

RADiO COMmunication

December 1983



CHRISTMAS CHEER



Journal of the Radio Society of Great Britain

ANNEE MONDIALE DES
COMMUNICATIONS
WORLD COMMUNICATIONS
YEAR
AÑO MUNDIAL DE LