to cw activity".

Other USA changes include an arrangement whereby those upgrading a licence will use suffixes to indicate their new status until the new call is received: /KT for Technician, /AG for General, /AA for Advanced, and /AE for Extra.

Expeditions

PY1BVY (who operated in 1983 as PY0FE) hopes to operate from Trindade Is, possibly in December.

According to the *Long Island DX Bulletin*, K8AQM will be leading an eight-operator group which will visit the part of Quebec which is located in Zone 2 during the CQ WW DX Contest on 27–28 October.

Another group, this time the S Florida DX Association, is planning a visit to Taiwan early this month.

The Down Under DXers Contest Club is planning to visit Mellish Reef during the 1984 CQ WW DX Phone Contest. This follows the very successful trip to Lord Howe Is as VK2LHI last year, and they hope they will have the callsign VK9MR. They will be trying to obtain the world top score in the multi-single category, and the team will be there for about two weeks. Equipment will consist of three TS830s with FL2100Z amplifiers, and antennas will include a four-element multi-band quad (from TET). The organizers are VK2WU, VK3CE and VK2CX—the last mentioned having previously visited the reef in 1978. The first two will be in the team and will be accompanied by VK5ARO, VK2CIA and VK2AD. At least two of the group favour cw. Operations should begin on 25 October and end on 6 November, and they should cover all bands 1.8 to 30MHz. QSLs go to VK2WU and donations towards the enormous expense of the expedition should also go to the same address—all will be receipted, and returned in the event of the expedition having to be cancelled.

Members of the Rutherford Appleton Laboratory RC (G3RRS) will be active from VP2MW during the CQ WW DX Phone Contest. The operation will begin on 20 October on cw before the contest. The combined antennas of three stations are to be used with particular emphasis on the lower frequency bands for the benefit of those needing Montserrat for 5BDXCC. An award will be issued to dx stations who work VP2MW on all six bands (1.8 to 30MHz) during the contest. The operators will be G3SJK, GM3YOR, G3UKS, G4BGH, G4JVG, G4XRI and G4XRJ. QSLs go to the address in "QTH Corner".

Several rumours of impending activity from Albania have proved to be groundless. However, OH2BH and OH2NB are believed to have received a telex from Tirana asking for their trip to be postponed. There does seem to be some dialogue and it is possible that amateur radio in ZA may develop in the same way as it has in China via the gradual introduction of club stations.

PA3DEV will be in the Maldive Is between 27 September and 16 October. His 8Q7 call will be issued when he arrives and he will be active on cw and ssb on 7, 14, 21 and 28MHz. Some operation on 3.5MHz may also take place.

Overseas news

Dave Frost, VE7FJE, of 6269 Elm Street, Vancouver, BC, V6N1BL, Canada, is a member of the Society and invites anyone who would like to arrange a schedule with Vancouver to write. He has a five-element Wilson 14MHz monoband beam at 75ft so should have a good signal.

Paul Kirby, currently on the air from Swaziland as 3D6AK, whose UK call is G3XUD, reports an unusual example of piracy of his callsign. He was on 21,032kHz from 1600 to 1630 one day before announcing that he would QSY to 14,032kHz. However, when he arrived there he heard himself giving a report to UB5QDU! This was followed by more bogus QSOs during which the pirate gave the correct name, QTH, QSL manager etc. The signal peaked from the north and possibly came from W Europe. This means that some who have worked "3D6AK" may not in fact be in his log. Paul will be active at least until April 1985 and will concentrate on the low bands. Main activity is on Wednesdays, Fridays, and Saturdays on 3.5 and 7MHz after 1900, and Sunday mornings from 0200 on 1.8MHz.

Some genuine activity from A6 seems to be imminent. Des Shepherd, G3LCS (VS1HQ), has a long-term contract as communications manager of a new company. His chief is a resident of Abu-Dhabi and has been given the first new amateur callsign—A61AA—by the head of the royal family there. A61AA is as yet inexperienced and Des will help him to get going. A personal callsign seems unlikely but may be issued in a few months; however, Des does not think that this is the beginning of a general granting of licences. He intends to be active on cw, ssb and rtty on 7MHz and higher

*10 Knightlow Road, Birmingham B17 8QB



The DX Family team at the VC0JA/BV0YL station. (Front row, l to r) JH1KRC, CRA member Liu JA1HEH, JA1XGQ. (Rear, l to r) JA7FWR, JA1YDJ, BV2A/BV2B, JP1LAB, CRA member Lu. Photo: courtesy of The DX Family Foundation (Another photo appears on p885)

at first, and then 3.5MHz later. A large log periodic antenna may be available, but it is only designed for 6MHz and up.

A special event station will be on the air from the Town Hall in Knokke, Belgium, from 1600 on 30 October until 3 November. This will celebrate the 40th anniversary of the Normandy landings by Canadians. The call sign will be ON4CLM and activity will centre around 3,515, 3,785, 7,012, 7,045, 14,020, 14,125, 14,249, 21,020, 21,245, 28,020 and 28,545kHz. A special award printed in six colours and honouring the Regina Rifle regiment will be issued. The cost is BF150, \$5, £2, or 10ircs, and surplus money will be donated to a welfare fund. The 1983 award is still available (at half price) if applied for at the same time as the 1984 version and this makes it possible to collect the series. Apply to Radio ON4CLM, PO Box 140, 8300 Knokke-Heist 1, Belgium.

Tony Guiver, C53FG, has been in the UK on leave and should have been heard as G4WOF, but is due to be back in Banjul by now.

More information on the situation in Taiwan has come via G3RZP. He has sent a document which says that the Ministry of Communications had agreed to release amateur radio to citizens (in July) and that licences would be issued following the passing of an examination. It seems that the only legal Taiwan call (BV2A/B) was issued before the government moved to Taiwan.

DX

The RCV has made a formal announcement that only QSL cards issued by the RCV and signed by QSL manager Edwin Rivera, YV5HUJ, will be considered to be official confirmations for the YV0AA expedition last March.

ARRL has now approved an endorsable DXCC for 1.8MHz—this will become available on 1 November 1984, and QSOs since 15 November 1945 will count. There will be no separate Honor Roll listings.

A special station will be on the air this month (and also for the next five) to commemorate the 150th anniversary of the State of Victoria. The call will be used from different locations, using the callsign V13W1.

Tom Christian, VR6TC, still maintains schedules at 0630 on 14,180kHz, each Monday, at 2300 on 21,350 on Tuesdays, and on the same frequency on Fridays at 1630. VR6KY is often around 14,190kHz at 1100 or earlier.

WB6LED now has the logs of T3AY and T30AY and will QSL direct to anyone still needing confirmation. No return postage is required.

AB4Y, who is an American diplomat, is in Mozambique and hopeful of obtaining a licence—he is asking for the callsign AB4Y/C9 or C90A. 5U7LD is to be found almost every day on 14,214kHz between 2000 and 2100.

According to I2YAE there are no licensed amateurs in Somalia at present and this would suggest that "6084TI" (who gave I2YAE as his QSL manager) was a pirate. Another instance of action likely to damage amateur radio was the K6UA/A6 activity last March. QSL cards have the fact that operation was "illegal and unauthorized" printed on them. "JH8YDY/S21" was also illegal.

Mayotte seems to have a new prefix. FH4AA(F6ECS) will be there for a year or so and is to be found after 1130 in the 14,005–14,030kHz area, or near 14,185kHz. FROFLO should also be on the air soon as FH4AB.

VP8MT is ssb only—the station signing his call on cw was a pirate. The callsign block V4A to V4Z has now been allocated to St Kitts Nevis. I2YDX is reported by DX-NL to be in Haiti until the end of the year and is likely to take part in contests using the different prefixes HH2-HH10.

DX'press quotes a note from OE6EEG, who says that a Yemeni resident will be present to come on the air by the end of this year, and that he hopes he will be present when this happens.

WB7RFA should be in Sao Tome from 23 October and is hoping for an

1984 SIX-BAND TABLE No 4

	1.8MHz	3.5MHz	7MHz	14MHz	21MHz	28MHz	Total
G3XQU	5	84	116	167	182	140	694
G3SXW	49	83	119	136	127	88	602 (cw only)
G3TXF	54	86	112	144	112	85	593 (cw only)
G3KDB	40	67	91	113	136	95	542 (cw only)
GW4OFO	13	128	102	116	95	39	493 (cw only)
G4SKI	2	46	9	111	131	109	408
G3XTT	68	53	76	72	65	59	393
G4OTU	18	30	58	103	92	51	352
G4RHW	0	1	86	70	81	23	261
G4GDF	6	10	16	49	47	47	175

Band leaders in bold type. Next deadline for this table is for scores to reach G3GIQ no later than 15 October to appear in the December issue.

1984 28MHz TABLE

G3XQU—140	G3XTT—59	GM4LKJ—32
G4SKI—109	G3WVG—58 (cw)	G3KSH—25 (cw)
G4VJK—100	G4DXW—56	G4RHW—23
G3KDB—95 (cw)	5B4DN—54	G4FVK—22
G4MUW—95 (ssb)	G4OTU—51	G4SXX—20
G4TTR—91	GW4TEJ—48	GM3CHX—19
G3SXW—88 (cw)	GM4CHX—47	GI4PCQ—17
G4RAB—86 (ssb)	G4GOF—47	G4RWP—14
G3TXF—85 (cw)	GW4OFO—39	G4LZZ—10 (ssb)
G4PEL—83	G4OBK—38	G2FQR—8
G4NXG/M—65	G4SDZ—36	

S9 licence. Should he prove unlucky he will try for a D2 call and visit Angola.

Another Chinese station is now on the air—BY5RA. This is licensed for all bands 1.8 to 30MHz plus vhf, with cw, ssb, fm, and Oscar facilities. Rty and fax may be available later.

SSTV

The EU SSTV Net meets daily (except Saturdays) on 7,040kHz at 0730gmt, and consists of DL1KBP, DL1MY, DJ1SS (who also transmits 24s single-frame colour pictures) and OZ3WP.

DA2ZE is to be found on 14,230kHz transmitting the new Robot 12s single-frame colour sstv from his 400C modified 400 Robot converter.

Contests

Would all those who take part in RSGB hf contests and who live outside the British Isles please note that in future, whatever the contest entered, logs may be sent to PO Box 73, Lichfield, Staffs WS13 6UJ, England. This should help those who are not sure where to send logs in those cases where the adjudicator changes yearly. Please write the name of the contest to which the entry applies very clearly in the top left corner of the envelope. Please note, entrants in the home countries must follow the rules and send their logs to the address given for each individual contest.

ON Contest

0700 to 1100 7 October (3.5MHz phone)

0700 to 1100 14 October (3.5MHz cw)

0700 to 1100 21 October (14MHz phone and cw)

Contacts should be made with ON and DA (Belgian Forces in Germany) stations. Exchange RS/T plus serial number (from 001). ON/DA stations will give their club code (eg MCL). Each QSO counts three points and each club counts as a multiplier. Listeners may enter and should log gmt, callsign of station heard, given code, and callsign of other station. The best transmitter and listener entrants in each country will receive an award. Send logs within three weeks of the contest to Welters Leon, ON5WL, Borgstraat 80, B 2880 Beerzel, Belgium.

HA-QRP Contest

0000 1 November to 2400 7 November

3,500–3,600kHz cw only. Exchange callsigns, RST, QTH and name. QSOs with own country count one point, with others, two. Stations may be worked once only. Final score is total QSO points multiplied by the number of DXCC countries worked. The power amplifier of the transmitter must have less than 5W input. Logs should show date, time, callsign of station worked, reports, QTH, name, and details of power amplifier. Post before 21 November to Radiotechnika szerkesztose, Budapest Pf. 603, H-1374, Hungary. All participants will receive a "memorial leaf", and outstanding scorers the magazine *Radiotechnika* for one year.

YL Anniversary Party

1800 17 October to 1800 18 October (CW)

1800 31 October to 1800 1 November (SSB)

For licensed lady operators. Copies of rules from G3FKM (sae please).

CQ WW DX Contest

0000 27 October to 2400 28 October (CW)

0000 24 November to 2400 25 November (Phone)

All bands 1.8 to 28MHz. Single-operator, single- and all-band, and

QTH CORNER

A35MP
A61AA
A92ED
BV0AB
C30LBS
K4Y7/DU
FH4AA
HB0NL
H13RST/KP5
HS0JUA
V13WI
VP2MF

PO Box 30, Neiafu, Vava'u Is, Tonga
 via G3LQP, 32 Albert Rd, Sutton, Surrey SM1 4RX
 Box 22381, Muharrag, Kuwait
 Y. Fukahori, PO Box 10, Hoshiguma, Fukuoka 814-01, Japan
 S. Tacca, IK1CJT, Viale Parona 9, Gozzano 28024, Italy
 (New) KE3A,
 J. Respault, Box 4, Mamouzo, Mayotte, F-97600, France
 HB9NL F. Acklin, CH-6233 Bueron, Switzerland
 WP4ATF, Box 449, Palmer, Puerto Rico, 00721, USA
 via JA1SDV, S. G. Shinozaki, 3-14-19 Hikowadai, Nerima, Japan
 VK2WI, 412 Brunswick St, Fitzroy 3065, Vic, Australia
 c/o Jean Mills, R20 Rutherford Appleton Laboratory ARC, Chilton,
 Didcot, Oxon

VP8ALD
VP8QI
VP8VN
3V8AI
3V8ZY

T. Adams, G4CHD, Redland House, 171 Leckhampton Rd,
 Cheltenham, Glos GL53 0AD
 via IN3RZY, D. Monauni, Casella Postale 212-39100 Bolzano, Italy

multi-operator multi-band categories (single and multi-transmitter). There is a QRP section for stations with less than 5W output. A new category, "Team Contesting", has been introduced; this consists of five amateurs operating in the single-operator category with entrants located in at least two different continents. A list of the team must be received by Team Contest, 76 N Broadway, Hicksville, NY, 11801, USA, by 15 October or 15 November respectively. Exchanges consist of RS/T plus CQ zone (UK is 14). QSOs with own continent count one point and with others three. The multiplier is the total number of zones and DXCC/WAE countries worked on each band added together. Photocopies of the full rules may be available from G3FKM (see please). Sample copies of summary sheet and log forms are also available.

In the 1983 CQ WPX SSB Contest UK scores were as follows:

SINGLE-OPERATOR					
Callsign	Band	Points	Callsign	Band	Points
GB4DX	All	4,446,907	G2AJB	All	17,987
G3XBY	All	2,101,120	G5EBA	All	9,920
GU5BLG	All	1,379,472	G3JKY	28MHz	20,304
GM3RAO	All	446,688	G3MWZ	21MHz	3,168
GM4GPN	All	378,884	G3FXB	14MHz	1,874,312
GU5EOO	All	193,802	GM4RFE	14MHz	85,440
G3TXF	All	81,488	G3YCP	14MHz	64,906
G4/VE3GCO	All	66,993	G3ICG	14MHz	4,284
G4PIO	All	49,476	GM8SQ	14MHz	2,080

Certificate winners are listed in bold type. Congratulations to **GB4DX** (G3VDL) who came world fourth in the single-operator section (all band) and won the W8IMZ Trophy; to **G3FXB** who was world sixth on 14MHz; **G4GIR** who was world top in the QRP section with 374,602 points; and **GB4ANT** who came world fourth in the multi-operator, multi-transmitter class. In the multi-operator single transmitter class **G6CW** came 23rd with 2,015,384 points, **G3AHD/A** scored 1,729,328, and **GB2WPX** 1,400,084 points.

In the 1984 G. Marconi QRP Phone Contest **GM4ELV** topped the multiband entry with 43,968 points. There were no other UK entrants.

Congratulations to **G4CNY**, who is the lucky winner of this year's **Bermuda Contest**. Other winners are believed to be **DF6PK**, **VE3BGY**, **K1RM** and **Judi Davidson**, **VP9IL**. Stuart has been invited to join the **VP9AD** team for the **CQ WW DX Phone Contest** at the end of this month. A big operation is planned, and other participants may include **VP9AD**, **VP9IJ**, **W2REH**, **N3RD**, **N3RS**, **W3MA**, **KU8E** and **N8ET** (G5CMX).

Awards

Flanders Field Award

Issued in memory of those who lost their lives during both world wars. Obtained by hearing or working ON7FF on 9, 10, or 11 November. Send QSL card plus 10 ircs or equivalent to Radioclub Ypres, Box 32, B-8900 Ypres, Belgium. (The 1,000th award was handed over to **G6ZOQ** on 14 May this year.)



Presentation of the 1,000th Flanders Fields Award. L to r: a member of Ypres City Council, the Burgermeester, ON5YK, G6ZOQ's wife, and Keith, G6ZOQ

Worked All Continents

The Administrative Council of the IARU has created two new endorsements for the WAC Award—for fax and for QRP. Amateurs who have achieved two-way facsimile (A3C, F3C or J3C) QSOs with all six continents may request the fax endorsement, and in recognition of the fact that pioneers of the mode may now be engaged in other activities, contacts of any date are valid. FAX certificates will not be numbered.

QRP endorsement will be available from next year, and will be in the form of a sticker for affixing to a basic ssb, sstv, rtty, fax, mixed-mode or five-band certificate. QRP is defined as 10W input or 5W output, or less. Only QSOs on or after 1 January 1985 will count. Other endorsements available at present are for 1.8, 3.5, 50, 144, 432MHz and for six-band operation. Note that contacts on 10, 18 and 24MHz may not be used for WAC claims at the present time. Applicants for any of the WAC awards should send QSLs proving QSOs with N and S America, Europe, Asia, Africa and Oceania since 1945 (1 January 1974 for the five and six-band versions) with a list and return postage and envelope to the awards manager of their national society (G3KDB in the UK). UK amateurs must enclose evidence of membership of RSGB. There is no charge.

The 1066 Award

Awarded to those who have worked eight members of the Hastings Electronics & Radio Club, or G6HH plus six members. Send list certified by two licensed amateurs plus £1.50 to K. Homewood, G4UBP, 73 Hughenden Road, Hastings, E Sussex TN34 3TF. Listeners may apply and should list call signs of stations being worked.

Around the bands

Due to the very early deadline, **G8KG** missed sending his report last month, but has made up for the omission this time. His comments are as follows: "It was too much to hope that the upsurge of solar activity in the early months of the year would be long sustained. At the end of May the average solar flux for the past 27 days began to fall quite steeply from its peak value of 140sfu, and this fall has continued up to the time of writing (late August) when the 27-day average had dropped to 81sfu. Whereas daily values of around 180sfu were recorded in late April they have not exceeded 100 since the end of June, and fell to 74sfu in the third week in August—a situation not seen since the middle of 1977. On the other hand there are some indications that the steep downward trend in mean activity which began in 1982 may be giving way to a somewhat gentler decline.

"It is most unlikely that recent behaviour indicates that we are rushing to a solar minimum. On past form that event is very unlikely to arrive before mid-1986, and could be as late as 1988. There are always upswings and downswings superimposed on the slow variation which constitutes the basic solar cycle, and these typically last for several months. Their effect is proportionately greater in the later years of the cycle when, as at present, a downswing can take values almost to those seen at solar minimum.

"In recent years these shorter-term variations have occurred at intervals of approximately 11 months, and if—but it is a very big if—this periodicity is maintained the next upswing should peak early in 1985, with benefit to the 1984/85 dx season, though conditions on the higher bands will have declined as compared with 1983/4."

Still rather a lack of activity on 18 and 24MHz, with everyone listening and believing the bands to be dead. As **GM3HBT** says, these bands are definitely "weekend" and "daylight" and putting out "CQ" calls is to be recommended.

Thanks go to the following for sending in logs: **G2HKU**, **G3YY**, **G5JL**, **G3s** **GIQ**, **GVV**, **GM3HBT**, **G3s**, **IGW**, **KSH**, **NWG**, **URA**, **YRM**, **G4EHQ**, **GM4KHE**, **GW4KGR**, **G4s** **LRS**, **NXG/M**, **OBK**, **UOL**, **UYR**, **G5CFJ**, and **RS1096**.

Stations listed in italics were on A1A.

1-8MHz. 0200 **CY0SAB**. 0400 **CX8DT**. 2100 **Y23VBA**, 2200 **0H0PA**, **UG6GAW**, **UZ9AYA**. 2300 **UV2M**, **VK6HD**, **4U1ITU**.

3-5MHz. 0300 **6W1CK**. 0400 **CE8ABF**. 0500 **VE3NYG**, **KN6MW5**. 2200 **RL8PYL**, **UA9IM**, **VK6LK**, **Z21EV**. 2300 **CE**, **ON5NT/HB0**, **HZ1AB**, **SP6LHI/OH0**, **UA9FAR**, **4U1ITU**.

7MHz. 0300 **ZP5JAL**. 0400 **DK6NN/C6A**, **CP1RC**. 0500 **LU8DQ**, **VK9LX**, **W6**, **W7EJ**, **OE8AJ/KYK**, **ZK2IK**, **ZL1.2**, **ZS5DE**. 0600 **G3OLU/EA6**, **FG7BT**, **FG0UQ** (St Martin), **VE7SZ**, **YS9RVE**. 1800 **LX1PD**. 1900 **4S7GF**. 2100 **BV0AB**. 2200 **OD5AS**, **VK3RW**, **VP8ALJ**, **ZD7CW**, **9Y4NP**. 2300 **CE3GFD**, **JY9WR**, **RL0G**, **4K1s** **CEY**, **GAG**, **6Y5AC**, **8P6OV**.

10MHz. 0400 **VE7VL**, **W7**. 0500 **ZL1CH**. 0600 **VK2EW**, **VK4s** **QP/RF**, **VK5LU**, **VK7CN**. 0700 **OY7ML**, **VK2VA**, **VK3MR**, **Y24DO/P**, **9H1BB**. 0800 **ZL1AIZ**. 1500 **W8EB**. 1800 **OY3LV**. 2000 **ZL3GQ**. 2200 **JA6HW**, **NP4GD**, **VP2MIX**, **W1-W4**, **W8-9**, **ZC4CZ**. 2300 **CT2FN**, **J73D**, **DF3GX/PJ4**.

14MHz. 0300 **VU2GI**. 0600 **W0PU/SV9**, **V2AZM**, **VK**, **ZK1CG**, **5W1DZ**. 0700 **A35SA**, **AL7BA**, **KH6IJ**, **KH6LW/KH7**, **H13RST/KP5**, **T2ADE**, **ZK2RS**, **3X4EX**. 0800 **F1W1CCN**, **FW8AF**, **FW0BT**, **ZK2IK**. 0900 **KH6**, **KL7TC**. 4K0B. 1000 **5W1DZ**. 1100 **J6LMY**, **XX9DX**, **3V8ZY**. 1200 **YC0DLG**. 1300 **SM6KVX/W7(Wyo)**. 9L1NM. 1400 **4S7VK**. 1500 **CZ1ASJ**. 1600 **HL9HO**, **S79WW**, **9V1VC**. 1700

8Q7BZ, 9V1OK. 1800 DU1DBT, 1900 CY0SAB, JA, KL7H, UM9MWEIU8Q, VU2OO, XT2BR, YI1BGD, 2000 A71AD, HS1ANV, S83H, VP8MT, 3X4EX, 5U7LD, 2100 G4EWQ/PJ2, V2AN, W6-W7, 4K1B, 5U7NG, 2200 D2CCC, FV4VAR, VK2, W6-W7, 2300 CY0SAB, KG4DX, WP4ATF/KP5, W6-W7.
18MHz: 0800 DL, GI, GM, HB9DX, I, IS, 0900 DF5MX, F6GOW, LA, OE, OZ, PA, 1300 DL, GJ, I, LA9MF, OY9ML, PA0TO, 1800 LU1DOW, DL8NBN/TK, 1900 LU7ER.
21MHz: 0600 YC3FU, 0800 FR0FLO, JA, 1000 C30LBI, VS6CT, 1100 4U1ITU, 1200 VU2BK, 1300 FB8WJ, 1500 TR8JYC, OH7RE/4U (OD5), 5Z4JD, 9V1TL, 1700 T2FE, 1800 A92DQ, VP8AXJ, ZD7CW, ZD9CC, 3D6AN, 2000 C53FG, FO8IW, 2100 HI3RST/KP5, 2200 HC1BP, VP2MR, W1-W4, 2300 OA4JH.
24MHz: 0800 DL, F, GM, GW, I, OE, 1100 OY7ML, 1500 LU7ER, 1600 LU1DOW, 1700 EI, I, IS, DL8NBN/TK, 2000 LU5DJO.

28MHz: 0800 9J2BO, 1200 9J2BO, 1400 OK1DLG/QRPP (0-1W), 1900 Sporadic-E, KP4AXC, LU7HJ, ZP5CF, 2000, PYs 2GQT, 3YTH, 2100 CX8DR, PU2MIK.

Many thanks to all who supplied information this month and also to the following for items extracted:— *Lynx DX Group Bulletin* (EA2JG/EA3CBQ), *DXpress* (PA0GAM), *CQ Magazine* (W1WY), *DXNL* (DL3RK), the *DX Bulletin* (K1IN), the *Long Island DX Bulletin* (W21YX), *DX News Sheet* (G3XTT/G3ZAY), the *Ex-G Radio Club Bulletin* (GI3OEN/W6), and *Long Skip* (VE3GCO).

Please send items for December to arrive no later than 2 November. ☐

HF propagation predictions for October 1984

Using the table

The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band, ie 0=0000, 1=0200, 2=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.

GMT	28MHz				21MHz				14MHz				10MHz				7MHz				3-5MHz							
	000 024	001 680	111 246	122 802	000 024	001 680	111 246	122 802	000 024	001 680	111 246	122 802	000 024	001 680	111 246	122 802	000 024	001 680	111 246	122 802	000 024	001 680	111 246	122 802				
EUROPE																												
Moscow			12	21			67	764			687	788	72		422	655	557	985		876	432	235	799	††3		2	4††	
Malta			12	111			77	666	2		687	789	94†		563	765	567	996		998	532	235	899	†††	2	2	5††	
Gibraltar			1				36	544	2		341	676	567	894		898	753	334	799		898	753	334	799	†††	52	2	4††
Iceland							2	432			48	888	72		11	176	667	872		773	654	345	788	†††	52	2	45†	
ASIA																												
Osaka							54				376	432	1		243	235	651		1	12	662						34	
Hong Kong			23	2			277	72			256	555	51		1	33	235	863		1	12	685					352	
Bangkok			33	31			378	751			135	566	62		2	13	235	873		2		2	687				3†4	
Singapore			44	33			478	774			235	567	72†		2	2	235	885		1		2	686				3†3	
New Delhi			144	31			478	76			1	235	566	22†		521	2	235	786		62		2	688	3		3††	
Teheran			144	33			677	785			1	2	533	567	732		754	2	1	235	887	862		2	688	†3	3	†††
Colombo			144	33†			467	786	1		1	223	567	732		32	1	235	888		51		2	688	2		3††	
Bahrain			154	44†			677	785			212	423	567	742		864	1	235	888		861		2	688	†3		3††	
Cyprus			155	453			688	888	4		323	766	678	964		987	533	346	899		985	211	124	789	††2	2	4††	
Aden			155	453			566	788	3		412	322	367	964		954		135	898		861		2	688	†3		35†	
OCEANIA																												
Suva (S)							2	43				55	563	41		343	235	51			321	12	2					
Suva (L)							131		3		121	765	32	641		2	642	223	52		31		2	2				
Wellington (S)							24	42				266	564	3		443	235	52			21	12	3					
Wellington (L)									1		122	441		352		12	542	112	531		21		2	2				
Sydney (S)			22	1			377	551				566	567	51			243	235	841		1	12	62				3	
Sydney (L)							2		1		11	63	1	163		1	243	211	542		2		1	52			2	
Perth			144	2			588	742			1	1	355	567	631	2	22	235	885			2	673				35	
Honolulu								1				21	1	4	52		11	143	225	31		3	421	2	1		2	
AFRICA																												
Seychelles			134	453			556	788	3		422	211	457	964		852		135	889		83		2	678	†			35†
Mauritius			165	554			566	888	4		421	222	557	974		852		235	899		83		2	688	5			3††
Nairobi			155	565			566	788	5		432	311	257	975		984	1	25	899		872		2	688	†4			3††
Harare			45	676	1		466	789	7		441	422	257	985		984	1	25	899		872		2	588	†4			25†
Capetown			23	677	3		366	789	82		441	632	247	996		985	3	14	799		884		1	588	†5			25†
Lagos			66	677	3		28	679	83		462	742	226	896		897	51	3	799		888	2	1	588	†5	5		25†
Ascension Is			45	447	5		87	667	84		363	363	223	796		898	63	1	489		888	51		278	†††	2		4†
Dakar			36	657	5		87	768	84		364	463	224	796		898	741	1	489		888	51		268	†††	2		4†
Las Palmas			25	535	3		78	888	83		242	487	667	895		898	864	334	799		999	631	112	489	†††	3		5†
S AMERICA																												
South Shetland			1	334	3		25	777	74		353	465	554	564		688	742	221	235		566	51		12	233	2		
Falkland Is			3	556	5		28	877	74		354	365	532	465		798	742	2	136		788	51		13	4††	2		
Rio de Janeiro			5	324	5		18	666	74		254	265	322	475		898	643		148		888	51		26	†††	2		3
Buenos Aires			4	545	5		18	867	74		244	265	422	355		898	643	1	36		888	51		3	5††	2		
Lima			534	3			866	64			132	13	522	234		688	333	2	4		688	52		1	3††	2		
Bogota			433	3			1	866	63		121	15	521	134		787	233	2	15		788	52		2	4†5	2		
N AMERICA																												
Barbados			1	533	3		6	866	64		122	26	522	265		787	343	2	37		887	52		5	††5	2		2
Jamaica			322	2			766	53			121	3	532	244		676	133	21	15		788	52		2	4†5	2		
Bermuda			322	2			2	766	63		11	5	533	464		776	133	21	137		888	52		14	†††	2		2
New York			122	1			676	52			11	3	554	563		674	113	221	236		788	421		13	5††	2		
Mexico			22	1			176	42			11	1	453	222		464	41	22	2		388	421			††	2		
Montreal			121	1			566	52			11	4	555	563		664	13	222	236		788	421		14	4††	2		
Denver							25	41				155	431			452	1	232	113		377	42		1	4†	2		
Los Angeles							4	3				46	431			342	2	133	1	1	257	421			2†	2		
Vancouver							1	2				26	531			341	111	124	322		257	421		1	25	2		
Fairbanks											11	124	62			221	232	235	532		234	421		2	211	2	2	

The provisional mean sunspot number for July 1984 issued by the Sunspot Index Data Centre, Brussels, was 37. The maximum daily sunspot number was 80 on 4 July, and the minimum was 9 on 27, 28 July. The predicted smoothed sunspot numbers for October, November, December and January are, respectively: (classical method) 45, 43, 42 and 40; (SIDC adjusted values) 37, 35, 34 and 32.

by Ray Cracknell,
G2AHU (ex-Z22JV)*

ZE2JV BEACON LOG

[illegible]

*18 Green Lane Crescent, Yarpole, Leominster, Herefordshire HR6 0BQ.



Ray Cracknell has recently retired and returned to England after 36 years as a teacher and headmaster in Zimbabwe, from where he operated as ZE2JV and Z22JV. Born and educated in England, he held an AA licence before the war and during it served in the Royal Corps of Signals as a radio theory instructor at the Signals OCTU in

Ray was a pioneer exploiter of tep (transsequatorial propagation) and in the use of beacons in propagation research, working on 50MHz during the IGY and IQSY, and on 144 and 432MHz through the past sunspot maximum. Most of his early work was in conjunction with Roland Whiting, 5B4WR, in Cyprus, and, they were joint authors in this magazine of "Transsequatorial propagation during years of the quiet sun" in 1965 and "Twenty-one years of te" in 1980.

He is married with a daughter in Canberra and a son in Cape Town and holds BA and MED degrees. Ray is a corresponding member of the RSGB Propagation Studies Committee, and this article is a condensed version of the talk he gave at the 1984 RSGB National Convention in Birmingham.

JANUARY

1979

FEBRUARY

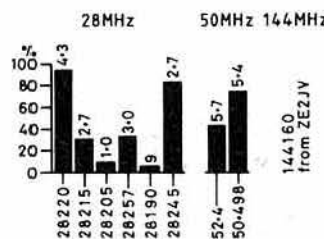
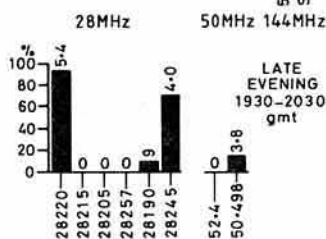
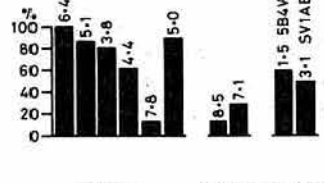
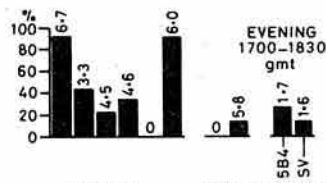
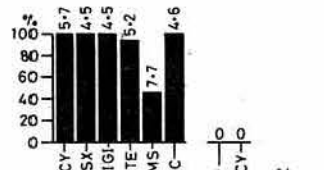
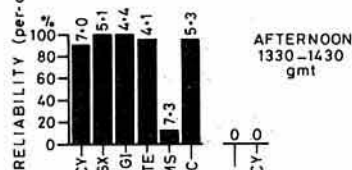
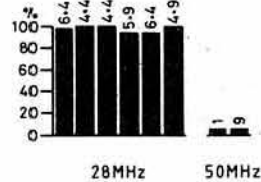
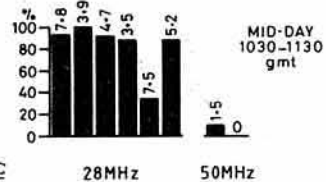
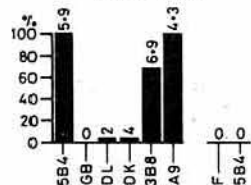
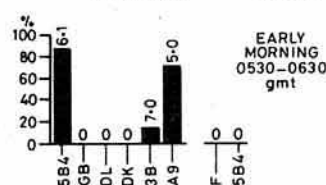


Fig 2. The first of the report sheets sent to interested amateurs at the beginning of the period being discussed

the propagation predictions as published monthly in *Radio Communication* for the path from Britain to Harare, Zimbabwe, at 28MHz and the records of reception of GB3SX at ZE2JV/Z22JV. The predicted reliabilities are indicated by the dashed lines joining points at two-hourly intervals, and the observed by the crosses joining the five observation times (0530, 1100, 1430, 1730 and 1930gmt). Zimbabwe time is two hours ahead of GMT, and it is important to appreciate that it is only the points that are valid indicators and the lines joining them are only a visual aid. Thus in the mornings during February, March and April the absence of an 0800gmt observation probably prevents the observed following very closely the predicted value at that time.

Significant differences are, however, apparent during the northern summer months when the mid-day predictions are very low compared with reliabilities actually recorded. The effect commences in May, and in June and July some predictions are as much as 50 per cent down, and although it decreases in September the effect is still apparent to a lesser degree right through to January. In the late evening, however, observations consistently fell below predictions, but this was almost certainly due to the low power of the beacon, particularly at low angles of radiation, and the high levels of noise received during the evenings on transequatorial circuits. Well-equipped amateur stations could often be heard on 28MHz long after the beacon had faded into the noise, and predictions of late evening propagation were probably correct and certainly not over-optimistic.

Seasonal variations in reliability at each of the testing periods are illustrated in Fig 5. The relatively smooth curves when signals are averaged over the four years and the very high mid-day and afternoon reliabilities are of considerable interest. The typical transequatorial seasonal variations are apparent in the early evening, and the first encounter with the ionosphere south from Britain would have been responsible for low reliabilities in the early morning and late evening during the northern winter.

Annual variations are illustrated in Fig 6. Apart from falls in reliability in the mornings and evenings during 1982, other variations are slight over the four years of high solar activity. These annual reliabilities are summated in Fig 7 for comparison with the variation in smoothed sunspot numbers as published in *Radio Communication* and the annual variation in signal strengths. In spite of the solar activity curve being slightly distorted to show the actual maximum in December 1979, it is evident that maximum reliability and signal strength lagged by approximately one year on the solar activity maximum.

The relationship between reliability and signal strength was an interesting and unexpected outcome of this analysis. Propagation between Britain and Zimbabwe frequently rose to above 50MHz during the day, and it might be expected that with such high usable frequencies 28MHz signals would suffer considerable attenuation. The relationship is examined further in Fig 8 where the diurnal variations in both reliability and signal strength are summated separately for each and illustrated together. The repetition of the pattern year by year is interesting, and the peak of signal strength at

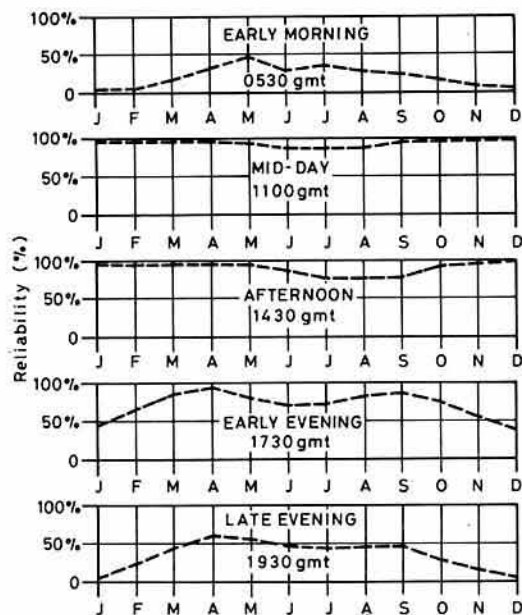


Fig 5. Variations in reliability as illustrated by the averaged monthly means over the four years of sunspot maximum conditions. The very high daytime reliabilities, even in summer, and the evening equinoctial maxima typical of transequatorial propagation are of particular significance.

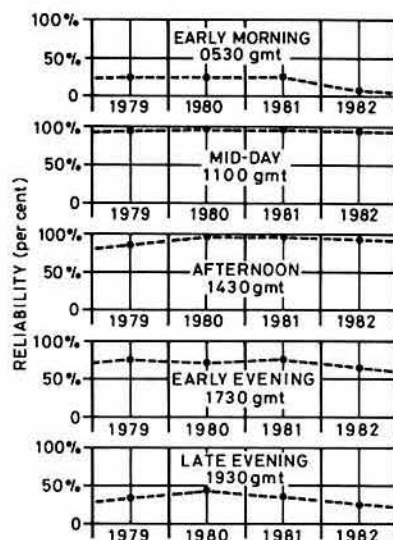


Fig 6. Annual variations in reliability over four years at sunspot maximum at each of the test times.

1430gmt—the same time as the highest usable frequencies were also recorded—seems to be significant.

Seasonal variations in signal strength are illustrated in Fig 9 and bear comparison with the seasonal variations in reliability illustrated in Fig 5. In detail the correspondence is not quite as close, and if reduced to a day-to-day comparison the relationship is not apparent and only appears when results are summated over a long period of time.

Finally, in Fig 10 the results from GB3SX were compared with those from two other beacons, 5B4CY from Cyprus and DL0IGI from Germany, both of which operated with commendable regularity throughout the four-year period. Details relevant to these three beacons and the receiving station in Harare are listed in Table 1. From this table it can be seen that the great circle distances and azimuthal angles from Harare to these three beacons vary considerably, and the geographical disposition of them has an important influence on propagation from them. The path from Cyprus to Harare is one of the most reliable on earth and its capabilities have been well documented in previous articles. Normal two-hop F2 layer propagation

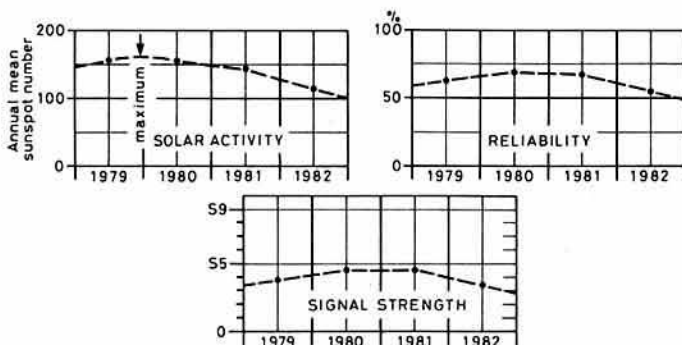


Fig 7. A comparison of annual mean sunspot numbers derived from data published in *Radio Communication* from the Sunspot Index Data Centre, Brussels, and annual mean reliability and signal strength of GB3SX in Zimbabwe.

required an elevation angle of 5-6° and occurred very frequently, but three- and four-hop propagation was generally replaced by chordal hop te, and has not been listed. Two-hop propagation was also theoretically possible from DL0IGI; however, had it been operative it would seem probable that the mid-winter reliability from DL0IGI would be greater than from GB3SX. As can be seen from Fig 10, this was not the case and GB3SX was significantly more reliable than DL0IGI in January and February. This suggests that three-F2 was the dominant mode and that the lower angle of elevation (6.8° for GB and 8.5° for DL) gave GB3SX a slight advantage when operating very close to the highest usable frequency.

It would seem probable too that the correspondence between reliability and signal strength observed from both GB3SX and DL0IGI, and to a lesser extent from 5B4CY, was also influenced by the angles of elevation. Antennas at GB3SX and ZE2JV were in the region of one wavelength above

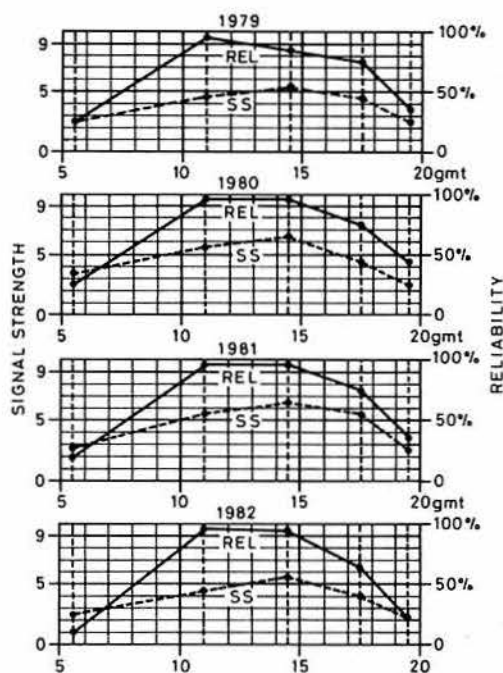


Fig 8. Diurnal variations in signal strength and reliability at the five testing times averaged for each year 1979-1982. The consistency of the shape of these curves, and the relationship between signal strength and reliability are of particular interest

ground, which would account for the effective radiated power (erp) at each being about 6dB down at 6° from what it would be at 12°. When the highest usable frequency rose well above 28MHz, it was reasonable to expect that the dominant mode became 4-F2 (or maybe 1-hop F layer followed by a chordal-hop te). If this were the case then refraction from the ionosphere would still be taking place near the critical frequency, and hence subject to little attenuation, and the 12dB extra antenna efficiency would more than offset any extra ground-reflection losses.

Conclusions

1. Over the circuit tested, the propagation predictions were reliable and when in error tended to be too conservative.
2. The predictions seriously underestimated north-south reliabilities at 28MHz during the summer in years of high solar activity. This finding is only valid during the hours of daylight, but it is important in that, if too conservative, the predictions discourage use of the 28MHz band and lead to unnecessary overcrowding in the 21 and 14MHz amateur bands.

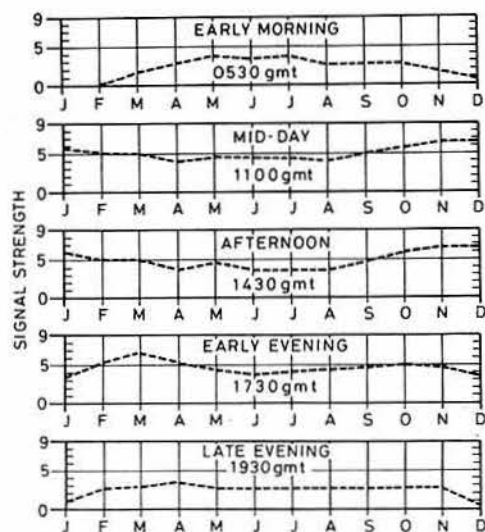


Fig 9. Variations in signal strength at each of the testing times averaged over the four years at sunspot maximum. The time in Zimbabwe is two hours ahead of gmt

Table 1—Details of beacons recorded in Fig 10

Frequency of operation	GB3SX	DL0IGI	5B4CY
Transmitter power	28,215	28,205	28,220
Mode of transmission	10-15W	100W	20W
Location	FSK	FSK	FSK
Latitude	Crowborough	Mt Predigtstuhl	Zygi
Longitude	51°02'N	47°42'N	34°45'N
Altitude	0°08'E	12°53'E	33°19'E
Antenna	167m	1650m	20m
Directivity	Dipole	Dipole	Groundplane
Great circle distance	N-S	N-S	Omni
Maximum elevation angle	8,222km	7,502km	5,846km
	2-F2 —	1-1°	5-6°
	3-F2 6-8°	8-5°	
	4-F2 12-5°	14-4°	
Azimuth (from the receiver)	340-4°	346-9°	2-4°

Receiving station	Milton Park, Harare
Location	17° 48-94'S
Latitude	31° 02-06'E
Longitude	Three-element monoband Yagi at 9m
Antenna	1,500m
Altitude	Home-designed and built
Receiver	

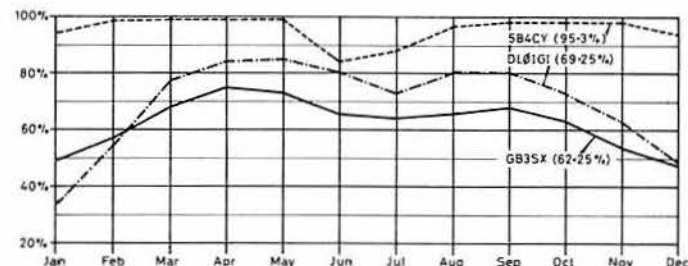


Fig 10. A comparison of the seasonal variations in reliability of three 28MHz beacons, located in Britain, Germany and Cyprus, as received in Harare, Zimbabwe, over the four years 1979-1982

3. Beacons such as GB3SX lack sufficient power to show up less-than-optimum propagation conditions, and hence are of limited use in propagation studies. A re-thinking of policy aimed at increasing the effective radiated power into high-density amateur population areas, and a more economical use of the frequencies available, is now to be recommended.

4. The refinement of our propagation predictions can only occur if amateurs feed back reliable information. While isolated incidents are of little value, those working the same path frequently on skeds, for example, or listeners willing to monitor over a considerable period of time, are urged to keep records and, if sent to me, such records will be submitted to the Propagation Studies Committee.

VISITORS TO BV0JA



Tim Chen, BV2A/BV2B, and Graham Mott, G4KLP, at BV0JA. (See "Overseas news," MOTA, p.879.) Two Japanese visitors are operating the station

Contest News

The Commonwealth Contest 1985 rules

Participation in this contest will count towards the HF Contest Championship 1984-5 for UK entrants.

TRANSMITTING SECTION

1. When. From 1200gmt on Saturday 9 March 1985 to 1200gmt on Sunday 10 March 1985.

2. Eligible entrants. Members of the RSGB resident in the UK and radio amateurs licensed to operate within the British Commonwealth or British Mandated Territories. Entries from GB, aeronautical mobile or maritime mobile stations will not be accepted.

3. Contacts. A1A only in the 3·5, 7, 14, 21, and 28MHz bands. Contacts may be made with any station using a British Commonwealth callsign, except those within the entrant's own call area. UK stations may not work each other for points. In accordance with IARU recommendations, contestants are requested to operate within the lower 30kHz of each band, except when contacting novice stations that operate above 21,100kHz and 28,100kHz. A contact exchange consists of RST and a three-figure serial number commencing with 001 and increasing by one for each successive contact throughout the contest, irrespective of band in use. Serial numbers, when sent from non-competing stations, must be recorded.

4. Scoring. Each completed contact will score five points. In addition, a bonus of 20 points may be claimed for the first, second, and third contacts with each Commonwealth call area (as listed in the accompanying table) on each band. All British Isles prefixes (G, GB, GD, GI, GJ, GM, GU, and GW) count as one call area.

5. Logs. Separate logs for each band must include gmt, callsign of station worked, RST/serial number sent, RST/serial number received and points claimed. Separate band totals should be added together and the total claimed score entered on the cover sheet. It is important that logs are carefully checked for duplicate contacts. Unmarked duplicate contacts for which points have been claimed will be heavily penalized and logs containing in excess of five may be disqualified.

6. Entries. Entries may be single- or multi-band. Single-band entries should show contacts on one band only; details of contacts made on other bands should be enclosed separately for checking purposes. Multi-band entries will not be eligible for single-band awards.

Each entry will consist of the separate band logs together with a cover sheet declaration that the rules and spirit of the contest and the terms of the entrant's licence were observed.

Entries should be addressed to A. K. Gray, G4DJX, 44 Sherwood Avenue, St Albans, Herts AL4 9PQ, UK. Adjudication of this contest will commence on Monday 13 May 1985. Any entry received after this date may be excluded from the contest. Overseas stations are therefore advised to forward their logs by air mail.

All entries become the property of the RSGB. In the event of any dispute, the ruling of the Council of the RSGB shall be final.

7. Awards. To the winner, the BERU Senior Rose Bowl; to the runner-up, the BERU Junior Rose Bowl, and to the leading UK station, the Col Thomas Rose Bowl. Certificates of merit will be awarded to (a) first, second and third placings in home and overseas multi-band sections; (b) the leading home and overseas single-band entries on each band; (c) the leading station in each overseas call area.

RECEIVING SECTION

1. When. Times and dates as for transmitting section.

2. Eligible entrants. Members of the RSGB resident in the UK and all swls resident in the British Commonwealth or British Mandated Territories. Only the entrant may operate his receiving station for the duration of the contest. Holders of transmitting licences covering frequencies below 30MHz are not eligible to take part.

3. Scoring. To count for points, a station outside the entrant's own call area must be heard in a contest contact. CQ or test calls will not count for points. A station may be logged only once on each band for the purpose of scoring. When both stations in contact are heard, they should be logged separately and points claimed for both entries provided that the stations are outside the entrant's own call area.

Each completed log entry will score five points. In addition, a bonus of 20 points may be claimed for the first, second and third stations heard in each British Commonwealth call area on each band. All British Isles prefixes count as one call area.

4. Logs. A separate log is required for each band. Logs should show the date/time gmt, callsign of station heard, RST/serial number sent by the station heard, callsign of the station being worked and points claimed.

5. Entries. Each entry will consist of the log sheets, cover sheet and a signed declaration that the receiving station was operated in accordance with the rules and spirit of the contest and that the entrant does not hold a transmitting licence for the frequencies below 30MHz. Entries should be addressed and sent as in rule 6 of the transmitting section. All entries become the property of the RSGB. In the event of any dispute, the ruling of the Council of the RSGB shall be final.

6. Awards. The BERU Receiving Rose Bowl to the winner. Certificates of merit to the leading entrant in each continent.

COMMONWEALTH CALL AREAS

The following call areas are recognized for the purpose of scoring in the 1985 Commonwealth Contest:

A2	Botswana	VR6	Pitcairn
A3	Tonga Is.	VR5	Brunei
A5	Bhutan	V56	Hong Kong
C2	Nauru	VY1	Yukon
C5	Gambia	VU	India
C6	Bahamas	VU	Laccadive Is.
GI/GB/GD/GI/GJ/GM/GU/GW		VU7	Andaman & Nicobar Is.

H4	Solomon Is.	YJ	Vanuatu
J3	Grenada	Z2	Zimbabwe
J6	St. Lucia	ZB2	Gibraltar
J7	Dominica	ZC4	Cyprus (UK Bases)
J8	St. Vincent	ZD7	St. Helena
P2	Papua New Guinea	ZD8	Ascension Is.
S7	Seychelles	ZD9	Tristan da Cunha, Gough Is.
T2	Tuvalu	ZF	Cayman Is.
T30	W. Kiribati	ZK1	Cook Is.
T31	C. Kiribati	ZK1	Manihiki
T32	E. Kiribati	ZK2	Niue
V2	Antigua, Barbuda	ZK3	Tokelau
V3	Belize	ZL0*	
VE1	Maritime Provinces	ZL1*	
VE1	Sable Is.	ZL2*	
VE1	St. Paul Is.	ZL3*	
VE2	Province of Quebec	ZL4*	
VE3	Province of Ontario	ZL7	Chatham Is.
VE4	Province of Manitoba	ZL8	Kermadec Is.
VE5	Province of Saskatchewan	ZL9	Aukland & Campbell Is.
VE6	Province of Alberta	3B6/3B7	Agalega & St. Brandon
VE7	Province of Br. Columbia	3B8	Mauritius
VE8	North West Territories	3B9	Rodriguez Is.
VK1	Australian Capital Ter.	3D2	Fiji
VK2	New South Wales	3D6	Swaziland
VK3	Victoria	4S	Sri Lanka
VK4	Queensland	5B4	Cyprus
VK5	South Australia	5H	Tanzania
VK6	Western Australia	5N	Nigeria
VK7	Tasmania	5W	Western Samoa
VK8	Northern Territories	5X	Uganda
VK9L	Lord Howe Is.	5Z	Kenya
VK9N	Norfolk Is.	6Y	Jamaica
VK9X	Christmas Is.	7P	Lesotho
VK9Y	Cocos Keeling Is.	7Q	Malawi
VK9Z	Melish Reef	8P	Barbados
VK0	Heard Is.	8Q	Maldives
VK0	Macquarie	8R	Guyana
VK0/VP8/ZL5	Antarctic	9G	Ghana
VO1	Newfoundland	9H	Malta
VO2	Labrador	9H4	Gozo & Comino
VP2E	Anguilla	9J	Zambia
VP2K	St. Kitts, Nevis	9L	Sierra Leone
VP2M	Montserrat	9M2	W. Malaysia
VP2V	British Virgin Is.	9M6/9M8	E. Malaysia
VP5	Turks & Caicos	9Y	Singapore
VP8	Falkland Is.	9V	Trinidad & Tobago
VP8	S. Georgia	*	Due to recent changes in the New Zealand licence allocations.
VP8	S. Orkneys		
VP8	S. Sandwich Is.	ZL0, ZL1, ZL3, & ZL4	will count as separate call areas for the purpose of this contest.
VP9	S. Shetland Is.		
VQ9	Bermuda		
	Chagos		

December 70MHz CW Contest rules

0900-1400gmt 16 December 1984

The following general rules, published in the supplement to the January 1984 issue of *Radio Communication*, will apply: 1, 2, 3, 4a, 5a, 6b, 7a, 9, 10a, 11a, 12a, 13-24.

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

December 144MHz Fixed Station Contest rules

0900-1700gmt 2 December 1984

The following general rules, published in the supplement to the January 1984 issue of *Radio Communication*, will apply: 1, 2, 3, 4b & 4d, 5a, 6a, 7a, 9, 10a, 11a, 12b, 13-24. Certificates will be awarded to the leading station in each RSGB zone. Entrants should note their zonal code (see p18, January 1984 *Radio Communication*) on their cover sheets.

All entries and check logs to: VHF Contests Committee, c/o M. Pharaoh, G3LCH, 49 Streathbourne Road, London SW17 8QZ.

Second 1·8MHz Contest 1984 rules

1. The general rules for RSGB hf contests, published in the January 1984 issue of *Radio Communication*, will apply.

2. **Eligible entrants.** Single-operator stations only. British Isles entrants must also be members of the RSGB.

3. **Period.** 2100gmt Saturday 10 November to 0100gmt Sunday 11 November.

4. **Sections.**

(a) British Isles stations.

(b) Overseas stations including EI.

5. **Frequencies/Mode.** 1·81-2·0MHz cw only. British Isles stations should note that overseas stations may be allocated different parts of the band, eg France, Luxembourg, Netherlands, and Denmark, 1·830-1·850MHz; Yugoslavia, Switzerland and Austria, 1·810-1·850MHz; FR of Germany, 1·815-1·835MHz; 1·850-1·890MHz; Norway 1·820-1·850MHz; and Sweden, 1·830-1·845MHz.

6. **Exchange.** RST and serial number commencing at 001. British Isles stations must also send their county/region codes as published in the January issue of *Radio Communication*.

7. **Scoring**

(a) **British Isles section.** Three points for each completed contact, with a bonus of five points for the first contact with each British Isle county/region, and for the first contact with each country outside the British Isles.

(b) **Overseas section.** Three points for each completed contact with a British Isles station, with a bonus of five points for the first contact with each country/region.

8. **Logs.** RSGB hf contest log sheets, written on one side only, or A4 sheets with seven columns headed: date/gmt; callsign; RST/number sent; RST/number received; county code received; bonus; points. Duplicate contacts must be clearly marked without claim for points. Any unmarked duplicate will be penalized at the rate of 10 times the contact points value. Entries with more than five unmarked duplicates will be disqualified.

9. **Declaration.** Each entry must be accompanied by the following declaration, signed and dated: "I declare that this station was operated strictly in accordance with the rules and spirit of the contest, and agree that the decision of the Council of the RSGB shall be final in all cases of dispute."

10. **Address for logs.** RSGB HF Contests Committee, c/o M. Harrington, BRS20249, 123 Clensham Lane, Sutton, Surrey SM1 2ND.

11. **Closing date for logs.** Logs must be postmarked no later than Monday 26 November 1984.

12. Awards.

(a) The Victor Desmond Trophy will be awarded to the winning station in the British Isles section, and certificates of merit will go to the second and third placed entrants in this section.

(b) The Maitland Trophy will be awarded to the Scottish station scoring the highest aggregate number of points in this contest with the First 1-8MHz Contest 1985.

(c) Certificates of merit will be sent to the first three stations in the Overseas section and to the leading station in each overseas country.

(d) A certificate of merit will be awarded to the highest placed entry from a station which has not entered a Second 1-8MHz contest before. Candidates for this award should mark their cover sheet "First time award".

(e) A certificate of merit will be awarded to the highest placed British Isles entrant who has achieved pensionable age on or before 10 November 1984. Candidates for this award should mark their cover sheet "Senior citizen's award".

RECEIVING SECTION

1. Transmitting section rules 1, 2, 3, 4, 5, 7, 8, 10 and 11 will apply.

2. **Logging.** A station may appear once only in the column headed "station heard". The callsigns of the stations being worked may only repeat once in every three contacts logged. Entrants should log date/gmt; the callsign of the station heard; RST/serial number and county code given by that station; and the callsign of the station being worked.

3. **Awards.** Certificates of merit will be awarded to the leading three receiving stations.

4. Holders of British Class B licences may enter the receiving section.

Low Power Field Day July 1984 results

Although the number of entries is comparatively small, this contest is obviously enjoyed by the participants. Simplicity of logistics and convenient operating hours are the attractions. The 3-5MHz session in the morning gave good inter-G contacts, but the afternoon session on 7MHz provided relatively few inter-contestant QSOs. With the continuing decline in the sunspot cycle inter-G working on 7MHz becomes less certain, and next year's rules may reflect a change concerning 7MHz.

The White Rose group (G3VMW, G3VTY, G3WSZ and G4UZN), operating G3XEP/P, were the winners of Section A with 913 points from 101 QSOs. On 3-5MHz they found 24 15-pointers and 18 on 7MHz. Verulam, G3VER/P, just held on to second place, only three points ahead of Jeff, G4ELZ/P.

Section B was won by George, GM3OXX/P, running 2W. Second and third places were also very close in this section. Graham, G3VIP/P, just pipped Denis, G3KKQ/P, into second place. Equipments used in the 5W section included some HW8s, an FT301S and an Argosy. For his first-ever contest entry, Rod, G4MIJ/M, used a 1W crystal-controlled tx on 7,030kHz.

The certificate for the fixed station check log entry giving the highest number of points to portable stations goes to Lionel, G4PLJ, who worked 22 portables on 3-5MHz and 14 on 7MHz. Members of the Verulam Club supported this contest in a big way, with no less than four logs—three in Section A and one checklog.

Subject to Council approval the White Rose group, G3XEP/P, will be awarded the Houston-Fergus Trophy.

G3TXF

SECTION A (15W input maximum)

Posn	Callsign	Power (W)	QSOs 3-5MHz	QSOs 7MHz	Pts 3-5MHz	Pts 7MHz	Total score
1	G3XEP/P*	10	56	45	514	399	913
2	G3VER/P*	15	49	46	463	362	825
3	G4ELZ/P*	12	47	43	432	390	822
4	G4JKS/P	15	52	32	470	287	757
5	G4JBD/P	10	55	32	455	295	750
6	G3SFG/P	15	48	38	366	295	661
7	G3ASR/P	15	41	28	388	268	656
8	G4AYM/P	10	50	31	425	219	644
9	G4CDD/P	12	40	25	400	230	630
10	G4KGB/P	15	46	21	418	135	553
11	G4OGB/P	8	37	18	329	149	478
12	G4PDO/P	15	44	—	370	—	370

SECTION B (5W input maximum)

Posn	Callsign	Power (W)	QSOs 3-5MHz	QSOs 7MHz	Pts 3-5MHz	Pts 7MHz	Total score
1	GM3OXX/P*	2	30	22	269	205	474
2	G3VIP/P*	5	24	9	287	105	392
3	G3KKQ/P*	3	28	—	388	—	388
4	G3DIT/P	3	23	19	245	127	372
5	G3SB/P	3	19	11	220	135	355
6	G3YRC/P	5	11	12	94	136	230
7	G4MIJ/M	1	—	4	—	57	57

Check logs gratefully received from G3AYC, G3VW/P, G4PLJ*, G4PVB.

* Certificate winners.

June 70MHz & SWL Contest results

As outlined in the rules for this contest the date had been changed to coincide with HF NFD and to encourage vhf operation from the "hf" sites used during HF NFD.

The feedback from the entries shows limited support from HF NFD station sites. Comments on 427 sheets varied from "Why not try a 144 or 432MHz contest?", or "How about a 50MHz contest instead next year!", to one station for the first time in 20 years sending a check log instead of a full entry as a protest.

The VHF Contests Committee will obviously take these views into consideration when setting out next year's contest calendar, and this does show the value of using your 427 sheets to communicate your views.

The contest itself had less entries than last year, but it was good to note the three entries in the Listener section (there were none last year).

Conditions appeared average to good depending on QTH, with many reports of rain static and strong sporadic-E. One station quoted 5 and 9 + 60 Es for a period of 60min. GMs were worked by a number of stations via meteor scatter. One station complained of interference from illegal radio phones. This seems to be an increasing problem on 70MHz.

Congratulations to the winner and runner-up in the Open section, GW4MGR/P and G3MPN/P respectively. Also the winner in the Fixed section, G4FOM, and the winner in the Listener section, BRS52543, who all receive certificates.

G4HWA

OPEN SECTION

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
1	GW4MGR/P	601	77	YN75f	GM3WOJ	512
2	G3MPN/P	586	63	AM06d	GM3WOJ	609
3	G4ADV/P	504	41	KK46c	G3MPN/P	500
4	G4ERP/P	484	89	YL10c	GM4JLD	443
5	GW4BYV/P	480	69	YL25j	GM4JLD	457
6	G3PIA/P	429	72	ZL33h	GM3WOJ	686
7	G3UAX/P	411	75	ZL53b	GM4JLD	517
8	G3ZAM/P	402	69	ZK07h	G3BW	441
9	G4BOX/P	221	52	ZL59c	G4ADV/P	337
10	G3LXP/P	163	43	ZL28b	GD2HDZ	380
11	G4TUJ/P	141	34	YM60d	G3TY/P	242
12	G3LTY/P	132	22	AL56b	GW4MGR/P	349

FIXED SECTION

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
1	G4FOH	284	53	ZM80b	G4ADV/P	414
2	G4CIZ	216	45	ZL55a	EI2CA	387
3	G4NRG	163	36	AL32c	G4ADV/P	388
4	G4SHP	157	34	AL41j	G4ADV/P	363
5	GU4XEA	146	15	YJ48h	G3MPN/P	460
6	G4MUT	126	36	ZL46j	G4ADV/P	298
7	G4VZV	101	20	ZM05g	G4GQR	247
8	G4CAX	81	17	YN68a	G3PFM/A	274
9	G4JED	71	26	ZL50c	GW4MGR/P	276

LISTENER SECTION

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
1	BRS52543	229	28	YN15c	GM3WOJ	424
2	BRS28198	131	24	AK04h	GW4MGR/P	340
3	BRS44984	59	18	AL41e	GW4MGR/P	286

Check log gratefully received from G3JEQ.

BARTG Autumn VHF Contest 1984 rules

1800gmt 13 October to 1100gmt 14 October

The rules for this contest are broadly the same as those of previous years. Copies of the rules can be obtained from BARTG Contest Manager, 464 Whippendell Road, Watford, Herts WD1 7PT, to whom all logs should be sent, postmarked no later than 17 November 1984.

Summer 1-8MHz Contest 1984 results

Good band conditions with unusually low levels of QRN ensured a successful and enjoyable mid-summer contest, and a higher level of activity from overseas permitted achievement of record scores for the UK winners. A total of 228 different stations were logged from 39 different DXCC countries, including FC, HB0, LX, OY, PY, UA9, VE, W, ZB2. The 129 logged UK stations were located in 49 different counties, but with the other 29 counties remaining unrepresented.

In the UK section Dennis Andrews, G3MXJ, kept ahead of a closely fought battle by combining a good QSO score with a winning bonus total. Al Slater, G3FXB, came in just ahead of Peter Linsley, G3PDL—second and third places respectively—and these leading logs lost extremely few points in adjudication. Over half of all QSOs claimed by UK entrants were fully cross-checked against other logs submitted and several stations lost positions in the table as a result of inaccurate callsigns, RST, serial numbers or county codes.

In the Overseas section Nick Shirko, UA2FJ, finished well ahead on both QSOs and bonus points, and was followed, as in the UK section, by several stations competing closely for second place. The operators at EI2CA were placed second, just ahead of OK3KIL, operated by OK3-27356. Many points were deducted from logs, especially as a result of inaccurate county codes: three-quarters of all QSOs claimed by overseas entrants were cross-checked against logs submitted by UK stations.

Cover sheets reveal that the most popular antenna for this contest is the inverted-V. While station location clearly contributes to performance, height above ground of the antenna certainly helped entrants to be among the leaders: several stations claimed 60ft above ground or more, and the UK winner also benefited from a choice of antennas in the form of an inverted-V at 65ft and a 65ft shunt-fed vertical.

Nearly all entrants are congratulated on submitting logs clear of unmarked duplicates: the penalty of 10 times the claimed points for the duplicate contact evidently makes it worthwhile to spend a few minutes cross-checking logs before posting. However, all entrants are reminded that accurate logging of QSO details is also essential to avoid loss of valuable points. A high proportion of claimed QSOs can be cross-checked against other submitted logs and this led to many stations losing points (including the associated bonus points where callsigns were logged incorrectly).

The duration of the contest and all other rules appear to meet with favour and accordingly no material changes are proposed for the 1985 event. Many

overseas stations appear to lack copies of detailed rules, scoring system and UK county codes and address for posting: the HF-Contests Committee will therefore seek to improve spread of publicity.

Checklogs are gratefully acknowledged from G3BPM, G3KDB, PA3AAV and UB5ZAL.

G3SXW

BRITISH ISLES SECTION

Posn	Callsign	QSOs	Bonus	Total
1 *	G3MXJ	132	68	730
2 *	G3FXB	134	63	711
3 *	G3PDL	131	65	707
4	G4BUO	123	67	700
5 *F	G3RFS	126	66	694
6	G3XTT	124	63	674
7	G3TXX	124	61	672
8	G3XWZ/A	123	58	637
9 F	GU3HFN	116	57	606
10	G3SWH	98	58	578
11 F	G4VER/P	100	56	570
12	GM3PFO	93	59	567
13 FM	G4KHC	100	53	558
14	G4CP	113	59	527
15	G3OLB	96	50	520
16 F	G4UPS	90	52	516
17	GM4SID	94	53	507
18	G4ARI	80	54	500
19	GM3ZRT	89	51	480
20	G2MJ	101	50	473
21 M	G4VFC	82	48	472
22	G4ELZ/P	77	49	468
23	G4BOU	75	48	454
24 F	G4OGB	77	47	454
25	G3PJX	78	46	445
26 *	GW3J	68	47	435
27 S	G8RZ	72	42	419
28	G3CCZ	60	40	370
29 F	G4XFB	55	40	366
30	G3MCX	54	40	361
31 F	G4OTU	55	40	341
32 F	GD3RFH	43	39	322
33 M	G4LPK	41	33	285
34	G3HRY	36	34	278
35	G3GMM	38	31	258
36	GW3GWX	35	28	240
37	G6QZ	20	20	159
38	G3VJZ	11	9	60

OVERSEAS SECTION

Posn	Callsign	QSOs	Bonus	Total
1 *	UA2FJ	64	36	363
2 *M	EI2CA	51	33	306
3 *	OK3KII	49	34	297
4	DK8AX*	45	32	291
5	OK3CZM	46	32	285
6	OL1BIR	39	29	258
7	OK2PLH	36	27	236
8 *	PA3AMA	34	27	228
9 *	OE1TKW	31	28	220
10	OK1DAV	29	25	207
11 *F	EA1AUI	31	24	200
12	OK1DBM/P	43	24	196
13	OK2PGT	29	22	191
14 *	UQ2GNL	30	22	190
15 *	EA2CR	26	23	189
16	UA3PFN	25	23	189
17	UA6LV	27	22	181
18	OK1DRO	24	21	176
19 *	UB5ITU	28	20	174
20	OK2BIU	33	24	170
21 *	UC2IDZ	22	21	169
22	DJ8FR	32	22	163
23	UB4ZWW	28	17	157
24	OL5BFO	22	18	151
25	RA3DOX	25	18	150
26	U26LWT	25	16	145
27	OL0COB	19	18	144
28	OK1ORA	25	15	139
29 F	DL1KAV	24	16	138
30	RT5UY	32	19	134
31	UA3AQW	17	16	130
32	OK1KZ	13	13	104
33 *	UA9CR	9	8	65
34 *	LA1PBA	9	6	51
35	OK1DZD	5	5	40
36	U24WWB	6	4	36

* Certificate winner M Multi-operator station
F First-time entrant S Senior citizen entry

June 432MHz Trophy Contest results

This year the 432MHz Trophy Contest moved from April to early June, in the hope that fair weather would encourage more activity, especially from the more northern areas. Judging by the number of entries, which was nearly double last year's, and by the views of most contestants, the move has been successful. It has, however, meant a greater density of contests in the middle of the year, and this brought adverse comment from one participant. Your comments, please.

The weather was particularly kind throughout the country, but this was not matched by conditions on the band, which had deteriorated from the lift of a few days before. Contestants described conditions as "flat", "average", or "reasonable", and commented on deep QSB being noticeable on many signals. Nevertheless, the scores and numbers of QSOs made by the leading stations were over 50 per cent up on last year.

The only comment on equipment came from GW4LIP/P whose "GaAs fet preamp died (again) just before the start". Presumably they replaced it, because the 1951 Council Cup goes to them this year (subject to approval by Council). Congratulations to the winners and runners-up in each section, and to BRS32525, who won the swl section.

G4ERP

Contests Calendar

22 September-7 October	International "50th Anniversary Province of Latina" Tournament (Rules in September MOTA)
6 October	DF Double Night Event Slade
6-7 October	432MHz-24GHz & IARU UHF (Rules in June issue)
6-7 October	VK/ZL Oceania (Phone) (Rules in September MOTA)
7, 14, 21 October	ON (Rules in October MOTA)
9, 25 October	432MHz Cumulative (Parts 1 and 2) (Rules in August issue)
13 October	BARTG Autumn VHF (Rules in October issue)
13-14 October	VK/ZL Oceania (CW) (Rules in September MOTA)
14 October	21/28MHz Phone (Rules in May issue)
17 October	1,296MHz Cumulative (Part 1) (Rules in August issue)
17-18 October	YL Anniversary Party (CW) (Rules in October MOTA)
21 October	21MHz CW (Rules in May issue)
27 October	DF Treble Night Event Mid-Thames
27-28 October	CQ WW DX (CW) (Rules in October MOTA)
28 October	70MHz Fixed (Rules in August issue)
31 October-1 November	YL Anniversary Party (SSB) (Rules in October MOTA)
1-7 November	HA-QRP (Rules in October MOTA)
2, 18 November	1,296MHz Cumulative (Parts 2 & 3) (Rules in August issue)
3-4 November	144MHz CW & Marconi Memorial (Rules in August issue)
4 November	LF CW WAB*
10-11 November	European DX (RTTY) (Rules in July MOTA)
10-11 November	2nd 1-8MHz (Rules in October issue)
10, 26 November	432MHz Cumulative (Parts 3 & 4) (Rules in August issue)
12, 20, 28 November	28MHz Cumulatives
6-14, December	
24-25 November	CQ WW DX (Phone) (Rules in October MOTA)
2 December	144MHz Fixed (Rules in October issue)
16 December	70MHz CW (Rules in October issue)
1985	
January-February	BATC ATV Winter Cumulative (Rules in CQ-TV)
2-3 February	7MHz (Phone) (Rules in September issue)
23-24 February	7MHz (CW) (Rules in September issue)
9 March	Commonwealth (Rules in October issue)

* Rules, logsheets and other information from Steve Lawrence, 7 Ashfield Road, Market Harborough, Leics.

FIXED SECTION

Posn	Callsign	Score	QSOs	QTH	Best dx	Km	Antenna
1	G4LOJ	1,584	159	AM37	DL6WU	621	27-el QL
2	G4SIV	1,369	133	ZM29	DL4OL	706	4 x 21-el Y
3	G4BVY	797	113	YM79	DL2KBB	604	2 x 21-el Y
4	G3GJL	607	97	YM58	DL2KBB	642	2 x 19-el Y
5	G8OPR	571	92	ZL63	GM8MJV/P	491	8 x 21-el Y
6	G6VLT	306	76	ZL39	F6CTW	352	4 x 21-el Y
7	G4FOH	294	42	ZM60	DJ6JJ	495	21-el Y
8	G1DOX	288	58	YM28	GM8MJV/P	312	19-el Y
9	G4ERO	281	43	ZK11	G4THB/P	414	88-el MBM
10	G4TBR	255	61	ZL27	PE0MAR	327	19-el Y
11	G4DDL	240	48	ZL47	G4THB/P	334	19-el Y
12	G8EBT	188	30	ZO75	G4CQR	343	2 x 48-el MBM
13	G6SKU	182	39	YM60	GM3KJF/P	324	21-el Y
14	G4UDE	168	28	YM15	G4MRS/P	302	21-el Y
15	G6LZO	112	26	ZN22	G8OPR	275	2 x 48-el MBM
16	G6TGB	90	16	ZK14	G4NVA/P	275	18-el PBM
17	GM8GFF	28	6	YP04	G4THB/P	240	18-el PBM

Checklogs received from G6GVI, PE1EWR, G6AXO and GM3KJF/P.

ALL OTHERS SECTION

Posn	Callsign	Score	QSOs	QTH	Best dx	Km	Antenna
1	GW4LIP/P	2,724	269	YN75	DK0OW	735	4 x 21-el Y
2	GW4NXP/P	2,633	257	YL25	DK1UV	763	4 x 16-el Y
3	GW8KQW/P	2,211	235	YM44	DJ6JJ	715	4 x 21-el Y
4	G4THB/P	1,987	171	ZO48	F6CTW	652	2 x 21-el Y
5	G4MRS/P	1,793	196	AM67	DL4OL	599	4 x 4-2x Y
6	G4NVA/P	1,538	182	ZN53	DJ6JJ	626	4 x 19-el Y
7	G3WOI/P	1,440	202	ZL53	DJ5BV	596	2 x 48-el MBM
8	GW4MGR/P	1,432	184	YN65	F6CTW	621	4 x 19-el Y
9	G3TQF/P	1,369	143	ZN18	DK1UV	615	2 x 21-el Y
10	G3UHF/P	1,001	148	ZN61	DJ6JJ	642	4 x 23-el Y
11	G6ZEK/P	787	151	ZN61	DJ6JJ	522	4 x 19-el Y
12	G4RLF/P	630	100	YK10	PA0RDY	504	Silver 70
13	GW8VHI/P	616	82	YL23	PE0MAR	568	2 x 19-el Y
14	G8JAY/P	485	79	ZL01	DL2KBB	572	21-el Y
15	G4LLR/P	392	78	ZL07	GM3KJF/P	399	17-el Y
16	GM8MJV/P	376	42	YP42	G8FUO	482	2 x 21-el Y
17	G8UZY/P	326	39	ZO58	G4ERO	402	19-el Y
18	G6CSY/P	240	54	AL51	GW4MGR/P	308	19-el Y
19	G8URJ/P	227	43	AL22	DL2KBB	422	19-el Y
20	G6HLL/P	220	40	YN66	G4CQR	318	21-el Y
21	G3NJA/P	211	36	YK22	G4THB/P	465	18-el PBM
22	G3VEF/P	184	40	ZK05	F6CTW	346	19-el Y
23	G6OI/P	144	37	YM49	G8FEZ	250	10-el Y

SWL SECTION

Posn	BRS No	Score	QSOs	QTH	Best dx	Km	Antenna
1	32525	231	58	AL41	G4THB/P	310	19-el Y
2	28198	147	19	AK04	GW4MGR/P	360	48-el MBM
3	52543	121	23	YN15	G4MRS/P	340	19-el Y

1984 HF NATIONAL FIELD DAY RESULTS

This year's contest, the fifty-first year of NFD, attracted well over 100 entries, the Restricted section having the largest number of competitors. With the decline in the sunspot activity, the lower frequency bands took the lion's share of the contest traffic, and most of the higher-placed stations used these bands to their advantage. Some very good scores were recorded, and many groups were able to achieve their best results ever in an NFD contest.

Once again the weather proved to be more than unkind, and most areas suffered from thunder, rain, hail and high winds. It all started well enough, and Saturday proved to be a real scorcher, but the rain and thunder were not very far away. Come nightfall, the storms moved in from the south and most groups were in for a bad night. Thankfully, there were no reports of actual, or near, lightning strikes, but there was so much static that many stations had to close down until the storms had passed. After the thunder came the rain and the wind, and judging by reports from contestants, there was plenty of both.

A number of groups suffered from flash floods, gale force winds, hailstorms and all sorts of associated problems. Antennas and masts came down and many had to carry out running repairs to waterlogged generators and tents during the worst of the rainfall. Farm tractors, Land Rovers and other fwd vehicles had to be called into service to tow out bogged down or waterlogged cars, caravans and antenna trailers. One group had a narrow escape when their 60ft scaffold tower came down on top of the motor caravan that they were using as the shack.

Open section

It has been some years since the NFD Trophy was won by a station in the south of England, but this year Gravesend, G3GRS/P, managed to take the top honours and the NFD Shield with a score of 3,319 from 815 contacts. In second place Rascal 'B', G3KLH/P, made 834 QSOs for 3,219 points, followed by Glenrothes 'A', GM4GRC/P with 2,965 points from 683 contacts.

G3GRS/P was operated by G4BUO and G4FAM using nine different antennas—single dipoles on 1.8 and 3.5MHz; two dipoles and two loops on 7MHz; a three-element triband Yagi, and 14 and 28MHz loops. Their transceiver was an Omni-D, and they used a separate JRS599 receiver for 'spotting'. Rascal 'B' used a TS930S into a two-element triband quad for 28/21/14MHz, a two-element Yagi for 7MHz, and dipoles for the other bands. The operators were G3KLH, G3RVM, G3SJJ and G4DSE. Glenrothes, with operators GM3OLK, GM3YOR, GM3ZSP and GM4EJ had both a three-element triband Yagi and a separate 14MHz single-band Yagi for the hf bands, and dipoles for the lower frequencies.

Restricted section

The section winners Stockport, G6UQ/P, had a final score of 3,080 points from a total of 743 contacts, to net them the Bristol Trophy. They used a TS830S transceiver feeding an inverted-V fed with open wire line. The operators were G3PEK and G3NOM. Second were last year's winners, the Great Western Group, using their new club call, G6VX/P. They made 730 contacts using a TS530S and a 264ft c/f wire. G3MZV, G3NKS and G5EBU did the keying. As there was a greater number of entries in this section than in the Open, the



The Channel Contest Group, G4DAA/P, keeping a close eye on the generator. L to r: Roger, G3SXW; Nigel, G3TXF; Dennis, G3MXJ; and Ian, G3WVG. Photo: G3WVG

NFD Trophy
Gravesend RS.....3,319 points

Bristol Trophy
Stockport RS.....3,080 points

Gravesend Trophy
Great Western Contest Group.....2,930 points

Scottish NFD Trophy
Glenrothes & DARS 'A'.....2,965 points

Frank Hoosen (G3YF) Memorial Trophy
Hereford ARS.....1,365 points

Leading scores on individual bands

Open section

1.8MHz Gravesend RS.....776 points
3.5MHz Farnborough & DRS (Contest Gp).....1,154 points
7MHz Maidenhead & DARC 'A'.....1,083 points
14MHz Hereford ARS.....1,365 points
21MHz Torbay ARS.....351 points
28MHz Glenrothes & DARS 'A'.....622 points

Restricted section

1.8MHz Marple Contest Club.....698 points
3.5MHz Echelford ARS.....1,231 points
7MHz Farnborough & DRS.....1,178 points
14MHz Saltash & DRS.....766 points
21MHz West of Scotland ARS 'B'.....281 points
28MHz Aberdeen ARS 'B'.....398 points

Overseas stations giving most points to entrants

Europe: YU7SF/M
Australasia: VK6PG
Africa: ZS6ME

North America: W3ARK
Asia: 9K2BE

group will be awarded the Gravesend Trophy. Channel, G4DAA/P, with G3MXJ, G3SXW, G3TXF and G3WVG, used Drake "separates" and a 264ft c/f wire to make 696 QSOs for third place.

Scottish NFD Trophy

The Aberdeen, West of Scotland, and the Glenrothes groups were in contention during much of the 24h. There was little difference in their scoring rates on the non-bonus bands. Surprising as it may seem, it was 28MHz that decided the issue, and the extra time spent on the band gave Glenrothes 'A' a very definite edge over the others. Their 93 contacts and 622 points not only gave them the trophy (yet again!), but also helped to put them in overall third position in the Open section.

1.8MHz (by BRS20249)

This band was seriously affected by QRN, causing some stations to QSY to the higher frequencies earlier than they may have wished. One or two found it nearly impossible to work at all, and in the south severe thunderstorms were experienced during the peak period for the band. For those who persevered, or were not so badly influenced by the noisy conditions, it remained a good source of contest points. There was a fair selection of Europeans to work, and one group managed a dx contact with a PY station. Several of the regular dx supporters of NFD heard UK portable stations, but had no answer to their many calls. (9K2BE) commented "unfortunately the G/P stations, who were 599, seemed unable to hear me."

Despite QRN, storms, and other horrors, the NFD Shield winners Gravesend, G3GRS/P, "murdered the band" to use their own words, with the top score of 776 points from 110 contacts. They spent nearly 6h on the band during seven separate sessions. Second in the Open Section was Leicester Poly, G3SDC/P. In the Restricted section, the Marple Contest Group, G4MCC/P, managed 95 contacts in a single 2.5h session to give them the top placing. In second place was Aberdeen 'A', GM3BSQ/P. It was noticeable that there seemed to be little geographical advantage this year and stations from all parts of the UK and in both sections were doing equally well.

Logs were presented in very good order and there were very few unmarked duplicates, which was all to the good as each one on this band can cost up to 88 points! One group submitted a horrible, nearly unreadable pencilled log, while others seemed to think that UB, UT and UY5 are east of the Urals and worth three points and not the correct score of two!

There were a number of comments from entrants and some of these have been included in the main report. Comments specific to the band included: "Nice to hear top band so lively"—Sutton & Cheam; "Appalling QRN"—Addiscombe; "Brooks Benefit from spark-gap discharger"—SRCC/Croydon; "Pity DARC do not include this band in the rules"—Channel; "Conditions good, but being 70 miles west of mainland a disadvantage. Some enormous signals from the south of England"—Isle of Man; "Less noise than usual in Wales, no static and signals very strong throughout"—Verulam 'A'.

3.5MHz (by G3OZF)

101 logs were received for this band, plus two check logs. Several contestants again suffered loss of time this year as a result of electrical storms. However, the general comment was that the band provided a more consistent scoring rate than in the previous year—perhaps because of the poorer conditions on the hf bands, which offered little in the way of contacts during the night. Little dx was worked, the main exception being VE1BVL, who appeared in a number of logs.



Some of the members of Worthing & DARC at HF NFD. L to r: G3LQI, G4KIT, G1DGI, G4GPX, G4FNL and G3FBX

The band leaders in the Restricted section were Echelford, G3UES/P, with 1,231 points, followed by Stockport, G6UQ/P, in second place with a score of 783. The Open section leaders were Farnborough, G3RRA/P, who made 1,154 points. Second in the section were Harlow, G6UT/P, with 850 points. It should be noted that both G3UES/P and G3RRA/P were single-band entries. The standard of log-keeping was generally good, although one station will find its score increased significantly (it pays to read the rules carefully!) and another had four unmarked duplicates which, when added to those made on other bands, exceeded the number specified in the rules. Other stations had one duplicate each and the majority of entrants lost a few points due to incorrect log entries and other errors.

7MHz (by G3TXF)

"The sardine band"—Edgware, "The bottomless pit"—Channel, "Most successful band"—Melton Mowbray, and "Best band as usual"—East Notts, are typical of the way that most groups used the band to record no less than 16,000 QSOs for UK portables. The level of activity that can be squeezed into this narrow 40kHz can be seen from a breakdown of those active during the contest: DL/P—150; UK/P—110; ON/P—32; other/P—20. Apart from the portables about 350 fixed stations each made an appearance at one time or another during the 24h. With 700 different stations active, it is no wonder that entrants never ran short of anything to work on this band!

The vast majority of the traffic was inter-G and inter-Eu, and that was where most of the points came from. The dx was there but never in great quantities, with YV5, FM7, OX3, PP/PY, PZ, VK, ZL, ZS and 9K2 as examples of what could be worked. Around 50 WVE contacts were made, but only by a handful of contestants, and most found the QRM and skip a problem.

As was predicted by a number of groups who are critical of the current rule allowing single-band entries to compete for band awards on equal terms with multi-band stations, both the Open and the Restricted sections were won by groups that operated only on the 7MHz band. The top score was achieved by Farnborough, G4FRS/P, working in the Restricted section. They finished with a checked score of 1,178 points compared with that of Maidenhead, G3WKK/P, who had 1,083 points to lead the Open section. Verulam 'A', GW3VER/P, and Channel, G4DAA/P, were the highest multi-band entrants in the Open and Restricted sections respectively.

Logs were generally accurate, neat and correctly scored, but there were 44 unmarked duplicates and around 800 incorrectly logged callsigns. There were a number of computer derived logs and these had as many, if not more, errors than the hand written ones. Unmarked duplicates and errors in these logs often originated from the omission of a /P, or adding it when it was not appropriate.

A number of groups in the Open section used Yagi, quad or delta-loop antennas, but the main stream kept to the simple dipole or centre-fed open wire types. From analysis of the final scores, it is clear that the higher radiation angles from the wire antennas at the lower heights suited the prevailing propagation conditions. There were a number of comments about problems experienced due to inter-mod and cross-modulation related to the use of certain solidstate transceivers in the very heavy contest traffic and the strong broadcast QRM. Others complained about high levels of QRN and the weather, but these are fully detailed in other sections of the NFD report.

14MHz (by BRS32525)

There were 55 Restricted and 50 Open section entries on this band, of which three were single-band logs (from Hereford, West of Scotland 'A' and West Kent). The Frank Hoosen Memorial Trophy for the highest 14MHz score was won by Hereford, G3YDD/P, who operated in the Open section and made 430

valid QSOs. This effort, although not as prolific as their mammoth winning entry in 1983, was an achievement, bearing in mind the generally poor conditions. However, they did have the advantage of being able to concentrate on just one band. They used an FT102 working into a quad and a dipole. Second was the West of Scotland 'A' Group, who finished just ahead of Guernsey 'A'.

In the Restricted section, Saltash, G4GXX/P, managed 766 points to capture first spot from last year's winners, West of Scotland 'B', who had to be content with second place this year. There were many comments from entrants in both sections reflecting the poor state of the band for dx working, and even stations in the Open section with their better antennas found it difficult to prolong a W pile-up. Conditions to Europe seemed to be quite acceptable, especially during Sunday morning, and the majority of entrants were able to build their scores during this period. Typical of the band comments were: "Stations' ears ok, but difficulty in making contacts."—Chiltern 'B'; "Heard some good dx but couldn't work it"—Warrington; "20 almost unusable on Saturday due disturbed auroral type conditions."—Red Dragon; "Hard going"—Shefford, and many in similar vein.

Logs were good and there were none written in pencil! There were the usual crop of errors, and a number of scores have been reduced. Unmarked duplicates were quite uncommon, but one group had three, which, added to those on other bands, resulted in their elimination from the contest. In addition to the moans about conditions, many stations also commented on the thunderstorms and the heavy rain. There was also comment about single-band entrants winning the band award and in particular the Frank Hoosen Memorial Trophy. Swindon and Clifton both feel that there should be a points incentive for working dx, but the majority are happy with the rules and scoring system.

21MHz (by G4BUO)

Most entrants found the band hard going and used it only scantily, if at all. There were occasional short skip openings to Germany on Sunday, but no dx openings to speak of. A few stations managed contacts with the USA, and even Guernsey with their prefix and site advantage only netted 12 transatlantic QSOs. Several groups worked JA6PA and one or two other Japanese stations, but the hoped-for runs of contacts never took place. VK6PG, 9V1TL, ZS6ME and 9K2BE provided bright spots of dx activity and were worked by many entrants in both sections.

Comments such as "rubbish" (G3TBK/P), "terrible" (G3SRC/P), "four visits to the band for 17 contacts" (G4DAA/P), "generator QRM was the loudest signal on the band" (G4GZQ/P), "the score says it all" (G3RAC), "virtually unworkable" (GW8GT/P), "a jinx band" (G2DMR/P) and "were we on the right weekend?" (G4AHG), are typical, but in contrast, the comment from the West of Scotland 'B' Group, who won the band award for the Restricted section with 281 points, reads "What a treat for a station struggling through NFD to run into an opening of this sort—a good solid hour of being in demand with three or four stations calling after every contact. All credit to the high operating standards of field day stations which gave us our highest hourly score by far, with 59 QSOs between 1100 and 1200gmt." Most of the GM groups were favoured by short skip to the Continent on Sunday morning, which helped their totals. In the south, the only group that seemed to hit a patch of good propagation was Torbay, G3NJA/P, who also had a good run of Continentals at the same time as the GMs. This gave them the band award for the Open section, with 351 points.

A number of groups in the Restricted section blamed their poor performance on the lack of beam antennas, or tuning problems with their multi-band wires. The Open section could not use this excuse, but fared no better, as the average scores are about even for both sections. There were

Farnborough & DRS
HF NFD team. L to r:
(back row) Paul,
G4XHA; Ivor, G4BUO;
Tom, G3OLB, Dave,
G4ISK; (front row)
Bruce, G4WJQ; Brian,
G3ZUM; and George,
G4IZB



many comments about antenna problems, and typical of these were "triband beam elements got bent, so maybe this was the reason for our poor results" (G4ECT/P), "swr was 14:1 and it took 10 minutes to tune antenna for band" (G3D/T), "not helped by antenna tuning problems" (G3WSC). With the sunspots in decline, the conditions for next year are likely to be even less reliable, but even so it will still be worth checking the band from time to time for short skip traffic.

28MHz (by G4DJX)

Conditions on the band were again disappointing, with half the entries making less than 100 points, despite the x2 multiplier. With the exception of the Scottish stations, who had a distinct advantage over the rest of the UK, there were few long openings to Europe, although there were short periods when contacts were possible, as evidenced by the 41 contacts and 270 points made by G3KLH/P, who were second in the Open section. It was a case of being on the band for the right few minutes when the sporadic-E activity broke through. Four of the top five scores were made by groups from GM, and as reported in another section of this report, the Scottish NFD Trophy was decided by the good score made by Glenrothes 'A', who were the overall band leaders. The second highest placed G entry was that of the SRCC, who this year were using their club call, G3SRC/P.

In all, 37 different call areas were worked, including PY, 9K2, ZD8, ZS6 and ZC, plus the usual Europeans. There was less overall dx activity than last year, with no VK or ZL contacts being reported. UP2BBF and 9K2BE gave most support to the band, with G3KLH being the most-worked UK station. In all, 1,200 contacts were recorded for a total of 8,175 points. Considering the state of the sunspot cycle, this is no mean achievement, and undoubtedly higher scores could have been made if G stations had checked the band more frequently during the daylight hours.

The leading Restricted entry came from Aberdeen 'B', GM8AT/P, with 398 points from 61 QSOs. Aberdeen 'A', GM3BSQ/P, had 50 contacts for 354 points to give them second place in the section. A few entrants made the comment that the multiplier should be scrapped, but the majority seemed to think that the rules were right, but the conditions were worthy of a good moan!

Check logs

The committee is grateful to those stations who sent in check logs as they provide useful information for the checking process. This year logs were received from G2BTO, G3FAS, G3VJZ, GW3JI, GW4TXQ, OZ1IPP, OZ4RS, OZ5EDR, VE3XK, VK6PG, W3ARK, W4DGJ, W8VSK/M, YU7ORQ, YU7SF/M, ZS6ME and 9K2BE.

Certificates are awarded to the station in each continent which provides the largest number of contacts to UK entrants. These were YU7SF/M for Europe, 9K2BE for Asia, ZS6ME for Africa, VK6PG for Oceania and W8VSK/M for North America. There were no logs from South America.

Inspections

Following the 1983 contest, when there were a number of complaints of stations using excess power, illegal antennas and other "bending" of the rules, the committee arranged for a wide spectrum of inspections to be carried out this year.

All the inspectors were well received and we are glad to report that they found everything to be in order. From the comments from competitors, the majority of groups are in favour of tighter inspections. Typical of these are "jolly good, stations who play it fair have nothing to fear. Make it as tough as you like."—Addiscombe; "The arrival of GJ2LU to inspect, having come

specially from Jersey, certainly establishes NFD integrity, for which we are all very pleased."—Guernsey 'A', and "We are so pleased to see that the HFCC is taking a tougher line on inspections."—Wirral, SRCC, Norfolk and others.

The committee is very grateful to all those who gave their time to travel to and inspect the many groups in all parts of the UK.

Equipment and antennas

There was the usual wide range of equipment in use and once again the FT101 series of transceivers was most used, with the TS830S being in second place. The TS930S was next, followed by the FT102 and the FT757. Several groups, including the overall winners, used TenTec, and there were the usual devotees of the Drake twins. Surprisingly, there were few Icom units, TR7 or TS520/530 rigs in use this year. A few used the 707 and FT901/2, and one group had a FT980.

Antennas in the Restricted section followed the now well established pattern with the 260/270ft centre-fed wire being used by over 75 per cent of the entrants. Many reported that they used switched pre-tuned atus for quick band change and several had swr-sensed automatic tuning units. The double-length and standard sized G5RV was favoured by a few groups, but the longer end-fed wire, so popular in past NFD contests was hardly used at all. Bigger and higher beams were the norm for the hf bands with entrants in the Open section. A number of the newer seven-element tribanders were in use, and several of the four-band TET Yagi and homebrew four-band quads were listed on the cover sheets. Other groups favoured single-band Yagi or "loop" beams, particularly for 7MHz, where 27 were in use. Separate dipoles were used by the majority of Open section entrants for the lower frequency bands.

As in previous years, the various specialized lighting tower and crane vehicles were in use, as well as many trailer-mounted towers and other mobile structures. Caravans, motor-homes, vans and even a converted bus were popular as "shacks". On-site computers were used by 31 groups for log-keeping, check-logging and other tasks. Generators were once again the weak link in the equipment chain and there were many reports of failures. The SRCC used a gas-driven generator which proved to be very economic in use. (One gas bottle only for the whole 24 hours, and no need to refuel!)

Comments from competitors

(The weather)

"ATU flashed over quite nicely during thunderstorms"—Edgware
"Roof of trailer leaked, damp got into keyer paddles—they went berserk. Rained for so long feared generator would run out of fuel before we could reach it without getting soaked"—Chiltern 'A'
"Static so heavy had to close station for two hours"—Shefford
"Very sunny until 8pm when thunder and lightning closed us down for 1h. Site was waterlogged."—Guernsey 'B'
"Rained throughout night with thunderstorms causing one QRT of 15min."
—Channel
"At 0910 we were getting a lot of volts on the aerial, so chucked the feeder on the grass and went off the air for 20 minutes. Cannot remember such a long period of high static."—Quantock
"Virtually marooned on site due to overnight rain and needed a Land Rover to get off site."—Oxford
"Appalling weather."—Stockport, Addiscombe, and others
"Strong winds much rain."—Gt Western
"Weather very misty with downpour after downpour."—Aberdeen 'A', 'B' & 'C'
"Turned very wet with a half-gale."—W of Scotland 'B'

THE FIRST SIX ON THE BANDS

Band	Restricted section					
	1st	2nd	3rd	4th	5th	6th
1-8	G4MCC/P	GM3BSQ/P	G6UQ/P	G3KWT/P	G6KQ/P	G4CRA/P
3-5	G3UES/P	G6UQ/P	G4GZQ/P	G6KQ/P	G6VX/P	G4FUH/P
7	G4FRS/P	G3GXI/P	G4DAA/P	GW8GT/P	G6KQ/P	G6UQ/P
14	G4GXX/P	GM8TT/P	G6VX/P	GW3WAS/P	G5UG/P	GM3ULG/P
21	GM8TT/P	G3AHD/P	G3KUE/P	G6UQ/P	GW6AQ/P	GM8AT/P
28	GM8AT/P	GM3BSQ/P	GW6AQ/P	GM3USL/P	G3SRC/P	G6VX/P

Note: On 1-8 G3SFG/P and GW3VER/P have equal scores
On 7 G3ASR/P and G3RAC/P have equal scores
On 28 G3SFG/P and G6JC/P have equal scores

"Lost 10min through hailstorm. It would not be NFD without a thunderstorm!"—*Gravesend*
"We have been sunburned and we have been soaked during NFD contests, but never before have both occurred in the same event."—*Harlow*
"Tent leaked."—*12 groups*

(Equipment)

"We seized up yet another generator this year—a second oil filter hidden behind the silencer worked itself loose and all the oil was pumped out."—*Addiscombe*
"Someone forgot to tighten the coupler on the gin pole."—*Swindon*
"We spent 3h trying to suppress the noise from our diesel generator, it was S7 and sounded like the woodpecker."—*Aberdeen*
"TS830S blew up at 1815 and lost 1.5h obtaining replacement."—*Oxford*
"Our home-made generator returned a consumption of one pint per hour."—*Quantock*
"10min into contest FT102 oscillated wildly making it unusable. Only spare was IC740 and this incompatible with keyer."—*Guernsey 'B'*
"The hf beam on which we had placed a lot of hopes did not perform well having a very high swr on 10 and 15."—*Wirral*
"Two electronic keyers gave problems and had to be discarded, plus no hand key on site, must remember one next year!"—*W of Scotland*

"swr went high and signals down. Found 60ft pole had come down in the gale. Took 7h to repair the damage."—*Racal*
"Water in the generator."—*14 groups*
"We spent nearly 5h building a 60ft scaffold tower to hold our seven-element multi-band beam and inverted-Vs. One of our group forgot to put the pins in the hinged section and the whole shebang came down during the night in the gale. One section hit the top of the motor-home we had hired and broke the roof extension. It took us until daylight to clear up the mess and we finished the contest on some low wires slung over trees and a groundsheet over the hole in the roof. It we could have repaired the tower, its first use would have been to hang the guilty party!"—*Anon by request*. (we hope they were insured. *HFCC*)

(Rules)

"It is time to make NFD more interesting. Suggest that present Open and Restricted sections are scrapped and that four new sections used, 100W, 10W, single-band entry and 12h only. A more comprehensive exchange such as RST/No/county code/engr etc."—*part of a letter from West Kent ARS*
"Present scoring system provides no incentive for working dx, otherwise leave alone. We don't want ssb and cw combined."—*Swindon*
"Unchanged rules for 1985 please. Nobody here wants a hybrid cw cum ssb fd."—*W of Scotland*
"Rules now perfect, start and finish times are ok by us."—*Guernsey 'A'*
"Although we recognize and respect that GU is part of the UK, they have a substantial geographical advantage over mainland stations. NFD should be changed so that each country in the UK is in a different section with a separate award for each."—*Anon by request*
"Don't change the rules, except possibly to put Guernsey in a separate section. They are good ops, but get a lot of help from the GU prefix. We approve of the new timings."—*Stockport*
"What about a separate award for the highest G entrant."—*Channel*
"Much approve of the new starting time."—*Channel and 19 other groups*
"How about a separate trophy for mainland 'G'. Please keep scoring the same and no changes!"—*Gravesend*
"Scoring system provides no incentive for dx working. A change is required."—*Swindon*
"We wish to bring to your attention the GU syndrome. It is clearly wrong that one group has such a clear advantage over others and it would be fairer if the RSGB followed the ARRL, eg to have a winner from each DXCC country. Another complaint we have is against single-band entrants being placed among the multi-banders. We suggest a separate listing for these groups and for them not to be eligible for band awards."—*part of a long letter from East Anglian CG*
"Rules excellent except for that we feel that the single-band entrants should not be allowed to enter the main contest and rate for awards. It is against the

OPEN SECTION

Posn	Name of society or group	Callsign	1-8	3-5	Band (MHz)				Total points	No of contacts made*
					7	14	21	28		
1	Gravesend RS	G3GRS/P	776	735	534	932	140	202	3,319	815
2	Racal ARG 'B'	G3KLH/P	524	458	800	1,075	92	270	3,219	834
3	Glenrothes & DARC 'A'	GM4GRC/P	576	464	534	638	131	622	2,965	683
4	Verulam ARC 'A'	GW3VER/P	608	710	1,029	532	40	36	2,955	765
5	Guernsey ARS 'A'	GU3HFN/P	386	327	578	1,262	264	128	2,945	844
6	Leicester Polytechnic ARS	G3SDC/P	696	505	770	741	113	88	2,913	733
7	Scunthorpe ARC 'A'	G3PDL/P	584	550	792	662	123	0	2,711	700
8	Torbay ARS	G3NJA/P	634	633	553	418	351	102	2,691	666
9	Leconfield RCT	G4GGD/P	576	654	679	662	62	48	2,681	667
10	East Anglian Contest Gp	G4ANT/P	468	537	759	690	82	84	2,620	704
11	Addiscombe ARC	G4ALE/P	362	660	743	554	58	104	2,481	651
12	Harlow & DARS	G6UT/P	414	850	644	399	15	151	2,473	614
13	East Notts Contest Gp	G3TBK/P	556	624	817	234	86	58	2,375	604
14	Wirral ARS	G3NWR/P	502	536	610	496	126	76	2,346	596
15	Racal ARG 'A'	G3RAC/P	554	430	812	400	46	70	2,312	559
16	Hornsea ARC	G4EKT/P	420	586	557	719	3	0	2,285	614
17	Edware & DRS 'A'	G3ASR/P	580	374	812	253	99	94	2,212	519
18	Chiltham ARC 'A'	G3CAR/P	552	502	579	279	70	162	2,144	489
19	South Essex ARS	G4RSE/P	590	501	646	87	43	180	2,027	534
20	Worcester & DARC	G8JC/P	404	486	439	411	81	168	1,989	514
21	Humberston Contest Gp	G3IYT/P	534	508	611	288	35	12	1,988	491
22	Sutton & Cheam RS	G2DMR/P	602	388	488	285	35	116	1,914	448
23	Southgate ARC	G3SFG/P	608	110	413	422	73	168	1,794	455
24	Swindon & DARC	G3FEC/P	566	426	302	403	54	40	1,791	439
25	Ainsdale ARC	G2OAI/P	476	415	456	131	111	184	1,773	412
26	Grimsby ARS	G3CNX/P	474	310	946	0	8	0	1,738	428
27	Wirral Contest Gp	G4WCG/P	176	399	484	562	90	0	1,711	482
28	Guildford Contest Gp	G5RS/P	596	346	536	125	38	64	1,705	436
29	Chelmsford ARS	G4DAN/P	352	364	702	244	0	0	1,662	424
30	Shirehampton ARC	G4AHG/P	210	488	472	457	20	8	1,655	465
31	Bromsgrove & DARC	G3VGG/P	168	319	469	492	86	74	1,608	436
32	Stirlingshire ARC	GM4MCB/P	220	220	421	453	80	100	1,494	374
33	Shefford & DARS	G3FJE/P	330	472	426	192	62	8	1,490	407
34	Salisbury R&E Soc	G3FKF/P	158	635	365	276	0	0	1,434	381
35	Norfolk ARC	G4ARN/P	332	258	482	230	25	72	1,399	358
36	Kilmarnock & Loudoun ARC	GM3ZRT/P	318	218	517	163	159	0	1,375	336
37	Hereford ARS	G3YDD/P	0	0	0	1,365	0	0	1,365	437
38	Clifton ARS	G3GHN/P	284	410	320	276	8	0	1,298	330
39	Verulam ARC 'B'	G4WLG/P	464	408	211	176	14	8	1,281	304
40	West of Scotland ARS 'A'	GM4AGG/P	0	0	0	1,271	0	0	1,271	405
41	Ilford Gp RSGB	G3XRT/P	152	605	471	32	0	0	1,260	375
42	Pitsoford Pirates	G3KQS/P	416	316	221	194	39	66	1,252	283
43	Greenock & DARC	GM3ZRC/P	0	285	265	204	231	264	1,249	325
44	Farnborough & DRS (Contest Gp)	G3RRA/P	0	1,154	0	0	0	0	1,154	356
45	Maidenhead & DARC 'A'	G3WXX/P	0	0	1,083	0	0	0	1,083	319
46	Thornton Cleveleys ARS	G4ATH/P	238	34	518	64	92	90	1,036	279
47	Burton-on-Trent & DRS	G3NFC/P	92	349	204	158	41	101	945	251
48	Bangor & DARS	GI3XRO/P	0	96	193	281	117	144	831	235
49	Dynamics Hatfield Club ARS	G3RF/P	12	182	462	24	0	0	680	226
50	West Kent ARS	G3WKS/P	0	0	0	677	0	0	677	212
51	Cheshunt & DARC	G4ECT/P	8	116	154	97	13	0	388	126
52	Maidenhead & DARC 'B'	G3LVW/P	0	0	0	150	84	86	320	91

*Contacts made are claimed figures only.
Entries from the following clubs have been disallowed: Leeds & DARS (Rule 2); Leicester RS and White Rose ARS 'A' station (Rule 10d).

RESTRICTED SECTION

Posn	Name of society or group	Callsign	1-8	3-5	Band (MHz)	7	14	21	28	Total points	No of contacts made*
1	Stockport RS	G6UQ/P	648	783		872	463	156	158	3,080	743
2	Great Western Contest Gp	G6VX/P	550	681		830	606	63	200	2,930	730
3	Channel Contest Gp	G4DAA/P	590	631		945	473	61	138	2,838	696
4	Aberdeen ARS 'A'	GM3BSQ/P	664	354		728	444	74	354	2,618	593
5	Red Dragon Contest Gp	GW8GT/P	518	526		920	467	94	56	2,581	667
6	East Barnet ARCC	G6KQ/P	612	692		899	333	6	26	2,568	624
7	Lichfield ARS	GW3WAS/P	546	572		597	600	133	110	2,558	625
8	Colchester Radio Amateurs 'A'	G4CRA/P	608	638		792	336	13	120	2,507	606
9	Crawley ARC	G3WSC/P	588	586		785	386	34	110	2,489	601
10	West of Scotland ARS 'B'	GM8TT/P	336	315		591	688	281	104	2,315	608
11	Worthing & DARS	G3WOR/P	520	559		776	231	37	104	2,227	565
12	Leyland Hundred AR Gp	G4TLH/P	504	584		613	314	103	60	2,178	536
13	Liverpool & DARS	G3AHD/P	0	632		711	401	208	182	2,134	582
14	North Wales Contest Club	GW6AQ/P	584	314		582	257	153	242	2,132	500
15	Gloucester ARS	G4AYM/P	570	408		542	424	55	126	2,125	509
16	Scarborough ARS	G4BP/P	512	467		673	324	132	0	2,108	522
17	Glenrothes & DARC 'B'	GM3ULG/P	590	368		566	569	0	0	2,093	527
18	G4GZQ NFD Gp	G4GZQ/P	280	699		719	111	9	60	1,878	510
19	Oxford & DARS	G5LO/P	508	481		468	124	115	126	1,822	438
20	Marple Contest Club	G4MCC/P	698	417		423	177	26	46	1,787	405
21	Thames Valley ARS	G3TVS/P	558	565		306	249	18	76	1,772	414
22	SRCC Croydon	G3SRC/P	538	222		400	297	93	204	1,754	394
23	Plymouth RC	G3PRC/P	400	307		621	288	65	48	1,729	455
24	Aberdeen ARS 'B'	GM8AT/P	156	286		363	294	142	398	1,639	406
25	White Rose ARS 'B'	G3KWT/P	616	132		353	371	106	0	1,578	354
26	Western Gp—I.O.M. ARS	G5UG/P	538	246		153	573	22	44	1,576	384
27	Melton Mowbray ARS	G4FOX/P	24	432		865	233	0	0	1,554	442
28	Easington & Hartlepool ACs	G4APN/P	488	377		512	174	2	0	1,553	356
29	Cheltenham ARS	G5BK/P	404	329		315	289	93	82	1,512	378
30	Blackpool & Fylde ARS	G8GG/P	382	304		296	354	129	16	1,481	370
31	Preston ARS	G3KUE/P	0	606		312	181	166	136	1,401	390
32	Edgware & DARS 'B'	G4IUZ/P	8	478		515	339	11	0	1,351	377
33	Windy Yetts Contest Gp	GM3AXX/P	428	270		356	243	0	0	1,297	319
34	Bury RS	G3BRS/P	316	374		484	109	8	0	1,291	297
35	Echelford ARS	G3UES/P	0	1,231		0	0	0	0	1,231	364
36	Farnborough & DRS	G4FRS/P	0	0		1,178	0	0	0	1,178	419
37	Warrington RC	G4CDA/P	140	2		601	329	34	56	1,162	308
38	Meirion ARS	GW4LZP/P	604	234		124	192	0	0	1,154	228
39	Saltash & DARC	G4GXX/P	0	58		219	766	85	0	1,128	296
40	Aberdeen ARS 'C'	GM4TEF/P	0	224		469	409	2	0	1,104	323
41	Bishops Stortford ARS	G5ZG/P	16	394		464	181	8	0	1,063	287
42	Ayr ARG	GM3MHG/P	0	120		468	371	91	0	1,050	300
43	Portsmouth & DRS	G3DIT/P	0	459		437	125	6	10	1,037	289
44	Cunningham & DARC	GM3USL/P	0	199		357	210	0	232	998	276
45	Eccles & DARS	G3GXI/P	0	0		982	0	0	0	982	310
46	Southdown ARS	G3WQK/P	24	448		413	82	0	0	967	284
47	Scunthorpe ARC 'B'	G4FUH/P	0	660		284	0	18	0	962	278
48	Colchester Radio Amateurs 'B'	G4YK/P	16	379		306	206	0	44	951	275
49	Havering & DARC	G4HRC/P	0	541		318	31	25	22	937	276
50	Weston-Super-Mare	G4WSM/P	0	235		511	174	12	0	932	279
51	Braintree & DARS	G4JXG/P	40	214		354	291	25	0	924	302
52	Lincoln SW Club	G5FZ/P	0	454		238	166	15	0	873	299
53	Quantock	G4OK/P	0	0		491	212	54	0	757	208
54	Medway AR & TS	G5MW/P	104	210		232	52	5	8	611	151
55	BATS (Bristol ATS) Contest Gp	G4MCQ/P	0	0		0	559	0	0	559	169
56	Chiltern ARC 'B'	G4MQC/P	0	0		0	509	0	0	509	160
57	Guernsey ARS 'B'	GU4NYT/P	104	0		52	55	141	14	366	102

*Contacts made are claimed figures only.

spirit of the contest and they should be shown in a separate section."—*part of a long letter from S Western FDA*

"Although Oscar 10 uses vhf/uhf it is in fact a new dx band and the Ws permit its use during their HF Field Day. Oscar 10 contacts should be permitted, particularly now that 21 and 28MHz are failing severely."—*G3IOR*
 "The present rules are excellent, no changes are required or should be made. Leave well alone."—*SRCC and 12 other groups*

General

"We continued our affair with an on-site computer used for logging and checks. The program is very polished now and with a good cw man in the driver's seat, the duplicate checking was incredibly quick."—*W of Scotland 'B'*

"Many thanks to Hastings (for their last year's comments) in effecting a noticeable improvement in operating standards. Thank you for a great contest."—*Guernsey 'A'*

"Excellent contest as usual, good luck with the checking and CU next year."—*Addiscombe*

"The contest was thoroughly enjoyable."—*Stockport*

"Even the youngest, most inexperienced operators thought NFD was terrific and will be back next year."—*Aberdeen 'A', 'B' & 'C'*

"Thanks again for the excellent work done by the HFCC on our behalf."—*Wirral*

"Thanks for a vfb weekend."—*Gt Western*

"Should hopefully be in the fray from UK next year."—*9K2BE*

and finally:
 "The most appalling weather we have ever experienced in our many years of field day operating. Our antenna was on top of the pole on the Saturday but was at half-mast at daybreak. Coffee in the TS830S on the way to the site and for a long time it would only work out of its case on its side with a fan heater blowing into it. Everyone turning out in the driving rain at 0100 to prevent the tent being blown away. Water in the keyer, saturated clothes and bedding. The damp, gnawing cold slowed us down during the night. Nevertheless, we hope to be there next June and none of that combined cw/ssb nonsense please."—*extracts from a long letter from Lichfield*

Comments from the HF Contests Committee

We are sorry to report that the entries from three groups have been disallowed by the committee for contravention of the rules. One of these because they did not follow the entry procedures and failed to notify their section, callsign or location in advance, thus they could not be inspected. The other two were because they had a substantial number of unmarked duplicate

contacts (in excess of the maximum of five specified in the rules).

The cross-checking of NFD logs requires some 1,000 man-hours plus from the volunteer members of the committee, and although computers have eased the task of sorting and listing, the comparison of log entries for duplicate contacts is still one of the most time consuming aspects of the work load.

As most of the adjudicators are NFD operators, we know how easy it is to work duplicates and no penalty is incurred provided that they are properly marked. It is the responsibility of the person submitting the log to check that all such contacts are shown as a duplicate and the majority of entrants heed this to avoid losing points at the rate of 10 times the claimed score for the contact. Apart from a handful of groups, the majority had very few unmarked duplicates in their logs.

There have been a number of complaints about the rule which allows single-band entrants to compete for the band awards in the same section as multi-band entrants. The committee has received many letters or comments from NFD groups who feel that it is unfair to continue this practice. Several have gone further by accusing the committee of not following the wishes of the late Frank Hoosen that the memorial trophy should go to the leading multi-band contestant for the highest 14MHz score. In the light of these complaints, the committee will investigate and if necessary revise the rules before the 1985 contest.

The IARU Region 1 proposal to merge SSB FD and NFD has also been a subject of much adverse comment from entrants, but as was reported in the September *Rad Com*, it is hoped that the NFD contest will remain a separate event, even if Region 1 decide to merge their field-day contests.

This was the first NFD to use the new timings. Most entrants seem to prefer the 1600gmt start, so it will become the standard for future NFD events. Apart from the band adjudicators, who are listed under their separate reports, the NFD team this year included most of the members of the HF Contests Committee who helped in one way or another. RSGB HQ staff looked after the stationery arrangements and G4BUO organized the inspections. BRS20249 looked after the entry procedures and prepared the logs for checking, as well as sorting out the final tabulations. G6LX edited the band reports and prepared the overall write-up. Decisions on matters relating to the rules were taken by the whole of the committee.

Easter 1985 is in early April, so there is no clash between the preferred NFD weekend of 1/2 June and the European Whit holiday. Perhaps by being a few days earlier than in recent years, the weather will be kinder to the many groups that have already indicated that they will be on. Let's make 1985 a bumper NFD to support the RSGB in their further discussions with Region 1. See you all?

G6LX

1984 VHF NATIONAL FIELD DAY RESULTS

VHF NFD again coincided with excellent weather this year, even for those stations on mountain tops in the far corners of the UK. Thanks to some good tropo openings and high levels of activity scores were well up this year, beating several of the records set last year. Some exceptional dx was worked, including the Canary Islands (EA8) on 144MHz, and what are believed to be the first G-EA contacts on 1,296MHz. Only GD4IOM reported sporadic-E this year.

The VHFCC inspectors visited nearly 20 per cent of the entrants during the event. As last year, everyone seemed to be following the rules, and also suffering the usual problems—blown-up linears, dead mast-head preamps, and antennas that ought to have worked but did not. Some site access instructions were not sufficiently detailed or clear, usually it was the last few hundred metres which were the problem.

Bad signal reports were few and far between on 70MHz and 432MHz, and non-existent on 1,296MHz. A few isolated reports of wide signals were received for 144MHz, but with no independent corroboration of complaints against specific stations. It appears that some groups will put up with nearby bad signals, not wishing to possibly disqualify other competitors by making a complaint. If stations persist in radiating bad signals after over the air reports and tests, please let us know so that at least a warning can be given. Apparently many stations put up with very high QRM levels on 144MHz, and stations in the Restricted section tend to find themselves edged out by higher power stations. One entrant suggested that there should be an erp limit for the Open section. Your comments on this problem would be welcomed.

The dropping of QTH information from the contest exchange met with little comment, but it was apparent that very few stations were giving their location details at regular intervals to comply with licence requirements. Please ensure that all operators are aware of this requirement in future.

There was a welcome increase in swl participation this year—perhaps next year we will have listeners' logs on 1,296MHz.

Congratulations go to the Sheppey Combined Contest Group, who were winners of the Open section this year, after achieving the runners-up spot last year. They will receive the Surrey Trophy. Close behind were the Hillbillies Group, who have consistently climbed the tables over the years. In the Restricted section the honours again go to the Cotswold & Big M Contest Group, who did not quite manage to win three bands this year. They eventually won by a small margin over the East Kent RS after very careful checking. They will receive the Arthur Watts Trophy. Once again the South of Scotland Contest Group take the Tartan Trophy as leading GM station. The Lagan Valley ARS awards the GI4GDV Memorial Trophy to the leading GI in VHF NFD. This year this trophy goes to the South Belfast VHF CG. Congratulations also to the leading swl, BRS52543, Martin Parry of Blackpool. Certificates go to all the winners and runners-up.

G3XDY

EQUIPMENT USED BY LEADING STATIONS ON 70MHz

	RESTRICTED SECTION		
	Transmitter	Receiver	Antenna
GW3SNN/P	FT101 homebrew transverter 2N3375 or 4CX250B pa	3N204 rf SBL-1 mixer	8-el Yagi at 33ft agl
G3FDW/P	28-70MHz transverter QVO3-20A pa	3SK28 rf 40473 mixer	6-el long Yagi at 22ft agl
GU4IUW/P	FT290R transverter MM linear	Transverter	4-el Yagi at 17ft agl
	OPEN SECTION		
	Transmitter	Receiver	Antenna
GM4TX/P	QVO6-40A pa	40673 rf 40673 mixer	4-el Yagi at 40ft agl
G4ALE/P	TenTec + Corsair transverter QV3-125 pa	BFT66 rf MD108 mixer	6 over-6 at 30ft agl
G3ZTZ/P	FT221R MM transverter MM linear	BFT66 rf 4 x lgfet mixer	8-el quad at 45ft agl

Specials" featuring on cover sheets. However, one of the best efforts must surely have been the single-operator entry by G3FDW, who gave GW3SNN a real fight in the restricted section.

In view of the good signal exchanges, it is disturbing that some logs contained a large number of errors. Several points were lost for non-existent contacts and this makes your adjudicator doubt the logic of the present trend of not giving both callsigns at least once in a QSO. More than one group commented that QRS seems not to be understood, and even in the SSB section it seemed apparent that information was being passed faster than it could be copied onto the log, and where this involves callsign information points can be lost by both stations. At least one group could have possibly saved many lost points by more careful attention to log accuracy.

The general format of the contest seems to be very acceptable to the majority of groups, with comments such as "the best band on field day" being common from the groups who were helpful in putting comments on the cover sheets.

Check logs are acknowledged with thanks from G2DHW/P, G3BPM/P, G3BPM, G4FMC, GW3UEY/P and GW3TAL/P.

G3LCH

	OPEN SECTION	RESTRICTED SECTION
Winner	Sheppey Combined CG	Cotswold & Big M CG
Runner-up	The Hillbillies	East Kent RS
Band Leaders		
70MHz	South of Scotland CG	Cotswold & Big M CG
144MHz	Parallel Lines CG	Cotswold & Big M CG
432MHz	Sheppey Combined CG	East Kent RS
1,296MHz	Sheppey Combined CG	East Kent RS
Leading GD	Isle of Man ARS	No entry
Leading GI	NW of Ireland ARS	South Belfast VHF CG
Leading GJ	Southampton University & Clockwork CG	No entry
Leading GM	South of Scotland CG	Aberdeen ARS
Leading GU	Guernsey ARS	Rockhoppers CG
Leading GW	Flowerpot Men	Cotswold & Big M CG
Leading swl	Martin Parry BRS52543	

70MHz

Conditions on this band were generally described as "about average" with good signal reports genuinely being the order of the day. Best dx for many was provided by EI4ALE/P, and the activity from many, usually silent areas of the British Isles added interest for many fixed stations who came on to "give some points".

It was evident that many groups were burning the midnight oil on the Friday night in an effort to get on the band, with unfinished linears and "Friday Night

144MHz

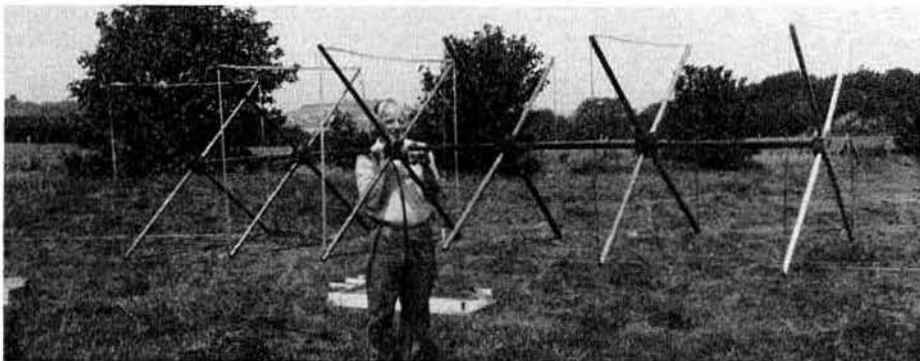
Seventy-six Open section and 57 Restricted section stations submitted logs for the 144MHz band. In addition 11 check logs and seven swl entries were received.

Nearly all the ORQ stations reported that propagation was average to good throughout the 24h, but many of the QRP stations claimed that conditions were no better than just fair. The factor common to both sections suggests that in reality conditions were somewhat variable, with lifts occurring to the south early on Sunday morning. There was also agreement that there was a general deterioration towards the Continent during the closing hours of the contest.

The weather of course, received universal acclaim, and the VHF Contests Committee has no hesitation in accepting full credit for getting it right again this year.

Several additions, particularly those in the West Country, experienced some excellent tropo openings deep into EA, with contacts to EA8 in the Canary Isles being the dx highlights of the event. A similar isolated dx contact to IS also exceeded 2,000km. Stations along the east coast also enjoyed some real dx, and it was good to find so many QSOs into LA, SM and OZ figuring prominently in the logs.

Lax operators no longer attempt to give meaningful signal reports, and the almost universal 5, 9 has degenerated into no more than a preliminary alert prior to the exchange of serial and QTH locator. In many instances 2 and 5 would be more appropriate and might persuade some of those who imagine themselves to be slick operators to use phonetics and not gabble their calls. Careless and sloppy operating is on the increase and the habit of operators



G3YYF holding the six-element quad used by Hastings E&RC in the 70MHz section of VHF NFD. Photo: G3SVL

failing to give, or to record, the /P has resulted in the loss of hundreds of points in this year's event.

Log keeping itself appears to have reached a watershed. There are those who regularly submit computerized print-outs and fair copy logs, carefully cross-checked and with few errors and there are those who merely forward a Xerox of their real time scribbles.

Finally no report of this section of VHF NFD would be complete without a selection of your comments, which as usual, say it all: "79 squares and 16 countries."—G4LIP; "Not enough activity from Scandinavia."—G4APA; "... then they went off on holiday leaving GM4DTH to do the logs. The computer crashed a disc..."—GM3WCS; "Creeping clag followed us around the band."—G6HH; "Suffered S9 + 40 electrical noise generated by the CEBG."—G4MRS; "... generator problems caused us to go QRP."—G3ZIG; "Had to make use of lulls in the QRM to work any dx at all."—GW8SJP; "Activity lower than usual."—G8LNC; "... ran out of petrol half hour from the end."—G3WQK; "Hard to slog from start to finish."—G4RFR; "Contest normal, all QRM."—G4CCC; "Nice opening to the south on Sunday."—GJ8KMI; "Did a reconstruction job on the aerial overnight."—GW2OP; "Stricter monitoring, please."—G3WSC; "We tried harder but our disasters were bigger."—G4EFY; "... plagued with flies."—G3CFH;

EQUIPMENT USED BY LEADING STATIONS ON 144MHz

	Transmitter	OPEN SECTION Receiver	Antenna
G4LIP/P	TS700G + 2 x 4CX240R 400W p.e.p.	TS700G	2 x 16-el at 60ft 200ft asl
G4APA/P	FT221R + 2 x 4CX250B 400W p.e.p.	FT221R + Mutek front-end	4 x 9-el Tonna at 50ft 850ft asl
G4BAR/P	FT225RD + 8877 pa. 400W p.e.p. 150W cw	FT225RD + GaAsfet	2 x 11-el DL6WU 35ft agl 1,70ft asl
	RESTRICTED SECTION		
GW4ERP/P	FT221 12W p.e.p.	FT221 with BF981	12-el. 30ft agl 1,840ft asl
GI4TAP/P	IC251E 20W p.e.p.	IC251E with BF981	19-el Yagi 20ft agl 1,750ft asl
GU4XEA/P	FT290R + MM 25W linear amp	FT290R	16-el Jaybeam 17ft agl 450ft asl

"Not a free kHz, 150 to 405."—GI4TAP; "Pleased to work into Andorra."—GU4XEA; "Band too crowded to find the dx."—G6EKP; "No bad signals, just overloaded receivers."—G4CDA; "Best barbecue yet. Over 100 present plus 200 sheep."—G3PIA; "Hard going for stations in the NW."—G4VKE; "... kept eating very hot curry to stay awake."—G8HSG; "Couldn't find a clear channel anywhere."—G6GWZ; "Hayfever again."—G8TRS; and the final gem from G4LXS which sums it all up, "Never mind the quality, feel the width!"

G2HF

432MHz

Over the country this band again exhibited widely differing conditions. Unusually, stations north of the border found conditions good throughout, whereas in the south there were times when propagation was poor, the timing and extent of this being very dependent upon location. Nevertheless there were many good lifts for most stations. As the best dx column shows, the south-west was favoured by propagation along the north-south path to Spain, whereas for those further east propagation was best to the south-east and to Scandinavia. In general the conditions ensured that the number and

value of contacts was higher this year—the leading station, for example, increased his QSO total by one third, with an average points/QSO figure in excess of 12. Indeed for many the 432MHz band provided the best overall dx.

The ability of stations to operate in a jamming environment was tested by Syledis yet again. Most coped well, but for several it made life impossible. G3IRC/P had to contend with power-line hash in addition to Syledis spread-spectrum signals and reported "noises out of this world"; this meant operator fatigue set in after only 15min. G3LCH/P expressed "pity for those stations near the east coast", but the results seem to indicate that difficulties like this can be overcome by enthusiasm and dedication.

EQUIPMENT USED BY LEADING STATIONS ON 432MHz

	Transmitter	OPEN SECTION Receiver	Antenna
G8TFI/P	Belcom LS707 2 x 4CXnt250BM	Belcom LS707 MGF1412	4 x 16-el Yagis at 50ft
G4CLA/P	TS770 2 x 4CX250R	TS770 MGF 1200	4 x 21-el Yagis at 40ft
G4PUB/P	FT620B 8877	FT620B GaAsfet	2 x 21-el Yagis at 30ft
	RESTRICTED SECTION		
G8ULU/P	IC471E	IC471E GaAsfet	21-el Yagi at 35ft
G4RNL/P	TS780S	TS780S BF981	21-el Yagi at 35ft
GW4PDS/P	TS130 + transverter 2C39A	TS130 + transverter MGF1402	19-el Yagi at 30ft

There were only one or two unsubstantiated reports of poor quality signals for this event, which seems to indicate that some effort has been made by entrants to follow the VHF/UHF Code of Practice (see January 1984 *Rad Com*). Several stations suggested that operating manners were very much better on this band (compared to 144MHz). Perhaps this contributed to the comment from G2CPM/P which seemed to sum up 432MHz: "Great fun!"

G3VPK

1,296MHz

The entry was up in the Open section, with 48 entrants against 45 last year, but down in the Restricted section, with 20 against 24 entrants last year. The weather was the best that has been enjoyed for some time and with sunshine and high pressure operators were on the look out for ducting. Sure enough this occurred and seemed to favour those stations at or near the coast, especially in the south, and to a greater extent the east. Ducting over the North Sea occurred for a few hours after sunrise on Sunday. It was interesting that the best dx worked by G4NXO/P from the Isle of Sheppey—SM6HYG/P (1,013km)—was very close in distance to the best contacts of G4JAR/P to EA3ADW (1,061km), and G4HRY/P to EA3JA (1,063km). It was also apparent that high power was necessary to work the best dx, as the longest distance contact in the Restricted section was that of G4BRA/P to F6CIS (838km). Another contact of interest was between G4HWA/P and LA8AK, who called off the back of the dish.

Operating standards were high and there were no reports of poor quality signals. It now appears that everyone has learnt how to set up the transmitters correctly. Logging was of a very high standard and only one scruffy hand-written log was received. The majority were either computer print-outs or neat handwriting. Scoring accuracy using radial rings was very high, and very few points have been deducted in what has been a troublesome area in the past.



Aberdeen ARS members hard at work during VHF NFD. L to r: GM4BKV, GM4OBD (in the background), GM6JUK, and GM4VCB. Photo: I. Watt

EQUIPMENT USED BY LEADING STATIONS ON 1,296MHZ

OPEN SECTION			
Transmitter	Receiver	Antenna	
G4NXO/P FT225 + MM transverter + linear 2 x 7289 130 p.e.p. out	MGF1412 rf amp (masthead)	8 x 23-el Yagi at 24ft agl	
G4HWA/P FT221R + MM transverter + linear 6 x 2C39 300 p.e.p. out	NEC 64535 rf amp (masthead)	4m dish at 25ft agl	
G4ECY/P TS700 + transverter + linear 2 x 7289 120 p.e.p. out	NE64535 rf amp	8 x 23-el Yagi at 45ft agl	
RESTRICTED SECTION			
Transmitter	Receiver	Antenna	
G8FEZ/P Icom 271E + MM transverter + linear 2 x 7289 25 p.e.p. out	NEC 57835 rf amp (MM)	6ft dish at 25ft agl	
GW3WDG/P No details. Linear 2C39A 25 p.e.p. out	MGF1402 rf amp	5ft dish at 26ft agl	
G4BRA/P FT221RD + MM transverter + linear 2C39A 25 p.e.p. out	NE327089 rf amp	2m dish at 29ft agl	

Equipment used tended to be very similar, with Microwave Modules transverters being used by the majority. Linear amplifiers were almost always from one to six 2C39 or variants, and antennas either Yagis or dishes, many with masthead preamplifiers.

Overall this was a highly satisfactory field day. Scores were well up on 1983, and with the good conditions 1,296 sounded more like one of the lower vhf bands. Activity was very high, but it would be good to get more Continental activity during July VHF/NFD, which is time coordinated with IARU Region 1. Check logs were gratefully received from G3LIA, G3PRV, G3VVB and GW3NZS/P (latter two unregistered site).

G3FZL

OPEN SECTION OVERALL RESULTS

Posn	Group name	70	144	432	1,296	Overall score
1	Sheppey Combined CG	7	7	1	1	3,371
2	The Hillbillies	3	2	5	2	3,319
3	Parallel Lines CG	18	1	2	3	3,164
4	Hadrabs & Addiscombe G	2	3	3	7	3,087
5	Norfolk VHF/UHF CG	6	11	4	6	2,496
6	Martlesham & Ipswich	16	9	7	8	2,395
7	Wolds CG	13	22	6	4	2,345
8	South of Scotland CG	1	4	15	19	2,231
9	Scunthorpe VHF CG	25	21	20	5	1,927
10	Pact	23	19	8	12	1,903
11	Flight Refuelling ARS	11	13	9	18	1,878
12	Quantock CG	15	26	19	9	1,732
13	Hastings E&RC	12	5	14	1	1,705
14	Southdown ARS	27	17	9	21	1,675
15	Horsham ARS	30	6	28	25	1,643
16	Flowerpot Men	30	14	11	28	1,602
17	Dunstable Downs RC	32	24	12	22	1,582
18	Edinburgh VHF Group	14	12	29	26	1,573
19	Isle of Man ARS CG	4	10	64	—	1,527
20	South Manchester RC	28	37	18	11	1,503
21	Clifton ARS	29	29	26	14	1,501
22	Newbury & D ARS	34	35	16	16	1,468
23	Victory CG & CRA CG	9	16	34	—	1,402
24	Reading ARC	33	27	57	10	1,396
25	Ayr ARS	10	8	69	—	1,343
26	Wirral & D ARC	20	28	35	38	1,320
27	Crawley ARC & Reigate	26	59	36	15	1,294
28	Telford & DARS	19	42	30	30	1,273
29	Soton Univ & Clockwork CG	17	31	45	39	1,273
30	Sutton & Cheam RS	24	49	24	35	1,228
31	Exmoor RC CG	31	25	21	48	1,228
32	Hornsea ARC	35	39	43	20	1,201
33	Vale of W. Horse ARS	48	55	13	23	1,182
34	Preston ARS	6	63	49	—	1,167
35	Newark ARS	22	43	37	41	1,146
36	Port Talbot ARC	36	23	38	—	1,138
37	The RS of Harrow	45	18	50	31	1,129
38	North Cornwall Group	5	48	74	—	1,113
39	North Bucks CG	38	40	22	43	1,075
40	Farnborough & D RS	37	64	33	29	1,033
41	Colchester RC VHF CG	46	20	54	—	972
42	Leyland Hundred ARG	40	52	44	31	957
43	Cheltenham/Hereford ARG	43	38	41	40	948
44	Haverling & D ARC	54	60	39	17	934
45	Martlett CG	—	41	17	13	927
46	Crawley Court ARG	52	44	56	24	896
47	Lincoln SW Club	39	46	59	45	845
48	Mayland & D ARS	58	15	47	—	811
49	Kidderminster ARS	41	53	48	—	802
50	Northern Heights ARS	51	54	62	26	798
51	Great Lumley ARS	55	51	32	42	772
52	Basingstoke ARC	49	45	40	—	767
53	Southgate ARC	44	68	67	34	761
54	Pembroke & D ARC	50	34	66	—	727
55	Mid Cheshire ARS	47	61	55	—	722
56	Guernsey ARS	56	65	23	—	690
57	Harlow & D ARS	53	33	75	—	659
58	RWCG	—	30	27	—	585
59	NW of Ireland ARS	42	72	73	—	564
60	Shefford & D RS	57	57	61	—	524
61	Yeovil ARC	60	50	51	—	502

Posn	Group name	70	144	432	1,296	Overall score
62	West Kent ARS	—	56	42	36	462
63	Bury St Edmunds RS	—	32	—	33	440
64	RAF ARS	—	36	46	—	430
65	Sutton Coldfield RS	59	69	63	—	400
66	Chad Radio Club	—	71	25	—	351
67	Anglesey CG	—	47	60	—	341
68	Nunsfield House CA ARG	—	62	58	—	297
69	Grafton RS	—	67	52	—	270
70	Hillingdon ARC	—	58	65	—	264
71	GB3DC CG	61	73	71	47	260
72	Aylesbury Vale RS	—	70	53	—	259
73	Salop ARS	—	—	31	—	226
74	Rhyl & D ARC	—	66	70	—	186
75	Ealing & D ARS	—	—	68	37	160
76	North West ARC	—	74	72	46	123
77	Yellow Welly CG	—	—	—	44	27

RESTRICTED SECTION OVERALL RESULTS

Posn	Group name	70	144	432	1,296	Overall score
1	Cotswold & Big M CG	1	1	3	2	3,319
2	East Kent RS	19	4	1	1	3,294
3	Bracknell ARC	9	11	7	3	2,990
4	Harwell ARS	13	6	12	5	2,321
5	S Birmingham RS	7	23	5	4	2,288
6	Five Bells Group	15	7	11	6	2,243
7	Rockhoppers CG	3	3	6	—	2,065
8	Surrey Radio Contact C	11	9	10	9	2,016
9	Univ of Surrey EARS	17	15	4	8	1,933
10	Torbay ARS	10	12	18	11	1,898
11	Warrington RC	16	5	2	—	1,893
12	Mid Cambs Gentlemen	26	17	26	7	1,630
13	Guildford & D RS	8	22	9	20	1,588
14	Plymouth RC	4	19	20	21	1,555
15	Bury RS	5	29	27	—	1,362
16	Aberdeen ARS	31	16	44	12	1,351
17	Maidenhead & D ARC	23	42	33	10	1,332
18	North Kent RS	30	33	15	13	1,329
19	West of Scotland ARS	6	28	29	—	1,323
20	Edgware & D ARS	20	26	21	18	1,310
21	Bolsover ARS	18	21	19	—	1,256
22	Shirehampton & Bristol	21	31	28	17	1,250
23	Waveney Valley CG	29	18	13	—	1,220
24	Racal Tacticom ARS	22	39	14	19	1,200
25	South Belfast VHF CG	—	2	16	—	1,190
26	Chiltern ARC	27	43	32	15	1,164
27	Westmorland VHF	2	53	—	—	1,149
28	SE London Raynet CG	32	35	23	16	1,146
29	Stoney Hill CG	14	14	—	—	1,137
30	Saffron Walden & D ARS	24	24	38	—	1,025
31	South Lakeland ARS	36	13	36	—	882
32	Goole R & E S	—	20	8	—	795
33	South Essex ARS	28	52	37	—	785
34	Bishops Stortford ARS	25	48	49	—	770
35	Doncaster Student ARS	33	47	31	—	729
36	Abingdon Contest Club	—	8	48	—	659
37	Cray Valley RS	12	—	—	—	647
38	Turks Head	—	30	—	14	638
39	Buchan ARC	—	27	30	—	578
40	Solihull CG	—	34	22	—	548
41	E Lancs ARC	34	50	50	—	535
42	G5ECD/G6LVB	—	10	52	—	530
43	Plessey RC	—	25	41	—	523
44	Tamworth ARS	—	44	17	—	510
45	Mexborough & D ARS	37	41	39	—	506
46	Queens Univ Belfast RC	35	51	45	—	480
47	North Bristol ARC	—	38	35	—	468
48	Fareham & D ARC	—	32	40	—	468
49	South Bristol ARC	—	45	24	—	445
50	Edenbridge ARS	—	46	25	—	441
51	Braintree & D ARS	—	36	47	—	395
52	Nene Valley RC	—	37	46	—	394
53	Kelso ARS	—	40	43	—	387
54	Dengie 100 ARC	—	55	34	—	343
55	Coulston ATS	—	49	42	—	329
56	Bolton Bradford CG	—	54	51	—	182

70MHz BAND RESULTS

OPEN SECTION

Posn	Call sign	Total points	QTH	CW section Points	QSOs	SSB section Points	QSOs	Ant
1	GM4TXX	2,399	XO26	1,150	82	1,249	91	4EY
2	G4ALE	2,364	YK31	880	85	1,484	138	6/EY
3	G3ZTZ	2,233	ZO48	956	86	1,277	117	8EQ
4	GD3YEO	2,180	XO68	811	62	1,369	105	4EY
5	G4ADV	2,090	XK27	828	66	1,262	101	4/4/4EY
6	G3SYA	2,070	YO78	903	95	1,167	125	4/4EY
7	G4BYV	1,894	AL45	751	89	1,143	125	7EY
8	G3MPN	1,836	AM06	709	71	1,127	116	4 x 5EY
9	G3ZAM	1,801	ZK35	653	77	1,118	131	12EY
10	GM3VMG	1,753	XO19	730	60	1,023	81	6EY
11	G3PFM	1,727	YK30	649	81	1,078	123	12EY
12	G3YFF	1,705	AK14	745	87	960	119	6EQ
13	G3AMW	1,683	ZN18	748	82	935	108	6EY
14	GM4HAM	1,684	YP42	811	61	871	66	4EY
15	G2ASF	1,678	YL75	681	80	1,017	120	5EY
16	G4FRE	1,670	AM67	731	81	939	104	—
17	GJ3KMI	1,664	YJ70	548	49	1,116	92	4EY
18	G4HNS	1,659	AN61	673	70	986	128	8EY
19	G3UKV	1,587	YM28	660	88	927	134	4EY
20	GW4EFP	1,560	YN75	571	69	989	121	6EY
21	G3SWC	1,558	ZK08	597	78	961	125	5EY
22	G3TBK	1,509	ZN75	679	88	830	120	6EY
23	G4BOH	1,503	ZN53	621	85	882	124	2 x 6EY
24	G4BOX	1,498	ZN71	681	95	817	119	5EY
25	G4ERG	1,445	ZN49	566	71	879	102	4EY
26	G4MEL	1,436	ZL76	714	96	722	105	5EY
27	G4MJC	1,414	AK12	561	67	853	107	4EY
28	G4HON	1,397	ZN61	562	76	835	119	5EY
29	G3JKY	1,384	AL52	618	82	766	107	4/4EY
30	GW4KFK	1,382	YM44	581	75	801	105	5EY

Posn	Callsign	Total points	QTH	CW section Points	QSOs	SSB section Points	QSOs	Ant	Posn	Callsign	Score	QSOs	QTH	Best dx	Km
31	G4JKN	1,374	YL72	459	53	915	102	7EY	31	GJ8KMI	4,858	433	YJ70	EA2BAK	920
32	G4ARD	1,346	ZL18	565	86	781	117	6EY	32	G6BSE	4,670	468	AM64	DL00U/P	641
33	G3WGV	1,333	ZL54	560	82	773	113	8EY	33	G6BUT	4,569	563	AL21	Y23SB/P	816
34	G3UAX	1,330	ZL53	510	76	820	120	8EY	34	GW2OP	4,209	396	YL26	F1ECA/P	1,072
35	G4IGY	1,305	ZO78	628	66	687	71	8EY	35	G4EFE	4,166	516	ZL53	F6FZS/P	927
36	GW4HNT	1,301	YL23	290	41	1,011	114	5EY	36	G3RAF	3,964	453	YL68	EA2BAK	1,182
37	G4DKN	1,225	ZL66	515	79	710	104	4EY	37	G3FVA	3,776	487	ZN61	O25DD	783
38	G4BJM	1,183	ZL06	551	87	632	112	4EY	38	G5BK	3,762	525	YL20	F6EKG	699
39	G3PVU	1,147	ZN48	473	62	674	88	4EY	39	G4EKT	3,748	399	ZO78	OZ1FGP	677
40	G4TXA	1,132	YN38	545	69	587	79	4EY	40	G4NUT	3,733	510	ZL06	DF8VK	623
41	G4CTU	1,089	YM48	468	68	621	84	4EY	41	G4DZO	3,705	424	AK11	DL7JM	710
42	G4ONL	1,083	WO05	345	23	738	86	2 x 4EY	42	G3ZME	3,661	547	YM28	PE1DXL	610
43	G4ILI	1,063	YL20	441	69	622	92	8EY	43	G3PJR	3,604	446	ZN75	DL8GP	695
44	G3KIZ	1,061	AL01	465	70	596	89	5EY	44	G6IBA	3,488	499	ZL75	EA1YV	1,148
45	G3MLS	1,060	ZL06	303	51	757	117	2 x 4EY	45	G3TCR	3,359	451	ZL65	GM3PJ/P	710
46	G4TNY	1,017	AL05	488	65	529	77	6EY	46	G5FZ	3,329	362	ZN48	DL8GP	692
47	G3ZTT	1,006	YN67	437	58	569	73	4EY	47	GW6LAC	3,315	403	YN49	PE1KKN	661
48	G5RP	964	ZL34	543	67	421	92	4EY	48	G4LXS	3,258	324	XK27	F1FEM	1,038
49	G4OXX	866	ZL65	421	71	445	59	4EY	49	G4ADM	3,243	505	ZN71	DL8GP	751
50	GW4VRO	851	XL26	278	31	573	55	4EY	50	G3CMH	3,085	317	YK05	EA2BAK	1,113
51	G4GAK	845	ZN11	19	3	826	105	4EY	51	G4EUV	3,056	344	ZO02	DL0SE/P	738
52	G3RDQ	840	ZL74	451	69	389	73	4EY	52	G4TLH	2,969	477	YN38	F2OC	653
53	G6UT	785	AL21	434	69	351	62	4EY	53	G4GXP	2,912	411	YM48	GD4IOM/P	240
54	G4HRC	746	AL22	213	58	433	77	5EY	54	G2SU	2,883	382	ZN11	DC0SE	695
55	G4SLV	666	ZO02	262	26	404	38	4EY	55	G4VWH	2,797	378	ZL34	GM3PJ/P	673
56	GU3HFN	664	YJ48	361	39	303	34	4EY	56	G3WKS	2,782	358	AL73	DF0EP/P	613
57	G4PSO	571	ZM79	237	46	334	62	2 x 4EY	57	G3FJE	2,652	339	ZM79	GM3HRZ/P	628
58	G3ZXX	468	AL24	1	1	467	70	6EY	58	G1DXY	2,638	407	ZL17	F6EKG/P	728
59	G3LNN	430	ZM31	256	41	174	34	4EY	59	G3WSC	2,609	366	ZL76	F2GL	714
60	G4JBH	352	YK05	198	34	154	30	4EY	60	G8HRC	2,551	405	AL22	DM3DX/P	565
61	G4HIX	315	YO14	155	21	160	26	4EY	61	G8ZTT	2,508	392	YN67	ON4Y7	594

RESTRICTED SECTION

Posn	Callsign	Total points	QTH	CW section Points	QSOs	SSB section Points	QSOs	Ant
1	GW3SNN	1,932	YN75	872	104	1,060	132	8EY
2	G3FDW	1,928	YO29	647	59	1,281	114	6EY
3	GU4IUW	1,748	YJ49	722	66	1,026	87	4EY
4	G4GXX	1,553	YK21	647	66	906	88	6EY
5	G3BRS	1,513	YN29	622	74	891	109	4EY
6	GM4PHG	1,446	XP17	737	46	709	53	4EY
7	G4EYD	1,414	YM50	600	69	814	128	6EY
8	G3PJX	1,402	ZL69	662	88	750	109	8EY
9	G4DDN	1,396	YK18	595	68	801	95	6EY
10	G3LHJ	1,394	YK33	656	70	738	80	6EY
11	G4FUU	1,325	ZL60	480	70	845	117	6EY
12	G3TAA	1,250	AL65	638	74	612	78	4EY
13	G4HLX	1,249	ZL33	599	85	650	102	9EY
14	G4KOT	1,248	ZP61	548	46	700	57	4EY
15	G4EMK	1,213	ZM29	525	73	688	109	7EY
16	G3NFB	1,129	ZN61	345	50	784	114	4EY
17	G4CWH	1,115	AL51	488	72	727	106	5EY
18	G4NLZ	1,092	ZN53	417	63	675	94	4EY
19	G3LTY	1,066	AL56	381	57	677	87	6EY
20	G3PSP	1,060	ZL29	452	72	588	100	6EY
21	G4BWB	1,053	YL49	421	65	632	92	5EY
22	G3PGM	985	ZL36	441	78	544	97	6EY
23	G3TWG	946	ZL17	416	71	530	98	4EY
24	G4KF	919	AM72	315	51	604	95	6EY
25	G3TVW	903	AL02	406	65	497	81	8EY
26	G4FOH	901	ZM70	310	50	491	87	8EY
27	G3NCL	887	ZL27	397	70	490	92	8EY
28	G4OAD	848	AL32	254	61	494	82	6EY
29	G4RKK	847	AM48	367	43	480	52	4EY
30	G3WMR	756	AL51	316	52	440	81	6EY
31	GM4OBD	746	YO08	336	22	410	26	7/7S
32	G4TAW	704	AL52	230	40	474	87	5EY
33	G4RHZ	597	ZN44	112	22	485	69	5EY
34	G4ULL	525	YN18	26	4	499	63	4EY
35	G4WWF	383	XO32	108	14	275	27	4EY
36	G3ZFZ*	374	YO65	175	24	199	-25	Dipole
37	G4AOU	178	ZN44	76	18	102	27	3EY

* 400mW

LISTENER SECTION

Posn	Station	Total points	QTH	CW section Points	Heard	SSB section Points	Heard	Ant
1	BRS52543	549	YN15	—	—	549	64	5EY
2	BRS28198	105	AK04	—	—	105	19	TA31JR

144MHz BAND RESULTS OPEN SECTION

Posn	Callsign	Score	QSOs	QTH	Best dx	Km
1	G4LIP	14,415	1,113	AN61	OK1KRA/P	922
2	G4APA	14,213	961	ZO48	HB9MM/P	973
3	G4BAR	11,229	839	YK31	EA8XS/P	2,710
4	GM3WCS	9,081	782	XO26	F8SQ/P	767
5	G6HH	8,865	752	AK14	F6HPP/P	882
6	G4HRS	8,389	862	ZK08	EA1YV	1,133
7	G4BVG	8,360	809	AL54	DK0BN/P	819
8	GM4PPT	8,130	693	XO19	F1BDE/P	767
9	G4MRS	8,001	751	AM67	DB5UK/P	726
10	GD4IOM	7,668	741	XO68	ISODKU	2,050
11	G3ZIG	7,020	658	AM06	HB9RFB/P	835
12	GM4RZW	7,005	607	YP42	F0FF/P	652
13	G4RFR	6,904	617	YK30	EA1BLA	870
14	GW8SJP	6,775	660	YM44	DC6MK	927
15	G4TVI	6,717	627	AL24	OZ1OF	750
16	G8LNC	6,284	696	ZK35	GM3HRZ/P	767
17	G3WQK	6,242	567	AK12	DL3LAL	732
18	G3EFX	6,169	733	ZL06	F6HPP/P	992
19	G4NVA	6,141	667	ZN53	DF5OX	781
20	G4CRA	6,025	622	AL05	OZ1BUR	702
21	G4CDC	5,968	552	ZN49	F6CJG/P	879
22	G8GBY	5,953	504	ZN18	OZ5OO	797
23	GW3EOP	5,896	572	YL23	F1KKL	1,096
24	G4DDC	5,881	650	ZL18	DF0CN/P	761
25	G4SSS	5,420	496	YL72	EA8XS/P	2,751
26	G4CFG	5,406	566	YL75	EA2AX	1,132
27	G3CCC	5,175	610	ZL54	DB6HB	804
28	GW4MGR	5,160	665	YN75	DF0DA/P	745
29	G3GHN	5,088	600	AL52	GM3PJ/P	716
30	GW4CZZ	4,901	673	YN64	DL8GP	827

Entry also from G6LJO/P (No 427 and no claimed score)

RESTRICTED SECTION

Posn	Callsign	Score	QSOs	QTH	Best dx	Km
1	GW4ERP	4,990	674	YN75	DL8GP	810
2	G4TAP	4,366	410	XO51	F8SQ/P	804
3	GU4XEA	3,817	369	YJ49	F6HTJ/P	850
4	G6EKR	3,703	395	AL56	G4TAP	583
5	G4CDA	3,663	554	ZN61	DK3F8	690
6	G3PIA	3,618	503	ZL33	DL0OS/P	660
7	G8NWM	3,368	306	ZM29	DL4OL	706
8	G4UHF	2,725	379	ZL15	GM3PJ/P	640
9	G4DDY	2,655	492	ZL60	GM3BSQ/P	647
10	G5ECD	2,640	368	YO65	F6EPU/P	557
11	G6BRA	2,525	311	YK18	not recorded on 427	
12	G3NJA	2,480	218	YK33	F6HTJ/P	1,002
13	G4VKE	2,460	293	YO65	F6EPU/P	561
14	G4UOE	2,450	308	ZP61	DL0CK/P	794
15	G4VCR	2,325	380	AL51	GM3PJ/P	716
16	GM3BSQ	2,295	178	YQ08	F1KBF/P	815
17	G8BBK	2,246	288	ZM70	GM3PJ/P	615
18	G4SOL	2,131	240	AM48	G4TAP/P	540
19	G3PRC	2,026	230	YK21	EA1BLA	861
20	G8HSG	2,021	243	ZN07	DL0NO/P	703
21	G4RSB	1,961	280	ZN53	DL0SE/P	651
22	G6GS	1,956	322	ZL69	GM3PJ/P	717
23	G8OHM	1,941	341	YM50	DF0BY	632
24	G3TXC	1,796	248	AM72	GM3BSQ	576
25	G8IGQ	1,791	277	ZM16	DL8GP	675
26	G3ASR	1,786	272	ZL29	DF0EP/P	736
27	GM3PJ/P	1,766	132	YR40	F1KBF/P	886
28	GM4AGG	1,712	196	XP17	F1KBF/P	730
29	G4TBT	1,697	279	YN29	ON6DZ/A	559
30	G8YYB	1,677	215	ZL77	F6EAK/P	713
31	G4AHG	1,642	227	YL49	F6HPP/P	948
32	G3VEF	1,507	243	ZK05	DF1JM	568
33	G8TNK	1,502	250	AL51	G4TAP/P	529
34	G4JDL	1,452	322	ZM42	GM3PJ/P	570
35	G4JED	1,387	230	AL52	GM3PJ/P	716
36	G6BRH	1,382	186	AL03	G4TAP/P	516
37	G6GWZ	1,372	245	ZM57	GM3PJ/P	597
38	G4GCT	1,327	195	YL48	DL9GS	678
39	G3XOX	1,248	221	ZL36	EI7DJ/P	548
40	GM3VLB	1,163	133	YP28	F1KBF/P	676
41	G4BTS	1,143	200	ZN44	F8SQ/P	509
42	G3WKX	1,133	194	ZL17	GM4NFI/P	619
43	G3CAR	1,008	174	ZL27	G4TAP/P	463
44	G8TRS	1,003	180	ZM73	GM3BQS/P	551
45	G4WAW	998	148	YL48	F6HPP/P	946
46	G6IUS	993	158	AL51	GM4RZW/P	516
47	G3PTV	988	171	ZN44	GM6WQC/P	576
48	G5ZG	973	153	AL02	GM3WCS/P	445
49	G4FUR	863	166	ZL60	PA3AOT	522
50	G3NTJ	793	140	YN18	G6BUT/P	287
51	G14MXW	768	76	XO32	G3GHN	546
52	G4RSE	763	127	AL32	GM3WCS/P	490
53	G3FDW	753	70	YO29	F1KBF/P	566
54	G8MVD	734	110	ZN22	F0FF/P	461
55	G4XOX	654	130	AL24	GM3WCS/P	500

432MHz BAND RESULTS

Posn	Callsign/P	Points	QSOs	QTH	Best dx	Km	Square
1	G8TFI	7,013	583	AL45	SM6HYG	1,013	FS
2	G4CLA	5,674	460	AN61	SK4BX	1,143	HT
3	G4PUB	4,956	380	YK31	EA2AX	1,086	ZB
4	G4LOJ	4,342	363	AM06	SM6HYG	877	FS
5	G4THB	4,140	320	ZO48	OZ9FW	817	GP
6	G3LRS	4,101	311	ZN18	DL7QY	1,039	FK
7	G4IRC	3,865	382	AM67	DB7UZ	726	FH
8	G4BVE	3,480	380	ZN53	OZ1HRA	793	EQ
9	G4VOP	3,052	322	YK30	EB1MS/P	898	XC
10	G4MVN	3,032	291	AK12	OZ3ALD/P	857	EQ
11	GW8IFT	2,869	314	YM44	DF5VLA	779	DJ
12	G8DDC	2,858	309	ZL18	DC6NA	880	FJ
13	G3SEK	2,751	341	ZL34	DL6WU	723	EJ
14	G8BQX	2,658	272	AK14	DB7UZ	746	FK
15	GM4DIJ	2,518	210	XO26	PA0PLY/A	705	CM
16	G2CPM	2,489	269	ZL53	F6CIS/P	894	ZD
17	G4GZO	2,298	265	AK11	DK2PR/P	679	EN
18	G3UHF	2,133	273	ZN61	DL0SE/P	678	DL
19	G4DSF	2,014	225	YL75	EA3JA	1,063	BC
20	G4GZA	1,976	206	ZN49	Y3SO	870	GM
21	G4HGU	1,946	188	YL72	EA2AX	1,138	ZB
22	G3ZFT	1,913	247	ZL06	DL6WU	700	EJ
23	GU4NYT	1,856	179	YJ48	EA3JA	877	BC
24	G3LCH	1,852	272	ZN71	DL0SN/P	731	EK
25	G4GBH	1,746	236	ZM21	DL0SE/P	669	DL
26	G4DBW	1,727	240	AL52	OZ9PZ	779	EQ
27	GW3XVA	1,716	225	YN64	F6FJE/P	624	BJ
28	G3WZT	1,654	234	ZK08	DK0HR/P	723	EL
29	GM8TSI	1,639	142	YP42	F1ANH/P	752	YI
30	G6ZME	1,591	242	YM28	DG3EK	622	DL
31	G6DQY	1,586	240	YM48	DG3EK	620	DL
32	G4GBF	1,545	108	ZO02	OZ5HAM	1,061	HP
33	G4MBZ	1,520	227	ZL66	DK2PR/P	706	EN
34	G6ISY	1,511	205	ZK35	DK4PF	799	EN
35	GW8WDC	1,510	212	YN75	F6FJE/P	609	BJ
36	G5LK	1,435	197	ZL76	DL0SN/P	638	EK
37	G4HVC	1,400	167	ZN75	DJ9MH/P	814	EK
38	GW4NZ	1,312	149	YL23	F1BYM	822	ZE
39	G8KAX	1,281	208	AL22	DL0SN/P	551	EK
40	G4XIP	1,214	188	ZL65	DK2PR/P	721	EN
41	G8IVD	1,160	173	YL20	PI4TWN	616	DM
42	G4RPO	1,159	165	AL73	DJ0OL/P	534	DK
43	G4MWE	1,139	118	ZO78	DF5VLA	708	DJ
44	G4WGT	1,136	166	YN38	F1FHI	718	ZH
45	GJ6KMI	1,100	107	YJ70	PE1HXK/A	746	DN
46	G3RAF	1,086	142	YL68	F6CIS	880	ZD
47	G4NUL	1,049	143	AL24	DK2PR/P	584	EN
48	G6KRC	1,025	154	YM48	PA0JRS/A	603	CK
49	G8RIP	999	136	YO78	F1ANH/P	594	YI
50	G4JWD	993	169	ZL06	GM4VHU/P	572	YO
51	G4PJO	992	120	YK05	EA2AX	1,108	ZB
52	G8DWL	929	150	AL02	DJ5VL/A	537	DJ
53	G1ECE	913	150	ZL26	DL0SE/P	579	DL
54	G4TZM	912	126	AL05	DF5VLA	499	DJ
55	G6ZTT	905	139	YN67	F1ANH/P	605	YI
56	G4IBA	893	145	ZL75	DK2PR/P	723	EN
57	G4MMB	880	161	ZL54	F6CIS	889	ZD
58	G8KGC	868	136	ZN71	ON7WR/P	500	CK
59	G6COL	834	144	ZN48	DL2KBB	539	DK
60	GW6DOK	775	113	YN49	PA0PLY/A	637	CM
61	G4VXF	712	125	ZM79	DL0SE/P	543	DL
62	G4EMW	666	117	ZN11	OZ9PZ	740	EQ
63	G6LPB	618	110	ZM31	ON7WR/A	479	CK
64	GD4GNH	602	72	XO68	F6KBF/P	551	ZJ
65	G4EZZ	566	128	ZL17	GU4XIT/P	416	YJ
66	GW4REI	561	51	XL26	F6CIS	966	ZD
67	G3RWL	492	84	AL01	GM4DIJ/P	418	XO
68	G8UUP	401	84	ZL26	DK1KN	493	DK
69	GM3KJF	337	35	XO19	G8TFI/P	514	AL
70	GW1ARC	309	55	YN63	G8TFI/P	363	AL
71	G4NXH	212	26	YO19	OZ3NH	783	EQ
72	GIBNBW	181	21	WP66	G3SEK/P	541	ZL
73	G4OUN	131	21	WO05	G3LCH/P	395	ZN
74	G8XNH	110	12	XK27	F6CIS/P	856	ZD
75	G4KVR	102	26	AL21	G4THB/P	300	ZO

RESTRICTED SECTION

Posn	Callsign/P	Points	QSOs	QTH	Best dx	Km	Square
1	G8ULU	3,040	279	AL56	SM6FYU	959	GO
2	G4RNL	1,748	244	ZN61	DK2ZF	611	DN
3	GW4PDS	1,653	239	YN75	ON7WR/A	580	CK
4	G4XWT	1,420	225	AL51	DK2PR/P	648	EN
5	G4OHM	1,390	195	YM50	DF4KT	652	DL
6	GU4XIT	1,201	128	YJ49	G6GRA/P	619	ZO
7	G6ACM	1,198	139	YK18	F6CIS	838	ZD
8	G8ERX	1,185	126	ZN07	DF5VLA	710	DJ
9	G5RS	1,180	183	ZL69	GM8TT/P	541	XP
10	G3ZPB	1,150	173	ZL60	DK2PR/P	650	EN
11	G4YHF	1,134	150	ZM29	LA8AK	794	DS
12	G4CXJ	1,102	185	ZL33	DK1KN	537	DK
13	G4LDZ	1,078	121	AM48	DL0SE/P	433	DL
14	G3ZVL	985	159	ZL36	DG6ZN/P	695	EN
15	G4CW	962	161	AL51	PA3DIJ	454	DN
16	GI4KSO	959	104	XO51	F1ANH/P	665	YI
17	G4FWC	939	157	ZM73	PA0GUS/P	483	CN
18	G8NJA	929	84	YK33	EA3MM	1,025	BC
19	G4PPR	905	135	ZN53	DL0SN	703	EK
20	G4HTD	859	84	YK21	EA3MM	1,057	BC
21	G3SHY	824	151	ZL29	GM8TSI/P	469	YP
22	G4PYR	780	147	ZM42	PE1CMO	455	CM
23	G4AVV	779	110	AL52	GD4GNH/P	545	XO
24	G4WOD	745	104	YL48	F6CIS	904	ZD
25	G8PPQ	736	120	AL51	GM4DIJ/P	417	XO
26	G8XGO	734	119	ZM70	F1ANH/P	437	YI
27	G6BRS	728	104	YN29	F1ANH/P	553	YI
28	G3TAD	727	123	YL49	PA0EZ	524	CM
29	GM8TT	704	66	XP17	F6KBF/P	730	ZJ
30	GM4UFD	682	47	YR40	OZ7LX/P	857	FP
31	G3UER	675	112	ZN44	F1ANH/P	537	YI
32	G4LWA	659	125	ZL27	PA0NZH/P	411	CL
33	G3LVW	648	116	ZL17	GM4DIJ/P	421	XO
34	G8YEZ	645	90	AL24	DF5VLA	495	DJ

Posn	Callsign/P	Points	QSOs	QTH	Best dx	Km	Square
35	G6PNB	613	99	YL48	PA0EZ	536	CM
36	G3ZDZ	592	82	YO65	F1ANH/P	612	YI
37	G6RSE	586	102	AL32	GM4DIJ/P	490	XO
38	G3PGN	576	99	AM72	GM4DIJ/P	451	XO
39	G4IHZ	563	82	ZN44	PA3DIJ	497	DN
40	G8KGI	504	93	ZK05	F6CIS	853	ZD
41	G8ZK	500	87	ZM16	PA0GUS/P	420	CN
42	G6YOG	473	105	ZL60	PA0PLY/A	375	CM
43	GM4KHS	468	39	YP28	SM7FMX	965	GP
44	GM4VHU	442	35	YO08	OZ7LX/P	878	FP
45	G13LLO	390	49	XO32	G8ZDS	487	XK
46	G6FJF	363	71	ZM57	PA0PLY/A	389	CM
47	G6HWA	358	62	AL03	PA0GUS/P	359	CN
48	G4PSU	345	75	ZL15	GM4DIJ/P	404	XO
49	G6HKK	329	61	AL02	F1ANH/P	413	YI
50	G1ELC	316	58	YN18	F1KAW/P	461	AK
51	G6YPJ	106	24	ZN22	PA0PLY/A	476	CM
52	G6LVB	2	2	YO65	G8RIP/P	50	YO

LISTENER SECTION

Posn	Station	Points	QSOs	QTH	Best dx	Km	Square
1	BRS32525	340	72	AL41	F1FHI	494	ZH
2	BRS52543	172	42	YN15	G4VOP/P	359	YK
3	BRS28198	28	8	AK04	GW8IFT/P	310	YM

Check logs gratefully acknowledged from G3AYC, G3HRY, GW3TAL/P, GW3TGL/P, G6GVI and G6JME/P.

1,296MHz BAND RESULTS

Posn	Callsign	Points	QSOs	QTH	Best dx	Km	Pwr
1	G4NXX	2,523	235	AL45	SM6HYG	1,013	130
2	G4HWA	2,049	144	ZO48	DC8UB	717	300
3	G4ECY	1,673	143	AN61	SM6HYG	901	120
4	G3ZUD	1,628	126	ZN18	DF1AS/P	753	250
5	G4CCH	1,588	142	ZN49	DK1KR	722	150
6	G4ANT	1,578	154	AM06	DL6NAQ	676	150
7	G4JAR	1,554	121	YK31	EA3ADW	1,061	300
8	G4FSG	1,495	170	AM67	DK2PR/P	540	100
9	G4HRY	936	97	YL75	EA3JA	1,063	130
10	G3ULT	897	117	ZL54	F6CIS/P	889	30
11	G4ROM	896	106	ZN61	DL0SN/P	731	100
12	G3WFW	893	108	ZN53	F1ELL	549	25
13	G3YKI	862	104	AK11	DL0HC	566	30
14	G4RFC	819	117	AL52	H89AMH/P	676	100
15	G3GRO	780	113	ZL76	F6CIS/P	862	60
16	G3WOI	682	98	ZL53	F6CIS/P	894	30
17	G4VIX	664	102	AL22	DL0HC/P	536	50
18	G4WHO	615	76	YK30	F6CIS/P	818	30
19	GM4BYF	611	52	XO26	F6KBF/P	606	150
20	G4GGD	594	48	ZO78	DL0HC/P	652	20
21	G4PRJ	557	67	AK12	DF5DN/P	538	2
22	G3RXX	516	84	ZL18	DL0HC/P	597	30
23	G4PMK	490	88	ZL34	PA0OOS/A	563	60
24	G2DBT	447	75	ZL75	F6CIS/P	867	40
25	G3NPF	443	92	ZK08	PA0GUS	475	50
26	G4ENR	380	45	ZN11	DK1VCD	689	35
27	GM8MJV	380	34	YP42	G4JAR/P	533	100
28	GW6JIM	372	51	YM44	PA0PVC/A	523	250
29	G4FRS	370	70	ZL66	PA0OOS/A	549	240
30	G4IUT	332	50	YM28	PA0GUS/A	538	1
31	G4JNZ	296	53	ZL06	PA0EZ	411	12
32	G4BZO	296	46	YN38	FOFF/P	474	30
33	G4UCW	292	42	AM64	PA2PVC	480	4
34	G4AEZ	289	45	AL01	PA0OOS/A	444	2
35	G3DCD	287	54	ZN71	FOFF/P	410	2
36	G4DRV	263	37	AL73	PA0OOS/A	474	1
37	G3UUP	259	59	ZL26	PA0EZ	419	3
38	GW3UVR	245	45	YN75	G8FEZ	345	40
39	G4KMI	215	25	YJ70	F6CIS/P	664	60/2
40	G8HZK	199	30	YL20	PA3BPC/P	489	

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	Time	Callsign	MHz	Mode	Town	Notes
Sundays											
1015	G3CGD	1-875	A1A/A3E	Cheltenham, Glos		1830	G3GNS	{ 1-910 3-550 144-250 }	A1A	Locking, Avon	[13]
1100	G2FXA	1-910	A1A/A3E/J3E	Stockton-on-Tees		1830	G4TYF	145-250	F2A/F3E	Bishop Auckland, Co Durham	[1]
1100	G3BLS	145-250	F2A	Osney, Oxford	[1]	1830	GW4OXB	145-275	F2A/F3E	Swansea, West Glam	[1]
1100	G4ICC	3-535	A1A/J3E	New Duston, Northants		1900	{ G4ILD G3ZQS }	145-250	F2A/F3E	Rishton, Lancs	[1]
1200	G3HVI	145-250	F2A/F3E	Stoke-on-Trent, Staffs	[1]	1900	G2ABC	145-250	F2A/F3E	Darwen, Lancs	[1]
1200	G3GNS	{ 1-910 3-550 144-250 }	A1A	Locking, Avon	[13]	1900	G3ULY	3-583	A1A	Truro, Cornwall	[1]
1830	G4NZU	144-525	F2A/F3E	West Bridgford, Notts	[1]	1900	G4EXD	145-475	F2A	Culgaith, Cumbria	[1]
1830	GW4OXB	145-275	F2A/F3E	Swansea, West Glam	[1]	1900	G3KWT	145-250	F2A/F3E	Leeds, W Yorks	
1900	G4OBK	1-875	A1A/J3E	Chorley, Lancs		1915	GM4RSJ	145-250	A2A/F3E	Prestwick, Strathclyde	[1]
1930	{ G4NRO G4IBV G4GBK }	145-275	F2A/F3E	Atherton, G Manchester	[1]	1930	G4VRK	144-625	F2A/F3E	Guildford, Surrey	
1930	G4VBL	144-625	F2A/F3E	Fulham, SW London	[1]	1930	G4LHI	145-250	F2A/F3E	Huntingdon, Cambs	[1]
1930	G3LDW	144-250	A1A/J3E	Halesowen, W Midlands	[1]	1930	G4SXU	145-250	F2A/F3E	Harrogate, N Yorks	[1]
2000	G4TKM	145-250	F2A/F3E	Birmingham	[1]	2000	G4VSC	145-250	F2A/F3E	Belfast, N Ireland	
2005	G3OLU	145-375	F3E	Braintree, Essex	[1]	2000	G4INM	145-250	F2A/F3E	Chelmsford, Essex	[1]
2030	{ G3ORP G4UAK }	144-250	A1A/J3E	Maldstone, Kent	[6]	2000	{ G4JTVZ G4ATXB }	144-250	F1B A1A	St Helier, Jersey, CI	[1]
2100	G4EWK	144-850	F2A	Burton-on-Trent, Staffs	[7]	2000	G2FXA	144-250	A1A/J3E	Stockton-on-Tees	[1]
2100	G3HQB	144-500	F2A/F3E	Stockport, G Manchester	[1]	2000	GW4KDP	145-550	F2A/F3E	Barnmouth, Gwynedd	[1]
2200	G4OJD	145-250	F2A/F3E	Brixham, Devon	[1]	2000	G3SWP	144-250	A1A/J3E	Doncaster, S Yorks	[1]
						2000	G4BPA	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/J3E	Ilford, Essex	
						2130	GM4HYF	{ 28-350 145-250 }	A1A F2A	SE Glasgow	[1]
Thursdays											
1400	G4OOC	145-250	F2A/F3E	Leeds, W Yorks	[1]	1400	G4OOC	145-250	F2A/F3E	Leeds, W Yorks	[1]
1830	G3GNS	{ 1-910 3-550 144-250 }	A1A	Locking, Avon	[13]	1830	{ G4ILD G3ZQS }	145-250	F2A/F3E	Rishton, Lancs	[1]
1830	GW4OXB	145-275	F2A/F3E	Swansea, West Glam	[1]	1830	G3GNS	{ 1-910 3-550 144-250 }	A1A	Locking, Avon	[13]
1900	G4FEX	145-250	F2A/F3E	Horsley Woodhouse, Dbys	[1]	1830	GW4OXB	145-275	F2A/F3E	Swansea, West Glam	[1]
1900	{ G3ULY G4EXD }	1-880	A1A	Culgaith, Cumbria		1900	G4FEX	145-250	F2A/F3E	Horsley Woodhouse, Dbys	[1]
1900	G3CMH/A	144-250	A1A/J3E	Yeovil, Somerset	[1]	1900	G3BLS	145-250	F2A	Osney, Oxford	[1]
1900	G8QR	145-250	F2A/F3E	Norwich, Norfolk	[1]	1900	G4RS	3-565	A1A/J3E	Catterick, N Yorks	[1]
1900	G4ILD	145-250	F2A/F3E	Riston, Lancs	[1]	1915	GM4RSJ	145-250	A2A/F3E	Prestwick, Strathclyde	[1]
1900	G3ZQS	145-250	F2A/F3E	Darwen, Lancs	[1]	1930	G3ASR	{ 1-875 144-175 }	A1A/J3E (Isb)	Harrow, Middx	[1] [11] [12]
1900	G4DLB	145-250	F2A/F3E	Banbury, Oxon	[1]	1930	{ G4NRO G4IBV G4GBK }	145-275	F2A/F3E	Atherton, G Manchester	[1]
1915	GM4RSJ	145-250	A2A/F3E	Prestwick, Strathclyde	[1]	1930	G4VWV	144-625	F2A/F3E	Slough, Berks	
1930	G4VBL	144-625	F2A/F3E	Fulham, SW London	[1]	1930	G4SBH	145-250	F2A/F3E	Torquay, Devon	
1930	G4LLU	144-160	A1A/J3E	Wolverhampton, W Mids	[1]	2000	G2ACZ	1-819	A1A	Mablethorpe, Lincs	
1930	G4JSQ	145-275	F2A/F3E	Atherton, G Manchester	[1]	2000	G4INM	145-250	F2A/F3E	Chelmsford, Essex	[1]
1930	G4SUX	145-250	F2A/F3E	Harrogate, N Yorks	[1]	2000	G3GMS	145-250	F2A/F3E	Whitley Bay, T&W	[1]
2000	G2FXA	145-250	F2A/F3E	Stockton-on-Tees	[1]	2000	G3WOR	144-250	A1A/J3E	Lancing, Sussex	[14]
2000	G3GMS	145-250	F2A/F3E	Whitley Bay, T & W	[1]	2100	G4EWK	144-850	F2A	Burton-on-Trent, Staffs	[7]
2000	G4INM	145-250	F2A/F3E	Chelmsford, Essex	[1]	2100	G3AVJ	145-250	F2A/F3E	Huyton, Merseyside	[1]
2000	G4PYR	1-880	A1A/J3E	Solihull, W Midlands		2100	G3HQB	144-500	F2A/F3E	Stockport, G Manchester	[1]
2000	G4VSC	145-250	F2A/F3E	Belfast		2200	GM4HYF	{ 28-350 145-250 }	A1A F2A	SE Glasgow	[1]
2000	G4OO	145-250	F2A/F3E	Spalding, Lincs	[1]	2200	G4OJD	145-250	F2A/F3E	Brixham, Devon	[1]
2030	G4UOL	145-250	F2A/F3E	Ilford, Essex	[1]						
2030	G3ASR	{ 1-875 144-175 }	A1A/J3E (Isb)	Harrow, Middx	[1] [12]	Fridays					
2030	G4NZA	145-250	A2A/F3E	Wellington, Somerset	[9]	1830	{ G4ILD G3ZQS }	145-250	F2A/F3E	Rishton, Lancs	[1]
2100	G4OTV	145-250	F2A/F3E	Tunbridge Wells, Kent		1830	G3GNS	{ 1-910 3-550 144-250 }	A1A	Locking, Avon	[13]
2100	G4RPQ	145-250	F2A/F3E	Goudhurst, Kent	[1]	1830	G4TYF	145-250	F2A/F3E	Bishop Auckland, Co Durham	[1]
2100	G4RWT	145-250	F2A/F3E	Paddock Wood, Kent		1830	GW4OXB	145-275	F2A/F3E	Swansea, West Glam	[1]
2100	G3AVJ	145-250	F2A/F3E	Huyton, Merseyside	[1]	1900	G4NFK	145-250	F2A	Hucknall, Notts	[1]
2100	G3WOR	144-250	A1A/J3E	Lancing, Sussex	[14]	1900	G4FIM	145-550	F2A/F3E	Leeds, W Yorks	
Tuesdays											
1100	{ G4NRO G4IBV G4GBK }	145-275	F2A/F3E	Atherton, G Manchester	[1]	1930	G4VWV	144-625	F2A/F3E	Slough, Berks	
1200	G3GNS	{ 1-910 3-550 144-250 }	A1A	Locking, Avon	[13]	1930	G3HVI	145-250	F2A/F3E	Stoke-on-Trent, Staffs	[1]
1830	{ G4ILD G3ZQS }	145-250	F2A/F3E	Rishton, Lancs	[1]	2000	G3RR	145-550	F2A/F3E	Barnoldswick, Lancs	[1]
1830	GW4OXB	145-275	F2A/F3E	Swansea, West Glam	[1]	2000	G4INM	145-250	F2A/F3E	Chelmsford, Essex	[1]
1900	G3WQK	144-775	F2A	Eastbourne, E Sussex	[1]	2030	G3CAR	144-625	F2A/F3E	High Wycombe, Bucks	[1]
1900	G4RS	{ 3-565 145-250 }	A1A/J3E F2A/F3E	Catterick, N Yorks	[1]	2100	G3AVJ	145-250	F2A/F3E	Huyton, Merseyside	[1]
1915	GM4RSJ	145-250	A2A/F3E	Prestwick, Strathclyde	[1]	2200	G3AWL	144-250	A1A/J3E	Easington, Co Durham	[8]
1930	G4BFJ	144-625	F2A/F3E	Banstead, Surrey	[1]	Saturdays					
1930	G4DAL	145-250	F2A/F3E	Lancaster, Lancs	[1]	1200	G3GNS	{ 1-910 3-550 144-250 }	A1A	Locking, Avon	[13]
1930	G4TDO	144-160	A1A/J3E	Wolverhampton, W Mids	[1]	1830	GW4OXB	145-275	F2A/F3E	Swansea, West Glam	[1]
1930	{ G4NRO G4IBV G4GBK }	145-275	F2A/F3E	Atherton, G Manchester	[1]	1930	G4XOI	145-275	F2A/F3E	Stockport, G Manchester	[1]
2000	G4INM	145-250	F2A/F3E	Chelmsford, Essex	[1]	1930	G4TDO	144-160	A1A/J3E	Wolverhampton, W Mids	[1]
2030	G4PDP	144-250	A1A/J3E	Biggleswade, Beds	[1]	2000	G4TKM	145-250	F2A/F3E	Birmingham	[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]						
2100	G3HQB	144-500	F2A/F3E	Stockport, G Manchester	[1]						
2200	G3AWL	144-250	A1A/J3E	Easington, Co Durham	[8]						
2200	G4OJD	145-250	F2A/F3E	Brixham, Devon	[1]						
2230	G4NRE	145-250	F2A/F3E	Enniskillen, N Ireland	[1]						
Wednesdays											
1100	{ G4NRO G4IBV G4GBK }	145-275	F2A/F3E	Atherton, G Manchester	[1]						
1400	G4OOC	145-250	F2A/F3E	Leeds, W Yorks	[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

Club News

The following is the latest information received by RRs from RSGB affiliated societies, clubs and groups in time for inclusion in this issue. Basic unchanged information on other affiliated organizations will be published again in the January 1985 issue.

RSGB affiliated organizations are requested to report all programmes and news items to their regional representatives regularly. Information for inclusion in the **December** issue should reach them by **23 October** and for the **January 1985** issue by **20 November**.

Club programmes are given in order of date, subject, time and place of the meeting. All call signs of club secretaries and other contacts are QTHR (correct in the current *RSGB Call Book*) unless otherwise stated.

All clubs welcome visitors and would be pleased to hear from potential new members.

REGION 1—RR B. Donn, G3XSN, 7 Thurne Way, Liverpool L24 4SQ. Tel 051-722 3644.

Ainsdale (AARC)—9, 23 October, 8pm. Scout HQ, Marine Drive. 14, 28 October, 10.30am, fox hunts. 20, 21 October (JOTA station GB0SJS). Details from David Norris, G4TUP, tel Southport 35947.

Bury (BRS)—Tuesdays, 9 October (Construction competition. During the interval for judging there will be a film show "How to build a large concrete tower"), 13 November ("Home pcb manufacture", by Laurence Jones, G4KLT, and team, including practical demonstrations), 11 December (AGM with wine and cheese to follow), 8pm. Mosses Centre, Cecil Street, Bury. Main meetings (as above) are held on the second Tuesday of each month. The remaining meetings are informal. Newcomers are invited to contact Brian Tyldsley, G4TBT, tel Burnley 24254, for further details. Pro Malcolm Pritchard, G3VNO.

Fylde (FARS)—2 October (Talk by David Gregson on British Telecom), 16 October (Natter night with Morse class), 7.45pm. Kite Club, Blackpool Airport. Sec H. Fenton, G8GG, tel 0253 725717. Pro F. Whitehead, 91 Blackpool Road, Ansell, Lytham St Annes, tel 0253 737680.

Heswall (Wirral ARS)—3 October (Surplus sale), 17 October (AGM), 7 November (Chairman's

night). Heswall Parish Church Hall, Telegraph Road, Heswall. Details from sec Cedric Cawthorne, G4KPY.

Isle of Man (IoMARS)—Mondays, 8pm. Keppel Hotel, Cregny-Baa. An expedition is planned to NX square for WAB fans in October. Expedition depends on good weather so please listen to RSGB News broadcast or WAB frequencies. Details from GD4RAG, tel 0624 833413. The barbecue held recently was a great success. Sec Mrs Anthea Matthewson, GD4GWQ, tel 0624 22295.

Liverpool (L&DARS)—Tuesdays, 8pm. Churchill Conservative Club, Church Road, Wavertree, Liverpool 15. 2 October (AGM, 8pm prompt. New committee to be appointed), 2 November (Friday, 8pm, "Old members reunion"), 23 November (Annual buffet dance & social). Contact Harry Cohen, G4GHS, tel 051-428 5442.

Liverpool Raynet. With the approval of the zonal rep and the Merseyside County Controller, a Raynet group has now been formed in Liverpool. Group organizer is Bill, G6DXF, tel 051-427 9350. Recruiting is still in progress.

Manchester (South Manchester RC)—Mondays (Informal), Fridays (Formal meetings), 5 October ("QRP", by Bill Stevenson, G4KKI), 12 October ("Explanation and application of Smith charts", by David Bolton, G8UQC), 19 October ("Experiences of radio and tv servicing", by Dave Holland, G3WFT), 26 October ("Hall effect devices made easy", by Chris Ward, G4HON, and David Yorke, G4JLG), 2 November (Halloween event. Supper afterwards), 8pm. Sale Moor Community Centre, Norris Road, Sale. Details from G3WFT, tel 061-973 1837. Sec Dave Holland, G4WFT.

Rishton (East Lancashire ARC)—First and last Tuesday in each month. Conservative Club, Cliffe Street, Rishton. The first Tuesday is usually a lecture or demonstration and the last Tuesday is an informal meeting, both starting at 7.30pm. Pro Stuart Westall, G6LXU.

Thornton Cleveleys (TCARS)—1 October (Demonstration of printing colour transparencies, by Pete Reilly, G4BVW), 8 October (Morse class), 15 October (AGM and pie & peas supper), 22 October (Informal and construction evening), 29 October (Morse class), 7.45pm. 1st Norbreck Scout Hut, Carr Road, Bispham. Details from Mrs Jen Ward, G8YOK, tel 0253 890114.

The RR intends to visit the clubs in Region 1 during his term of office along with the area rep wherever possible. Would club secretaries contact the RR for suitable dates and keep him informed of their activities as regularly as possible.

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

Hornsea (HARC)—Wednesdays, 3 October (Slide show by G4IGY), 24 October (Committee meeting), 26 October (AGM), 31 October (ATV, by members of Goole ARS), 7.30pm. The Mill, Mill House, Atwick Road, Hornsea. Details from Norman, G4NJP, tel 0262 73635.

Pontefract (P&DARS)—4 October (Visit to North Wakefield Club junk sale), 11 October ("Oscilloscopes", by John, G4LOS), 18 October (Arrangements for JOTA), 20/21 October (GB2AS JOTA station at Askern Scouts), 25 October ("The generation of ssb", by G3SYC and G3HCX), 1 November (Committee meeting), 7.30pm. CW classes on Mondays. Carleton Community Centre, Carleton, Pontefract. Details from sec Ron Tams, G4TCG.

UKFM Group (Northern)—7 October (General meeting), 4 November (AGM), 7.30pm. Royal Hotel, Barnsley. Please support the group as they provide a first class service with the repeaters. Details from sec G6BHK.

Apologies to all clubs who wondered where club news was last month. The postal system lost it! Would club secs please ensure that RR2 receives club news before deadline dates.

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

Atherstone (AARC)—15 October (JOTA), 20 October (Informal meeting). The Tudor Centre, Colleshill Road, Atherstone. Sec G6BED, tel 121 2051.

Birmingham (Midland ARS)—20 October (AGM), 7.30pm. 294a Broad Street, Birmingham. Sec G8BHE, tel 021-422 9878.

Birmingham (South Birmingham RS)—10 October (IBA engineering), 30 October (Visit to Birmingham University), 8pm. Hampstead House, Fairfax Road, West Heath, Birmingham. Sec G8RGQ, tel 021-459 8312.

Dudley (DARC)—1 October (Committee meeting and natter night), 8 October (Natter night), 22 October (AGM), 7.45pm. Allied Centre, Greenman Alley, Tower Street. Sec G4SQP, tel Codsall 5636.

Halesowen (MEB Sports & Social Club)—9 October (Surplus sale), 23 October (General meeting), 8pm. MEB Social Club, Mucklow Hill, Halesowen. Sec G4RWH, tel 021-747 8784.

Hereford (HARS)—5 October ("Microwaves", by G8MWR), 19 October (Informal meeting). Civil Defence HQ, Gaol Street, Hereford. Sec G3WRQ, tel 54064.

Malvern Hills (MHRAC)—9 October ("A radio amateur on the Burma-Siam railway", by G3BA), 7.30pm. Red Lion Inn, St Ann's Road, Malvern. Sec G4TXG, tel 65802.

Redditch (RRG)—11 October (Video show, "The ham's wide world" and "One man's meat"), 25 October (Natter night), 8pm. WRVS Centre, Ludlow Road, Redditch. Sec G3EVT, tel Alcester 762041.

Shrewsbury (SARS)—4 October (Natter night), 11 October (AGM), 18 October (Natter night), 25 October (Talk by G6AKE), 8pm. The Albert Hotel, Smithfield Road, Shrewsbury. Sec G4XBI, tel 62737.

Stourbridge (StARS)—1 October (Informal meeting), 15 October (General meeting). Robin Woods Centre, Enville Street, Stourbridge. Sec G8JTL, tel Lye 4019.

Sutton Coldfield (SCARS)—5 October ("Starting on 10GHz", by G8MWR), 22 October ("Aerials for the amateur's back garden", Griffiths memorial lecture by G3BA), 8pm. Central Library, Sainsbury building, Sutton Coldfield. Sec G6UFD, tel 021-358 6501.

Telford (TARS)—3 October (Natter night).



At the Schools of Chesham Carnival, Chesham & DARS had a stand to give an insight to the hobby to the public. A special events call sign was issued, GB2SCC, and many contacts were made. Operators here are Ron, G3NCL, a visitor from the Chiltern Radio Club, on the key, with Shirley, G4HES, making the log. As can be seen the stand created a lot of interest

Community Centre, Dawley Bank, Telford. Sec G6XUF, tel 47952.

Warwick (Mid Warwickshire ARS)—9 October ("Aircraft radio", by G3ILL), 23 October (Talk by G8MWR), 8pm. 61 Emscote Road, Warwick. Sec G4TIL, tel Southam 4765.

Wordsley (WRC)—4 October (Natter night), 18 October ("Life and death of a star", by Steve, G6YQH, and Simon, G6TKK, with supportive computer visuals). Vine Inn, Camp Hill, Wordsley, West Midlands. Programme sec G4VJU.

First let me say thank you to Leo Craven who has represented us so well for the last three years. There is a lot of activity in the clubs in this area and to make sure that your activities get maximum publicity it is essential that you let me have full details as early as possible. Would any club secretaries who would like me to visit their club to talk over RSGB matters please get in touch as soon as possible. I look forward to meeting many of you over the next three years. *Glen Ross, G8MWR.*

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

Buxton (BARS)—9 October (Open forum), 23 October (Talk on AMSAT UK, by G4CUO), 8pm. Egerton Hotel, St Johns Road, Buxton. Sec Dave Cooper, G6MIF, tel Buxton 6174.

Derby (D&DARS)—3 October (Junk sale), 10 October (Visit to Derby Optical Co.), Wednesdays, 7.30pm. 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.

Grantham (GRC)—16 October ("Make your own printed circuit boards", a talk, by G8CWB), 8pm. Shirley Croft Hotel, Harrowby Road, Grantham. Sec John Kirtton, G8WWJ, tel Grantham 65743.

Lincoln (LSWC)—10 October ("Western USA and Canada", slides, Robert Littlewood), 24 October (Activity night/night on the air), 8pm. City Engineers Club, Waterside South, Lincoln. Sec Pam Rose, G4STO, tel Gainsborough 788356.

Mansfield (MARS)—5 October ("Satellites, getting going", talk by Dave Rowen, G4CUO), 16 October (Natter night), 8pm. Victoria Social Club, Princes Street, Mansfield. Sec Keith Lawson, G4AAH.

Nottingham (ARCON)—4 October (Forum), 11 October (Talk by G4NJH on his trip to "VK"), 18 October (Activity night), 26 October (Talk by G6IPW on measuring equipment), 1 November (Forum), 7.30pm. Sherwood Community Centre, Woodthorpe House, Mansfield Road, Nottingham. Sec Jim Towle, G4PJZ, tel Nottingham 624764.

Skegness (S&DARS)—First and third Tuesday in the month, 8pm. The White Swan, Burgh le Marsh. 21 October (Spilsby junk sale, Corn Exchange, White Hart, Market Place, Spilsby, at 7.30pm). Sec Clive Ironmonger, G6HYF.

Spalding (S&DARS)—19 October ("Satellite reception", Geoffrey Perry, of Kettering Grammar School), 8pm. Maple Room, White Hart Hotel, Market Place, Spalding. Sec Betty Whitley, G6YBL, tel Spalding 2781.

Workshop (WRAS)—11 October (Visit by Lowe Electronics, start at 7.30pm), 18 October (AGM), 25 October ("Do vertical ants work equally badly in all directions?", by Mike Gibbings, G3FDW), 8pm. Morse practice every Thursday. Club station G3FDW will be active as events allow. Old Ship Inn, Market Place, Workshop. Sec G. Barker, G4PPM, tel Workshop 486935.

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

Bedford (B&DARC)—31 October (AGM), 7.30 for 8pm. Ravensden. Sec G4PBE.

Dunstable Downs (DDRC)—12 October (Two films—"The electric wave" and "Opportunity at Sizewell"), 26 October (Talk on hf antennas), 8pm. Chews House, Dunstable Downs. Sec Phil Morris, G6EES.

Leighton Linlade (LLRC)—1 October ("Testing for performance", a talk by Ian Gurton, G8ASP), 15 October (Meeting, speaker to be announced). Vandyke Community College. Sec Peter Brazier, G6JFN.

Luton (Kent Process Controls ARC)—3 October (Final arrangements for JOTA), Luton Sports Club, Tenby Drive. Sec G3DOT.

Milton Keynes (MKARS)—8 October (AGM). Lovatt Hall. Sec G3ZPA.

Peterborough (GPARC)—18 October (RSGB

video evening), 7.30pm. Southfields Junior School, Stanground. Sec Frank, G4NRJ.

Shefford (S&DARS)—4 October (General discussion evening, on getting started on amateur radio), 11 October (Club closed, no meeting because of the street fair), 18 October ("Amor and packet radio", by Ian, G3NRW), 25 October ("The history of the fireproof", a talk by Neil, G6PVS). Church Hall, Amptill Road. Sec Alan, G4PSO.

Wellingborough (Nene Valley RC)—3 October (Lecture on the Town & County Planning Act 1971, by G6FEJ), 31 October (Junk sale), 8pm. Dolben Arms PH, Finedon, nr Wellingborough. Sec L. Parker, G4PLJ.

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

Aylesbury (AVRS)—16 October (Details to be announced). Sec Cathy Clarke, tel Kingston Blount (0844) 51461.

Bracknell (BARC)—10 October ("Cellular radio", by G4DSE), 14 November (Construction competition). Coopers Hill Community Centre, Bracknell. Sec Dave Sugden, G4CGS, tel Bracknell 55898.

Burnham Beeches (BBRC)—1 October (Talk on RSGB), 6 October (Open day), 15 October (Talk by Louis Varney), 8pm. St John's Ambulance HQ, Burlington Avenue, Slough. Sec G6DVC.

Maidenhead (M&DRS)—4 October (Grand junk sale), 16 October ("The operation of the HF Contest Committee of the RSGB", by D. Booty, G3KKQ). Details from John F. Hicks, G8RYW.

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

Ashford (Echelford ATS)—Second Monday and last Thursday in each month, 8 October ("A bit of a lift on OM", by Jim Bacon, G3YLA), 26 October (Video "Japanese visit to China", 7.30 for 8pm. The Hall, St Martins Court, Kingston Crescent, Ashford, Middlesex. Club nets: Sundays 1000, 1-92MHz, Wednesdays 2000, 144-575MHz (fm). Sec Bob Crane, tel 01-977 4157.

Biggin Hill (BHARC)—16 October (Construction contest), 8pm. St Marks Church Hall, Church Road, Biggin Hill. Sec Ian Mitchell, G4NSD.

Couldson (CATS)—8 October (Subject to be announced via GB2RS), 25 October (Morse tuition), 8pm. St Swithins Church Hall, Grovelands Road, Purley. Details from Alan Bartle, G6HC, tel 01-684 0610.

Cray Valley (CVRS)—4 October (Grand CVRS surplus sale), 18 October (Natter night), 8pm. Christchurch Centre, Eltham High Street. Sec P. Clark, G4FUG, QTHR, tel 0689 29230, evenings.

Croydon (Surrey Radio Contact Club)—1 October ("Planetarium", by Peter Bruce, G4WPB), 7.45 for 8pm. TS Terra Nova, 34 The Waldrons, South Croydon. Sec John Simkins, G8IYS, tel 01-657 0454.

Crystal Palace (CP&DRC)—20 October (Junk sale). All Saints Parish Rooms, Beulah Hill, Upper Norwood SE19. Details from G3FZL.

Redhill (Reigate ATS)—16 October ("Aurora", by Wally Blanchard, G3JKV), 8pm. Upstairs meeting room, The Constitutional and Conservative Centre, Warwick Road, Redhill. Sec T.I.P. Trew, G8JXU.

Surbiton (308 ATC)—2 October (AGM), 9 October (Junk sale), 8pm. St Mark's Church Hall, Church Hill Road, Surbiton. Sec Dave Davis, G6YQD. A new club, welcome. RR7.

Thames Ditton (Thames Valley ARS)—2 October (Film show, ladies will be very welcome), 8pm. Thames Ditton Library, Watts Road, Gigg's Hill, Thames Ditton. Details from Peter Firmin, G4SES.

REGION 8—RR M. Elliott, G4VEC, 20 Haysel, Sittingbourne, Kent ME10 4QE. Tel 0795 70132.

Canterbury (East Kent ARS)—First and third Thursdays of each month, 4 October (Club AGM), 7.30 for 8pm. Cabin, Kings Road, Herne Bay. Details from Mr Broad, G8GTF, tel Canterbury 63104.

Chichester (CARC)—20 October (Club meeting), 18 October ("Amor", by Tony, G4CJO, with live demonstration by Bernard, G4EMR), 7.30pm. Green Room, Fernleigh Centre, 40 North Street, Chichester. Details from Chris Bryan, G4EHG, tel Chichester 789587.

Dartford (DDFC)—9 October (Pre-hunt meeting), 14 October (Club hunt). Pre-hunt meetings held after 9pm at the Horse & Groom PH, Leyton Cross, Dartford Heath. Further details from Pete, G8DYF, hunt organiser, tel Greenhithe 844467.

Eastbourne (Southdown ARS)—1 October (Talk by Mr Wood of Wood & Douglas on history of their kits), 7.30 for 8pm. The Chaseley Home, South Cliff, Eastbourne. Details from Peter, G8IQO, tel 0323-763123. In addition, the club now has a room at the Hailsham Leisure Centre which will be open on Tuesdays and Fridays. Tuesday evenings will be learning evenings—RAE classes and a computer course are some of the items on the agenda. Friday evenings will be club night, although cw classes will be held, and possibly construction projects. The club radio station will also be operational. Details from Dick, G4KAR, tel 0323 845413.

Hastings (HERC)—17 October (Junk auction), 8pm. West Hill Community Centre, Croft Road, Hastings. Details from Dave, G4NVQ, tel Hastings 420608. Please note that the club has various activities on other days.

Tunbridge Wells (West Kent ARS)—5 October (Formal meeting), 12 October (Informal meeting), 19 October (Formal meeting), 26 October (Informal meeting), 8pm. Adult Centre Annexe, Quarry Road, Tunbridge Wells. Further details from Brian Guinnessy, G4MXL, tel 0892 32877, after 7pm.

If your club is not mentioned I have either received no news, or it arrived too late for this issue. If any club would like me to give an RSGB presentation, I would be delighted to do so. *Mike, RR8.*

REGION 9—RR R. W. Jones, G3YMK, 10 Oaktree Close, Upton, nr Honiton, Devon. Tel 040486 468.

Axe Vale (AVARC)—5 October (A microwave evening), 7.30pm. The Cavalier public house, West Street, Axminster. Contact G3YVW, tel Lyme Regis 5282.

Cornish (CRAC)—11 October (G3NPB presents "Aerials—part 2"), 7.30pm. The Church Hall, Treleigh, nr Redruth. Contact pro G3IUE, tel Gernoe 3402.

Exeter (EARS)—8 October (AGM). It is vital that all members attend this important meeting. There will also be a discussion of projects and lectures for the next 12 months, 7.30pm. Community Centre, St Davids Hill, Exeter. Other Mondays (Informal), Emmanuel Scout Hut, Okehampton Road, Exeter. Pro G4KXR, 11 Chancel Court, Chancel Lane, Pinhoe, Exeter EX4 8QE.

North Devon (NDRC)—24 October. Pilton Community College, Chaddiford Lane, Barnstaple, Contact G4CG, tel 0271 43683.

Stockland Hill Repeater Group—The group have now increased the antenna height and transmitter power of GB3SH on RB11 and reports would be welcomed by G8AOJ at 1 Hillymead, Seaton, Devon.

Torbay (TARS)—27 October (Film show). Details of time and venue from G3LHJ, tel 0626 4437.

West Devon Raynet Group—The group now has a new controller—G3TGR—and meets on air every Tuesday evening on S9. Further details from John, tel Plymouth 45478.

Unfortunately, almost as soon as G3YMK learned that he had been elected RR9 his employers decided to promote him to a post in Aberdeen! Reluctantly I have of course to resign as RR and would like to apologise to all those who voted for me in the recent election, but I am sure that members will understand that the day job must come first! Meanwhile until a new RR is appointed I will carry out the collation of club news, and look forward to hearing from secs in due course. *73s de G3YMK.*

REGION 10—RR E. J. Case, GW4HWR, 2 Abbey Close, Tyrhiw, Taffswell, Mid-Glam CF5 7RS. Tel 0222 810368.

Aberystwyth (ARSGBG)—9 October (AGM). Since the society assumed its present form last November, this is a chance for the members (42 of them, at the last count) to review the year's progress etc. Bay Hotel (on the sea front opposite the bandstand). Sec J. Mike Pryse, GW4JXB, tel 0970 828446.

Barry (BCoFERS)—Thursdays, 7.45pm. Barry College of Further Education Annexe, Weycock Cross, Barry, 18 October (AGM). Sec Margaret Beynon, GW4GSH.

Bristol Channel Repeater Group (GB3BC)—The



Beith amateurs were treated to a little glamour when Jennifer Duncan, Beith Civic Week Queen, visited their station. Shown here are, from l to r, back row: Jim McLaverty, Bill, GM6NHJ; Stewart, GM4WXM; Norrie, GM4VHZ; and Tom, GM4DOZ. Front row: Jack, GM3KJF; and Jennifer. Photo Ronald Cowan, GM4SRL

group wishes to remind its users that subscriptions for the membership year 1 October 1984/5 are now due. Those unable to pay at the Blackwood Convention are invited to send their £2 subscription (payable to BCRG) to Roy Selleck, GW6MBU, 12 Norseman Close, Rhosne, South Glam CF6 9FY. Thank you for your continued support.

Cardiff (CRSGBG)—8 October (AGM), 7.30pm. Pantmawr Hotel, Tyla Teg, Pantmawr Estate, Whitchurch, Cardiff. Sec Cyril Laws, GW6ZHP, tel Cowbridge 3212.

Newport (NARS)—1 October (A talk by John Case, GW4HWR, entitled "Woodpecker blunders"), 7pm. Brynglas House, Brynglas Road, Newport. Sec Robert Johns, GW4NXD, tel Pontypool 56348.

Rhondda (RARS)—Please note changes in meeting arrangements. Thursdays, 7.30pm. National Union of Mineworkers' Club, Tonypandy. First Thursday, meeting night, third Thursday, arranged night, remaining Thursdays, activities nights. Further details from sec John Howells, GW4BUZ, tel Tonypandy 432542.

REGION 11—RR B. H. Green, GW2FLZ, 1 Clwyd Court, Tan-y-Bryn Road, Colwyn Bay, Clwyd LL28 4AH. Tel 0492 49288.

Colwyn Bay (Conwy Valley ARC) (GW6TM)—1 October (Talk by Andy Choraffa, G3PKW, "hf operating"), 8pm. Green Lawns Hotel, Bay View Road. Sec Mr J. N. Wright, GW4KGI, tel 0745 823674, or deputy sec Mr N. Vickars-Harris, GW6ZZL, tel 0492 636376.

Hawarden (Alyn and Deeside ARS) (GW3TZR)—4 October ("Ham radio on a shoestring"), by Ivor Rees, GW3VKZ, 11 October (Committee meeting), 18 October (Demonstration by Gordon Adam, G3LEO of Icom and Yaesu equipment). Shotton Conservative Club, King George Street, Shotton, Deeside. Sec Mr M. McIntosh, GW4IEQ, tel 0244 549154.

Porthmadog (P&D ARS)—18 October (Talk by Ralph Taylor, GW2HCJ, and showing of a video on rty), 8pm. Queen's Hotel, Porthmadog. Sec Mrs L. Jones, GW4WKQ, Henllys Bach, Lanbedrog, Pwllheli, Gwynedd LL53 7PG, tel 0758 740445.

Rhyl (R&D ARC) (GW4ARC)—1 October (Junk sale), 15 October (Activity night), 7.30pm. 1st Rhyl Scout HQ, Tynewydd Road, Rhyl. Sec Mr J. McCann, GW4PFC, tel 0745 583467.

REGION 12—RR M. R. Hobson, GM8KPH, 17 Well Brae, Pitlochry, Perthshire PH16 5HH. Tel 0796 2140.

Aberdeen (AARS)—5 October (Junk sale), 12 October ("Mini-aerial radiation patterns"), by GM6JUK, 19 October (Videos on "Troposcatter" and "Offshore gas", by Shell), 26 October (Beginners' night), 2 November (Junk sale), 9 November (Wine and cheese evening), 16 November (AGM), 7.30pm. Club rooms, 35 Thistle Lane, Aberdeen. Details from sec Don Travis, GM4GXD, tel 04676 251.

Calthness (CARS)—10 October (Computer demonstration by GM6JWR), 14 November (AGM), 7.30pm. Loch Watten Hotel, Watten (midway between Thurso and Wick). Sec Iain Morrison, GM4MIM, tel 0995 3960.

Forfar (F&DARC)—The club have new club rooms at 91b, West High Street, Forfar. Anyone with spare chairs is asked to contact the club sec,

as they are in short supply. The club will also be starting the RAE class again (take your own seats...). Full details from club sec, Ken, G4XKP, on S20, or tel 0307 63095.

The above is the only up-to-date available club news. If your club does not appear, ask your club secretary why not.

REGION 13—RR Andrew Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife KY1 2LH. Tel Kirkcaldy (0592) 200335.

Glenrothes (G&DARC)—Wednesdays and third Sunday in each month, 21 October (Programme to be arranged), 7.30pm. Provosts Land Centre, Leslie, Fife. Details from Bob, GM4LYQ, tel 745047.

Scottish Borders Repeater Group—The Scottish Borders Repeater Group owns and maintains the two repeaters—GB3BT at Berwick-on-Tweed, and GB3SB near Duns. Membership of the group is £4. Details from Bruce McCartney, GM4BDJ.

REGION 14—RR Thomas G. Wylie, GM4FDM, 3 Kings Crescent, Elderslie, Strathclyde PA5 9AD. Tel Johnstone (0505) 22749.

Glasgow (West of Scotland ARS)—Fridays, 7.30pm. Morse classes available. Club Rooms, 22 Robertson Street, Glasgow. Programme and details from sec Des Canaway, GM8YBP, tel 041-776 2814.

Raynet—A regional controller for Strathclyde region is in the process of being appointed. The following groups are active: Strathclyde: Controller Vic Kusin, GM4HCO, tel 041-334 2472. Argyll: Controller Colin Ferguson, GM4HNK, tel 0546 84253. Clyde Coast: Controller Peter Burn, GM4PSW, tel 0369 6334. Central Region: Controller Jim McKenzie, GM6UCN, tel 0786 824810.

Stranraer (Wigtownshire ARC)—Thursdays, 7.30pm. The Community Education Centre, Lewis Street, Stranraer. Details from Neil, GM4LQS, tel Stranraer (0776) 2570.

Would the current secretaries of the Dumfries and Falkirk clubs please contact the RR with current details of the clubs.

REGION 16—RR Alan Owen, G4HMF, 102 Constable Road, Ipswich, Suffolk. Chelmsford (CARS)—2 October (AGM), 6 November ("RTTY, Amtor and packet radio," by Ian Wade), 7.30pm. Marconi College, Arbour Lane. Details from Andrew Mead, G4KQE, tel Silver End 83094.

Colchester (CRA)—4 October (AGM), 18 October (Planning permission for aerials), 1 November ("Hypnotherapy", by Albert Smith), 15 November ("Aerials for the lower frequencies", by Tony, G8ZWX), 7.30pm. Colchester Institute, Sheepen Road. Details from Frank Howe, G3FIS, tel Colchester 851189.

Great Yarmouth (GYRS)—10 October (RSGB video), 25 October (Informal evening), 8 November ("Airborne communications", by G3TWA), 7.30pm. STC Sports & Social Club, Beevor Road, South Denes. Details from A. D. Besford, G3NHU.

Ipswich (IRC)—10 October (A night on the air), 17 October (Planning for JOTA), 31 October (Bring and buy at Barrack Corner Church Hall), 14 November ("Weather fronts and radio propaga-

tion", by G4BJO), 8pm. Club Room, Rose & Crown, Norwich Road. Details from Jack Tootill, G4IFF, tel Ipswich 44047.

Loughton (L&DRAS)—26 October ("Collecting and repairing old wirelesses", by Peter, G4CMD), 23 November ("VHF to hf transverters", by Ray, G8DBR), informal meetings on 12 October and 9 November, 7.30pm. Loughton Hall, Rectory Lane. Details from C. Knowles, G6FWT, tel 01-508 7190.

Stowmarket (S&DARS)—1 October ("RNLI", by Mike Smith), 5 November ("Getting started on 23 & 15cm", by G3ZOU), 7.30pm. Red Cross Hut, Station Yard. Details from Jim Lowe, G8SCB, tel Needham Market 721296.

Vange (VARS)—Thursdays, 4 October (Open evening), 11 October (Junk sale), 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 T. Emery, Wilverley, Old Lyndhurst Road, Cadnam, Southampton SO4 2NL. Basingstoke (BARC)—9 October (AGM). The Swan, Sherborne St John, Basingstoke. Chairman G8WIZ, tel 07356 5185.

Bournemouth (BRS)—5 October ("HF broadcasting", by G3PXH), 19 October (AGM), 7.30pm. Kinross Community Centre, Kinross, Bournemouth. Sec G4EKE, tel 0202 877945.

Eastleigh (Itchen Valley ARC)—12 October (SW Hants Raynet AGM), 26 October ("Power supplies and batteries", by a Chloride power electronics representative), 7.30pm. The Scout Hut, Brickfield Lane, Chandlers Ford. Sec G6DIA, tel 0703 863039.

Fareham (F&DRS)—Wednesdays, 3 October ("Making the right connections", by G4ITF), 17 October ("Meteor scatter", by G4XZL), 7.30pm. Portchester Community Centre, Portchester. Morse classes before meetings at 7pm. Sec G4ITG, tel Fareham 234904.

Farnborough (F&DRS)—Second and fourth Wednesday of each month, 10 October (Film on troposcatter—G4MBZ), 25 October (Surplus equipment sale), 7.30pm. Railway Enthusiasts Club, Access Road, Farnborough. Pro G4MBZ, tel Farnborough 837581.

Guernsey (GARS)—Tuesdays and Fridays, 26 October (AGM) 8pm. The Lodge, La Corbinerie, Oberlands, St Martins. Sec Steve Gibbs, G3MBBS, PO Box 100, Guernsey, tel 0481 57605.

Liphook (Three Counties ARC)—First and third Wednesday in each month, 10 October (Communication within the force", Hampshire Constabulary), 24 October, 8pm. The Railway Hotel, Liphook. Pro G4VKC, tel Liphook 723415.

Poole (PARS)—Last Wednesday in each month, Poole College of Further Education. Sec G3XYD, tel Poole 671562.

Southampton (SUARC) (G3KMI)—Mondays during termtime. Clubroom, 65 University Road. Further details from Andrew, GJ6WEX, QTHR during holidays, or Union pigeonholes during termtime.

Winchester (WARC)—20 October (Junk auction), 7.30pm. The Log Cabin, Stockbridge Road, Winchester. Sec G3SHQ, tel Twyford 713003.

The following clubs have sent me no new information: Andover RAC; Chippenham & D ARC; Blackmore Vale ARS; Rowers & D ARS; Horn-dean & D ARC; Jersey ARS; Jersey AEC; Marconi EARS; Portsmouth & D RS; Salisbury ARS; Southampton ARS; Swindon & D ARC; South Devon RS; and Flight Refuelling ARS. I would be very pleased to receive details from all of these clubs of their current activities for publication in *Radio Communication*. RR17.

REGION 19—RR R.J.C. Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ. Tel 01-989 6741.

Cheshunt (C&DARC)—3 October (Natter), 10 October (Film show, G3TIK), 24 October ("Coax cables", by G6BTQ), 31 October (Natter), 8.15pm. The Church Room, Church Lane, Wormley, Nr Cheshunt, Herts. Details from Roger Frisby, G4OAA, tel 09924 64795.

Chiswick (ABCARC)—16 October (Talk on 70cm, by G6BLT), 7.30pm. Chiswick Town Hall, High Road, London W4. Sec W.G. Dyer, G3GEH, tel 01-992 3778.

Edgware (E&DRS)—11 October (Talk, to be announced, or slow cw over the air). The Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. Sec J. Cobley, 4 Briars Close, Hatfield, tel Hatfield 64342.

Harrow (RSH)—5 October (Informal), 12 October (Construction contest), 8pm. Harrow Arts Centre, High Road, Harrow Weald. Sec Alison Wilson, G6NDJ, tel 0923 53642.

Hillingdon (HARC)—This club has recently become affiliated to RSGB and welcomes newcomers wishing to talk amateur radio. Tuesdays, 8pm. Treaty House, Uxbridge. The sec is Howard, G6STI, tel 01-561 2917.

St Albans (Verulam ARC)—9 October (Informal), 23 October ("Larkspur ex-military equipment for the amateur's use", by Terry Smith, G8MQT), 7.45 for 8pm. RAFA HQ, New Kent Road, St Albans. Sec Hilary, G4JKS, tel St Albans 59318.

Watford (WRC) (RS83552)—3 October (Main meeting to be announced), 17 October (Informal), 8pm. Tudor Arms, Bushy Mill Lane, North Watford. Sec Gordon, G8XXV, tel 01-950 3611.

Note to all club secretaries. Would club secretaries and new officers of committees of clubs in Region 19 please note that the deadline for copy to RR19 is approx six weeks prior to publication. I cannot get your late copy into club notes four days before publication and your meeting. If you have no programme of events to attract new members then you do not need publicity. G3AAJ.

REGION 20—RR N. F. O'Brien, G3LP, 26 Southfield Road, Tuffley, Gloucester. GL4 9UD. Tel 0452 34890.

Bath (B&D ARC)—3 October and alternate Wednesdays, 7.45pm. Englishcombe Inn, Englishcombe Lane, Bath. Club station G4TMH regularly operating. Details from Trevor Whitehead, tel Bath 319150, or sec Mike Mason, tel Bath 311046.

Bristol (North Bristol ARC)—Fridays, 7pm, S.H.E., 7 Braemar Crescent, Northville, Bristol. Details of winter programme, morse classes etc from Ted Bidmead, G4EUV.

Bristol (South Bristol ARC)—3 October (Lecture—"Submarine mobile", by Mike, G3OUK), 10 October (Club winter project, Paul G8XIH), 17 October (Computer activity night, John, G4WOD), 24 October (Discussion—1985 event calendar), 31 October (Bring & buy night, Len G4RZY), 7.30pm. Whitchurch Folk House, East Dundry Road, Whitchurch, Bristol BS14 0LN. Details from Len Baker, G4RZY, tel 0272 834282.

Cheltenham (CARA)—5 October (Combined meeting, details to be announced), 19 October (Natter night), 7.30pm. Stanton Room, Charlton Kings Library, Cheltenham. Details from Gill Harmsworth, G6COH, tel Cheltenham 525262.

Cheltenham (Smiths Industries RS)—4 October, 18 October, (Informal meetings). Club House, Newlands, Bishops Cleeve. Details from Roger Hawkins, G8UJG.

Gloucester (GARS)—3 October ("Amateur radio in the USA", by G5AER), 10, 17, 24, 31 October (Informal nights), 7.30pm. St Johns Ambulance Headquarters, Heathville Road, Gloucester. 20 October (JOTA, Apperley Scout HQ). Full details from Tony Martin, G4HBV.

Portishead (Gordano ARG)—24 October ("Amateur tv", by Steve Bateman, G6RQP), 7.30pm. Ship Hotel, Redcliffe Bay, Portishead. Details from new sec John Davies, G3LJD.

Weston-super-Mare (WsmARS)—8 October (ARRL video of W5LFL on the recent space shuttle mission), 7.30pm. Rugby Club (off Drove Road), Weston-super-Mare. Details from Dave Restrick, G4KAONGP, Tel Weston-super-Mare 28482.

Yeovil (Y&DARC)—Thursdays, 4 October (Bring and show your gadget), 18 October ("Computers", by G3GC), 25 October (Natter night), 7.30pm. Recreation Centre, Chilton Grove, Yeovil. Full details from sec Eric H. Godfrey, G3GC, Dorset Reach, 60 Chilton Grove, Yeovil, Somerset BA21 4AW, tel 0935 75533.

Members' Ads

CONDITIONS OF ACCEPTANCE

These subsidized flat-rate advertisements are accepted as a service to members of the RSGB only. They must be submitted on the Members' Ad form printed on the back of a recent address label carrier used to mail *Rad Com* to the advertiser: this will automatically provide proof of membership and should not be more than two months old. No acknowledgement of receipt will be sent, and advertisements not clearly worded or punctuated, or which do not comply with the conditions of acceptance, will be returned. No correspondence concerning this service will be entered into.

The advertisements must be limited to items of amateur radio equipment or interest, but houses, vehicles etc of which they form part may be included. Items unrelated to amateur

radio, including items of citizens band equipment, will not be accepted.

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.

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: **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

FT101ZD Mk3 fm, fan, mic, spare xtals, FC902 atu, FT901 spkr module, all mint cond, boxed, £550 the lot. Tel Maldon (Essex) (0621) 783065.

60ft tilt-over tower, three sections, comp base, post winch etc, £400 ono. Tower alone, £300. Tel Brentwood 228525.

Icom IC240, mint cond, very little used, mag mount antenna, £130. G8OBK, QTHR. Tel 061-439 2021.

Rad Com: all from June 1976 to Oct 1982. Offers to A. Clarke. Pick-up could be arranged around London, Cambridge, Sussex. Tel Wisbech (Cambs) (0945) 860525.

MM morse talker, as new, no longer needed, £70. Sony rx ICF6700W fm/a.m. multiband, Sony serviced, £150. Bruce Taylor, G6KPI. Tel 072278 396.

Tandy TRS80-3 computer, cassette loading, adaptable to internal single or dual disk drive, boxed, as new, all user manuals, £350 ono. G8XOY, QTHR. Tel 021-308 5875.

VFO120 external vfo for Trio TS120/130, boxed, leads, manual, as new, £45 plus postage. **Wanted:** Collins 75A4 rx. Tel 0304 375136.

HQ1 minibeam, Hirshmann 250 rotator, dismantled, ready for collection, £100 or will sell separately. G4PYH NOT QTHR. Tel Burton-on-Trent (0283) 65761.

HRO-MX, psu, two coil packs, £15. Heathkit RA1 amateur bands rx, cw 2m Nuovistor converter, £20. Eddystone EC10 gen cov rx, mains psu, £40. 9in video monitor, mains psu, part-built case, spares, £35. National Panasonic R9000, £950 ono. G3XIG. Tel Clive, Crawley 547400.

Sharp MZ80K, 48K of memory, comp with i/o box, £300 worth of games and business programs, hardly used, £275 ono. G4KMF, QTHR. Tel Orpington (0689) 29324, evenings, 01-283 5347, daytime.

TS430S, fm, ssb filter, 444 mic, PS30 psu, mobile mount, G-whip antenna, £855. IC4E 70cm portable, mains psu, £180. All less than one year old. G4PFR, QTHR. Tel Wendover (Bucks) 623802.

FDK Multi 700E, 2m fm, 25W tx/rx, perfect, manual, exchange rty/cw decoder unit, adjust cost if necessary, or sale £150 ono or w.h.y? G3IVB, QTHR. Tel 42098 after 6pm.

Tx/rx, Shimizu Denshi SS105S, professionally assembled, Lowes Matlock fitted noise blanker board, xtals for bands covered, psu, PP1205GS, Kenwood MC50 desk mic, HF5V vertical antenna, exc cond, wkg order, £350 ono. G4KJN, QTHR.

Yaesu FT480R, multimode tx/rx, boxed, manual, perfect, £275. Sun 5/8 2m whip, £5. Magnetic base, coaxial, plug, £5. Teleradio audio generator, 10/100K, £25. Scopex 4S6 oscilloscope, 6MHz bandwidth, transistorized, manual, £85. Postage extra. G3RDG. Tel 01-455 8831.

Shack clearance: Yaesu FT200, ac, dc psu, £200. Icom IC240, £140. Trio 2200GX, leather case, nicads, charger, £75. Eddystone EC10 rx, £50. G4BLX, NOT QTHR. Tel Hassocks (Sussex) 4711. **G5RV** multiband dipole, full size, slotted 300Ω ribbon feeder, matching section, see *Rad Com* July 1984, £10. Dummy load (carbon) Morganite type, 7102, 5.8in long, 1in diameter, 50Ω, £5. Both items plus postage. G3RDG, QTHR. Tel 01-455 8831.

KW500 linear, £40 ono. KW77 rx, £40 ono. Minimitter, £50 ono. KW Viceroy, £30 ono. G6UHD. Tel Eaststoke 531.

FDK Multi 2000, 2m, fm, ssb, cw base station, good cond, power supply ac and dc for mobile, £195. G6ZTL, 24 Marmion Road, Conningsby, Lincoln. Tel 0526 42899, after 6pm weekdays, or weekends anytime.

FRG7700 rx, matching atu, active antenna, £300 ono. G8SEQ, QTHR. Tel 0203 598186.

FT107R transverter, 2m, 70cm, fitted FV107 vfo, what offers. Tel Honiton 850501.

Pye PF8, comp with service manual, xtals, batts, very nice, £60. Airband scanner, xtal control, comp with 16 xtals, 12V or 240V operation, £100. Pye 15V black block, batts to fit PF6, PF70, PF2, etc, £10 each. G1DRR NOT QTHR. Tel 0302 835280.

FT290R, helical, case, boxed, used little, £210. Standard C146 hand-held tx/rx, nicads, helical,

case, charger, £50 ono. G4FAZ, QTHR. Tel 0935 29003, evenings.

Printer, ITT Creed 444 teleprinter, used little, machine vgc, not converted as unwanted gift, quick sale at only £49. No offers. Buyer inspects and collects, or delivery in north London can be arranged. Tel 01-445 5174, evenings only.

Liner 2, 2m ssb, good rig, £70. 40W, 2m linear, 10W in, £30 ono. G4WTE. Tel Medway (Kent) (0634) 221061, evenings please.

Magnum Two transverter, exc cond, contains Microwave Modules 144MHz converter, two spare QOV640A, two QOV3-10 valves, instructions, ideal for FT101 owner, £60 incl shipping charges. GU8TGP, Tel Guernsey (0481) 25545.

Tower! 120ft galvanised mast (triangular section), buyer dismantles and removes (Midlands site), offers. G1AUG, QTHR. Tel 021-458 7734, evenings.

Video Genie EG3003 computer, manuals, copy of service manual if required, £75. Tandem TM100-2 40-track double-sided disk drive, manual, £125, or swap for EA12 or fax equipment, or w.h.y? GM6PUK. Tel 0592 756682.

FT75 hf tx/rx, 10W, ssb/cw, ac/dc, psu, external vfo, mic, manual, good cond, £85 ono. Sanyo G200S music centre, less than two years old, works well, £65. Jon Jenkins, G4LJW. Tel Bedford (0234) 781323.

SSB NOAA/Meteor 137MHz weather rx, provision for 1.691MHz Meteorat, reception perfect, £210 ono. Met 16X 2m cross Yagi, brand new, £38. Possible part exchange for 70cm gear in perfect cond. G4XHE, QTHR. Tel Crawley (0293) 515201.

Ferrograph series 5A recorder, tape-splicer, Ferrograph table, Heathkit spkr, tapes, £60 ono. Buyer collects. Memory keyer, USA pcbs, four memories, acs, sidetone, mains psu, bit display, fully rf proof, £50. G3LDI. Tel Norwich 419720.

Comp station: FT102, FV102, SP102, CNA2002, CN62A, Trio scope, 12A psu, 3A psu, Microdot three-section mast, ladder, bearings, etc, T2X rotator, DX33, MET2 19-el 2m Heath dummy load, Trio 2200, £2,250. No split. Can be seen working. G4UCV, QTHR. Tel 020888 738.

FT107M solidstate hf tx/rx, FT107E psu, exc, £495. TS802 2m fm 80ch handheld tx/rx, very good, £85. Data Tech model 30 digital multimeter, nicads, charger, good, £25. Heathkit GD1U grid dip meter, £15. Carriage extra. GM3TBV, QTHR. Tel 0250 2520.

CWR610E, new, modulated, £145. Mutek SLNA70S switched preamp, also new, £35. GW4IUY. Tel Aberdovey 367.

Texscan uhf sweep generator HS85, 350-1,020MHz, 2W max op, handbook £85 ono. Marconi communication rx, 500kHz-32MHz, good cond, £30 or w.h.y? Tel The Lizard 290711.

Philips FM321 mobile 70cm rig, £120. GPV7 70cm base antenna, £10. Video Genie 1 computer, built-in tape, 16k, £150. 32k expander with printer and disc interface, £130. Microliner printer, £130. All as new. G8SER, QTHR. Tel 0773 717846.

MMT 432/70S, £110. Welz SP15M power meter, £30. Both in orig packing and immac. G4TXA. Tel 0257 424593.

G2DYM trap dipole antenna, 75Ω twin feeder, 80/10m, £20. W2AU "big signal" balun/lightning arrester, 1:1, £10. HI-imp mic, on stand, £8. Sun 5/8 2m whip, £5. Magnetic base with coaxial, £5. Postage extra. G3RDC. Tel 01-455 8831.

Welz swr power meter SP15M, at by Welz, AC38M, comp on mounts, brand new, £60. Silent key. G3XBR, QTHR.

Sale or swap: VS6000 video games console, five cartridges, cost £200, communications receiver, cost £199, swap both for BBC B computer or either for Electron computer or £150 each ono. Heathcote, G6BCZ, 91 Bishopcote Road, Luton. Tel 0582 508075.

FRDX500 ham bands rx, 160-2m incl 4m, ssb/cw/ a.m./fm, vgc, £120. Datong UC1 up-converter, as new, 900kHz to 30MHz coverage, £80. Carriage extra both items. Tel 0376 510664, after 7pm.

Data, General Micro-Nova computer: 8xV-24 interfaces (+ 1 synchroniser); 64kb memory; three diskette drives; cabinetry etc, £1,000 ono. Buyer collects. VDUs and printers extra. G1AUG, QTHR. Tel 021-438 7734, evenings.

Approx 400 old and interesting QSL cards, various awards, Great Circle map of the world, £10. Silent key. G3XBR, QTHR.

KDK FM2030 2m fm tx/rx, 5 or 25W, 10 memories, band scanning, full repeater facility, mobile mount, handbook, £175. G6USD, QTHR. Tel Witcombe 2564.

G4MH minibeam, £35. Pye W15FM high-band, £30. **Wanted:** Eimec SK620 or SK630 base. Bird model 43 plug-in elements. G4RFK, QTHR. Tel 01-858 3579 (SE London).

Solartron CD1400 double-beam oscilloscope, incl CX1443 X-time base amplifier, two CX1441 wide-band Y-amplifiers, used very little, incl all gen books and circuits, £100. G5CS, QTHR. Tel 01-398 1583.

Sideband engineers 1kW linear amplifier model SB1LA, 15-80m, cw auto-transformer, manual, six brand new boxed valves costing £36, needs check over, £100, plus carriage. For full details contact Roy. Tel Swindon 822055.

Electric diagram scanner AR2001, £3. Xerox copy of service manual, £7. Air and meteor code manual, discloses those rty five-figure transmissions and others, £11. Crispino Messina, I5XWW, Via di Porto 10, 50058 Signa FI, Italy.

Yaesu FT208R 2m handheld, mnt cond, £170. G6TLB, QTHR. Tel 0909 476354.

Yaesu FRG7700M gen cov rx, FRT7700 atu, FRA7700 active antenna, Microwave 144/28 converter, Slim Jim antenna, all as new, £275 ono. Tel Crawley (Sussex) 884941, or 36073, evenings.

IC720, fitted with Idu unit, FL32, FL34 filters, ICPS20 psu, ICAT100 atu, ICSM5 desk mic, all as new, in orig packing, £825 the lot. IC215 15ch 2m/fm, nicads, case, helical antenna, vgc, £95 ono. G4KRT, QTHR. Tel 021-458 7878.

Heathkit solidstate SB303 rx, 80-10m, matching SB401 tx, transceiver capability, SB610 spkr, HDP21 desk mic, manuals, professionally built, vgc, tx never used on the air, £275 ono. Buyer inspects and collects. G6XHR, QTHR. Tel 070-14 55459.

Datong UC1 up-converter, gives gen cov rx on amateur band tx/rx, 90kHz-30MHz input, 28MHz output, plus 144MHz input/output, vgc, £70 plus p.p. G4JCO NOT QTHR. Tel 06993 744.

BBC 32k Morse programs: Random allsorts; 100 plain language 3 min tests; save/reload your own texts; 70 cw punctuation/abbreviation; choose internal spkr/oscillator/rig; Morse keyboard. Learn and pass really fast! £4.75. D. Brandon, G4UXD, 1 Woodlands Road, Chester CH4 8LB.

G&S binocular research microscope, quartz halide illumination, Complan 10X eyepieces, 100X, 50X oil immersion plus 10X and 5X objectives. Micrometer stage. Will exch for reasonable tx/rx. Tel 0443 203496.

Icom IC202, xtalled 144.0-144.600, 144.800-145.00, vgc in orig packing, manual, circuit diagram, £100, carriage extra. GW8HWS. Tel 0446 760802.

Grundig Satellit 2400 sl digital, nine-band bfo., perfect, £130. KW three-way antenna selector. Two three-way antenna switches. Extension spkr amp three-way. Eight-position noise suppressor. L.D. Ireland, Carnell Green, Camborne, Cornwall. Tel Praze 831236.

FRG7 rx, £110. IC290D multimode, as new, £360. G6TWW. Tel Barnsley (0226) 89578.

Heath Mohican rx, gwo, £30 ono. Buyer collects or pays postage. Seven-strand copper antenna wire, 60ft, £3 + £1 p.p., or pro rata. 8kg 19swg dcc copper wire, offers? Lindars. Tel 01-647 6157.

QTH, det house, 3-4 beds, wash basins, luxury bathroom, gas ch, large lounge, well fitted kitchen, two toilets, fair size garden, permission for tower. Standing for four cars, enclosed car porch, ideal b&b business, £38,000. G2FQP, QTHR. Tel W-S-M 32788.

Scarab rty interface board for ZX Spectrum, split screen rty program, never been used, £25. G4KUB, QTHR. Tel Steve, 061-427 5931.

Ultimast, special order, wall-mounting, tilts to left, with head units UHD1 and UHD2, heavy duty auto brake winch, all new, unused, cost £360, accept £195 ono. Buyer collects. G4BOO, QTHR. Tel Thatcham (0635) 68640 (nr Newbury).

Collins KWM2, vgc, best tx/rx, 30SI linear, 30LI linear, both vgc, all items used regularly. **Wanted:** Vibroplex EK1 brass racer. 60ft P60 hd tower. TH6 or TH7 beam ant. Tel Derby 557705.

Datong FL3 ssb/cw/rty filter, automatic notch, £95. Sagant five-band (3-5-28) four-wire inverted-V trapped dipole, balun, traps, brand new, unused, in maker's sealed packing, £40. G6VS, 71 Hey Park, Huyton, Merseyside L36 6HS. Tel George, 051-480 6603.

Blaupunkt Toronto car radio, digital self-seek a.m./fm stereo, autoreverse cassette, Dolby, four channel, one year old, perfect wk order, cost £275, accept £125. Hirschman RO250 med duty rotator, two months old, hardly used, boxed, £25. Tonna 20199 Oscar Special, £18. **Wanted:** KR500 elevation rotor. G6IAF NOT QTHR. Tel 0482 654030, after 6pm.

TS520SE, in fine cond, four years old, any trial, orig packing etc, offers over £385. Will deliver up to 50 miles. G4DCW, QTHR. Tel 0274 878317.

Heathkits in sealed boxes: SB102 tx/rx, 10-80m,

100W, matching HP13B power supply for mobile use, HB23B power unit for homebase, mint, £250 ono. Telequipment Lab double beam cro type D55A, vgc, £75. Test and collect. G6XHR, QTHR. Tel 0705 255459.

FT501 classic hf rig, 560W p.e.p. input, hard to part with, PW speech processor, Europa transverter, 80W on 2m, Heathkit gen cov rx, £310, or might split. G4HMG, QTHR. Tel 0753 651652.

Microwave Modules 23cm/2m converter, 23cm varactor, 70cm varactor, Shure model 201 ceramic hand mic, Jaybeam 6/6 double 70cm Yagi. Offers (sensible) to G4JJ, QTHR. Tel 203704.

Marconi TF455E af wave analyser, £60. AF dist measuring set, £60. HP 1300 hi-sensitivity oscilloscope, £50. Sound-Tech stereo fm sig gen, £300. Ditto 1100 sig conditioner, £150. Tech-Inst TE111 decade attenuator, £25. G4VVF, QTHR. Tel Brixham (08045) 2304.

Philips V100 monochrome camera, low light, built-in mic, electronic viewfinder, 6:1 zoom, video or rf with 6MHz sound, perfect cond, used twice, £110. G4OGT NOT QTHR. Tel 0204 22968, Mondays or out of office hours.

Kenwood TR8400, 70cm mobile, mint cond, never used mobile, used little, one year old, complete with matching Kenwood PS10 psu, £180. Postage extra. Sennhieser unipolar electrostatic stereo headphones, used little, cost new £95, sell £35. G4WBT, QTHR under G6MEF.

TS120V and vfo, £325 ono. FRG7700, basic, as new, £300. Solartron stab psu, 0-500V. Evershed pen recorder, £75. G6MLJ NOT QTHR. Tel Terry, Stanford-le-Hope (0375) 679339.

HQ1 minibeam, three-band hybrid quad, nearly new, list over £130, very good dx but changing QTH, bargain at £65. G4RMM. Tel Ruislip 31240, evenings.

Heathkit SB102, psu, £150. KW202 rx, £100. Limer 2 2m ssb, £60. Microwave Modules 40W linear, 10W drive, £35. G4IYP, QTHR. Tel Chorley (Lancs) 75876.

FT250 hf tx/rx, FP250, exc cond, used only as reserve rig, manual, spare valves, £160. SSM Europa transverter, £50. G3AQY, QTHR. Tel 0472 87268 (Lincolnshire).

IC260E, 2m, multimode, mobile mount, boxed, £220. Nascom 2, Nas-sys 3 monitor, tons of software, manual, comp in pretty box, £225. G4HPE, QTHR. Tel Royston (Herts) (0763) 42581.

DIN-cased digital panel meters, mains powered, quartz locked, digital measurement, have volts (ac) amps (ac), Hertz, kilowatt power-factor, all new, unused, current models, British made by Contrology Techniques, £200 the lot, or will split. G4JUY, QTHR. Tel 0563 850702, pm.

Teletypes: ASR33, KSR33, Ascii coded, some early teletype machines for restoration, polar relays, tdms units etc, wide range of teleprinter parts, Creed autos etc, gone computer based. Telephone G3WLO for details. Amersham (Bucks) (02403) 3371.

IC2E, boxed, spkr/mic, charger, £120 ono. 30ft two section telescopic tower, two winches, one for tilt-over, £120. Brand new unused Daiwa 500W automatic atu, £110. KW E-Zee Match, £35. KW trapped dipole, £20. Tel Rugby 815506.

HW32A 20m tx/rx, very clean, well-made homebrew, ac psu, both in regular use, £75. **Wanted:** loan Heathkit HP13A manual for copying. All expenses paid. G4VAO, QTHR. Tel Martyn Jordan, Gt Withingham 853.

FT707, tx/rx, FP707, FC707, FTV707, mint cond. Offer near £625 secures. VIC20, 16k ram, cassette, two-slot motherboard, cassettes of games and utilities, 40 column tape, books and manuals for machine code, tape monitor, £150. G4NAB. Tel Chris, Locksheath (04895) 84914.

2m fm handheld, Sorno 500, comp with leather case, spare nicad packs, charger, discharge checker, handbook, xtalled S20, R5, rubber duck antenna, 0-5W rf out, can be seen working, £85 the lot. G8AKA, QTHR. Tel Reading 701163.

Yaesu FT101 hf tx/rx, 1-8-28MHz, G3LLL fm built-in transmit and receive, repeater shift, toneburst, fine wk order, unbelievable clean cond, bargain, £250. Magnum Two transverter, 28-144MHz, fm/ a.m./ssb, 100W out, superb cond, £60. Trio JR599 rx, custom special, 1-8-144MHz cw/ssb/a.m./fm, again unmarked cond, £155. Oscilloscope, BWD Electronics model 509B, all solidstate, up to 10MHz, super instrument, bargain, £75. Marconi insitu universal bridge, l, c, r all solidstate, ranges will amaze you, 0-1pF to 10,000pF, 0-1Ω to 100MΩ, 1μH to 110kH, super cond, cost several hundred, £40. Advance sig gen, 100kHz-70MHz, first class, £20. 2m Bantex 5/8 hole fixing type, 144MHz ¼4 gutter clip-on type, £5 for the two. All the above instruments include service manuals and

instructions. No rubbish offered, demo with pleasure, prefer buyers collect or carriage by Securicor only at your cost. Must make space. G3VCJ, QTHR. Tel Ron, 042-43 4726.

Microwave Modules 70cm 30W linear, £90. Grundig Satellit 3000 rx, £200. Mobile mic set, £25. Mutek 70cm rf-switched preamp, £55, offers. G4WAK, QTHR as G6HUG. Tel 01-504 4830. **ICL Termiprinter**, punch, optical reader, desk unit, needs some attention, hence £100 ono. Teleprinters, Creed 444, 7B, 7ERP etc, several machines available. For details tel G1EAZ, Amersham (Bucks) (02403) 3371.

Microwave Modules MMA1296 preamp, £12, plus post. **Wanted:** MMV1296 tripler. G8AYY, QTHR. Tel 021-783 2996, evenings or weekends only. **Yaesu CPU2500** k/bd mic, scanner, 10-25W, 144-148MHz, mobile mount, checked by SMC, £160. G4STH NOT QTHR. Tel 0202 309069. **Trio TS501**, PS501, ssb, cw, hf, set been checked, used rx only since then. G4YUG. Tel 0473 830147, anytime.

JVC LA11 auto-return turntable, two-speed, 33-3 and 45rpm, new diamond stylus fitted, belt driven, ac 240V stereo, comp with manual, £45 incl postage and packing. GW4CPZ, QTHR. Tel Cwmbran 67457.

FT101Z, brand new, boxed, FC902 atu, only £450 the lot. Free 1974 Ford Cortina, good runner, MoT and tax, if you buy the 2m whip antenna attached at £450. Dave Davis, G6YQD, QTHR. Tel 01-399 5487.

Trio R1000 rx, 200kHz-30MHz, immac, orig box, manual, £210 ono. Tel Taunton (0823) 53904.

8XY170 Jaybeam, new, comp with harness, no reasonable offer refused. Ribbon cable, large quantities, 10-way to 100-way twist'n'flat, cheap, prices on application. G4LZW, QTHR. Tel Ken, 0498 21372, anytime.

FT101E, mint cond, Yaesu spkr, cw filter, 12V dc leads, 10MHz band fitted, three sets of pa and drivers, £360. Tel 01-651 5147, evenings and afternoons only.

FT200, DC200, 136AHR battery, ideal portable station, £190 ono. Buyer collects. G4PAC, QTHR. Tel Kingsclere 298537.

Yaesu FT290R, two packs of nicads, chargers, helical, 1/4 whips, car lead, £180. Microwave Modules MML 144/30 linear amp, £55. All items ono. G6JXA. Tel Kim, 01-648 0028 (Morden, Surrey), after 7pm and weekends.

FT200, FP200, hf tx/rx, all 10m xtals, two mics, £200 ono. G4DFB, QTHR. Tel 01-360 3614.

HQ1 mini beam, £100 ono, or will exchange for 2m hand held. G4URF. Tel Al, 0604 68247, evenings.

FT707, FC707, immac cond, £350. Icom IC246 2m, mobile, 10W, 1W output, comp with books, £100. G4MH mini beam, £50. Trio 2300 2m handheld, nicads, charger, etc, £100. G6SVI, QTHR. Tel Brian, 0706 218657.

Trio TS820S, as new, £375, no offers. G4NTY, QTHR. Tel 061-790 7673, after 6pm.

Jaybeam, 2m colinear, £39. Microwave Modules, 2m receive converter, £14. Four channel stereo mixer, £20. Stereo headphones, £10. HF balun, £6. Morse key HK708, £8. Gibson Les Paul Standard, sunburst finish with flight case, £325. Tel 0376 84478, evenings please.

TS520S, good cond, used little, £300. FT480R, psu, £200. No offers, purchaser collects or arranges carriage. G4JXV, QTHR. Tel 0257 480970. **KW2000B**, plus ac p/s, c/w, handbook, ccts, some spare valves, £150 ono. G4ORS, QTHR. Tel Crudwell (Wilts) 212.

TS120V, 20W, good QRP, rig, mint cond, offers around £330. G4KFJ, QTHR. Tel 061-344 5484.

MM 500MHz digital freq meter MMDO 50/500, £40. KW500 linear amp, two spare 813s, £150. G3JYJ, QTHR. Tel Thanet (0843) 593279.

Morse key, heavy Royal Navy key, old type brass and copper, £10 plus p&p. G4PYQ, QTHR. Tel 061-480 4550, day, or 061-366 0927, evening.

Icom IC2E, as new, boxed, £120 ono. FDK Multi 2, £60 ono. Tel Sapcote 3320.

Yaesu FT101ZD, Mk1, comp with fan, cw filter, hand mic, service manuals, all in orig packing, as new, only £375. Yaesu FT208R, comp with spkr/mic, spare nicad, charger, adaptor for use with mobile power supply, mobile bracket, mobile antenna, all as new, less than one year old, only £185, worth over £300! Tokyo high power atu, HG2000 2kW antenna tuning unit, built like a tank! Less than one year old, as new, only £185. G4UJW, QTHR. Tel 01-346 8597.

Trio TR9000, as new, in box, £285. 40ft lattice tower in 10ft sections, head unit, galvanized, buyer collects, price negotiable. Tel 0908 368707, evening only 6-7pm.

Standing wavemeter, unused, 300MHz-12GHz,

£85. Spectrum analyzer, £85. Sig generator 2MHz-400MHz, £85. RXs: AR88D, HRO, Collins 51J, R444 Search, £45. Tuning units 36MHz-12GHz. BC348, BC312, 35mm film reading/viewing/teaching monitor unit. RS46829. Tel Wigan 55948.

MM transverter 2m-70cm repeater version, comp with 10W and 3W attenuators, £165 ono. Unfinished 25W, 2m linear, W&D, with case, offers? G4IDE rty system, unbuild, offers? G8XCL, QTHR. Tel Ian, Lydd (Kent) (0679) 20954, anytime.

The best terminal unit money can buy—the AMT1—in perfect wkg order, comp with VIC20 computer, plus all AMT1 software, cables, 16k ram pack, cassette deck, Seikosha dot matrix printer, plus lots of other software. The whole lot for £530, or may consider splitting. G4OTV, QTHR. Tel Dave, Tunbridge Wells (0892) 28275. **FT560** high power hf rig, spare pa tubes, wkg order, £195 ono. G3ZAY NOT QTHR, PO Box 146, Cambridge. Tel 0223 311714.

Yaesu FT707 £350. FRG7, digital, £140. FT901DM, all accessories, (atu, vfo, 6m-2m-70cm xvr, monitor scope, spkr/patch all filters), £950. All above in virtually as new cond, with orig manuals and boxes. G3VZJ, QTHR. Tel 024-365 312.

HRO-MX rx, orig cond, no mods, four bands spread coils, gen cov coils, suit collector. Tel 051-652 7454, daytime, or 051-342 7880, evenings (Merseyside).

Microwave Modules MMT 432/144R transverter, £100 ono. Jaybeam 8XY2m crossed Yagi, phasing harness, £25 ono. Purchaser to collect or cover cost of delivery. G6RNP, QTHR, West Midlands. Tel 06755 2342.

Clearance ASR33, silence cover, pedestal, £50. AR88, £25. Creed 7E printer, £20. 5/8 unit tape reader, £10. Cossor 1035 scope, £5. 19 set, £5. Various components, valves, amplifiers, decks, spkrs. Tel Sevenoaks (0732) 451975.

KW2000A, ac psu, manual, £130. GD3YUM, QTHR. Tel 0624 22226.

Icom IC215 2m fm, fitted 15 channels, set of nicads, orig packing, exchange for good MK123 tx/rx. D.T. Price, G3LYU, 16 Dorset Avenue, Glenfield, Leics. Tel 0533 876459, after 6pm.

Trio TS510 80-10m tx/rx, remote vfo, good cond, new output valves, £185. Telequipment D53S 25MHz storage scope, £125. G4IRU. Tel Poynton 874110.

FT290R, as new, nicads, charger, case, £200. 2m, 5x/8 mobile whip, gutter and boot mounts, £8. Five-el 2m Yagi, new, £5. GW3XQZ NOT QTHR. Tel Abergelge (0745) 826445.

Trio TR2300 2m synth fm portable, incl case, nicads, charger, flexible ant, mobile mount, £150 ovo. G4DPZ, QTHR. Tel 0787 476925.

Trio 9130, 2m multimode, £390. Yaesu FT230, 25W fm, £160. Both mint cond, boxed. G4LQD, QTHR. Tel Farnham Common 3286.

Adonis MM202FX mobile gooseneck mic, preamp control box with timer and scan, mint cond, incl orig instructions, £25. Bantex mobile body mount, 1/4 whip, £5. Prefer buyer collects. G6IBC, QTHR. Tel John, 01-790 8163, evenings or weekends.

AR88D, spkr, preselector, gwo, £50. Buyer must collect. Tel Guildford (Surrey) 224327.

Yaesu FT107, fitted memory, fm boards, matching external psu, £375. FTV107 2m transverter, £115. FC107, £65. SP107, £20. Trio R1000, with boards to convert to tx, £175. FRT7700 atu, £30. Vomax processor, £50. **Wanted:** Dentrion MT3000 atu. G4EMG. Tel 01-534 3460.

Synthesized scanning vfo, keyboard, 12 memories, FV101DM, and FT101ZD, Mk3, fm, nine-band, fitted cw filter, fan, a.m. plug-in, mic, workshop manual, boxed, handbooks, vgc, cash £575 ovo. G4MBZ, QTHR. Tel Farnborough (0252) 837581, evenings.

AR88 LF, full wkg order, buyer collects, £45 ono. Letters only please to W. Rodger, Flat 1, 23 Valingers Road, Kings Lynn, Norfolk PE30 5HD.

Comp station comprising FT290R, Mutek board, MML30LS linear, psu, swr meter, charger, carrying case, £275. R1000 rx, £200. Datong D70 morse tutor, £30. 70cm MBM48 multibeam, £30. G6ZEK, QTHR. Tel John, 0782 721395.

MMS1 morse talker, guaranteed new and unused in box, factory replacement of original, £80. G4YDK NOT QTHR. Tel Uxbridge 30503, evenings. **FRG7700** gen cov rx, mint cond, FRT7700 atu, manual, orig packing, Securicor delivery, £245. G3GTR, QTHR. Tel Holywood 6466.

FT101ZD fm nine-band mic, fan, £425. MMT 144/28, £65. HS HF5 vertical, £25. Or £500 the lot. G4IUH, QTHR. Tel 0908 542440.

Acorn Atom computer, fully expanded, b/w 12in tv, games and business software, wordpack.

Practica LLC 35mm slr. The lot for £220 ono, will split. Tel 0494 35275, anytime.

TR2200G, nicads, charger, xtals for 10ch, Trio 10W rf amplifier, £70. SR9 rx, 0-5W tx with mic, both with xtals for 10 2m channels, all above vgc. GU3HKV, QTHR. Tel Guernsey (0481) 47278, 6-7pm only.

Tx KW202, £150. TX KW204, £120. RX EC10 Mk2, £65. RX Grundig Satellit 2000, ssb unit, £75. KW108 monitorscope, £65. Delivery 50 miles. GW4BMN, QTHR. Tel 0341-250 330.

DX station, over 200 countries worked: KW204, £150. JR500S, £100. Datong processor, £20. Datong FL1, £50. Or complete, £280. G4IUF, QTHR. Tel Harrogate (0423) 68954, ext 262 (office). **Trio R600** gen cov rx, as new, £180, or swap for 2m multimode mobile. Admiralty B40 gen cov rx, £25. G4UMP NOT QTHR. Tel Southend (0702) 231247, evenings.

AR2001, as new, perfect cond, £280 or offers. Paul Hodgetts. Tel Dudley 50327.

Yaesu FRG7700 rx, FRT7700 atu, Microwave Modules 144/28 converter, manual, good cond, orig packing, £270 ono. G1GCN NOT QTHR. Tel David, 0900 826461.

Racal RA117E, perfect, seen working, £230. **Wanted:** four-jaw chuck and any other tools Myford ML7. Tel 029-922 279 (Clows Top, Worcs). **FT902DM**, cw filter fitted FTV901R, FV901DM, only used for transverting, no split, £750. FR 101DD hf/vhf rx, £200. FT207R, NC2 charger, extras, £160. Trio TS780, as new, £700 ono. Deliver or meet 50 miles radius of Hull. G6FSQ. QTHR. Tel 0482 657853.

ADMY Patt No7681 brass morse key, serial NoP1661, year 1937, will exchange for 10m rig and linear converted cb etc. G1DZL. Tel Brian, 061-723 4939.

Yaesu FT480R, £230. PSU, £10. Realistic DX302 rx, £160. Hirschman vhf rotator, £25. All in exc cond, used little. J. Webber, G6FGV, QTHR. Tel Hemel Hempstead 44961.

KDK2030 10 months old, plus 7x/8 mobile plus SMC 2m colinear, £200 ono. GM4SNZ, QTHR. Tel 0324 21910.

Iambic memory keyer, G3GJX design, £25. Hi-mount key, single lever type MK701, £20. Datong RFC speech processor, £25. Microwave Modules MMV432 varactor tripler, £20. **RSGB Bulletins and Radio Communication** 1960-83, comp, offers? G3OHC, QTHR. Tel 021 352 0199.

Daiwa SR11 vhf fm rx, 144-146MHz, 5 xtals R3, R6, S16, 20, 21, £39. G4RRG. Tel 0905 352110 (Worcs).

Morse key HH808, marble base, perfect cond, three months old, £30 ono. G4WUU NOT QTHR. Tel Kings Langley 65823.

FT780R, only several months old, hardly used, now transverting from hf rig, £290, offers. Cumana 80TRK single side disc drive, approx six months old, £170, no offers. Buyer collects. G6TYO NOT QTHR. Tel 01-640 8055, evenings/weekends.

Hokushin HF5V five-band trap vertical antenna, matching radial kit, £50. IC240 vhf fm tx/rx, incl 80ch plug-in accessory, mobile mounts, orig packing, manual, £150 ono. G4MGL. Tel Farnborough (Hants) 546966, after 6pm.

Ten fm rigs, DNT M40FM, modified to 29-310 to 29-700MHz, brand new, warranted, £33 each. Scooper 2m scanner 10ch, £30 ono. Kenwood atu AT130, unopened, £70. G4SNO. Tel 0562 884824, evenings or weekends.

TR8400 uhf fm 10/1W synth, 3 x 5x/8 mobile whip, gutter mount, £200. AR240 2m fm, 1W synth, handheld, nicads, charger, soft carrying case with 10W 2N6082 pa unit, £100. **Wanted:** FT780R with 1-6MHz shift, or similar multimode. G8GHU, QTHR. Tel Weymouth 789022.

Yaesu FT230R mobile 2m, 25W, new cond, boxed, £160. **Wanted:** aircraft band 360/720ch tx/rx, or will consider glider channels only tx/rx. G6XRL, QTHR. Tel 061-489 3770, work, Poynton (Cheshire) 876192, home.

IC245E, IC RMS multimode 10W mobile patch panel for remote control, boom mic, meter, hand mic, £250. Scope Telequipment type D53, perfect, £100. Tandy DX100L, gen cov rx, and Global atu, £55. 16mm films, sound with projector. Tel 0621 828807.

Dragon 32 computer, comp with joysticks, software, £125, or swap for Bearcat or similar with cash adjustment, of w.h.y? G4GNU, QTHR. Tel Andy, 0268 774947.

KW TenTec Omni-C digital, last Omni line, faultless since new, notch irl QSK, new bands, vox, three audio filters, rf filters, 2-4/1-8kHz int/ ext spkrs supplied, superb rx audio and tx, modulation three matching mics, 160m mod by KW, any test, £495. Ten-Tec psu, £125. AEA Woodpecker blander built in rf relay, switched

6dB lift, works well, £45. All immac cond and with KW back-up, a reliable lot, separate or £625 the lot, carriage paid UK. G3RHM, QTHR. Tel 01-423 0306.

Icom IC24G 2m fm tx/rx, comp mobile mount, 5V/8 mobile whip, mic, £100. Jaybeam eight-el x/y plus Hirschman RQ250 rotator, £50. Video Genie 16k micro with in-built Catronics CT600 rly to plus monitor scope, £150. Datong asp rf speech processor, £50. G3ZNE NOT QTHR. Tel Tavistock (Devon) (0822) 66867.

TS700G 2m multimode, £300. IC240 2m fm, £120. Both items mint, no offers. 23cm homebrew transverter, 0-5W o/p incl Piper USM2, repeater shift, cables for use with above TS700G, £75. Tonna 23cm antenna, unused, £19. G4BWW, QTHR. Tel Southport 29036.

Trio R300 gen cov rx, all mode, incl fm, power leads, manual, £75 exc carriage, or swap for SLR camera, Olympus OM10 or similar. Would prefer buyer or swapper collectors. GW4MTE, GW8XJC, QTHR. Tel Richard, Porthcawl 4832.

FT102 a.m./fm unit, cw, a.m. filters, FC102 atu, FV102 vfo, £740, may split. EA12, £100. R70, £340. Part exch possible for all, as wanted ssb/cw tx or tx/rx FT200, KW204, Viceroy, accept faulty gear. G3YRQ, QTHR. Tel 0942 672251, day, 679948 evenings.

Racal 117E rx, good cond, buyer collects, £175. G8SEE, QTHR. Tel 0209 716526.

Yaesu FR101S dig rx with 13, 16, 19m b/c bands, £150. Welz CP5 five-band trap vertical antenna with radials, £65. Datong FL2 audio filter, £50. FL1 agile filter, £30. MPU/AC adapter with first sold. All items as new. Tel 01-876 2070.

Dentron linear GLA1000, Hansen FS710H watt-meter, £250. Uniden 2030, seven simplex, six repeater, £65. Carriage extra. G4GIZ, QTHR. Tel 0282 842776.

Dressler D200S linear, 1kW p.e.p. on 2m, incl three spare valves, £595. You too can work the Russians on two! For sale due to arrival of QRO linear. Peter Crossland. Tel 0905 620041, evenings or weekends.

Pye PF1 tx/rx, batts, £20. HP1 fm Bantam three-ch, mic, shoulder strap, on 144MHz, no batts, xtals, exc cond, £55. With cct, Heath GR110 144-170MHz scanning rx, factory built, manual, £40. Pye PF70 charger, single unit, £15. Hudson high band fm portable tx/rxs in canvas shoulder bags comp with handset, separate loudspeaker amp, ideal Raynet, operate from dry cells, 12/15V, three only, £17.50 each. Buyer collect/pay carriage. Other items, write G3MOE, QTHR. Tel 0242 524217.

Cushcraft AV5 five-band vertical, unused, £75. G4KLN, QTHR. Tel Leeds (0532) 821020, evenings.

IC4E, as new, incl DC1, spkr mic, case, semi-auto toneburst, charger, nicad, exc, £175. G8EPQ, QTHR. Tel Milton Keynes (0908) 67721, after 7pm.

Eddystone 770U uhf rx, continuous tuning up to 550MHz, exc sensitivity, internal psu, rugged construction, manual, circuit diagrams, leads, etc, new cond, £75. Delivery extra. G4GTU, QTHR. Tel Steve, 09062 76570 (West Sussex).

Receivers: Racal RA1218 1-30MHz with RA298 lsb adapter, all solidstate in cabinet, £650. RA17L in Racal cabinet, £175. Collins R389URR 15-1.5MHz, no cabinet, £200. R390URR 500kHz-32MHz, £325. 75A4 amateur bands, three mech filters, 500, 1500, 3000cs, £225. TMC CV91 ssb adapter for use with 390, can be used with other rx's, £115. Icom 251E, 2m multimode, fitted with Mutek front end, SM5 desk mic, £425. Trio TR8400 70cm fm with PS10 psu, £195. Racal MA174 eight-way antenna multicoupler, £70. Hatfield eight-way multicoupler, type 3401, £40. All in vgc, all except RA17L with handbooks, carriage extra. GW3JAZ, QTHR. Tel Gresford (097883) 2584, nr Wrexham.

Hygain 12AVQ vertical for 10-15-20m with hb radials, £28 ono. Buyer collects (Sussex). G5DJW, QTHR. Tel Arthur, 034282 3016.

Trio 9000, immac with mobile mount psu, Daiwa crossed needle swr power meter, £350. Video Genie 3001 e.g. second tap machine and monitor, plenty of programs, £150 ono. G4JRQ, QTHR. Tel Lincoln (0522) 38640 or 42031.

KW202 rx and matching spkr, instruction manual, nine bands, built-in Q multiplier and notch filter, exc cond, suit new swl, £125. G4YVY, QTHR. Tel 0704 79825.

Yaesu FT101ZD nine bands, fan, mic, FV101DM digital vfo, FTV901R transverter, 2m, 70cm, fitted FC902 atu, SP901 spkr, all as new, boxes, leads, etc, £825. G. M. Barnes, 3 Blandford Avenue, Castle Bromwich, Birmingham B36 9HX.

TS700G immac, orig pkg, £295. 48K Spectrum, psu, plus ZX printer, £125 or swop both for hf rig. G6UHH, QTHR. Tel Peter, Oakamoor 702208.

Shack clearance: microdot cw/rty terminal unit

with onboard printer; Eddystone EC10; Heathkit OS 12V oscilloscope. All fb cond, offers to G3TJQ, QTHR. Buyers collect and inspect. Tel 02273 63345.

RA17 rx, cased, £160. Bendix rx, uncased, 0-15 to 15MHz, £30. Lo-band a.m. Cambridge, dash mounted, £20. Liner 2, 2m, £50. Cased keyboard, 49 keys, suitable microcomp, conv, £30. *Wanted:* hf linear. W.H.Y? Carriage extra all items. G4UPD, QTHR. Tel 0532 491366.

FT101ZD (Aug 82), used little, as new, mic, fan, book, packing, £450. Sig gen Marconi TF144G, near mint, 85kHz-25MHz, £20. DSB80 kit set, built, wkg, £30. Carriage extra. G4OYJ, Tel Geoff, Albrighton 2611 (nr Wolverhampton).

Drake SSR1, solidstate comms rx, 150kHz-30MHz, incl cct diagram, manual, £65. KW Vespa Mk 1 tx, psu, incl cct, diagram, manual, £75. Tel 0375 676315.

SWR, power meter (i.e.d.), £6. VHF valves from 50p. QQVO30/20, £3. 832, £2. 350.0.350 tranny, £3. Meters 150mm and smaller valves, £1. Thermos, some 2m xtals. G2ASL, QTHR. Tel 021-475 1831.

NAG144XL 2m linear amp, spare unused 4CX350, vgc, £375. 15-el Cue-Dee, 2m Yagi, almost unused, £30. HC25U xtals, 8-20, 8-30, 20-0, 116-0MHz, £1.50 each. *Wanted:* memory board and xtals for FT225RD. G8KAX NOT QTHR. Tel John, Chelmsford 355331, evenings.

FT77, as new, scan mic, £389. FT221R, good order with frequency readout, £399. Icom auto atu AT100, as new, £239. FV901 vfo, £149. Tel Bolton 592929.

E R D Ottawa a.m. high band radio telephone with mic, £35. GEC Messenger, fm, mid-band, £40. G6HXB, QTHR. Tel 01-574 2957.

TR7600, 2m, synthesized fm tx/rx, well known on air, very little mobile use, super dx performance, two mics, mobile bracket, orig packing, homebrew psu, £120 ovno. GW8VEO, QTHR. Tel 0978 357295.

HF5 vertical, as new, £35. Canon 310XL cine, unwanted gift. Bolex 102MTC projector Standard/Super 8. Hanimex E400 dual 8 Editor, cost £265. All immac and boxed. Exchange TS700G or vhf equipment similar value and cond. G2FZU, QTHR. Tel Southwell 813847 (Notts).

Sigma RF2000 pwr/swr meter, 200/2000W, £7. Four transmitting variable capacitors about 150pF, all for £5. Circuit boards from comm equipment containing at least £10-worth transistors, ics etc, only £1 each. S. Little, G4NNU, QTHR. Tel Seaton (0297) 20680.

Yaesu FT102, mint cond, fm board, fitted YM38, Yaesu desk mic, £550. G4MDR, QTHR. Tel 0908 613215.

SSTV keyboard built from wolmd pcbs and Ascii keyboard. 1/35 lines of six characters, black/white background, vertical/horizontal grey scales, 50/60Hz output, full documentation, £103. G4DFU, QTHR. Tel 0602 585055, daytime, 0602 278173, evening.

TS180S, PS30 psu, extra filter, £475. SX200N scanning rx, Discone antenna, £225. G3NFV, QTHR. Tel Leatherhead 372587.

Icom IC2E, four months old, as new, orig packing, all comp, charger case, helical, x4 wave antennas, unmarked, £140 ono. G4LVE, QTHR. Tel 0255 431451.

HB hf linear, (2x brand new 4CX250B), £200. Europa B transverter, £50. HB top band converter, 14MHz out, £15. New QQVO640A base, £10. Codar AT5 tx, panel marked, £20. All plus carriage. G3RB, QTHR. Tel Whitley Bay 530504.

Nine-el crossed Tonna, as new, 15m heavy duty coaxial, £25, or £15 each. Eurosonic 8A mains power supply, £15. Heavy duty lowpass twi filter, £5. Zetagi mains 200W linear, £50. All must go. RS85321. Tel Penrith 63200.

IC240 2m fm, 23ch, easy to use mobile rig, good cond, comp with manual, gone 70cm 1M, £100. Minibeam hf, G4MH type, £40. *Wanted:* mobile bracket for Trio 3200. G8GMT, QTHR. Tel 0922 414927.

Trio TS520S, mint cond, 500Hz cw filter fitted, orig packing, £325. Datong D70 motor tutor, mint, £40. KW2000E, good cond, £225. RTTY terminal CV89A, £30. *Wanted:* commercial hf ssb tx/rx, SSB125T, SSB130, AEL3030 etc. AR2001. G4NCE, QTHR. Tel 021-357 6139.

FT200B, SP200 hf tx/rx by Yaesu, 240W p.e.p. (130W out), exc cond, clean, almost as new, purchased 1977, used only infrequently. Homebrew cooling fan fitted, spare psu, comp with instruction manual, plugs, £250. GM4FSB, QTHR. Tel 0382 543069.

Kenpro KP200 memory keyer, in orig packing, new price £160, for sale at £110. G4PJM, QTHR. Tel 0305 832154.

Shimizu SS105S hf tx/rx, fm/nb boards, cw filter fitted, pristine cond, tested by Lowes, a bargain at £290. Trio R1000 gen cov rx, in vgc, £200. G4MPD, QTHR. Tel Northwich 47552, evenings.

Heavy brass morse key, engraved date 1916 on polished wood base, heavy brass morse sounder, sell or exchange for B2, type A Mk3, 10m fm rig with repeater shift, HW7. All offers considered. W.H.Y? G3JFC NOT QTHR. Tel 0474 872743.

MM144/50S exc cond, used very little, have changed rig hence sale, £65 post paid. No haggling! Realistic DX302 GCR, 0-30MHz, vgc, £120 ono, post paid. G4RVY, QTHR. Tel Gordon, 0783 266357.

KW Vespa, psu, good cond, manual, circuits, 6LQ6 pa, £50 ono, or exchange for decent electronic keyer. Tel 031-664 3891.

KW204 tx, ssb/cw, 180W, new pas, KW202 rx, matches tx, all connecting leads, handbooks, both in vgc, working order, £110 each or £200 both. Collect or pay carriage. G4JSS, QTHR. Tel Wakefield (0924) 276294.

HLA5U 430MHz linear, 10W in, 45W out, as new, bargain, £115. Elevation rotator, Kenpro KR500, 45ft, six-core cable, £95. Welz SP350 swirlpower meter, vhf/uhf, £50. Datong rf speech clipper, £30. 12V TA psu, ex-computer, £20. G4YBU, QTHR as G8FIH. Tel 01-394 1499.

Antennacraft USA uhf/vhf/fm tv colour antenna, model CCS1233, length 3m, 7cm, splitter incl, hardly used, cost \$64, sell £60. G6VRV, QTHR. Tel 061-653 8737.

Yaesu FT102, a.m./fm module, MH1 mic, six months old, in perfect cond, £580. Postage can be arranged. G14OGA. Tel Belfast (0232) 227244, ext 290, and ask for Larry, 9am-4.30pm.

Eddystone EC10 rx, gen cov, 500kHz-30MHz, mains and battery plug-in module, psus, nice clean cond, £50 ono. *Wanted:* £271 BBC micro disc control chip. G3PCT, QTHR. Tel Paul, Chelmsford 321086.

Microwave Modules transverters, MMT 144/28, £65. MMT 432/28, £65. Trio R600 rx, £170. KW108 monitorscope, £60. G4SOX, QTHR. Tel 0926 498388.

Datong asp, £52. Datong FL2, £52. Ambit hf lin/amp, decaist box, heatsink, 1W in, 20W out, £25. PSU, 1-30V Zegati twin meter, 6A reg protected, £32. Kenwood MC42S mic, £8. All immac, boxed. G3RHM, QTHR. Tel 01-423 0306.

Revox B77 reel-to-reel, complete variable speed, remote controls, barely used, £500 ono. Buyer collect. G4OMP, QTHR. Tel Michael, 021-382 3606, after working hours.

Blower motor type 2PL, 321-297C Mk2 by Plannair. 115/230V ac, bolts to chassis skirt, approx 10 by 9 by 8cm, weighs 600g, as new, £10 incl postage. G3ESP, QTHR. Tel 0977 611229 (Ponterfract area).

The wife has told me to sell!! Yaesu FT480, FT780, SCL station console, £650 ono. 2m antenna, 17-el Tonna, £20. Jaybeam 8-el Yagi, £10. Portable mast, £10. 7x8 mobile whip, £10. 3 x 5V/8 70cm mobile whip, £10. Wood & Douglas 2m preamp, boxed, £10. Hirschman rotator with staybearing, £35. Please help me! I have been given permission to buy Icom IC251/IC451. I can deliver between Banbury and London. G6LOH NOT QTHR. Julian Tether, Highview, Banbury Lane, Culworth, OX17 2AX. Tel 029576 8152.

PW, PE, PT, RC, WW, ETI, Elektor, many complete years since mid-sixties; some HR, 73. Most adverts, some fluff removed, year, £3. Odd ones, 20p. Collect or add postage. Butterworth, The Rectory, West Woodburn, Hexham, Northumberland. Tel 0660 60235.

Transdata 309 8m floppy-d drive, 240KB capacity, 64k buffer, six disks, software includes DO5 and extensive editor, four-ports, vdu, printer, modem, aux, documentation, £250. Buyer collects. Tel 025-14 28526 (N Hampshire).

BBC 32k morse programs, incl random allsorts, 100 plain language 3min tests, 70 cw abbreviations/punctuation, save/playback of text typed in, output to spkr or external oscillator; learn and pass fast! £4.75. D. Brandon, G4UXD, 1 Woodlands Road, Chester CH4 8LB.

Yaesu FL2100 linear, exc cond, spare 572Bs, £275. G3SJH, QTHR. Tel 021-427 1115.

FTV901R transverter, 2m module only fitted, comp with all leads, as new, £190. Nine-el 2m Tonna beam, Yagi, £15. 2m rotator, £40. G6VAQ, QTHR Essex.

FT102, boxed, used little, perfect cond, £600. MM 28/144, recent alignment, £60. G4ODK NOT QTHR. Tel Basildon 418058, evenings, weekends.

TR2400, leather case, exc cond, £180. Telephone answering machine, Phonsitter P70, £55. Eddystone 898 dial, unmarked, £8. New VCR139A crt

with base, £8. 600V 0-6A mains transformer, £5. G3ZLS, QTHR. Tel Knowle 70235.

FDK750E 144-148MHz multimode, £180 ovno. G6XV, QTHR. Tel 0702 549810, after 6pm.

Trio R300 rx, exc cond, performance, £95. Atlas 210X tx/rx, £250. Deluxe ac console, £85. VFO206 digital, £110. All exc. New Gem quad, two-el conversion kit, £95. *Wanted:* pre-war domestic and amateur rxs, magazines catalogues. G4ERU, Tel Bournemouth 510400.

Valves, six KT66 GEC, boxed, new, exch TT21s, RCA 807s, 813, new preferred, or w.h.y? G3WKG, QTHR. Tel 01-505 0197.

Yaesu FRG7700M, FRT7700 atu, used little, good cond, boxed, bargain at £275. Tel Bernard, Leicester 885540, after 7pm please.

FT707, FP707, mounting bracket, mobile, YM36 mic, Welz AC38M atu, SP15M meter, gwo, £375. G4PLF, Tel Stroud (Glos) 78765.

Philips PM3207 15MHz oscilloscope, manual, probes, mint cond, £275. G4RPK, QTHR. Tel 01-267 1000.

Hi-mound autokeyer model UFO 001, £40. HF5 hf vertical antenna, £25. SR9 2m fm rec, £30. G4OUR NOT QTHR. Tel 021-550 7442.

Trio 7500 2m fm mobile, synthesized, 25kHz steps, mint cond, 15W out, repeater shift etc, mobile mount, orig box, instruction manual, £150. G6MKC, QTHR. Tel 01-642 0492.

Yaesu FL110 hf linear amp, 4W input, 100W output, 12V, exc cond, £90. Yaesu FT75 vfo, hb, compact, stable £10. Full set xtals, three each band, total 15, £10. VXC capacitor, coil, £2. G3YUQ QTHR. Tel Bedford (0234) 768120, evenings, weekends.

Vestigal sideband atv tx, 10W peak sync, built professionally, £130. Datong morse tutor, £30. G3XKX, QTHR. Tel Leicester (0533) 715378.

Yaesu FRG7700 gen cov rx, digital readout, Yaesu FRT7700 antenna tuner, 2m converter, all only 11 months old, exc cond, manuals, orig packing, £300. Tel Blackpool (0253) 404566.

FT102 fm/a.m., immac cond, £525 ono. GW4IUY, Tel Aberdovey 367.

Rotator AR40, £19.50. Texas T155(II) programmable calculator, £14. Vero KM4C double Eurocard frame, £10. 2708 eproms, 75p. CRTS VCR97, CV2286, CV1596 (Hartley 13A scope), £4 each. *Wanted:* Circuits/maintenance manual for DRE3100 Winchester disk drive. G8ISI, QTHR. Tel 0428 723168.

Yaesu FT780R 70cm multimode tx/rx, no mods, vgc, £250. MML432/50 50W linear, £65. Jaybeam MBM48, £20. G3HRY, QTHR. Tel Newport Pagnell 616519.

Yaesu FT203R 2m handheld, bought four months ago at NEC, hence exc cond, comp with nicads, charger, comp manual, diagrams, one year warranty, £135. David Traynor, 2 Pembridge Court, Ellesmere Port, South Wirral L65 9EG. Tel 051-356 0883.

Heathkit HW8, fitted rit, fb cond, exchange for hf linear or KW109 atu, workshop manual FT101ZD, £8 plus p&p. *Wanted:* single lever paddle. G4IUI, QTHR. Tel Chorley 62988.

Trio TM401A 70cm tx/rx, still under guarantee, £275. 5x/8 mobile ant, magmount, £20. KW/SMC monitorscope, nice cond, £60. Carriage extra. G3UOZ, QTHR. Tel 021-373 8806.

FTDX401, £225. Would consider px for FT480, FT290 or FT790. G3WWJ, QTHR. Tel Cambridge (0223) 880101.

Bell & Howell 16mm sound projector, auto threading type 655, 1000W, q lamp, spare lamps, workshop manual, spools, mint cond, £380. *Wanted:* Trio psu PS20. G4TAM, QTHR. Tel 0634 250408.

TS830 manual, official US Kenwood service manual (bought in error in USA), £8. G3SEK, QTHR. Tel 0235 31559.

FRG7700M, FRT7700 atu, FRV7700, as new, boxed, seen Bognor or Oxford, lot, £395. Bodigian, RS9271. Tel Thame (084 421) 3555, office hours.

Amtech 300 hf atu, £45. 70MHz tx/rx, needs attention, £20. Teletype ASR33, good cond, £40. Heathkit power units, IP18 variable, 1 to 15V, £10 each. Hustler 4BTV hf antenna, £40. Heath swr meter, AM2, £10. Carriage extra. G3FXA, QTHR. Tel 0242 35727.

Drake SSR1 communication rx, good cond, £90. National (USA) NC81X amateur band rx, 1938, 10 metal tubes, good order, £75. Two 'twenties Victrola cabinet gramophones, one original, one fitted 'forties wireless, £45 the two. Exchanges possible. Tel Jim, Bournemouth 510400.

TP15B (Creed) 444 teleprinter, pag terminal unit, rolls of paper, punch tape, £90 ono. G6TVX NOT QTHR. Tel 0983 882491, after 5pm.

Gentlemen—this beautiful piece of lcom

equipment (IC02E) is surplus to my requirements, incl nicad-charger, used little (less than 6h) purchased new 30-1-84, Thanet, cheque for £198 secures, £229 new, save £31, lovely audio. G4WXL, QTHR. Tel 0772 702252.

Tektronix oscilloscope type 316, probes, some spare valves, service manual, £55. Advance E2 signal generator, handbook, £20. Buyers to collect. G3BEZ. Tel Tonbridge 358370.

Stabilized psu Advance PMA49, 30-50V, 3A, £20. Transformers, all 240V primaries: 3000V 1-4A (yes —5-2kVA), £30. 15V + 15V, 1-6A, toroidal, £5. 20V + 20V 3A toroidal, £7. 10V + 10V + 10V + 10V 5A toroidal, £10. 110V 30VA, £2. Solartron twin-beam scope, £60. G4NVA, QTHR. Tel 0477 33011 (Cheshire).

Digital magnetic tape unit, 803 film handler. Uses 35mm (hence "film") magnetic tape, eight-track, clock track, circuit diagrams supplied, full of interesting components (two servo motors, four big power units), offers. G6TGN, QTHR. Tel 0509 216164.

FT230R 25W tx/rx, new, used twice, £199. New hi-Q balun, 1:1, £7.50. Search 9 rx, fully xtalld Daiwa, £30. G4MUJ. Tel 0903 753102.

Outdoor loudspeaker for motorcycle etc, bolt fixing, 4-80, 5in dia, £4. Ever Ready "flag", large round batteries, 1-5V, six for £5. GEC (Salford Instruments), early xtal calibrator, 100kHz, 1MHz, 5MHz, set, synch osc, 30/40MHz, £8. G3MBL, QTHR. Tel 01-445 4321.

AR88D and **SX28**, both in gwo, what offers? Buyer to collect. G3NL, QTHR. Tel 0905 422110.

BBC complete ham program including digital clock "alarm", erasable notepad, logging with full editing and auto mode/band/date facility, full global search etc, 2m/70cm repeaters shown on map of UK—input suffix or QTH for full repeater details, QTH locator input co-ordinates and QTH pinpointed on map of UK, full graphics and professional presentation, fully menu driven, comprehensive instructions, this program has been designed to give the op everything at his fingertips, on disc, £7. G4TEN. Tel John, 0258 53075, weekends.

Yaesu FTV107R 2m transverter, as new cond, rarely used, will suit most hf rigs, £90. Five-el 2m Yagi, £6. 250Hz eight-pole cw filter, suits FT101Z, FT901, FT107, FT707, £15 incl postage. G4OBK, QTHR. Tel Chorley 74451.

144MHz 16-el G2BCX beams, two, £12 each. Oscilloscope, 50MHz twin-beam, £60. *Wanted:* memory plug-in for FT225. Cash or swap for scope? G4NVA, QTHR. Tel 0477 33011, (Cheshire).

FT775 10W hf tx/rx, fm board, calibrator, Trio MC60 desk mic, £399. MMT432/28, 1-6MHz shift, £110. MML 432/50, £80. MML 144/50S, £65. All plus carriage. G3TUX, QTHR. Tel 0428 54141, day.

Trio Kenwood TS930S, May 1983, £750. G4EUU, QTHR. Tel Havant 483879.

Ameco model PT preamp/station controller, USA but 220V, 1-8/54MHz, improves most any rx, uses 6EH7, £20. Comp IFR flying course, manuals, records, films, projector, £100. G3AAG NOT QTHR. Tel Liss 892143.

Tono 9000E communications terminal, rtty, Ascii, cw, in superb cond, real bargain for £50 ono. Tono CRT1200G green screen monitor, P3 tube, £99 ono. G6GOS, QTHR. Tel 01-586 5167.

70cm TR3500 with charger, orig packing, guarantee, two months old, £220 or exchange for lathe, Myford, cash adj. G4KFW, QTHR. Tel 021-357 2009.

Log book program tapes for Commodore 64, comp with full operating instructions, stores in pages, date, times, callsigns, modes and frequencies, will search the files to look for callsigns, loads in pages and shows them in log type columns, £4 each. G6WZZP, QTHR as G6WUW.

HRO500, gc, synthesized, all solidstate rx, vgc, £300. FT101 series workshop manual, £20. FRG7700, mint, £260. Kantronics morse reader, 3 to 80wpm auto tracking, clock, £30. G3AAG NOT QTHR. Tel Liss 892143.

Yaesu FTDX560, FV401, UD844 mic, £250. EC10, £55. Icom 280E, £150. CR100, £25. BC348, £25. OS1 scope, £30. Stolle rotator type 2010/220, £40. Echo 8 trap vert, £20. G3ZBM, QTHR. Tel 0270 68693.

Sale of silent key effects: equipment, accessories, books, manuals, etc. Please write enclosing sae for complete list, to either G4DIU or G6QY, both QTHR.

10-el Jaybeam, 144MHz antenna, 10m RG213 coaxial, three-section 5-5m pipe mast, all new in April, good compact portable antenna for 2m, £23 the lot. Icom IC120 23cm fm tx/rx, antenna, £320. Returning to Australia. G4/VK4AIZ. Tel 0923 675009.

Clearance: rack mount psu, 10-12-5V, 10 + 4A, £12. 10W valve audio amp chassis, £5. AVO type III gen purpose a.m. sig gen, old but fully wkg, £18. Tektronix 190B constant amplitude sig gen, ideal for rx alignments/sensitivity checks, £65 incl copy hb Coutant psu, rack mount, 5V 3A, £8. Dynatron SRX24 tuner/amp chassis, bargain to d.i.y er, £8. LAR vhf Omnimatch, used little, £18. MC200 microcassette recorder, £10 (£4.50-worth tapes, £2). All wkg. Other items/parts. G8YBF, QTHR Stockport.

SX200N, JIL, the ultimate scanner, boxed, as new, discone type antenna, £199 or exchange for Trio 9000 or FT290 and 2m linear with cash adj. G3FUF, QTHR. Tel 03265 63648.

Trio TR7730 25/5W 2m miniature mobile, scanning mic, memories, i.e.d. display/S-meter, £165. FT790 70cm multimode, £195. Dragon 32, cassette, joysticks, games, £115. Cordless phone, 700ft, £40. Fortop 70cm tv tx, converter, £25 and £15. Creed teleprinter, PO terminal, £15. Tel Leek 382117, office hours.

Yaesu FR101DD digital multimode rx, as new, 160-10m, 4m, 2m, main short-wave commercial bands, £165. G4HTE. Tel Potters Bar (0707) 54905, evenings.

Strumach Versatower model P60 ground post, £100. Top section, £30. Buyer collects. G4PZY, QTHR. Tel Derby (0332) 767994, or G3OZ, QTHR. Tel Derby (0332) 71694.

Tandberg 64X four-track stereo tape deck, reel-to-reel, orig packing, £70 ono, part exchange 4m or 70cm transverter for hf. GW4LZA. Tel Mike, Anglesey (0248) 713262, after 6pm.

CW tx program, 16/48k Spectrum, variable speed, tutor applications, tu not required, full instructions, air tested, £4.95 incl p&p. G4JHM, 41 Washington Road, Heighington, Lincs LN4 1QW.

FTDX401, six bands incl 160m, cw filter, Shure 401 mic, vgc, £250. Four-el 4m Yagi, £16. G4LMO. Tel 0993 831147, weekends only.

Trio 2m fm tx/rx, £175 ono. Minibeam antenna, comp, £50 ono. Yaesu comms rx, FRG7700, FRV converter, FDT7700 atu, £250 ono. Marine handheld tx/rx, Yaesu 6ch, £140 ono. Audio/video items —atrs, vtrs, monitors etc. Tel East Horsley (04865) 2029.

FT707 hf tx/rx, cw filter, FP707 psu, exc cond, £410 ono. Tel 0692 404260 (north Norfolk).

FT726R, comp with 2m, 70cm and satellite modules, ideal for working your favourite Oscar or ground to ground multimode, in super cond, £825 ono. Daiwa PS300 30A power supply, £125 ono. G6GOS, QTHR. Tel 01-586 5167.

Yaesu SP901 spkr, mint, £25. FT901DM service manual, incl circuit update on FT902DM, mint, £7.50. G4FXS, QTHR. Tel 021-458 3537, after 7pm.

Yaesu FT200, FP200 hf tx/rx, all 10m xtals fitted, exc cond, £210 ono. G3ZNK, QTHR. Tel Leeds (0532) 504599.

Yaesu FR50 rx, calibrator, new cond, FL50 tx, ssb, cw, a.m., vox, tx/rx together, very reliable, new spare valves, morse key, manuals, circuit drawings, cash sale, £195. Buyer collects. Advance Volstat, 190-260 in, 230 out, 150W, £10 ono. G3FK, QTHR. Tel 0202 873175.

For sale or swap: FT480R 10-el Parabeam, 5A pwr supply, 5x/8 over 5x/8 whip, gutter mount, £350 ono, or swap hf rig, FT707 or similar. Linear amp, 26-30MHz, 500W, £80. G1AZU, QTHR. Tel Terry, 0344 489296, after 7pm or weekends.

TS120V, PS20, exc cond, orig packing, interested in part exchange for 70cm multimode FT780R or similar, or sell at around £295. G8WRV, QTHR. Tel 0480 217756.

Search 9 vhf fm marine band rx, freq 156-162MHz, vfo, xtals for ch12, 14, 16, nine months old, inst pamphlet, receipt, £35. *Wanted:* 10m fm rig. G4TPK, QTHR.

TH3 Mk3 Thunderbird triband beam by Hygain, offers. Prefer buyer collects. G4-W5MJQ, QTHR. Tel 0538 754553.

FT101ZD fm, WARC, fan fitted, unused, £450 ono. KW107, offers. Mirage 2m 80W amp. G4OIQ. Tel 0242 519668/0453 882786.

TR9500, 70cm multimode, mint cond, BO9 plinth base, desk mic, £295 ono. Sell comp or less desk mic, £275. G6DZH, QTHR. Tel Redditch (Worcs) 052 789 2328.

Microwave Modules MMS1 morse talker, HK706 key, as new, £90. G4YVT. Tel St Helens 20370.

Yaesu FT221R, Mutek, good cond, £310 ovno. Icom IC2E, case, x/4, battery pack, dc/dc converter, etc, £140 ovno. G8YKM. Tel Farnborough (Hants) (0252) 520227.

Power supply transformer, 90A, 18-0-18V, exc for large power supply builder, £25. G6UED, QTHR. Tel 021-353 7280.

One Yaesu FRT7700 antenna tuner, £37. One swl LAR Omni-Match, £33. One Trio JR 310 communication rx, £90. Tel Wood, Clochan 378.

G2DAF Mk1 rx, £25. 813 Pinnacle, brand new, £10 each. 813, American, used, £5 each. Bases, £2. Heater trans, 5V, 10A, £5. All plus carriage. TS120S, cw, vfo, PS30, £450. G-whip, 40-10m, £25. G3UJE. Tel 0565 873205.

Yaesu FR50B rx, hf bands, £75. Yaesu FL50B tx, hf bands, xtals included for hf and vhf transverter use, £75. G3DQY, QTHR. Tel Polegate 5704, evenings.

Intel 8086, 8087, £50. RS232 letter quality printer, used with BBC Micro, £90. TR2200GX, 10W amp, £60. Tektronix 561A double beam, £160. Solartron CD1016, double beam, slight fault, £15. Marconi video monitor, £20. Marconi 6458, 4-12GHz sig gen, £75. Yaesu YR901 cwr/rtty, £150. Part exchange above for BBC B micro. Tel 078-42 51409, after 8pm.

Mics, AKGD19C, ball and biscuit, 2021, Philips stereo dnl unit, Tanoy monitor, red spkr, as new, books, camera, Fujica S7705 1500 to one second f1.8, lens, case, £45. All above offers please. SAE for list. All as vgc. Tel Maidstone (0622) 61327.

Yaesu FT77 fm board, case top scratched, otherwise perfect, £390. Set of Yaesu mobile antennas, gutter mount etc, 10-80m, £45. G4SDK. Tel Pete, 021-300 7438, office hours.

KDK 2030 vhf tx/rx, 11 memory channels, mount, bracket, instruction manual, would deliver reasonable distance, £120 ono. W. D. Mitchell, 5 Hillpark Road, Gosport, Hants.

WANTED

Wireless set (Canadian) No 29, 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.

RTTY program or any info on rtty hardware or software for Texas Instruments T199/4 16k basic computer. Good set of video heads for Philips N1700 vcr. G8PQG. Tel Dave, Oxford (0865) 67165.

Supply unit No5 for WS 38, 18. Eureka portables, Rebecas, AN/DPN-2 AN/DPN-1 units. Power supply for B2. Spares box. Any second world war SIS, OSS, SOE portable radio, excellent prices paid. W.H.Y? WA4MRR, 5 Rollingwood Drive, Taylors SC 29687, USA.

Tower, any cond, P60 or similar, can collect. 300W dummy load. Military type morse key. G6ZJA NOT QTHR. Tel 054-47 350 (Herefordshire).

FT902DM and some accessories. G4NWC, QTHR. EC10 rx, in good cond, all replies answered. G4BNB, QTHR. Tel 01-504 3260.

Jaybeam 15-over-15, 23cm slot-fed Yagi, in good cond. Book, *Wireless Transmission*, by Camm. *RSGB Bulletins* from mid-1944 on. GW6AYM, QTHR. Tel Swansea (0792) 204146.

Ambit ssb module, 91600, G4CLF design, cash please. G8SFI/G4KCT, QTHR York.

Maintenance/technical manual and circuits for DG3100 Winchester disk drive (not user's manual). G8FJE, QTHR. Tel 0424 814 375.

Any Liner 2s for spares, any cond, need to repair my own. Tel Chelmsford 466956.

Integrated circuits type MD108 or any information leading to the supply of these. Any quantity, any source, private or business. G4RJC, QTHR. Tel 04022 21523, 6pm-midnight, not Sundays.

Loop antenna type 3 for R1155. Gee grid map. Antenna loading units types 2 and 51. Any interesting second world war RAF. Nav, lfr, radar equipment. Ken Brooks, G3XSJ. Tel Bristol 685280, after 7 October.

MK123 spy set in good wkg order. G4RJC, QTHR. Tel 04022 21523, evenings, not Sundays.

Wireless set operator cards, metal or cardboard, eg WS18 or 38 etc. Need UK military manuals (Army), second world war to present, exc prices paid, all costs refunded. W.H.Y? Please write Tony Grogan, 5 Rollingwood Drive, Taylors SC, 29687, USA.

Yaesu FTV901 transverter with modules fitted. G3FPJ NOT QTHR. Tel Poundsgate 413.

Three Bright emitters type R4. TL120 linear amplifier. G3BEX, QTHR. Tel 049-46 5097.

For the Wireless Museum: very old radio books, magazines, catalogues, manuals, QSL cards, wiring diagrams. Specially wanted: wartime and pre-war *Radio Times*. Gamages catalogue. Car radios. People's Set. Meccano crystal. Phonogram cylinder. Details please to G3PXO, QTHR. Tel 0983 62513.

US Army Signal Corps rx R44/ARR5 manual or at least circuit diagram. A. R. Bartle, 105 Mayfield Road, Thornton Heath, Surrey CR4 6DP. Tel 01-684 0610.

HF portable/manpacks such as Clansman PRC320 or other British/European models. 2-30MHz ssb, a.m., cw capability, or w.h.y? Parts acceptable, all letters answered. Can be shipped to UK address. WA4MRR, 5 Rollingwood Drive, Taylors, SC 29687, USA.

Infra-red filters, eg as used on military vehicles. Vehicle remote tuning atu, eg Racal BCC 540B Rediffusion ACU25 etc. For sale: Military df loop B No 3, £12. Sperry A12 Gyropilot Gyrosyn compass control, £12. G4MBS, QTHR. Tel Alton 62316.

Sinclair Spectrum 16k or 48k, working or not. Rotator vhf type, must be working. G6LTO, QTHR. Tel Derek, 061-430 5748.

2m fm handheld, xtal or synthesized, fitted repeater shift, around £80 offered. GD3KHE, QTHR. Tel 0624 6636.

Wanted asap: Trio TL922 linear in perfect cond. G4PVV, QTHR. Tel 0926 881507.

Yaesu FT780R, 70cm multimode, and 70cm linear amp, required for satellite operating. Tel Mark, Exmouth 265042, after 5pm.

BC221 case, metal or wooden, would consider comp unit if the price is right. 4-400 valve to complete homebrew linear project, can anyone please help. G3KVT, QTHR. Tel Norwich (0603) 860452.

HRO bandspeed coil for 14MHz. G8WTY, QTHR. Tel Malvern 4968.

Revcone antenna for SX200N scanner. FB100 handheld Bearcat 16ch scanning radio must be in gwo, with nicads and charger. Tel Burnley (0282) 59320 anytime.

Help! Wanted KM4000 keyer Feb 1982 *RadCom*, memory malfunction, G3RHI, QTHR. Tel Bratton 830606.

KW109 Supermatch or similar QRO atu. G4UIX. Tel Peter, Weymouth (0305) 784796.

Information on Army set WS38 Mk3 circuit, supply voltages, mods for amateur bands etc. G4EUW, 41 Regent Road, Brightlingsea, Colchester, Essex CO7 0NN. Tel 020630 3071.

TS120 or TS130 V or S model, and FT101ZD. G3XFB, QTHR. Tel 0902 850033.

HF ssb tx/rx, about £450. Tel Bill, Blackpool (0253) 404566.

Setting up comp station. Yaesu FT290R, FT790R, FT208, FT708, any hf equipment and accessories, radio equipment of interest. G4HKS NOT QTHR. 181 Argyle Road, Ealing, London W13 0AU. Tel 01-998 4936, after 6pm.

Someone must have a Trio 2400 handbook I could borrow. I would also like an external mic for this tx/rx, or advice on alternative types, please. G1DXD, P. Darke, 18 Colchester Close, Prittlewell, Southend, Essex SS2 6HR. Tel 0702 353247.

HQ170A, SX115, SX117 or SX122, good price if in good cond. Any similar type rx considered. G3KI, QTHR.

Borrow for photocopy or purchase, manuals or information on B40/B41 ssb adaptor CSA508 1969. US Army ssb tx/rx PRC47, RT671, all costs refunded. VFO PL1 for old Icom IC225/IC210 2m fm tx/rxs. Clean intact Command tx. G3WWL, QTHR. Tel 021-353 8874.

Buy or borrow circuit diagrams or manuals for Shibaden tv equipment FP707 camera, SV707 portable vtr, SV700 vtr, TU19EL tv. G8CPA, QTHR. Tel Tony, Swindon (0793) 20734.

KW202 and KW204. Must be fb cond, no mods, realistic price paid for right rigs. Will also consider any other station extra. Must be near this QTH, not transport. All letters answered. G3WXT, QTHR.

E-Zee Match atu, swr bridge, straight morse key, well balanced, all wkg cond, mod prices. Will collect 50 miles radius or pay carr. G4WBX NOT QTHR. Tel Mike, Downland (Surrey) 52512.

Sony ECM250 mic in good cond. G6GANZ, QTHR. Tel 03552 26412.

VHF and hf beam for school radio station, lower price bracket preferred. HQ1, G4MH, TH33, prepared to pay around £50. Rotator also wanted. Equipment for Hind Leys College, Shepsed, Leics. Money supplied by PTA. Tel John, Kegworth 2734, after 4pm.

Marconi morse key, long arm type, 1939/45 era. GMAWPU, 9 Scott Crescent, Tapport, Fife DD6 9PN. Tel 0382 552295, evenings.

Eimac SK620 or SK630 base. Bird model 43 plug-in elements. UHF, shf attenuators. Heathkit SB620. Racal RA17 bits. G4RFC, QTHR. Tel 01-858 3579 (SE London).

Datong morse tutor please. Tel Neville, 0926 22754.

Urgently required: FC707 or FC700, matching atu for FT707. Radial kit for HF5 five-band antenna. G4WMO. Tel Phil, Lincoln (0522) 75263.

Wanted: IC202S, IC402, in exc cond, good price paid, will collect reasonable distance otherwise pay postage. Please write to Steve Bessent, BR554203, 407 Evesham Road, Crabbs Cross, Redditch B97 5JA.

FM board for Yaesu 101ZD Mk3. Shure 444 mic. Tel Barry, 051-327 6548.

LG300 psu, working or faulty. G3MBW, QTHR. Tel 0943 74794 (Yorkshire), evenings.

SX200N scanner, must be in mint cond and gwo, for disabled member, good price paid. Tel Burnley (0282) 59320, anytime.

FRG7, FRG7700, R70 Trio 2300, IC202, exchange for FT77, FT102 with cash adjustment. G6SSG, QTHR. Tel Mike, 0733 222588, evenings.

Any hints or tips for taking out of an R1155 all the parts which are superfluous to its use as a comm rx. F. N. Brocklesby, 34 Littlecote, Petworth, W. Sussex GU28 0EF.

G1FAZ seeks: Sony portable open reel tape recorder TC800 series. Eddystone EB35 or EB36 rx. A small barograph in gwo. Chris Williams, 267 Hay Green Lane, Bournville, Birmingham B30 1SP. Tel 021-476 6438.

Would the gentleman from the Stroud who phoned me about a KW107 atu be so kind as to phone me again. Barrie Aspinall. Tel Herne Bay 3511.

Test report or review of Yaesu FT480R, 2m radio, will refund postage and costs of any duplicating etc. Thanks. K. Mott, 191 Joyner's Field, Harlow, Essex CM18 7QD. Tel 26647.

Vespa Mk2 power supply or trans for same. G4BWS, QTHR. Tel Orpington 37474.

FDK Multi 8000, unmodified. G3IFV, QTHR.

KW E-Zee Match or KW107 Super Match atu in good cond. Ten-Tec Century 21 tx/rx, with handbook. Morse keyboard (not hb). Labgear tx LG50/LG300 with handbook. G4AYG, QTHR.

Top section of 60ft Versatower. G3VXZ. Tel Maidenhead 27350.

FT790, IC4E, any cond. I have a Trio 7730 2m, fm, and a Trio 8300 70cm fm to part exchange/sell. Tel 01-363 6075.

Yaesu FL2100Z linear, must be in perfect working order. Tel Chorley 74451.

SK620 valve bases for 4CX250B. Any reasonable price and/or cond considered. Must be the genuine article. 1-6kV transformer rated at greater than 0.75A. G6WBN NOT QTHR. Tel Southampton (0703) 331910, evenings.

FT225RD memory module please! If necessary will buy complete tx/rx. Back numbers of QST, 73, *VHF Communications*. G4NVA, QTHR. Tel 0477 33011 (Cheshire).

Gents, Magneta, or similar, 30s slave clocks. G8UDJ, QTHR. Tel 0235 20005.

Drake TR3 handbook or photocopy. 9J2BO, Box 98, Kazembe, Zambia.

Swap Trio 120V 20W input, in mint cond, cash adjustment for FT707. Sommerkamp 767, Trio 120S, 130S, or similar 100W hf tx/rx, in good cond. G4VOE, QTHR. Tel Graham, 061-740 4126, or please send details.

2m/70cm handhelds, PF5, PF8, Palm 4, Palm 2, IC2E, FT202, or similar. General coverage hf rx TR600/1000 or similar. Pye Westminster W15AM LB, W15FM HB. SX200, FT230R, hf atu, vhf sig gen. Cash waiting. Tel Dave, 0538 382117, office hours.

Sked or eyeball with owner of Microlog ATR6800 "Mailbox/Basic" version (machine language programming), 4k ram and/or Sharp PC1251 with CE125 printer/recorder, with view to picking brains. Need progs for Oscar 10 predictions or w.h.y? G3AAG. Tel Petersfield (0730) 892143.

German second world war equipment, parts, literature for collection. Will collect. Offering WS 19, 22, 38, R1155, wavemeter 1649 or cash in return. OZ8RO, R. Otterstad, Vejdammen 5, DK 2840 Holte, Denmark. Tel 02-80 18 75.

ATU, anything considered, can collect 50 miles radius of London or pay postage. VHF scanner, Bearcat or similar. G4PDT NOT QTHR. Tel 01-952 9548.

Versatower, heavy duty rotator, hf monoband beams, gem quad, Shure 444, benchor paddle, Ham-M (outer casing only), Datong speech processor, hd hf linear, FT102. G3UJE. Tel 0565 87 3205.

Ham International Jumbo. Excalibur or similar for project. RX only accepted, "no" tx versions accepted. Must be defunct on tx side. Price to include carriage. Jim, BR584437. Tel Grimsby (0472) 51800, between 1630 and 1730.

L.A. Moxon, G6XN

hf antennas

for all locations



This thought-provoking book is a major contribution to the state of the art from an acknowledged expert. It explains the "why" as well as the "how" of hf antennas, and takes a critical look at existing designs in the light of the latest developments. A wealth of practical information on the choice and construction of antennas to suit most locations and requirements is also presented.

Chapter titles: *Taking a new look at hf antennas; Waves and fields; Gains and losses; Feeding the antenna; Close-spaced beams; Arrays; Long wires and ground reflections; Multiband antennas; Bandwidth; Antenna design for reception; The antenna and its environment; Single-element antennas; Horizontal beams; Vertical beams; Large arrays; Invisible antennas; Mobile and portable antennas; What kind of antenna?; Making the antenna work; Antenna construction and erection.*

264 pages; hardback; 246 by 189mm; 1982

Obtainable from
RSGB Publications (Sales)

**FROM THE
SCANNER
SPECIALISTS**



THE SX-400 SERIES

- 26-520MHz (Full coverage NO GAPS!)
- Switchable a.m./f.m. ● I.F. output terminals
- Automatic noise limiter ● Priority channel
- Switchable f.m. i.f. filter (wide and narrow)
- Frequencies and modes stored in memories (20 channels)
- Data interface facility (IEEE and RS232 versions to order)
- Programmable channel spacing (v.h.f. 5/6.25KHz, u.h.f. 10/12.5kHz)
- Designed and built to professional standards for specialist & commercial users

U.K. IMPORTERS & DISTRIBUTORS

REVCO ELECTRONICS LTD.
POUNDWELL STREET,
MODBURY,
DEVON PL21 0RQ
Telephone Modbury (0548) 830665



(GAREX ONLY)

MAIN SERVICE & SALES AGENTS

GAREX ELECTRONICS
7, NORVIC ROAD,
MARSWORTH,
TRING, HERTS. HP23 4LS
Telephone 0296 668684

NEW SAMSON KEYS

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)

ESCAPE EX SERVICE COMMUNICATIONS ASSOCIATION

(with Photography and Electronics)

Offers the Ex Service person MORE! World wide club with Ham Radio, CB, SWL, Photography and Electronics. Members QSL Bureau, Freelance market information, Old Buddy Locator, Competitions, Job Listings, Private Enterprise and full family participation. Ex Servicemen and Women everywhere can apply. UK Annual £8. Overseas Annual £10.

Secretary, ESCAPE

31 Knowles Hill Road, Newton Abbot, Devon, TQ12 2XF (Freepost in the UK)

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. See 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

2m 12V 6-CHANNEL TRANSMITTER FOR £30. Assembled & Tested

Board size 140 x 82mm ● Frequency multiplication x 12 ● Crystal sockets HC25/U
● 12V 2m PA board 180 x 30mm 150mW/25W, £20.

40673	75p	2N3553	£1.10	2N5082	£7.50	2N5180	60p	BLY55	£3.00
3N201	75p	2N4427	90p	2N5084	£11.00	2N2369	15p	CA3089E	£1.50
11S88A	40p	2N5913	£1.50	2N5595	£15.00	2N3478	60p	SL620C	£4.00
3N204	80p	2N5590	£6.50	2N5862	£18.00	8C183L	10p	SL630C	£2.50
40841	40p	2N5591	£8.50			8LY33	£1.80		

Mail order only. £3 min. p&p 40p. 15% VAT to be added to total

HELLER ELECTRONICS LTD, 49 Blossom Way, Hounslow, Middx TW5 9HB

HAM RADIO TODAY

GET YOURSELF A
'MAIDENHEAD'
EUROPEAN QRA LOCATOR
MAP—FREE INSIDE
NOVEMBER HRT!

'Maidenhead' comes into use on January 1st 1985 and Ham Radio Today are proud to bring you the first locator map of this new system—which has been adopted by all member countries of the IARU.

Coming in the DECEMBER issue, a companion series of grid overlays to enable you to find your EXACT 'Maidenhead' locator wherever you are in the UK. Simply apply the overlays to a certain cheap and readily available map and away you go.

**Don't be an 'old square'!
Find your new locator!**

Come and meet us at the Granby Halls Amateur Radio Show in Leicester on 26-27 October



FARNBOROUGH COMMUNICATIONS

PRICE?
Bargain
with Mick G4MPW

**FOR
ALL YOUR**

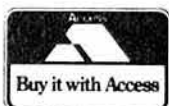
AMATEUR EQUIPMENT

PRICE?
Bargain
with Mick G4MPW

Yaesu, Sommerkamp, FDK, Icom, Drae, Microwave Modules, J-Beam, Shure Mics, Adonis Mics, Welz Equipment. TVI high pass and band stop filters.

Instant HP Terms

97 Osborne Road
North Camp
Farnborough, Hants
Tel: (0252) 518009



J. BIRKETT 25 THE STRAIT, LINCOLN. Tel: 20767

X BAND GUNN DIODES with data @ £1.65. X BAND DETECTOR DIODES similar to SIM 2 @ 25p. X BAND TUNING VARACTOR DIODES 2p.f. or 4p.f. @ £1.65 each. TAPE ENDED S BAND 3 GHz DETECTOR DIODES DC1509 @ £1.95. AERIAL SWITCHING VHF PIN DIODES @ 5 for 60p. AERIAL SWITCHING UHF PIN DIODES @ 5 for 75p. ITT CRYSTAL FILTERS 10.7MHz B.W. + 6KHz @ £5. TOYOCOM CRYSTAL FILTERS 10.7MHz BW 7.5KHz with 2 Transformers @ £4.60. QC 1112V SE1 CRYSTAL FILTER 1.4MHz BW 3.2KHz @ £5. SE1 CRYSTAL FILTER QC11122 1.4MHz BW 3.2KHz @ £5. ITT CRYSTAL FILTER 1.4MHz 538ACB 1.4MHz BW 3.2KHz @ £5. MULLARD CRYSTAL FILTER LP1175 470kHz @ 95p. 2GHz STRIPLINE NPN TRANSISTORS 18VOLT @ 3 for £1. PHILLIPS CONCENTRIC TRIMMERS 30p.f. @ 15p. VHF Tetfer Trimmers 10p.f. @ 18p NUT FIXING FEED THRU 3000 VOLT insulation @ 6 for 50p. VHF FETS like 2N3819, J304 @ 6 for £1. E304 @ 7 for £1. VMOS POWER FETS VW 10KM @ 50p. VN90 AA @ 80p. VM211 @ 40p. 144MHz WAVEMETER KIT with instructions @ £4.65. MORSE OSCILLATOR KIT with instructions @ £1.95. 50 ASSORTED INSULATED STAND-OFFS @ 45p. 50 assorted metal spacers @ 35p. SPECIAL SUB-MINIATURE 1UF 18VW CERAMIC CAPACITORS @ 15p each. 100 PIV 20 AMP BRIDGES @ £1.30. 4000Piv 2 AMP diode @ 55p. LEADLESS DISC CERAMICS 4.7p.f., 220p.f., 1000p.f. all 20p Doz. MULLARD 0.01UF 63VW CERAMIC PLATE CAPACITORS @ 25p Doz.

ACCESS and BARCLAYCARD accepted, Post 50p, Over £5 free.

8 TRAP DI-POLES

Data Sheets, Large 23p SAE. Aerial Guide 75p
G2DYM, UPLOWMAN, TIVERTON, DEVON
Callers welcome by appointment ONLY Tel 03986 215

SPECIALIST RF COMPONENTS

RF power transistors and special components. UNELCO capacitors. Transmitting mica trimmers. Low noise VHF/UHF front end transistors. Japanese equivalents.

Sale Agent for SSM (Thomson CSF) RF transistors.

Phone for Prices. SAE for lists

MODULAR ELECTRONICS

1 Coniston Close, Felpham,
(Bognor Regis), Sussex
PO22 8ND. Tel. (0243) 823603

ICS

our latest offerings for digital Communication!

AMT-2

The new **all mode** terminal unit. Compared to the world famous AMT-1, the AMT-2 offers the following additional benefits:—

- Lower Cost
- Smaller
- Wide shift RTTY receive
- CW receive standard
- True ASCII mode
- FSK output
- RTTY 'squelch'

All this, and with no sacrifice in performance! The ultimate RTTY/CW/ASCII/AMTOR terminal unit. Operates with any ASCII terminal or computer that will drive a 300 Baud modem.

Programs available for many micros **£199.95** (plus £2.50 P&P)

MBA-TOR

Quite simply the best stand alone communications software ever written for the Commodore 64.

A real alternative to the AMT-2 for those who already possess a terminal unit.

- RTTY/CW/ASCII/AMTOR
- Split Screen
- Message memories
- Time of day clock
- Mailbox operation
- Uses disc, tape, printer

A very comprehensive program which is very easy to use. Supplied on Cartridge (128K E-PROM!).

Interface from Commodore is at TTL levels. Suitable for use with our CP-1 Terminal Unit.

£60.00 (plus £1.50 P&P)

PKT-1

PACKET RADIO IS HERE!



A fully assembled, tested packet radio Terminal Network Controller.

TAPR and Vancouver protocols fully implemented.

Needs only a 300 Baud ASCII terminal and a 2 metre FM rig to be on the air.

Kits also available **£434.00** (P&P £2.50)

STOP PRESS... TAPR Packet Radio board kits with amazingly comprehensive manual now in stock. **£256.52** (£2.50 p&p)

RM-1

Not quite as good as our more expensive units but good enough for many VHF applications.

The RM-1 is simply a well made low cost phase lock loop radio modem for use on VHF. It provides narrow RTTY AFSK tones and wide tone spacing for ASCII transmission (both to IARU standards). Interface to the radio is PTT/MIC/SPKR and interface to the computer is at TTL or RS232 levels. Works with MBA-TOR and our other RTTY software—or just dump ASCII through it direct from your computer.

£60.00 (P&P £1.50)

Please add
VAT at 15%



I.C.S. Electronics Ltd
PO Box 2, Arundel, W. Sussex BN18 0NX
Phone: 024 365 590

See September Rad Com for full stock list

S.A.E. for full details
Closed Wednesdays
Visitors by appointment



NEW!

From Scarab Systems

From the UK's leading
Radio Software House,
come two new exciting
professionally produced items.

SSTV for 48K SPECTRUM. This slow scan TV program cassette enables you to receive photographs or diagrams without additional hardware. It provides the facility of syncing and the ability to change the grey scale. Images may be transferred to a printer if required. £15.00 inc. VAT.

ZX81-RTTY on EPROM. This features an encased 'Motherboard' with several input/output connectors, offering an expandable system which is easily connected and allows the ZX expansion RAM Pack to be incorporated. Variable Baud Rates can be selected and the chip is installed on the interface board, allowing



for added expansion. It also enables the storage of memories on tape and has the ability to 'hard-switch' external circuitry directly.
Motherboard £21.95, EPROM program board £15.95, Communications interface board (TTL) £24.95 inc. VAT.

MODEM ORDERING SYSTEM

You can now scan our stock list and order your Scarab System Equipment direct using this exciting new method. Send off the coupon for details.



SCARAB SYSTEMS

Scarab Systems produce many other top-quality programs and equipment for the Radio Amateur. Use the coupon now for details.

39 Stafford St, Gillingham, Kent ME7 5EN. Tel. (0634) 570441

Please send me

- ☐ SSTV for 48K SPECTRUM £15.00 ☐ Details of Modem Ordering System
☐ 'Motherboard' £21.95 ☐ Free details of other equipment and programs
*EPROM program board £15.95
*Communications interface board (TTL) £24.95
*Delete where necessary.

I enclose a cheque/postal order for

I wish to use my Access/Visa Card No.

Name

Address

Tel. No.

Signature

I understand that, if I am not fully satisfied, I can return the equipment with full reimbursement. 14 days delivery.



ANTENNES TONNA (F9FT)

YOUR NUMBER ONE CHOICE FOR
6m, 2m, 70, 24 and 23cm ANTENNAS



Below is a list of our complete range of Tonna antennas, and accessories. We believe that our antennas offer the best value today. Purchase with the confidence that our products are backed by nearly 40 years of experience in amateur antenna design and manufacture . . . c'est magnifique!

50MHz			Power		
20505	5 element	£34.30(a)	29202	2 way 144MHz	£35.94(c)
144MHz			29402	4 way 144MHz	£41.26(c)
20104	4 element	£14.95(a)	29270	2 way 435MHz	£34.21(d)
20110	5 element crossed	£26.30(a)	29470	4 way 435MHz	£39.39(d)
20109*	9 element fixed	£17.71(a)	29224	2 way 1250MHz	£29.19(d)
20209*	9 element portable	£20.00(a)	29424	4 way 1250MHz	£30.19(d)
20118*	9 element crossed	£32.43(a)	29223	2 way 1296MHz	£29.19(d)
20113	13 element portable	£31.05(a)	29423	4 way 1296MHz	£30.19(d)
20117*	17 element	£37.66(a)	Portable aluminium telescopic masts		
435MHz			50422	4 x 1m 3.7 metres	£20.70(a)
20409	9 element	£16.10(a)	50432	3 x 2m 5.7 metres	£24.15(a)
20419*	19 element	£20.70(a)	50442	4 x 2m 7.7 metres	£36.66(a)
20438*	19 element crossed	£34.27(a)	Galvanised steel telescopic masts		
20421*	21 element 432MHz	£29.67(a)	50223	2 x 3m 5.9 metres	£30.48(a)
20422*	21 element ATV	£29.67(a)	50233	3 x 3m 8.8 metres	£54.77(a)
144/435MHz			50243	4 x 3m 11.7 metres	£88.41(a)
20199	9x19 element Oscar	£34.27(a)	50523	5 x 3m 14.6 metres	£119.60(a)
1250MHz			Stacking frame kits for 4 antennas		
20624	23 element	£25.90(b)	20014	20109 or 20118	£39.39(a)
20648	4 x 23 element— power splitter— stacking frame	£140.00(a)	20044	20419 or 20421/22	£28.61(a)
1296MHz or 1269MHz Oscar Uplink			20016	20623/24 horiz	£17.71(b)
20623	23 element	£25.90(b)	20017	20623/24 vert	£13.80(b)
20696	4 x 23 element— power splitter— stacking frame	£140.00(b)	Andrew Helix 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		
			Rotators—coaxial cables—connectors		
			All prices include VAT. Carriage extra		

*Denotes available for 500 or 750 all other 500 only. All antennas supplied complete with mast clamps for up to 50mm masts.

FOR FULL SPECIFICATIONS FOR OUR RANGE OF ANTENNAS SEND 40p FOR OUR CATALOGUE. PLEASE ADD CARRIAGE AS SHOWN. (a) £4.00. (b) £1.95. (c) £2.20. (d) £1.10. MAINLAND ONLY. Cash with order. ACCESS, VISA CARDS—telephone your card number for immediate despatch. 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)

THE NEW UNIDEN 2021 PORTABLE COMMUNICATION RECEIVER

We recommend this receiver to all Amateur and Short Wave Listeners who require first class performance comparable with the best. At a competitive price.

Brief Spec. AM/S.S.B. (U.S.B. and L.S.B.)/C.W. 150 kHz to 29999 kHz. Triple superhet. Digital Tuning, Scan and six memories. Also F.M. 76-108 MHz. L.C.D. frequency display, etc., etc. Supplied with mains power unit.

£158.80 inc. VAT and Carriage

For full technical Spec. send S.A.E.

G4FLN

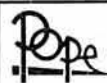
G8ADO

EMA Electronics Engineers
MUNDAYS LANE, ORFORD, WOODBRIDGE, SUFFOLK

24-Hr Answering Service

Tel: (039 45) 696

Access Cards taken



MORE POPES CABLES IN STOCK

POPES RG213/U (equ. UR67) This 10.3mm dia Low Loss 50 ohm Coax not only has over 90% Copper screen but is also the first generally available in this country made of NON-CONTAMINATING PVC . . . the ultimate in quality for only 60p per M (post 6p per M)

POPES RG58C/U (equ. UR76) 5mm dia 50 ohm (not to be confused with the horrible CB imported imitations) . . . this is to the full MIL spec, over 90% Screen and again NON-CONTAMINATING PVC. Price 23p per M (post 3p per M)

POPES SUPER LOW LOSS H100 . . . 50 ohm Air spaced with about 1/3 the loss of UR67/RG213 . . . even the Ministry of Defence are using this now . . . Price . . . 80p per M (Post 5p per M) 50m less 10% 100m less 20% 200m less 25%
POPES RG174U . . . Miniature 50 ohm Cable . . . 25p per M (p/lp/M)

GREENPARK N TYPES
50 ohm PLUGS for H100/UR67/RG213 . . . £2.40 Post 40p per
50 ohm in line Sockets for H100/UR67/RG213 . . . £2.20 order
Panel sockets . . . £1.80 5 or more less 10%

OTHER COAX AND Cables
UR70 . . . 75 ohm 6mm . . . 23p p M (post 3p/m)
UR57 . . . 75 ohm 10.3mm . . . 60p per M (post 6p/m)
14 s.w.g. HD Copper Aerial Wire . . . 20p/m (post 3p/m)
PVC Covered Aerial wire . . . 6p/m (post 2p/m)
BOFA GMP6 Slotted 300 ohm ribbon . . . 20p/m (post 3p/m)
75 ohm Twin . . . 18p/m (post 2p/m)

UR67 H100

W. H. Westlake, Clawton, Holsworthy, Devon



MICROWAVE MODULES LTD

NEW!

MML 144/200-S : 144 MHz 200 WATT LINEAR AMPLIFIER



FEATURES

- * 200 watts Output Power
- * Linear All Mode Operation
- * Suitable for 3, 10 & 25 watt Transceivers
- * Ultra Low-Noise Receive Preamp—Front Panel Selectable
- * Relative Output LED Bar Display
- * Equipped with RFVox & Manual Override
- * LED Status Lights for Power, Transmit, Preamp on and input level

£245 inc VAT (p + p £4.50)

144 MHz HIGH PERFORMANCE RECEIVE CONVERTER: MMC 144/28 HP



FEATURES

- * Excellent strong signal handling characteristics
- * Gasfet RF amplifier
- * High level double-balanced mixer
- * Harmonic-free, regulated oscillator

Input frequency range : 144-146 MHz
Output frequency range : 28-30 MHz
Typical gain : 20 dB minimum
Noise figure : 2 dB
3rd order intercept point : +19 dBm (output)

Size : 110 × 60 × 31 mm (4 3/8 × 2 3/8 × 1 1/4")

Image rejection : 60 dB
Input/Output impedance : 50 ohm
Power requirements : 13.8V at 75 mA
Power connector : 5 pin DIN socket
RF connectors : SO239 or BNC, please specify

£42.90 inc VAT (p + p £1.25)

1296 MHz GaAsFET PREAMPLIFIER—MMG1296

This GaAsFET 1296MHz preamplifier is constructed on high-quality Teflon glass-fibre pcb and includes a microstripline filter which provides excellent rejection to mixer image frequencies and out of band signals. It has a power gain of 15dB and a noise figure of 1.2dB. The power requirements are 13.8V at 35mA and the unit is fitted with 50 ohm type 'N' sockets.



£59.95 inc VAT (p + p £1.25)

MMC50/28-S-6M CONVERTER

This new converter has switched oscillators to provide coverage of 50-54 MHz on a 28-30 MHz receiver. The design utilises MOSFETs in the RF amplifier and mixer stages, and the local oscillator is regulator controlled.

Input Ranges: 50-52 MHz Output Range: 28-30 MHz
 52-54 MHz
Overall Gain: 30 dB Noise Figure: 2.5 dB

£34.90 inc VAT (p + p £1.25)

OUR ENTIRE RANGE OF PRODUCTS WILL BE EXHIBITED AND ON SALE AT THE 1984 LEICESTER SHOW
BY OUR OWN SALES TEAM. COME AND TAKE A CLOSER LOOK

ALL MICROWAVE MODULES PRODUCTS ARE FULLY GUARANTEED FOR 12 MONTHS (INCLUDING PA TRANSISTORS)



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.

Versatower: The professionals' choice!

A range of telescopic towers in static and mobile models from 7.5 to 36 metres with tilt-over facility enabling all maintenance to be at ground level.

Designed in accordance with CP3 Chapter V: part 2: 1972 for a minimum wind speed of 85 mph in conditions of maximum exposure and specified by professionals world-wide where hostile environments demand the ultimate in design, quality and reliability.

P40 Standard series
£472.00 inc. VAT (ex-works)

P60 Standard series
£574.00 inc. VAT (ex-works)

Further details available on request.



Strumech Versatower Limited,
Portland House, Coppice Side,
Brownhills, Walsall, West Midlands,
WS8 7EX, England.
Telephone: Brownhills (05433) 4321.
Telex: 335243 SEL G.

Main agent:
South Midlands Communications Ltd.
SM House, Rumbidge Street,
Totton, Southampton,
Hants SO4 4DP
Tel. (0703) 867333

Illustrated is a
Polybeam FB 33 from
the Fritzell antenna
range.

Available only from:
**South Midlands
Communications Ltd.**

WOOD & DOUGLAS

- * NEW CATALOGUE
- * NEW PRODUCTS
- * NEW TELEPHONE NUMBER
- * NEW PRICES

OUR FULL current product range is listed below but keep in touch at rallies and exhibitions throughout the summer for our latest developments for you the active amateur.

Package Prices	Kit
1. 500mW TV Transmit (70FM05T4 + TVM1 + BPF433)	35.00
2. 500mW TV Transceiver (As 1 above plus TVUP2 + PSI 433)	60.00
3. 10W TV Transmit (As 1 above plus 70FM10 + BDX35)	65.00
4. 10W TV Transceiver (As 2 above plus 70FM10 + BDX35)	90.00
5. 70cms 500mW FM Transceiver (70'T4 + 70'R5 + SSR1 + BPF)	75.00
6. 70cms 10W FM Transceiver (As 5 above plus 70FM10)	105.00
7. 2M Linear/Pre-amp 10W (144PA4/S + 144LIN10B)	40.00
8. 2M Linear/Pre-amp 25W (144PA4/S + 144LIN25B)	42.00
9. 70cms Synthesised 10W Transceiver (R5 + SY + AX + MOD + SSR + 70FM10)	150.00
10. 2M Synthesised 10W Transceiver (R5 + SY + SY2T + SSR + 144FM10A)	120.00
11. 2M Crystal Controlled 10W Transceiver (R5 + T3 + BPF + 144FM10 + SSR)	85.00
12. 70cms Linear/Pre-amp (70LIN10 + 70PA2/S)	45.00

70cms EQUIPMENT	CODE	ASSEMBLED	KIT
Transceiver Kits and Accessories			
FM Transmitter (0.5W)	70FM05T4	48.00	28.75
FM Receiver (with PIN RF c/o)	70FM05R5	65.40	45.80
Transmitter 6 Channel Adaptor	70MC06T	21.30	14.25
Receiver 6 Channel Adaptor	70MC06R	25.20	17.90
Synthesiser (2 PCB's)	70SY25B	88.00	62.25
Synthesiser Transmit Amp	A-X3U-06F	34.15	22.10
Synthesiser Modulator	MOD 1	8.95	5.50
Bandpass Filter	BPF 433	6.50	3.30
PIN RF Switch	PSI 433	7.55	5.35
Converter (2M or 10M i.f.)	70RX2/2	27.10	20.10

TV Products			
Receiver Converter (Ch 36 Output)	TVUP2	27.50	22.80
Pattern Generator (Mains PSU)	TVPG1	42.25	36.50
TV Modulator (For Transmission)	TVM1	9.85	5.75
Ch 36 Modulator (For TV Injection)	TVMOD1	9.80	5.50

Power Amplifiers (FM/CW Use)			
50mW to 500mW	70FM1	18.45	12.80
500mW to 3W	70FM3	23.45	17.45
500mW to 10W	70FM10	41.45	33.45
3W to 10W	70FM3/10	23.95	18.30
10W to 40W	70FM40	65.10	52.35
Combined Power Amp/Pre-Amp (Auto Changeover)	70PA/FM10	56.60	40.15

Linears			
500mW to 3W (Straight amp, no changeover)	70LIN3/LT	27.90	19.90
3W to 10W (Auto Changeover)	70LIN3/10E	41.05	30.15
1W to 7W (Auto Changeover)	70LIN10	44.25	32.50

Pre-Amplifiers			
Bipolar Miniature (13dB)	70PA2	8.10	6.50
MOSFET Miniature (14dB)	70PA3	9.65	7.50
RF Switched (30W)	70PA2/S	24.25	15.25
GaAs FET (16dB)	70PA5	20.10	12.80

6M EQUIPMENT			
Converter (2M i.f.)	6RX2	28.40	20.80

2M EQUIPMENT			
Transceiver Kits and Accessories			
FM Transmitter (1.5W)	144FM2T3	39.35	26.30
FM Receiver (with PIN RF Changeover)	144FM2R5	65.50	47.20
Synthesiser (2 PCB's)	144SY25B	78.75	60.05
Synthesiser Multi/Amp (1.5W O/P)	SY2T	27.80	20.65
Bandpass Filter	BPF 144	6.50	3.30
PIN RF Switch	PSI 144	7.55	5.35

Power Amplifiers (FM/CW Use)			
1.5W to 10W (No Changeover)	144FM10A	24.15	18.50
1.5W to 10W (Auto-Changeover)	144FM10B	36.11	26.25

Linears			
1.5W to 10W (SSB/FM) (Auto Changeover)	144LIN10B	38.40	28.50
2.5W to 25W (SSB/FM) (Auto Changeover)	144LIN25B	40.25	29.95
1.0W to 25W (SSB/FM) (Auto Changeover)	144LIN25C	44.25	32.95

Pre-Amplifiers			
Low Noise, Miniature	144PA3	8.60	7.40
Low Noise, Improved Performance	144PA4	12.86	8.40
Low Noise, RF Switched, Full Changeover	144PA4/S	24.30	15.30

GENERAL ACCESSORIES			
Toneburst	TB2	6.70	4.25
Piptone	PT3	7.50	4.45
Kaytone	PTK3	8.75	6.05
Relayed Kaytone	PTK4R	12.70	8.20
Regulator (12V, low differential)	REG1	6.95	4.40
Solid State Supply Switch	SSR1	5.85	3.70
Microphone Pre-Amplifier	MPA2	6.10	3.50
Reflectorometer	SWR1	6.35	5.35
CW Filter	CWF1	8.55	5.80
TVI Filter (Boxed)	HPF1	5.95	—

FM TV MODULES			
50mW 420MHz Source (Video Input)	UFM01	26.95	19.80
50MHz i.f. Processor	VIDIF	54.25	38.95
Varactor Multiplier (Boxed)	WDV400/1200	63.95	—

Further details on our product range will gladly be forwarded on receipt of an A5 size SAE. Technical help is available by phone (NEW NUMBER) during normal office hours. Kits are usually available by return of post but please allow 28 days for unforeseen delays. Please add 75 pence to your total order for postage and handling. Credit card orders are gladly accepted, please give us a call.

ANYONE CAN SELL A KIT . . . REPUTATION SELLS OURS

**UNIT 13, YOUNGS INDUSTRIAL ESTATE
ALDERMASTON, READING RG7 4PQ
TEL: (073 56) 71444 TX: 848702**



ARROW

ELECTRONICS LIMITED

5 The Street, Hatfield Peverel, Essex
Tel: Chelmsford (0245) 381626/381673
Telex: 995801 (Ref A5)

Serving the amateur experimenter for over 19 years we are certainly one of the largest specialist amateur radio dealers in the south-east with all major lines on permanent demonstration.



NEWS & VIEWS

How much does the Yaesu "Authorised Dealer" scheme mean to you? Yaesu mean to tell you that the Dealer has a proper franchised dealership with spare parts & technical backup available to him + of course support from the dealer network with up to date stocks & a full range of accessories for your Yaesu equipment. Your Authorised Yaesu dealer should know the latest technical details on your equipment. Did you know that most Yaesu models now have technical supplements available to the purchaser?

Arrow, as one of the countries largest Amateur Radio Retailers are proud to be a Yaesu Dealer — Our Major Line. That said, we are here to serve not to politicize, even if you did buy a transceiver outside the dealership Arrow will service it & give you the same good advice. We are substantial stockists of TRIO/KENWOOD equipment with full stocks of all major sets & accessories and have taken steps to see that our service & spares backup is as good as any dealer. What a pity the excellent ICOM products are often priced above the market. We are saving you some money this month on the 2M Base Station. (Backup on ICOM is very good indeed but we wish they would produce the excellent comprehensive technical manuals a bit sooner.)

And now some NEWS

The new FT209R Handy from Yaesu has been around for a month or so by the time you read this. We took the first one home on 20th June (Yes that's how long we wait for the adverts to appear) and had excellent reports through our local GB3DA repeater which is only 3 miles from the shop at Hatfield Peverel.

Soon we expect to have the 70CM version FT709R and the companion to the FT203R for 70cm — Yes you guessed FT703R. For some time we have been expecting a replacement to the FT408R/FT780R. We hope by the time you read this to have stock of the NEW FT207/700 Multimode 2M & 70CM Mobile station. Send us an SAE for details and a quote.

NEW from Trio/Kenwood the TR711E 2M base station — TS780 2M & 70CM base station — we ordered a pile as soon as we heard of it, so we should have stocks just as soon as it's released. Send SAE for details & quote.

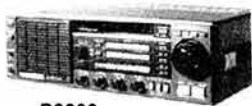
HF TRANSCEIVERS

FT960R	£1329
FT102	£719
FT77	£479
FT757GX	£719
TS930S	£1195
TS430S	£779
TS830S	£758
TS530SP	£669
IC751	£1099
IC745	£839

LINEARS HF

TL922	£950
FL2100Z	£539
IC2KL	£1349
PSU	

Henry Radio Big Linears to Order



R2000

WELZ

SP200	£82
SP300	£115
SP400	£82
SP10X	£29
SP15M	£41
SP45M	£60
SP250	£58
SP350	£70
AC38M	£74
CA35A	£13
CA23N	£13
AT15A	£9
CT15N	£17
CT150	£42
CT300	£58
CH20A	£21
CH20N	£37

TER ANTENNA

SPECIAL OFFER

HB238P	£149
HB33M	£199
HB338P	£199
HB34D	£239
HB43DX	£229
HB443DX	£309
HB464GX	£469
MLA4	£79
MV22C	£30
MV3BH	£40
MV4BHR	£83
MV5BH	£79

Send SAE for details new T.E.T. range.

VHF TRANSCEIVERS

FT726R	£775
FT290R	£279
TS780	£850
FT230R	£269
TR9130	£458
TW4000A	£488
TM201A	£279
IC271E	£649
IC271H	£789
IC290D	£499
IC27E	£299
C5800	£379
C8900	£219
HC1400	£179

VHF/UHF

LPM1443/100	£172
LPM10/100	£149
LPM25/160	£207
L1443/100	£143

Full Bros Range Stocked

LPM432-1/50	TBA
LPM432-10/50	£155
MR150	£169
4M60W	£149
7H60W	£175

Full Tono Range Stocked

LA2035	£53
LA2050	£90
LA2065	87

UHF TRANSCEIVERS

70CM/726	£259
FT790R	£259
FT730R	£239
TM401A	£310
IC471E	£735
IC471H	£879
IC490E	£549
IC45E	£345
IC120	£455
C7900	£239

R70

RECEIVERS

FRG7700	£385
FRG7700M	£455
New Yaesu Soon	
R2000	£435
R500	£272
R71E	£549
R70	£565

RTTY/CODE READERS

THETA550	£299
CWR610	£175
CWR685E	£739
CWR675EP	POA
THETA5000	£775
(AMTOR)	
T9100E	£699
(AMTOR)	
12" Amber	£95
12" Green	£99
Monitors	

AERIAL TUNERS

FC102	£185
FC757AT	£245
AT230	£143
AT250	£277
AT930	£150
AT100	£285
AT500	£399
CNW518	£233
CNW419	£148
CL680	£81

ROTATORS

FU2000	£50
KR250	£55
KR400RC	£121
KR600RC	£173
KR2000RC	£339
EMR400	£89
DR7500R	£139
DR7500X	£129
DR7500R	£192
DR7600X	£169
KR500	£129

ARROW PRICE PROMISE

Arrow will meet or beat any genuinely advertised price subject only to stock availability.

We buy big — phone us for price.



R71E

MORSE KEYS

SWEDISH	£55
Keys	£25
BK100	£14
HK708	£79
HK802	£28
MK701	£29
MK703	£36
BY1	
(Benchner)	
Vibroplex to Order	

POWER SUPPLIES

P8300	£166
P835	£149
PS15	£119
PS25	£89
FP757	£125
FP757HD	£179
PS430	£119

MONTHS SPECIAL OFFERS

FRG7700 Yaesu's famous General Coverage Receiver £299. — (last few to clear)

IC271E Latest Model 2M Multimode Base Stations £599.

FT790R 70CM Multimode £259. — with FREE Nicads & Charger.

TM201A The Beautiful 2M FM Mini from Trio/Kenwood £245

R2000 Trio/Kenwood's marvelous micro-processor receiver £415.

FT208R/FT708R 2M & 70CM matching handy's a few left at £199. — & £179.

INTEREST FREE FINANCE

20% Deposit + 6 Monthly Payments OR 50% Deposit and 12 monthly Payments. Available on many regular priced items.

CHOICE, SERVICE & KEEN PRICES AT 3 LOCATIONS NATIONWIDE

GLASGOW BRANCH
Arrow Electronics (Scotland)
51 Hyndland Street,
Partick,
Glasgow,
Scotland.

Tel: 041 339 6445
Bill McJimpsey GM5NHJ

WELSH BRANCH
Arrow Electronics (Wales)
14 Carreg-y-Gad
Llanfair-P-G
Anglesey
Tel: 0248 714657
John Lewis GW8UZL

MAIL ORDERS & HEAD OFFICE
Arrow Electronics Ltd.
5 The Street,
Hatfield Peverel,
Chelmsford,
Essex CM8 3YL.
Tel: (0245) 381626/381673
Peter G3LST, Bob G6AKL,
Adam G6MON

Most major creditcards accepted plus Lombard / Tricity "Creditcharge" cards. Our own club card available. Please ask for details. Instant credit, short or long term finance, interest free scheme see above.



NEW**HF/VHF/UHF
Handheld Scanning Receiver**

- ★ 160 Channels available
- ★ 40 memories
- ★ Key pad frequency display
- ★ Liquid crystal display
- ★ Scan/Search facility
- ★ Rubber helical antenna
- ★ Frequency Range:
HF 26-32 MHz
VHF Low 66-88 MHz
High 138-176 MHz
UHF 380-512 MHz
- ★ Rechargeable Nicads
- ★ RF Sensitivity:
0.500 microvolts for 66-176 MHz
1.000 microvolts for 380-512 MHz

£269 inc. VAT
(Postage and packing £2)

NEW**SC7000 BASE/MOBILE
Scanning Receiver**

- ★ 70 Channel memory
- ★ Lock out and priority
- ★ Automatic search and store
- ★ AM/FM Switch
- ★ Digital clock
- ★ AC/DC operation
- ★ Display switchable
- ★ Frequency Range: VHF Low 60-89 MHz; 140-144 MHz;
144-148 MHz; 148-179 MHz; UHF 380-470 MHz; UHF "T" Band
470-519 MHz; Airband 108-138 MHz
- ★ RF Sensitivity: 0.400 microvolts 66-174 MHz
0.800 microvolts 450-512 MHz.

£249 inc. VAT
(Postage and packing £2)

Stockists for: **AMATEUR, P.M.R. and MARINE COMMUNICATIONS**

★ **STANDARD** ★ **YAESU** ★ **ICOM** ★ **MICROWAVE MODULES** ★ **HIMOUND CDE** ★ **STOLLE** ★
★ **TELECOMM ANTENNAE** ★ **J-BEAM** ★ **KATSUMI** ★ **TOYO**

ALL PRICES ARE INCLUSIVE OF VAT AND ARE CORRECT AT TIME OF GOING TO PRESS

**400 EDGWARE ROAD,
LONDON W2
01-723 5521 Tlx 298765**



Normally 24hr despatch
but please allow 7 days
for delivery

**NORTHERN AGENTS:**

**JOE BELL, G4PMY
UNIT 3,
THOMAS STREET,
CREWE**

Tel. No. 0270 582849

BRAND NEW COMPONENTS BY RETURN OF POST

VAT Inclusive Postage 20p (Free over £5). List Free

HIGH STABILITY MINIATURE FILM RESISTORS 5% Tolerance
1W E24 Series 0-51R-10MΩ 1p (75p/100 ohm value) 0-125W E12 Series 10R to 1MΩ. 5p
0-5W E12 Series 10R to 10MΩ 1p 1-0W E12 Series 10R to 10MΩ. 5p
1W metal film 10R to 1MΩ. 5% E12 series 2p 1% E24 series 3p
Mullard or equivalent Subminiature Ceramic Plate capacitors 100V E12 Series
2% 1-8pf to 47pf 3p 2% 56pf to 330pf 4p 10% 390pf to 4700pf 4p
Plate Ceramic Capacitors 50V working for vertical mounting
E12 Series from 22pf to 1000pf then E6 series 1k 5pf to 47k pf. 2p
Miniature Polyester capacitors 250V working for vertical mounting
0-1, -015, -022, -033, -047, -068 4p 0-1 5p 0-15 & 0-22 6p
0-33 & 0-47 8p 0-68 (250V, 63V) 11p. 1-0 15p. 1-5 20p. 2-2 22p

ELECTROLYTIC Wire Ended (Mfids/Volts)
47/50 5p 10/50 5p 47/16 6p 100/25 7p 220/25 8p 470/40 16p
22/16 6p 47/25 6p 100/50 8p 220/50 10p 1000/15 15p
2-2/50 5p 22/25 6p 47/50 6p 150/16 7p 470/16 11p 1000/25 25p
4-7/50 5p 22/50 6p 100/16 7p 220/16 8p 470/25 11p 1000/40 35p

TAG ENDED CANS: 3300/25V. 40p 4700/16 25p. 4700/25V axial 70p.

TANTALUM BEAD ELECTROLYTICS Subminiature vertical Mounting (Mfids/Volts)
0-1/35 14p 2-2/35 15p 15/16 20p 22/16 30p 47/16 80p
0-22/35 14p 4-7/16 14p 15/25 35p 22/25 35p 68/3 30p
0-47/35 14p 4-7/25 15p 22/16 20p 33/10 30p 100/3 35p
1-0/35 14p 10/25 25p 22/10 25p 47-6 30p 220/16 £1.20

POLYSTYRENE Capacitors 63V working E12 Series Long Axial Wires
10pf to 820pf 3p 1kpf to 10kpf 4p 12kpf 5p

TRANSISTORS
BC107/8/9 12p BC547/8/9 8p BC212L 10p BFY50/51/52 20p BFX88 25p
BC147/8/9 10p BC557/58/9 8p BCY70 15p 2N2926 7p BSX19520 15p
BC157/8/9 10p BC182L, 184L 10p BF19567 10p 2N3055 50p BD13566 25p
8 pin i.c.s. 741 18p 555 24p Holders 8 pin 9p 14 pin 12p 16 pin 14p 28 pin 25p 40 pin 40p

DIODES (p.i.v./amps)
75/25mA 1N4148 2p 800/1A 1N4006 6p 400/3A 1N5404 14p 115/15mA OA91 6p
100/1A 1N4002 4p 1000/1A 1N4007 7p 60/1-5A S1M1 5p 100/1A Bridge 25p
400/1A 1N4004 5p 1250/1A BY127 10p 30/45mA OA90 6p 30/150mA AAY32 8p

Zener Diodes E24 series 400mW. 3V3 to 33V to 33V 8p. 1 watt 3V9 to 33V 12p.
LEDs 3 & 5mm. Red 10p. Green & Yellow 14p. Grommets 3mm 11p. 5mm 2p
Fuses 20mm glass 100mA to 5A. Q Blow 5p. A/Surge 8p. Holders 5p. (p.c. or chassis)
High speed p.c.b. drills 0-8, 1-0, 1-3, 1-5, & 2mm 22p. 12V Drilling machines £5.00

The C.R. Supply Co. 127 Chesterfield Rd, Sheffield S8 0RN. Tel: 57771

(GW3ZBB) AIRCOM of Abergavenny (GW4IHN)**THE FRIENDLY EMPORIUM IN A TOURIST TOWN**

Plenty for the XYL to do while you browse in stock—rigs and accessories, Microwave Modules, Jaybeam, rotators, etc.

Access and Visa welcome.

1st Floor (Above pet shop), Wilberton House, Frogmore
Street, Abergavenny, Gwent NP7 5UG. (0873) 2566/5175

**HATELY ANTENNA TECHNOLOGY (GM3HAT)
DIPOLE OF DELIGHT**

NEAT & TIDY—preserves visual amenity of small city gardens.
EFFECTIVE & BROADBAND—simple NO-TUNE with modern semiconductor PA's.
COAX-FED + CAPACITIVE BALUN—no antenna can claim better "ANTI-TVI" behaviour.

USER COMMENTS: "superbly easy for those with manipulation problems" "improved AMTOR & RTTY reception due to reduced computer hash" "so strong on 7MHz that steering diodes in receiver would cross-modulate had not 20db attenuator been switched in"

MULTIBANDERS	DD Europe 7/21 DD U.S.A. 7/21 DD 10/18/24 DD 14/21/28L DD 7/14/21/28L DD 14/21	length 21m (69ft) length 21m (69ft) length 15m (50ft) length 10.7m (36ft) length 21m (69ft) length 10.7m (36ft)	£28.00 28.00 56.00 46.50 58.00 33.00	Unified price structure. UK inc VAT and 1st Cl Post DX exempt VAT. AIR MAIL.
MONOBANDERS	DDM 10 DDM 14 DDM 21 DDM 28	length 15m (50ft) length 10.7m (36ft) length 7m (24ft) length 5.8m (19ft)	£23.50 15.50 11.50 11.50	Parcel Post. Cheques ANY CURRENCY where allowed.

For UK purchaser of antenna, 5mm coax at 30p per metre & PL 259 inc reducer £1 p.pd
SAE for full technical details (IRC's AIR MAIL for DX) 1 month money-back guarantee.

HATELY ANTENNA TECHNOLOGY

1 Kenfield Place, ABERDEEN AB1 7UW, Scotland

Proprietor Maurice C Hately, MSc MEE, Chartered Electrical Engineer (GM3HAT)

R.F. LINEAR AMPLIFIERS

	D.C. supply	Power in	Power out	Preamp included	Kit	Ready built and tested
2 metres	13.8v	1.5w	15w	No	£24.50	£36.50
	"	2.5w	25w	No	£29.50	£39.50
	"	10/15w	40/50w	Yes	£29.50	£43.50
	"	2.5w	50w	Yes	£44.50	£57.50
	"	2.5w	100w	Yes	£89.50	£109.50
	"	10w	100w	Yes	£69.95	£89.50
70 cm	Mains Op	25w	100w	Yes	£78.95	£78.95
	"	10w	150w	Yes	£169.50	£169.50
	"	1.5w	150w	Yes	£169.50	£169.50
	13.8v	1.5w	10w	No	£26.95	£39.95
	"	1.5w	40w	No	£59.95	£71.95
	"	10w	40w	No	£52.00	£64.50

Kits include pre-drilled case and heatsink and all parts except RF Input/Output connectors.
Preamp Gain—22dB, <N.F. 1-5dB, Auto switching changeover.

POWER SUPPLIES

BREMIL 13.8v 10a Regulated P.S.U. £59.95
TARREN 13.8v 5-7a Regulated P.S.U. £19.95
RFD 13.8v 20a Regulated P.S.U. Kit £59.50 Built £75.80

*We have a limited number in stock and in future will be made to order.
All goods guaranteed for 12 months including P.A. transistors: Terms: Post & Packing, £0.80. Please allow 21 days for delivery. S.A.E. for further details.
Southern stockist: ZJ Sound Ltd, Trud Maltins, Bishop Stortford (0279) 55308

R.F. DEVICES

41 Stainburn Drive, Leeds LS17 4NZ (0532) 680410

Take command in communications!

COM-IN 64

The ultimate communications interface!

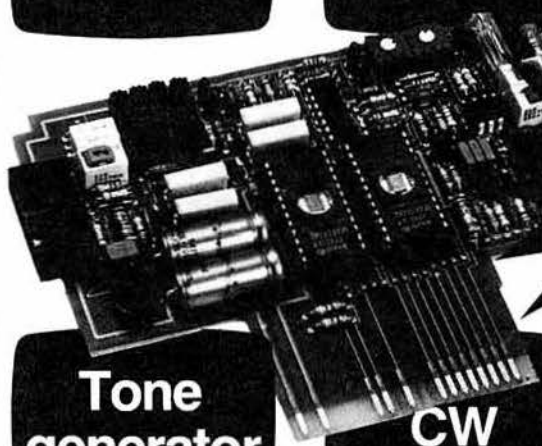
Zero's COM-IN 64 communications interface turns your Commodore 64 Personal Computer into an advanced (radio)communications terminal for BAUDOT, MORSE, ASCII, SSTV, Word-processor, Modem and Tone generator.

Plug in the interface, switch on your Commodore and the system is in operation! Over sixty commands are recognised by the COM-IN 64 program to ensure maximum operation convenience.

RTTY

**Modem
Mailbox**

SSTV



**Tone
generator**

CW

**Word
processor**

£109

(excl. VAT
and £1.50 postage)

Major features of the COM-IN 64 program:

- Written in fast and efficient 6502 machine language.
- Baudrates 45, 50, 75, 110 and 300, each adjustable with fine tuning system.
- Maximum Baudrate approx. 1500 in word processing mode.
- Fully autom. Morse speed, 5 to 99 words per minute.
- Split screen. Compose and edit text while receiving.
- 12 K byte text buffer in memory.
- Three active cursors. Receive, transmit and keyboard.
- Store received and transmitted messages on diskette.
- Disk-based mailbox system.
- User definable WRU.
- Create brag tapes on disk or cassette files.
- Transmit disk or cassette files.
- Hard copy available with a printer.
- Automatic word-wrapped carriage return and line feed. On transmit selectable.
- Unshift on space selectable.
- Seven 80 character message buffers with display, print and write options.
- Load and save message buffers on tape or disk.
- Software controlled CW sidetone, ASCII and BAUDOT AFSK.

- 14 tones selectable for adjustment purposes. (4 for modem adjusting).
- Sync idle, slow mode and word by word mode.
- Auto transmit receive switch for telephone line.
- Replay received message with resend command.
- Four CW identification options.
- CW FSK identification for RTTY.
- RYRY generator (baudot RTTY test signal).
- Quick brown fox generator.
- Several callsign generators available.
- Received text word-wrapped at end of screen lines.
- Keyboard selectable normal reverse tones for all modes except for CW transmit mode.
- Direct mode for fast break-in operations.
- 24 hour real time clock displayed on status line. (CIA TOD clock with automatic 50/60 cps selection).
- Send current time with QTR command.
- Random mode sends 5 character groups for morse practice.
- Loop mode for printer adjustments or beacon-like operation.
- Keyer mode allows connection of manual Morse paddle.
- Unique large TIMES SQUARE character display option.
- Ignore carriage return on receive option.
- User definable switch facility.
- Page mode allows reception of RTTY pictures etc.
- Byte mode allows transmitting program files.
- Modem mode with automatic Bell/CCITT selection.

Further details:

Zero's COM-IN 64 program is supplied with self supported power supply, cables and connectors. In the extensive user manual you'll find the complete schematic and 2 program listings for QTH locator and LOGBOOK. Send for free details and order form.

ZERO ELECTRONICS

Nash House
149 King Street
Great Yarmouth NR30 2PA
Tel: (0493) 2023



THE CHOICE OF PROFESSIONALS

LATTICE TOWERS, SLIMLINE TELESCOPICS, GUYED MASTS TELESCOPIC, TILTOVER, SELF SUPPORTING, FIXED, MOBILE

SOME SPECIAL FEATURES

- VERSATILE MOUNTING OPTIONS. GROUND POST, WALL OR TRAILER.
- EASILY TRANSPORTABLE 15FT SECTIONS, YOU DON'T NEED TO SELL IT WHEN MOVING!
- PURPOSE DESIGNED AND ENGINEERED TO B.S.I. STANDARDS: WIND LOADS TO CP3, CHAP V, PT2 1972.
- ROBUST WELDED CONSTRUCTION IN H.T. STEEL (BS 1775, 980, 4360).
- WELDED BY ELECTRONICALLY CONTROLLED M.I.G. FOR ADDED STRENGTH (BS 4872, 5135).
- UNIQUE ALTRON 15FT (4.5M) SECTIONS FOR LOW RETRACTED HEIGHT AND MINIMUM SKYLINING. (CAN HELP WITH PLANNING).
- FULLY TELESCOPIC AND TILT OVER (WINCH OPERATED) FOR QUICK ACCESS.
- EASY RATCHET WINCH OPERATION. (AUTO BRAKE AND ELECTRIC OPTIONS EXTRA).
- SAFETY UP LOCK TO RELIEVE WINCH CABLE.
- HOT DIP GALVANISED FINISH FOR EXTRA PROTECTION (BS 729).
- OPTIONAL HEAD FITTINGS.

OVER 50 TYPES FROM 5M TO OVER 30M HEIGHT - A FEW POPULAR ONES

SLIMLINE MAST
The popular SM30, unobtrusive telescopic, tiltover, up to 31ft raised. Post mounted, PM or wall mounted WM, complete with winch and mountings. Price £253.00. Optional reducer tube RT1 £13.00, Rotor Head RH1 (NY BRNG) £32.00, Ground Socket GS1 £23.50.

TELESCOPIC TILTOVER TOWERS
Compact, low profile, using 15ft section Series 1 (standard) AT32PM 32ft. £339.50. Series 2 (heavy duty) at 42PM, 44ft £439.00, at 52PM, 57ft £565.00. Head Unit RH2 with nylon brng £41.50. Wall mounted versions also available as above. Special applications undertaken.

MODELS INCLUDE ALL NECESSARY WINCHES, LUFFING, GEAR, MOUNTING POSTS BRACKETS ETC. STOCK ITEMS NORMALLY DESPATCHED IN 7 DAYS. SOME PRICES MAY VARY.

**ALTRON AQ6-20 'SPACESAVER' 2EL COMPACT BEAM 4-BAND. 6, 10, 15, 20M
FULLY SEALED COILS! REFLECTOR DRIVEN. ONLY £114.00 + £4.50 p&p (UK)**

WE DESIGN! WE MAKE! WE SELL! DIRECT! At manufacturers prices. You get best value and service. We offer no gimmicks. No free gifts, just competitive prices, quality, reliability and professional know how.

Callers welcome. Samples on display.

Opening hours: Mon-Fri. 9 am - 5 pm, Sat 9 am - 12.45 pm. Send 6x9 S.a.e. for more details NOW.

Price includes VAT @ 15% and U.K. mainland carriage (most areas), Terms C.W.O. - Access - Visa

ALL ALTRON PRODUCTS ARE EXCLUSIVELY MANUFACTURED IN THE U.K. BY

ALLWELD ENGINEERING

UNIT 6, 232 SELSDON ROAD, SOUTH CROYDON, SURREY CR2 6PL.
Telephone: 01-680 2995 (24 hr) 01-681 6734



KW TEN-TEC "ARGOSY II"

100 Watts SSB/CW

Mobile, Portable or Home Station



Price: £516 incl. VAT and delivery (UK)

Another winner from KW TEN-TEC
the "CORSAIR"
200 Watts SSB/CW with many facilities

Price: £922 incl.

Prices are subject to change—
please check first with KW

PURCHASE BY HP, ACCESS OR VISA

Write or phone for details

KW TEN-TEC LTD
Vanguard Works, Jenkins Dale
Chatham, Kent ME4 5RT
Tel: (0634) 815173

GWM RADIO LTD

All prices include
VAT and post

AVO TESTMETERS, Ex-Ministry, fully overhauled Model 7, no case or leads, £28. Model 8 with leather case and AVO leads, £70. POCKETFONES PF1, Rx and Tx £22 pair with circuits etc, batteries £5.50 pair. Rx only £6, with battery £9. RS AUTO TRANSFORMERS 250 watt. 0-115-200-240 volts, £6.50. Ex NAVY BRASS ROLLING NAVIGATION RULES, £12 or polished with box, £22. ARMY RADIO TEST EQUIPMENT, Kit Testing 452-2515, £30. FT1 6625-99-949-1358 £18. FT2 ZDO4575, £18. Prismatic MARCHING COMPASSES, latest issue type NATO 6605-99-331-2510, calibrated in MILS, Mother of Pearl dial, £27. Ex-NAVY BINOCULARS, 7 x 50 with case, £45. RACAL-MOBILCAL MA 4010 HIGH SPEED MORSE UNIT. No accessories—new condition. Records and replays in conjunction with Transceiver at high or low speed, £12. Operating instructions 75p or free with order. RECEIVERS R-390A/URR HAMMARLUND, 500Hz to 32MHz, £250 MUST be collected. Quality valve set, digital dial. Full details 75p. WRIST WATCHES. A rare opportunity, all black faced and centre seconds and all reconditioned by Ministry. International, £25. Lemania, £20. Hamilton, £20 or Smiths, £16. Spare AVO movements with dials for model 7 or 8, £10. Airlite HEAD & MIKE sets type 62, as new £12 or used less make £6. SRA CORVETTE HBFM units only £15. Phillips mains motors for machines type 54162-120 double ended, approx 1/8th HP, new and boxed £7.50. TELM 'F' well known Army 'phone in really clean condition £20. UHF WESTMINSTER units only, £35. Cambridge AM100 HB AM £16. A few BANTAMS HBFM no batteries £30.

40-42 Portland Road, Worthing BN11 1QN. Tel: 0903 34897



REG WARD & CO LTD AXMINSTER, DEVON

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 Tonobeam.

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

★ ★ ★ **THE LEICESTER** ★ ★ ★
AMATEUR RADIO
SHOW COMMITTEE

★★★★

EXTEND AN INVITATION TO THE
NATIONAL
AMATEUR RADIO AND ELECTRONICS
EXHIBITION

AT THE
GRANBY HALLS
LEICESTER

ON

FRIDAY & SATURDAY
OCTOBER 26TH & 27TH
1984

10.00_{AM} - 6.00_{PM}

ENQUIRIES TO FRANK G4PDZ on 0533 553293

B
R
I
N
G
&
B
U
Y

S
T
A
R
↑
R
A
F
F
L
E

ALYNTRONICS



AUTHORISED
ICOM
DEALER



FT 757GX — the complete H.F. transceiver — with general coverage on receive!



IC 751 — The latest H.F. transceiver from Icom



FT 726R — Yaesu's v.h.f. & u.h.f. multimode base station



IC 271 — Icom's v.h.f. multimode base station

Approved stockists for all of the following companies:
ICOM — YAESU — K.D.K. — TONNA — DATONG — MICROWAVE
MODULES — WELTZ — SHURE — HANSEN — KENPRO — C.D.E.
— DAIWA — TONO — HY-GAIN — A.E.A. — A.K.D. — T.A.L. —
I.C.S. — TASCO — G. WHIP — HI-MOUND — S.M.C. ANTENNAS
— WESTERN ANTENNAS

Always in stock, a large selection of plugs and sockets. Antenna mounting hardware — R.F. cables (H-100, URM 43, 67 and 76, 300Ω Ribbon) plus 5, 6 and 8 core rotator cable

129 Chillingham Road, Newcastle-upon-Tyne
Tel: 091-276 1002

Mail Orders Welcome

Open Tues-Sat 10 am to 6 pm



North Street, Crewkerne, Somerset TA18 7AR
Tel: (0450) 74433 Telex: 46283 inface.g.

FREQUENCY STANDARD, MARKER & CONVERTER CRYSTALS

5-0, 10-0, 10-7 & 38-66667MHz 18U £3.10; 1-0MHz 6U or 33U £3.40; 100-0kHz 13U or 34U, 116-0MHz 18U £3.45; 455-0kHz 6U £4.03; 200-0kHz 6U £4.26; 1-0MHz hi-stab 6U £4.90; 10-0MHz hi-stab 36U £6.90.

CRYSTAL FILTERS

Super selective 250Hz 8-pole CW filters for FT-101, FR-101, FT-301, TS-520, TS-820, FT-901 & FT-101Z £25.88 each (9MHz types with appropriate carrier crystals):

9MHz SSB	6 pole, BW 2-5kHz at -6dB and 5kHz at -60dB	£23.58
9MHz SSB	8 pole, BW 2-4kHz at -6dB and 4-3kHz at -60dB	£27.60
9MHz CW	5 pole, BW 500Hz at -6dB and 2-2kHz at -60dB	£25.88
9MHz FM	8 pole, BW 12kHz at -6dB and 21-6kHz at -60dB	£27.60
10-7MHz FM	8 pole, BW 7-5kHz at -3dB and 17-5kHz at -70dB	£27.60
10-7MHz FM	8 pole, BW 15kHz at -3dB and 35kHz at -70dB	£27.60
21-4MHz FM	8 pole, BW 15kHz at -3dB and 50kHz at -80dB	£28.98
455kHz CFU series ceramic filters, various bandwidths in stock		£1.73

POST AND VAT INCLUDED



SPECTRUM COMMUNICATIONS

NEW!!! TRANSCEIVE CONVERTER

2, 4 or 6 metre versions for use with a 10 metre transceiver. Suitable for use with any transceiver with 10mW to 1W output, eg. FT101, FT707, FT102, TS530, etc.

Repeater shift or split band simplex and semi duplex operation. Linear all mode operation suitable for CW, LSB, USB, AM, FM, RTTY. Low power transmit section provides 1W low spurious output. 20W clean RF output when used with matching linear amplifier. Receive section has a nominal 26dB gain and a 2dB noise figure.

Available with purpose built cabinet to house converter and linear. Board measures 4.8 x 3.2 inches and operates from 13.5V DC.

Types TRC2-10, TRC4-10, TRC6-10, Boxed units built £81.50, kit £51.50. Boxed with linear built £114.00, kit £75.00. Dual band unit, any 2 bands in one box, built £153.00, kit £93.00. Dual band unit with linear amplifiers, built £225.00, kit £140.00.

VAT INC PRICES, ADD £2 FOR P&P

Delivery within 14 days subject to availability, 24-hour answering service
Plus the usual range of kits and modules, SEND SAE for list



UNIT B6, MARABOUT INDUSTRIAL ESTATE
DORCHESTER, DORSET. Tel: 0305 62250



JAYCEE ELECTRONICS JOHN GM3OPW

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



NEVADA 29MHz FM R.F. POWER AMPLIFIER

HIGH QUALITY BRITISH MADE POWER AMPLIFIER



£19.95

SPECIFICATIONS

Input Power: 1-4 Watts FM
Output Power: 25-30 Watts FM

• **ONE YEAR GUARANTEE**

Protected against polarity inversion.

**AVAILABLE FROM YOUR LOCAL DEALER
OR DIRECT FROM THE UK DISTRIBUTORS**

TELECOMMS, 189 LONDON ROAD, PORTSMOUTH PO2 9AE TEL: 0705 662145

• USE YOUR CREDIT CARD FOR IMMEDIATE DESPATCH •



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

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



KEEP YOUR HANDS ON THE WHEEL with the Monolock safety microphone system

Pre-amp + Timer + Electret Condenser Mic
No extra connections to transceiver

£32.95
(Fully inclusive)

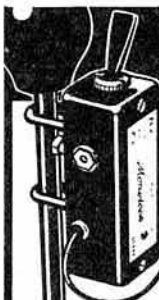
Send for a leaflet

R & A

SUDRON LTD

Tel (0532) 737120

Ferndale, Colliers Lane
Leeds LS17 8LP

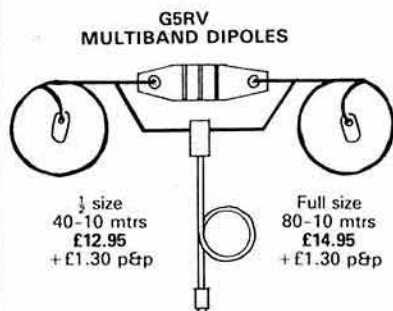




TAR AERIALS AND COMMUNICATIONS

THE COMMUNICATIONS CENTRE
KING WILLIAM STREET, AMBLECOTE
STOURBRIDGE, WEST MIDLANDS DY4 4CY

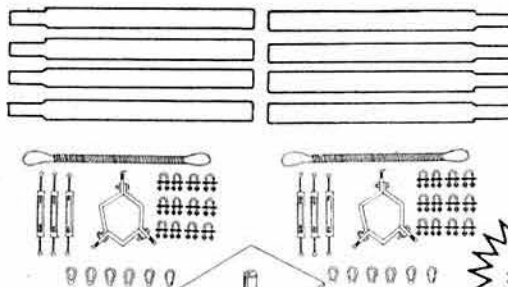
**NOW AVAILABLE AS A PACKAGE DEAL
THE NEW TAR 40' MAST**



1/2 size
40-10 mtrs
£12.95
+ £1.30 p&p

Full size
80-10 mtrs
£14.95
+ £1.30 p&p

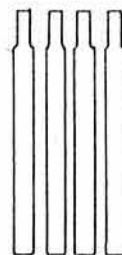
Now with slotted 'Bofa' plus silver
plated PTFE connector



CONTENTS

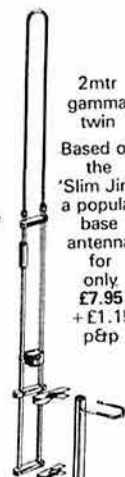
8-5' x 2" dia Aluminium Mast Sections
2- Tar Professional Guy Rope Kits
1- Base Plate

A 20' 4 section 1 1/2" dia
aluminium mast
Ideal for base or portable use

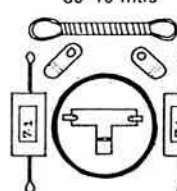


ONLY
£12.50 + £2.50 p&p

2mtr
gamma
twin
Based on
the
'Slim Jim'
a popular
base
antenna
for
only
£7.95
+ £1.15
p&p



Trap dipole kit
80-10 mtrs



Contains all
that's required
for this popular
multiband dipole
£24.95
+ £1.75 p&p



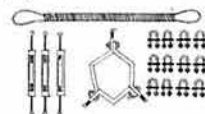
3-way Guy Ring
£1.75 + £1 p&p



Base Plates
any size made
to order



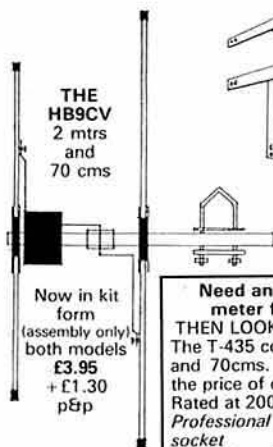
140' hard drawn
copper wire
£6.95 + £1.30 p&p



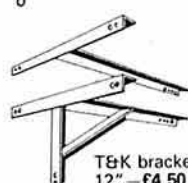
PROFESSIONAL GUY ROPE KITS

A—standard 7 x .56mm strands
B—heavy duty 7 x 1mm strands
A = £8.95 + £2.25 p&p
B = £9.95 + £2.25 p&p

THE
HB9CV
2 mtrs
and
70 cms



Now in kit
form
(assembly only)
both models
£3.95
+ £1.30
p&p

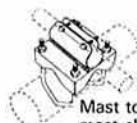


T&K brackets
12" — £4.50
18" — £5.50
24" — £6.50
+ £2 p&p

**Need an SWR/PWR
meter for 70cms?**
THEN LOOK NO FURTHER
The T-435 covers both 2mtrs
and 70cms. Two bands for
the price of one.
Rated at 200 watts.
Professional quality N. type
socket
£39.50 inc p&p



2" mast sleeves
£3.50 + £2 p&p



Mast to
mast clamp
£2.50 + £1 p&p

Swivel clamps

£1.50
+ £1 p&p

Model SU 4000
(similar to KR 400)

Will take up to 200kg vertical load.
Ideal for VHF/HF arrays.
Free bottom brackets.
Value £15 — ONLY £85 + £5 p&p

NEW ITEMS

A A 2 element loop
YAGI assembly only
Kit. boom 22"

GAIN 8.2db
ONLY £10.95 + £2 p&p

B The 12 element end fired
YAGI based on the "ZL
special"

Twin Driven elements with
slotted Bofa phasing
Line boom 10' 6" £25
+ £2.50 p&p

1.1 & 4.1 Baluns £12.95 inc.
p&p

Dipole centres £1.40 & £3.50
Egg insulators 40p

+
Copper wire in all sizes &
gauges

REMEMBER

We either make or stock a
large selection of aerial brack-
ets, mast, clamps, insulators,
etc. Please ring if you have a
specific requirement.

Sky King Rotators

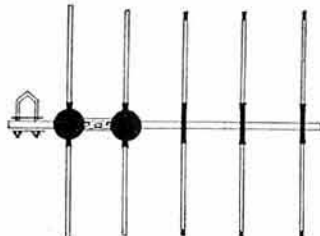


The
TAR PORTOMAST

A 4 section
aluminium mast
8 metres high
that will collapse
into a single unit
under 2.5 mtrs long.
Ideal for portable use
£25.00 + £3.00 carr.

FROM
2.5 mtrs
↓
8 mtrs

ZL SPECIALS



A proven performer with an
inexpensive price tag.
5 ele only £9.90 + £2.50 p&p
7 ele only £12.50 + £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.**

**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

MORSE

SPECTRUM OWNERS

Take morse direct from the
air and read it with your
Sinclair Spectrum. No inter-
face needed. Just load the
program.
Speeds 3.30wpm—self
tracking.
ONLY £6.50 inc. p&p
Also Tutor @ £5 inc. p&p

Whenever you enter a LOWE ELECTRONICS' shop...

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

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

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

Cambridge, not only a University town but the location of a LOWE ELECTRONICS' shop managed by Tony G4NBS. The address is 162 High Street, Chesterton, Cambridge (telephone 0223 311230). From the A45 just to the north of Cambridge turn off into the town on the A1039, past the science park and turn left at the first roundabout. After passing a children's playground on your left, turn left again into High Street. Easy and free street parking is available outside the shop.

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

MOVING... MOVING... MOVING... From the 13th September 1984 the LOWE ELECTRONICS' London shop will be located at 223/225 Field End Road, Eastcote, Middlesex (the new telephone number is 01-429 3256). The new shop, managed by Andy G4DHQ is easily found, being part of Eastcote tube station buildings. Immediately behind the shop is a large car park where you can currently park for the day for 20p. There is also free street parking outside the shop.

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

LOWE ELECTRONICS LTD.

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

Crack it!

QRM can be beaten – and Datong has some unique technology to do it! You can: wipe-out off-tune "monkey-chatter" from SSB with Model FL2 or FL3; neutralise the "Woodpecker" AUTOMATICALLY with SRB2; shoot down whistles AUTOMATICALLY with Model ANF or FL3; copy CW through almost anything the bands can offer with FL2, FL3 or ANF; clean up RTTY with FL2 or FL3.

All of these products simply connect in series with the speaker. Model SRB2 goes in series with the antenna as well.

Attack it!

When the going gets tough on SSB the real experts simply select "attack mode" by pushing the 18 or 24 dbS button on their Model ASP RF clipper. They know that there is no better way to increase their talk power to the absolute limit. If you don't yet use a Datong RF clipper then you have a treat in store. Your voice will coast in where previously it was touch and go. What's more you can use it for SSB, FM and AM, on any rig, and on any band!

If price is your priority, get one of our clipper modules such as RFC/M or D75/K and box it yourself. We can supply Model ASP wired to suit the mic socket on most rigs – just ask!

Track it!

The Amateur Radio movement used to be self-regulating. Now it can be again! With Model DF you can locate antisocial signals and learn some new skills into the bargain, as many responsible clubs have discovered. Connect Model DF to a standard NBFM receiver and you get an instant readout of the direction of the signal you are hearing. It works on AM and SSB signals, as well as FM.

To catch real "foxes" you need real tools. Model DF is exactly that, but low in cost, and is widely used by Government departments and other professionals.

THE NEXT STEP

To get more information on the above products or to learn about our other problem-solvers just write or phone for free information. When you are ready to purchase remember that we nearly always despatch within 24 hours.

PRICES OF PRODUCTS MENTIONED

(All prices include VAT and delivery)

ANF £67.85; FL2 £89.70; FL3 £129.37; SRB2 £86.25; ASP £82.80; D75/K £40.70; RFC/M £29.90; DF £182.85 (needs four whip antennas).

DATONG ELECTRONICS LIMITED			
Your Name		Call Sign	
Address		Tel	
Town		Post Code	
City		Post Code	
Please send me the following			
Model	Qty	Unit Price	Unit Total
Total £			
Prices include Post, Packing and VAT (U.K.)			
SEND TO			
Dept R.S.G.B Spence Mills, Mill Lane, Bramley,			
Leeds LS13 3HE, England. Tel: (0532) 552461			
I enclose CHEQUE/POSTAL ORDER No. for £			
Please debit my VISA/ACCESS account			
Card No.			
All orders sent by return, 1st class parcel post. Any delay will be notified to you immediately.			



STEPHENS-JAMES LIMITED

G3MCN



**TRIO TS-930S
HF TRANSCEIVER**

**TRIO R-600
GEN. COV. RECEIVER**

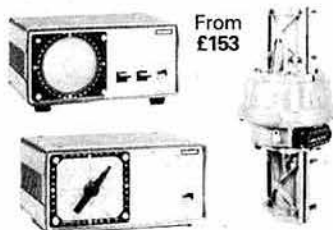


TRIO PRICES
Full Range of
Accessories
Available

TS830S	£758.54	R600	£272.83	TL120	£177.88	TW4000A	£488.70	TS530SP	£669.61
AT230	£143.91	SW100A	£37.97	SP120	£27.99	TM201A	£279.00	TR9130	£458.72
SP230	£43.47	PS430	£119.43	PS20	£57.96	TM401A	£310.32	SW200A	£81.95
VFO230	£258.34	TS130S	£576.66	SW100B	£37.97	TR3500	£265.85	TS930S	£1195.00
TS430S	£779.55	R2000	£436.75	AT930	£150.41	VC10	£117.00	TR930	£458.70
		HS5	£24.48	TR2500	£246.36				

THE ONLY OFFICIAL STOCKIST OF TRIO EQUIPMENT IN THE NORTH WEST

**DAIWA Full range of reliable
antenna rotators**



From
£153



AR-2001

Scanning receiver. Frequency
coverage continuously from
25MHz to 550MHz. AM-FM.
£345.00

FULL RANGE OF PUBLICATIONS IN STOCK RSGB, ARRL, ETC.

NEW TRIO MODELS



TS-711E All mode 2m Transceiver. Compact light weight design. 25 watts FM-SSB-CW Freq 144-146MHz. Incorporating: 40 multi-function channel selection: dual digital VFO8S: Programmable scan: memory scan: IF shift: speech processor: and featuring the new DCS (Digital Code Squelch). DCS uses a digital code information to open squelch on a receiver that has been programmed to accept the specific code being transmitted. The system recognises 100,000 different 5 Digit code signals making it possible for each station to have its own "private call" code as well as a group code.

TS-811E All mode 70cm Transceiver with above specifications. Freq coverage 430-440MHz.

Both models operated by 13.8V dc or 240 AC. Size 270mm wide 96mm high 260mm deep. Receiver section double conversion Superhetrodyne. Noise blanker: All mode squelch circuit: Voice synthesiser unit (optional).

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 1/2-mile on right. No parking problems at any time. SAE FOR S/H LIST.

STATION ACCESSORIES (inc post)

SWR 25 Twin meter	£15.50
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.

TRANSCIEVERS AND RECEIVERS

JST 100 HF Transceiver	£998.00
BELCOM LS202E FM/SSB Handheld	£225.00
FT290R Transceiver	£269.00
BELCOM LS20XE handheld	£139.00

HY-GAIN ANTENNAS

12AVO 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
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	£133.00

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. Blanking	£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

STEPHENS-JAMES LIMITED

47 WARRINGTON ROAD
LEIGH WN7 3EA
ENGLAND

Telephone (0942) 676790

STOCK CRYSTALS

CRYSTALS FOR 2 METRES
HC25 £2.15 FOR ONE CRYSTAL, £1.96 WHEN 2 OR MORE PURCHASED
HC5 £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 70.2 IN HC6/U AT £2.40 each
TX 8.78250 RX 8.78200

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 SU16 SU18

CONVERTER CRYSTALS IN HC18/U AT £2.85 each.
22.000, 38.666, 70.000, 96.000, 101.000, 101.500, 105.666, 116.000

FREQUENCY STANDARDS £2.75 each
HC6/U 200kHz 1000kHz 3.50MHz 5.00MHz 10.00MHz 10.700MHz
HC18/U 1000kHz 7.00MHz 10.700MHz 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 4.000 5.0668 10.2400 14.3180 15.00000
YAESU CRYSTALS for FT101's FT901 & etc £4.000 each
Many available ex stock (A list is available on request please send S.A.E)

QUARTZ CRYSTALS

FUNDAMENTALS	PRICE	OVERTONES	PRICE
FREQUENCY RANGE		FREQUENCY RANGE	
5 TO 50kHz	£21.00	3rd OVT	21.00 TO 65.00MHz
50 TO 150kHz	£11.00	5th OVT	60.00 TO 110.00MHz
150 TO 500kHz	£7.80	5th OVT	110.00 TO 125.00MHz
160 TO 999kHz	£11.90	7th OVT	125.00 TO 175.00MHz
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		

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 6-170kHz HC33/U 170kHz-175MHz HC18/U 6-175MHz

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.

CRYSTAL 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.

ALL PRICES ARE EX VAT PLEASE ADD 15%



MARKETING LTD.

P.O. Box 19 Erith Kent DA8 1LH

Telephone: 01-318 4419 24Hr Ansafone: Erith (03224) 30830

Telex: 8813271 GECOMS—G (Attention QUARTSLAB)

THE COMMUNICATIONS CENTRE OF THE SOUTH—

HF TRANSCEIVERS				2M FM TRANSCEIVERS				SPEAKERS			
		£	(c&p)			£	(c&p)			£	(c&p)
TRIO	TS930S	1195.00	(—)	TRIO	TM201A 25W Mobile	279.00	(—)	TRIO	SP230 (TS830, 530)	43.47	(1.50)
YAESU	FT980	1329.00	(—)	ICOM	IC27E 25W Mobile	299.00	(—)	TRIO	SP430 (TS430)	30.99	(1.50)
ICOM	IC751	1099.00	(—)	YAESU	FT230R 25W Mobile	269.00	(—)	TRIO	SP120 (TS120, 120)	27.99	(1.50)
ICOM	IC745	839.00	(—)	TRIO	TR2500 Handheld	246.00	(—)	YAESU	SP102 (FT102)	52.50	(1.50)
TRIO	TS430S	775.55	(—)	FDK	Multi 725X 25W Mobile	239.00	(—)	TRIO	SP40 Mobile speaker	14.98	(0.75)
TRIO	TS830S	758.00	(—)	YAESU	FT208R Handheld	209.00	(—)	YAESU	SP55 Mobile speaker	16.50	(0.75)
YAESU	FT102	719.00	(—)	ICOM	IC2E Handheld	179.00	(—)				
YAESU	FT757GX	719.00	(—)	ICOM	IC02E Handheld	239.00	(—)				
TRIO	TS530SP	669.00	(—)								
TRIO	TS130S	576.00	(—)								
YAESU	FT77	479.00	(—)								
ANTENNA TUNER UNITS				2M MULTIMODE TRANSCEIVERS				ANTENNA BITS			
ICOM	IC-AT500 Auto	399.00	(—)	TRIO	TS780 2M and 70cm base	850.00	(—)	HI-Q Balun 1:1 5kW pep		9.95	(0.75)
ICOM	IC-AT100 auto	285.00	(—)	YAESU	FT726R 2M fitted (70cm optional) base	775.00	(—)	W2AU Unadilla 4:1 Balun		19.99	(1.20)
TRIO	AT250 auto	277.00	(—)	ICOM	IC271E 25W base	649.00	(—)	7-1/4/121/28 MHz Unadilla Traps—pair		19.99	(1.20)
YAESU	FC757 auto	245.00	(—)	TRIO	IC290D 25W Mobile	499.00	(—)	7-1MHz RAL-TRAPS—Epoxy—pair		8.95	(1.50)
YAESU	FC102 High Power	185.00	(—)	ICOM	TR9130 25W Mobile	458.00	(—)	Self Amalgamating Tape 10cm x 25mm		3.95	(0.75)
TRIO	AT230	143.90	(2.00)	FDK	Multi 7500X 20W mobile	369.00	(—)	T-piece polyprop Dipole centre		1.50	(0.30)
TRIO	AT130	98.95	(1.50)	YAESU	FT290R Portable	279.00	(—)	Polyprop Strain Insulators		0.50	(0.10)
YAESU	FC700	103.85	(1.50)					Small ceramic Egg Insulators		0.50	(0.10)
WELZ	AC38	73.95	(1.50)					Large ceramic Egg Insulators		0.75	(0.10)
YAESU	FRT7700 Short Wave Listening	48.25	(1.00)					75 ohm Twin Feeder-light duty	per metre	0.16	(0.04)
								300 ohm Twin Feeder	per metre	0.14	(0.04)
								UR67 Low loss coax—50 ohm	per metre	0.67	(0.20)
								UR76 50 ohm coax—dia 5mm	per metre	0.25	(0.05)
								UR70 70 ohm coax	per metre	0.30	(0.05)
								4mm Polyester Guy Rope, strength 400kg			
									per metre	0.16	(0.04)
								50 metres 16 swg harddrawn copper		6.90	(0.75)
HF RECEIVERS				70cm TRANSCEIVERS				WELZ SWR-POWER METER			
ICOM	R70	565.00	(—)	TRIO	TW4000A Mobile 2M/70cm	488.00	(—)	SP15M	SWR-Power HF/2M 200W	41.00	(1.00)
ICOM	R71	649.00	(—)	TRIO	TM401A 12W Mobile	310.00	(—)	SP45M	SWR-Power 2M/70cm 100W	59.75	(1.00)
TRIO	R2000	436.00	(—)	TRIO	TR3500 Handheld	265.00	(—)	SP250M	SWR-Power HF 2kW	57.75	(1.00)
TRIO	VC10 VHF Converter for R2000	117.00	(—)	YAESU	FT790R Multimode portable	259.00	(—)	SP350M	SWR-Power HF/2M/70cm 200W	69.95	(1.00)
YAESU	FRG7700M with memory	455.00	(—)	ICOM	IC4E Handheld	229.00	(—)				
YAESU	FRG7700 without memory	385.00	(—)	YAESU	FT708R Handheld	189.00	(—)				
YAESU	FRT7700 antenna tuner	48.25	(—)								
TRIO	R600	272.00	(—)								
UNIDEN	CR2021	169.00	(—)								
VHF RECEIVERS				MORSE EQUIPMENT				COAXIAL SWITCHES			
JIL	SX200N	299.00	(—)	HK 707	Straight Key	14.95	(1.00)	SA450	2 Way Diecast SO239 (500MHz)	12.50	(0.75)
AOR	AR2001 25—500MHz	345.00	(—)	HK 703	"deluxe" Straight key	27.95	(1.20)	SA450N	2 Way Diecast N plug (500MHz)	15.50	(0.75)
FDK	ATC720 Handheld Airband	179.00	(—)	HK 802	"deluxe" Brass key	85.00	(2.00)	CH20A	2 Way Welz 50239 (900MHz)	20.75	(1.00)
FDK	RX40 Handheld 141—179MHz	142.00	(—)	MK 704	Squeeze paddle	8.95	(1.00)	CH20N	2 Way Welz N plugs (900MHz)	37.00	(1.00)
				CW-3	Practice Oscillator	8.75	(0.75)	DRAE	3 way SO239 sockets	15.40	(0.75)
				EK 150	Electronic keyer	96.00	(1.00)	DRAE	3 way N sockets	19.90	(0.75)
				D 70	Datong Morse tutor	56.35	(—)				
				MMS-1	Morsetalker morse tutor	115.00	(1.00)				
					Morse Code for Radio Amateurs (RSGB publication)	1.31	(—)				
				MK	Datong morse keyboard	137.42	(—)				
	</										

GOODS NORMALLY DESPATCHED WITHIN 24 HRS.—PRICES CORRECT AT TIME OF GOING TO PRESS—E&OE

NEW CONSTRUCTIONAL SERIES



THE PW TEME

Modular low power transceiver system.
A step-by-step guide to building a QRP
c.w. station for the 7 and 14 MHz bands.
Designed by George Dobbs G3RJV.

Plus **COMPUTING IN RADIO**

Special colour 8-page magazine. Feature articles include

- Part 2 of FORTH for the radio amateur
- AMSTRAD CPC 464 Review
- Programs for the BBC



Practical Wireless
NOVEMBER ISSUE
THE RADIO MAGAZINE

**ON
SALE
SOON**

Take a look at the world's most advanced range of 2 metre Linear Amplifiers

Over 40 years of design experience has gone into what is fast becoming acclaimed as the biggest break-through in linear technology.

Performance and reliability have been designed in, which gives us the confidence to offer a free 5-year warranty. Why not take a closer look at our products and see where value for money really counts.

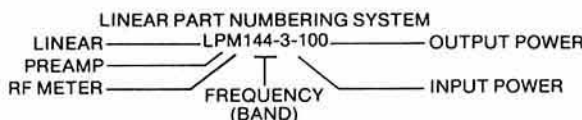
The LPM144 Range

This sophisticated, but simple to use, range of amplifiers have performance characteristics and extra features previously not available in the UK. The pre-amplifier uses the highly regarded BF981 MOSFET, and an LED bargraph power meter is provided, to highlight only two of the amazing number of features.



LPM144-1-100	£172.50
LPM144-3-100	£172.50
LPM144-10-100	£149.50
LPM144-25-160	£207.00
LPM144-3-180	£235.75
LPM144-10-180	£235.75

- Linear all mode operation
- Continuous rated RF output power (RMS)
- RF & HARD switched changeover with selectable delay
- Trouble-free RF switching at low drive levels
- Straight-through mode when switched off
- Unique over-drive protection circuit
- Mobile mount on all 100 Watt models



The L144 Range

To complement the LPM range, we have introduced the L series linear-only versions for the amateur who may already be equipped with a good pre-amplifier and power meter. The excellent linear performance is maintained and both RF Vox and hard-wired changeover are standard.



L144-1-100	£143.75
L144-3-100	£143.75
L144-10-100	£120.75
L144-25-160	£178.25
L144-3-180	£207.00
L144-10-180	£207.00

BNOS 'A' Series Power Supplies

12/6A £52.90

- 13-8V, 6A continuous output
- 7A maximum output current
- 10A current meter
- 10A output terminals
- LED shut down indicator
- Fully protected



12/12A £95.45

- 13-8V, 12A continuous output
- 15A maximum output current
- Large 20A current meter
- 15A output terminals
- LED shut down indicator
- Fully protected

12/25A £138.00

- 13-8V, 25A continuous output
- 30A maximum output current
- Large 30A current meter
- 30A output terminals
- LED shut down indicator
- Fully protected



12/40A £276.00

- 13-8V, 40A continuous output
- 50A maximum output current
- Large 50A current meter
- Large output meter
- LED shut down indicator
- LED out of regulation indicator
- Output sensing terminals
- Fully protected

Our Guarantee Our aim is to provide you with high quality products at realistic prices, to give you the best value for your money.

All products that carry our logo are designed and built by our engineers in the UK and carry a full 12-month guarantee, which includes all parts and labour.

We are so confident that our linears are simply the best that we offer to repair your unit at component cost for up to 5 years from date of purchase. That means we will repair, calibrate and return to you free of charge.

All other products sold by us carry our standard 12-month guarantee.

Available direct or from one of our many UK agents — or come and see us at most rallies and exhibitions



BNOS Electronics (Dept RC) Bigods Hall, Great Dunmow, Essex CM6 3BE
 Telephone (0371) 4677 SAE for further details
PLEASE NOTE NEW ADDRESS AND PHONE NUMBER
 All prices include VAT. Postage free on all Mainland UK orders



WARD for TRIO



NEW!

TS530SP £669.00

Enhanced version of
a favourite model

TS430S	HF Transceivers with	£779.00
TS930S	Gen. Cov. Receiver	£1195.00
R2000	Latest Gen. Cov. Receiver	£436.00
R600	Gen. Cov. Receiver	£272.00
TS130S	Transceiver	£576.00
TS780	All mode 2M/70cm	£850.00
TR9130	All mode 2M	£458.00
TW4000A	2M/70cm FM25W	£488.00
TM201A	2M FM25W	£279.00
TM401A	70cm FM12W	£310.00
FC10	Versatile remote unit for TM201/401	£42.00

HAND HELD/PORTABLE

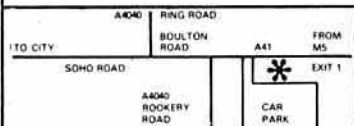
TR2500	2M	£246.00
TR3500	70cm	£265.00

We also have a considerable range of accessories—Mics, headphones, morse keys, SWR/power meters, filters, wavemeters, mobile and fixed speakers, etc.

Commodore 64	£195.00	1541 Disc Drive	£210.00
(Includes £100.00 FREE Software Pack)			
1520 Amazing 4 colour printer and plotter			
was £169.00 NOW OFFERED AT £95.00			
Lots of computer accessories and software			
Includes SCARAB programs for CBM64 & Vic20			

ICS Ham Radio Interfaces for CBM 64/VIC 20

AMT-1 AMTOR/RTTY/CW	£269.00
CP-1 RTTY/CW	£179.00
Micropatch RTTY	£129.00
AMTOR Mk II PCB	£135.00
G3LIV RTTY—BBC 'B'	£75.00
G3LIV PCB	£6.30
G3LIV SSTV PCB-BBC 'B' inc program	£17.50



RSGB books, morse keys, practice oscillators

All items subject to availability, prices currency dependent

WARD ELECTRONICS

SOHO HOUSE (First floor), 362-4 SOHO ROAD, HANDSWORTH
BIRMINGHAM B21 9QL. Tel: 021-554 0708 (Closed Monday)

LOSING DX?

ANTENNA FAULT? Poor reports? Check FAST with an Antenna Noise Bridge, MEASURE resonance 1-160MHz and radiation resistance 2-1000 ohms, no 10 second limit for measurement or confusion with harmonics, GET answers, **£21.20, MORE DX.**

LINEAR OKAY? Check with a Two Tone Oscillator, **£15.90.**

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, **£79.70, TIME RIGHT.**

Each fun-to-build kit (ready made to order) includes ALL parts, case, instructions, by-return postage etc and list of other kits.

CAMBRIDGE KITS

45 (RK) Old School Lane, Milton, Cambridge

THE AMATEUR RADIO INSURANCE SCHEME

(R.S.G.B. Members only)

Full 'All Risks' insurance cover for amateur radio and ancillary equipment (also including home computers)

Scheme 1 for portable and mobile cover*

Scheme 2 for base stations*

* Public Liability insurance as an optional extra

R.S.G.B. affiliated Clubs and Societies.

Special annual policies to cover

- (a) borrowed, hired and owned equipment and
- (b) public liability.

Also short period insurance available for special event call signs.

For details and leaflets, ring or write to:

John David or Julie Thomas,
Amateur Radio Insurance Services Ltd.,
19 Quarry Street, Guildford,
Surrey GU1 3UY.
0483-33771

INDEX TO ADVERTISERS

Aircorn of Abergavenny.....916	Lowe Electronics Ltd
Allweld Engineering.....918	818/21 & 922
Alyntronic.....920	
Amateur Electronics UK Ltd	Microwave Modules.....913
826/7	Modular Electronics Ltd.....910
Amateur Radio Exchange...828/9	Mutek Ltd.....Cover III
Amateur Radio Insurance Services	Partnership Microsystems Ltd.920
926	Practical Wireless.....924
Amcomm Services.....Cover II	
Arrow.....915	QuartsLab Marketing Ltd.....923
J. Birkett.....910	
BNOS Electronics.....925	Random Electronics.....912
Bredhurst Electronics.....924	R F Devices.....916
Cambridge Kits.....926	
CR Supply Co.....916	Scarab Systems.....912
Datong Electronics.....922	South Midlands Communications
EMA Electronics Engineers....912	Ltd.....830/3
ESCAPE.....909	Spectrum Communications...920
Farnborough Communications	Spacemark Ltd.....909
910	Stephens-James Ltd.....923
Garex Electronics.....909	Strumech Versatower Ltd.....914
GWM Radio Ltd.....918	R & A Sudron Ltd.....920
G2DYM Aerials.....910	
Ham Radio Today.....910	TAR Aerials & Communications
Hately Antenna Technology...916	921
Heller Electronics.....909	Telecomms.....920
ICS Electronics Ltd.....911	Thanet Electronics.....822/5
IQD Ltd.....920 & 927	
Jaycee Electronics.....920	Uppington Tele Radio Ltd.....920
KW Ten-Tec Ltd.....918	
Lee Electronics Ltd.....916	Reg Ward & Co. Ltd.....918
Leicester Amateur Radio Show	Ward Electronics.....926
919	Waters & Stanton Electronics.834
	W. H. Westlake.....912
	C. Wilson.....909
	Wood & Douglas.....914
	Yaesu Musen Co Ltd.....Cover IV
	Zero Electronics.....917

CLASSIFIED ADVERTISEMENTS

Classified advertisements 25p per word, minimum £4.00

Box Number £2.00 extra to wordage or minimum.

Semi-display 1/8 page 2 1/2" x 3 1/2" (57 x 91mm) £76.00

3/32 page 1 1/2" x 3 1/2" (42 x 91mm) £59.00

1/16 page 1" x 3 1/2" (26 x 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 enameled 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.

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. Also "RAYNET CONTROLLER". 2 sizes. Prices from £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.

AMATEUR RADIO EQUIPMENT bought, sold and exchanged. Phone Dave on (040 24) 57722 or send SAE for latest list. G3RCQ Electronics, 132 Albany Road, Hornchurch, Essex RM12 4AQ.

IK-1 CMOS-VMOS IAMBIC KEYS. Only £20.45 inc p&p. Chris Moulding Radio Services, 276 Hulton Lane, Bolton BL3 4LE.

TRIDENT 20/15/10M HF VERTICAL antenna, £40.00 inc p&p. Trident 2 two metre co-linear antenna, £35.00 inc p&p. Chris Moulding Radio Services, 276 Hulton Lane, Bolton BL3 4LE.

DIY QSL's—5 colours, 8 designs—100 mixed, £2.50. Hampshire Log, £1.90. SAE list. RWW, PO Box 11, Romsey SO5 8XX.

30ft TELESCOPIC/TILT-OVER MASTS, £170.00 complete. M. White, 14 Pingle Lane, Northborough, Peterborough. (0733) 76682.

AIRCRAFT COMMUNICATIONS HANDBOOK (Europe) including UK spot MF, HF, VHF, UHF frequencies, military, civil, ATC, airports, long range stations, beacons, call signs, co-ordinates, broadcast times, etc. £6.95 inc p&p. Maritime handbooks, including spot MF, HF, VHF frequencies, £11.95 inc p&p. PLH Electronics, 70 Vallis Road, Frome, Somerset BA11 3EJ. Tel (0373) 61831 up to 9pm.

SERVICE AND REPAIR RADIO EQUIPMENT to professional standards, £9.50. Any published s/sheet £2.50, Isae; CTV/M.C. £3.50, Isae. Thousands of manuals in stock—SAE brings quotation, price lists, free 50p map, free s/sheet, etc. TISRC, 76 Churches, Larkhall, Lanarkshire (0698) 883334.

G2VF D.I.Y. LOOP ANTENNAS. Long, medium and short wave. Details SAE to Rylands, 39 Parkside Avenue, Southampton.

QSL CARDS. White and tinted. Send SAE for samples. EPS Copycentre, 180 Portland Road, Hove, Sussex.

NEW AND USED AMATEUR RADIO equipment supplied, bought and exchanged. SAE for list. Calbresco Ltd, 258 Fratton Road, Portsmouth. Tel: (0705) 735003.

G5RV—FOR THE BEST RESULTS use open wire feeder. It's easy with our antenna insulator kit that includes 25 quick fit clip-on spreaders and 3 heavy duty ribbed insulators. £5.60 + 40p p&p. Viola Plastics, Dept RAD, 36 Croft Road, Hastings, Sussex.

BALDWIN ELECTRONIC ORGAN. Full pedal board. Rhythm unit. Capable expansion. £390. G2YS, OTHR, Tel: (0923) 776864.

PARTRIDGE G3CED: Antennas, ATUs, Rx/Tx, also DIY kits. Super bargains guaranteed. SAE details. 17 Ethel Road, Broadstairs, Kent. (0843) 62839.

MISCELLANEOUS

HEATHKIT. APPOINTED UK spares and service centre. Cedar Electronics, Unit 12, Station Drive, Bredon, Tewkesbury, Glos. Tel (0684) 73127.

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.

PATENTS, TRADE MARKS and DESIGNS—Booklets on request, Kings Patent Agency Ltd. Established 1886 (B. T. King MIMech., E. J. B. King, Regd. Patent Agents)—146a Queen Victoria Street, London EC4V 5AT. Tel: 01-248 6161. Telex 883805.

RADIO COMMUNICATION October 1984

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.

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.

PACKET RADIO: Just add one of our boards to your BBC/QL/Atmos/CBM computer and get into Packet—the most exciting mode yet! The fully assembled board features AX.25 protocol, built-in modem, CW ID, repeater operation, etc. £249. SAE details. Vomek Software, 11 The Dell, Stevenage, Herts.

MAIDENHEAD SQUARES PROGRAM. BBC or Electron, £5.00. G3ZPF, 502 Lapwood Avenue, Kingswinford, West Midlands DY6 8SG.

MORSE READER FOR Spectrum, Dragon, any Vic20. Self tracks approx 8/30 wpm. Spectrum needs no interface. Others use simple one transistor interface. Full instructions and cassette £6.00. Spectrum Morse Tutor, variable speed and spacing £4.50. J. E. Price, 4 Housman Walk, Kidderminster.

COMPUTER COMPATIBLE RTTY TERMINAL UNIT. Encoder/Decoder, 5 Volt supply, TTL output, 20-600 baud, Auto shift; £32.95. With Eprom and interface for Acorn Atom, £52.50. Both units ready-built and tested. Prices include p&p. SAE for details or call Plymouth 789220. G6AYY, QTHR.

BBC MICRO PROGRAMS... On line HF Field Day Contest Checker (3000 calls). Morse Tutor. QRA Calculator. See August RadCom. Send SAE for program specs. G. MacKenzie GM4NUN, 278 Ayr Road, Newton Mearns, Glasgow G77 6AQ.

AMTOR. SUPERB STANDALONE PROGRAM for Dragon 32/64 and TRS80 Color. Needs any RTTY T.U. and our timer/PTT board. ARQ, FEC and Listen modes. Split screen, type ahead, QSO review etc. Advanced RTTY programs also for CBM64, Vic20, Atom (Utility ROM). Also for Dragon: Morse transceiver, tutor, Basiccode receiver, Aldream assembler, monitor, dis-assembler. On tape cartridge and Dragon disk. SAE for details. Grosvenor Software (G4BMK), QTHR. (0323) 893378.

BBC MICRO SOFTWARE. RTTY transceiver program in ROM which is entered simply by typing "RTTY". Terminal unit pcbs, kits and built boards now available. Sophisticated Morse teacher, slow Morse broadcast software, Morse beacon. Written by professional software designers. Send large SAE for detailed technical specifications. GOC Software Limited, "CQ Cottage", Longhill Lane, Audlem, Cheshire CW3 0HU.

RTTY and CW TRANSCEIVE with no TU for CBM64. Very sophisticated program yet easy to use. Split screen, type ahead, 26 saveable memories, CW Ident, several baud rates and shifts, any CW speed, QSO review and much more. Needs only a very simple interface (components supplied). BBC-B and VIC20 versions coming, phone for availability. Tape, instructions, interface components £17.50 inc. p&p. Technical Software (GW3RRI), Fron, Cesarea, Caernarfon, Gwynedd (0286) 881886.

MORSE TUTOR CBM64, VIC20, BBC-B, Spectrum, ZX81-16k. Superb program, very easy to use. Absolute beginner to any test standard. Learn in stages, random letters, figures, words, plain language. Any amount, any speed. Tape, instructions, comprehensive learning guide £6 inc. p&p. GW3RRI, see ad above.

RAE MATHS TUTOR CBM64, VIC20, BBC-B, Spectrum, ZX81-16k. Gives unlimited practice and testing in all RAE formulae to make you perfect in this vital part of the exam. Don't let the maths make you fail. Pass with this program. Tape, instructions, complete reference sheet £8 inc p&p. VIC20 needs expansion. GW3RRI, see ad above.

LOCATOR CBM64, VIC20, BBC-B, Spectrum, QTH or Universal (Maidenhead) locators or lat/long. Distance, beam and return headings, VHF contest points and totals, long path details, converts between locator and lat/long. Tape, instructions £6 inc p&p. GW3RRI, see ad above.

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 Tolken, Fairmount House Hotel, Herbert Road, Chelston, Torquay TQ2 6RW. Tel (0803) 605446.

Technical Sales Executive

IQD Limited, located in the Somerset town of Crewkerne, manufactures and distributes quartz crystals, oscillators and communications equipment. We are a small, progressive and fast expanding company and our products are sold to electronic equipment manufacturers and communications systems users both here and abroad.

We need an engineer who, after product training, will join the sales team to act in a technical liaison role, reacting to customers' enquiries by providing advice to their engineers on the application of products and handling orders from buying departments.

While the position is office based, regular travel is necessary to maintain contact with important customers and to conduct demonstrations and commissioning tests in the field.

Probably over 25, the successful applicant will have a practical working knowledge of electronics, including both digital and continuous wave circuitry; a formal qualification is desirable but not essential, and experience of 2-way radio systems would be an advantage.

This is a real career opportunity to progress with this expanding company and remuneration is likely to prove no difficulty for the right applicant; assistance with relocation expenses will be provided if appropriate.



Please send C.V. to: The Development Director, IQD Limited, North Street, Crewkerne, Somerset, TA18 7AR, England.

RSGB MAIL-ORDER PRICE LIST

	Non-members' price	Members' price		Non-members' price	Members' price
RSGB books			Other publications		
<i>A Guide to Amateur Radio</i> (19th edn)	£3.44	£3.10	<i>Active-filter Cookbook</i> (Sams)	£12.71	£11.44
<i>Amateur Radio Awards</i> (2nd edn)	£3.41	£3.07	<i>All About Cubical Quad Antennas</i> (RPI)	£5.83	£5.25
<i>Amateur Radio Operating Manual</i> (2nd edn)	£5.22	£4.70	<i>Amateur Single Sideband</i> (Ham Radio)	£5.46	£4.91
<i>HF Antennas for All Locations</i>	£6.91	£6.22	<i>Amateur Television Handbook</i> (BATC)	£2.55	£2.30
<i>Microwave Newsletter Technical Collection</i>	£6.83	£6.15	<i>Amateur Television Handbook Vol 2</i> (BATC)	£2.77	£2.49
<i>Morse Code for Radio Amateurs</i>	£1.31	£1.18	<i>AMSAT-UK Technical Manual</i> (AMSAT-UK) (Includes all revisions and updates, including Oscar 10 data sheets)	£14.65	£13.18
<i>RSGB Amateur Radio Call Book</i> (1984 edn)	£7.14	£6.43	<i>Antenna Anthology</i> (ARRL)	£3.83	£3.45
<i>Radio Amateurs' Examination Manual</i> (10th edn)	£3.42	£3.08	<i>ARRL Antenna Book</i> (ARRL) (New edn)	£8.78	£7.90
<i>Radio Communication Handbook</i> (5th edn) Vol 2	£9.16	£8.24	<i>ARRL Electronics Data Book</i> (ARRL)	£4.47	£4.02
<i>Radio Communication Handbook</i> (Vols 1 and 2 combined, paperback)	£10.91	£9.82	<i>Beam Antenna Handbook</i> (RPI)	£6.83	£6.15
<i>Raynet Manual</i> (1984 edn)	£2.78	£2.50	<i>Better Short Wave Reception</i> (RPI)	£6.83	£6.15
<i>Teleprinter Handbook</i> (2nd edn)	£13.84	£12.46	<i>Care and Feeding of Power Grid Tubes</i> (Varian)	£6.83	£6.15
<i>Television Interference Manual</i> (2nd edn)	£2.13	£1.92	<i>CMOS Cookbook</i> (Sams)	£13.07	£11.76
<i>VHF/UHF Manual</i> (4th edn)	£10.31	£9.29	<i>Complete DX'er</i> (W9KNI)	£7.77	£6.99
<i>World at Their Fingertips</i> (paperback)	£7.75	£6.98	<i>Complete Shortwave Listener's Handbook</i> (Tab)	£12.21	£10.99
RSGB logbooks			<i>Design of VMOS Circuits with experiments</i> (Sams)	£8.50	£7.65
<i>Amateur Radio Logbook</i>	£2.77	£2.49	<i>English-French QSO Language Instruction</i> (out of print)	—	—
<i>Mobile Logbook</i>	£1.14	£1.03	<i>FET Principles, Experiments and Projects</i> (Sams)	£8.04	£7.24
<i>Receiving Station Logbook</i>	£2.72	£2.45	<i>FM and Repeaters for the Radio Amateur</i> (ARRL)	£4.30	£3.87
RSGB maps, charts and lists			<i>G-QRP Club Circuit Book</i>	£4.19	£3.77
<i>HF Awards List and Countries List</i>	48p	43p	<i>Hints and Kinks for the Radio Amateur</i> (ARRL)	£4.47	£4.02
<i>Great Circle DX Map</i> (wall)	£2.12	£1.91	<i>How to Troubleshoot and Repair AR Equipment</i>	£10.47	£9.42
<i>IARU Region 1 Beacon List</i>	35p	32p	<i>IC Op-amp Cookbook</i> (Sams)	£11.76	£10.58
<i>IARU QTH Locator Map of Europe</i> (wall)	£1.43	£1.29	<i>International VHF FM Guide</i>	£2.45	£2.21
<i>QTH Locator Map of Western Europe</i> (wall)	£1.43	£1.29	<i>Newcomer's Guide to Simplex and Repeaters on 2m</i> (UK FM Group)	£1.06	95p
<i>QTH Locator Map of Europe</i> (card for desk)	76p	68p	<i>Radio Amateurs Antenna Handbook</i> (RPI)	£6.88	£6.19
<i>UK Beacon List</i>	35p	32p	<i>Radio Amateur Callbook</i> (1984 USA listings) (ARCI)	£16.93	£15.24
<i>UK Repeater List and maps</i>	45p	41p	<i>Radio Amateur Callbook</i> (1984 DX listings) (ARCI)	£16.23	£14.61
<i>World Prefix Map in full colour</i> (wall)	£2.17	£1.95	<i>Radio Amateurs Handbook</i> (1984) (ARRL)	£9.71	£8.74
<i>Meteor Scatter Data</i>	£3.24	£2.92	<i>RTTY Today</i> (UEI) (A modern guide to rtty)	£7.19	£6.47
RSGB members' sundries (members only)			<i>Radio Frequency Interference</i> (ARRL)	£4.18	£3.76
<i>Radio Communication Easibinder</i>	—	£4.50	<i>Satellite Experimenters Handbook</i> (ARRL)	£9.90	£8.91
<i>RSGB badge car sticker</i>	—	49p	<i>Satellite Tracking Software for the Radio Amateur</i> (AMSAT-UK)	£4.47	£4.02
<i>RSGB belt</i> (real leather)	—	£7.57	<i>Secrets of Ham Radio DXing</i> (Tab)	£7.92	£7.13
<i>RSGB hf contest log sheets</i> (100)	—	£2.10	<i>Semiconductor Data Book</i> (Newnes)	£7.97	£7.17
<i>RSGB vhf contest log sheets</i> (100)	—	£2.10	<i>Shortwave Propagation Handbook</i> (Cowan)	£7.79	£7.01
<i>RSGB teeshirt</i> (extra large only)	—	£3.13	<i>Simple Low-cost Wire Antennas</i> (RPI)	£6.83	£6.15
<i>RSGB tie</i> (coffee, maroon, green or blue)	—	£3.03	<i>Solid State Design for the Radio Amateur</i> (ARRL)	£7.87	£7.08
<i>RSGB callsign cap</i>	—	£4.98	<i>Television for Amateurs</i> (BATC)	£2.23	£2.01
<i>RSGB station callsign plaque*</i>	—	£9.50	<i>UHF-Compendium Parts 1 and 2</i>	£14.43	£12.99
<i>Standard callsign lapel badge*</i>	—	£1.96	<i>Understanding Amateur Radio</i> (ARRL)	£4.73	£4.26
<i>De-luxe callsign lapel badge*</i>	—	£2.80	<i>VHF Propagation Handbook</i> (Nampa)	£3.75	£3.38
<i>Lapel badge</i> (RSGB emblem, pin fitting)	—	59p	<i>Weekend Projects for the Radio Amateur</i> (ARRL)	£4.95	£4.46
<i>Mini lapel badge</i> (RSGB emblem, pin fitting)	—	68p	<i>World Atlas</i> (RACI)	£3.35	£3.02
<i>Members' headed notepaper</i> (50 sheets) quarto	—	£1.00	<i>World Radio TV Handbook 1984</i>	£12.25	£11.03
<i>Members' headed notepaper</i> (50 sheets) octavo	—	57p			
*Delivery approximately five weeks.					
Miscellaneous					
<i>"Amateur radio" (two colours) car sticker</i>	62p	56p			
<i>DX Edge</i> (HF propagation prediction aid)	£13.98	£12.58			
<i>"I'm on the air with amateur radio" (four colours) car sticker</i>	84p	76p			
<i>"I'm monitoring -5 are you?" (two colours) car sticker</i>	62p	56p			
<i>QSL card holders</i>	£1.23	£1.11			
<i>Radio Communication back issues</i> (As available)	£1.01	91p			
<i>Radio Communication bound volume, 1980</i> (Parts 1 and 2)	£14.93	£13.44			
<i>Radio Communication bound volume, 1981</i>	£14.93	£13.44			
<i>Radio Communication bound volume, 1982</i>	£15.93	£14.34			
<i>Radio Communication bound volume, 1983</i>	£16.90	£15.21			
<i>Smith charts, pad of 25</i> (Chartwell D7510)	£2.23	£2.01			

ORDERING INFORMATION

NON-MEMBERS. Use left-hand price columns. Note that members' sundries are only available to members of RSGB.

MEMBERS. Use right-hand price columns. It is essential that you quote your call sign or BRS number so that you can be recognised as a member.

PRICES. These include postage, packing and VAT where applicable. For airmail despatch, please ask for price before ordering. Goods are obtainable, less p & p, at RSGB headquarters between 10am and 4pm, Monday to Friday.

POSTAL TERMS. Cash with order. **Stamps and book tokens cannot be accepted.** Cheques and postal orders should be crossed and made payable to "Radio Society of Great Britain". Our Giro account number is 5335256. Please write your name and address clearly on the order, and allow up to 28 days for delivery.

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)	£22.22	£20.00

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)

Fancy something a bit lower down?!

—then turn your 144MHz multi-mode into a high performance 9 band HF transceiver with the TVHF 230c HF Transverter



TVHF 230c

£334.90 inc VAT (carr £5)

*As reviewed in
September's 'Amateur Radio'

The TVHF 230c 144MHz to hf transverter is a complete self-contained transmit and receive frequency translation system from 144MHz to all 9 current amateur hf allocations.

Most multimode 144MHz transceivers possess somewhat limited dynamic performance (unless a muTek front-end is fitted!) and will restrict the potential performance of the complete system unless the transverter is designed with a degree of cunning.

HF is a rather different environment to that at VHF! Signals are more numerous and their absolute levels tend to be greater. External noise levels limit the usable sensitivity. Presented with the output of existing amateur HF transverter designs, many VHF transceivers simply give up! To overcome this problem the TVHF 230c has extensive filtering and employs the technique of 'noise equalisation'. This is a technique, used here for the first time in amateur radio equipment, in which the sensitivity of the transverter is tailored so that it is consistent with external noise; this ensures optimum dynamic performance from the system on each band. A front-panel switchable preamplifier provides the extra sensitivity needed when using electrically small antennas.

Another important factor in good receiver performance is the cleanliness of the local oscillator. The frequency synthesiser employed in the TVHF 230c has been designed around an LSI controller chip, and benefits from muTek's considerable experience in this field. Both the noise performance and reference sideband suppression are excellent and will not be the limiting factor in most instances.

The transmit side has also been designed with high performance in mind. The 10W pep output is generated by a push-pull pair of hf power transistors of 50W combined dissipation rating in class-AB driven by a class-A amplifier. The output level selected is compatible with many existing linear amplifiers and indeed is itself quite adequate in many applications. An ALC loop and excess VSWR protection circuitry are incorporated to ensure long-term reliability and a clean signal.

Connection to the 144MHz transceiver could hardly be simpler. The transverter will accept anywhere between 1 and 5W pep input drive without need for adjustment, and up to 20W pep with the optional VFAT 206 power attenuator. The TVHF 230c has built-in rf sensing and also a facility for hard-line (ground-on-transmit) control from the 144MHz transceiver. RF switching will always override this function in order to prevent potentially expensive accidents! The TVHF 230c requires 12.5 to 14.5v at 4A (ripple voltage less than 0.5v p-p), and so is ideal for portable and mobile operation in addition to fixed use with a suitable power supply.

muTek limited — the rf technology company

Dept. RC, Bradworthy, Holsworthy, Devon EX22 7TU (0409 24) 543



YAESU MUSEN



FT77

YAESU MUSEN

Utilizing a new
CAD/CAM
method now
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, FV700D Digital Scanning VFO and Memory System, FTV700 V/UHF Transverter 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 (A// 8 bands)

FREQUENCY RESOLUTION
100Hz (Digital Readout)

FREQUENCY STABILITY
Better than 100Hz/1 Hr After warm up
Better than 300Hz during 1 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 x 245/248W x 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/CWW): 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 SUPPRESSIONS
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)
FV700D Synthesized external VFO/memory
MMB16 Mobile bracket (accepts FT & FV &/or FC)
FTV700 VHF/UHF monoband transverter frame
*TV 6m, 4m, 2m, 70cms module

INTERNAL OPTIONS

D3000277 AM Board (Tx & Rx)
D3000233 FM Board (Tx & Rx)
D3000234 Crystal Marker (25KHz)
XFB-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
YM36 Hand, 'Noise cancel'
YM37 Hand, 'Economy'

SOUTH MIDLANDS COMMUNICATIONS LTD
SM HOUSE, RUMBRIDGE ST
TOTTON, SOUTHAMPTON SO4 4DP



YAESU MUSEN'S ONLY
AUTHORISED UK DISTRIBUTORS



AMATEUR ELECTRONICS UK
504-516 ALUM ROCK ROAD
ALUM ROCK,
BIRMINGHAM 8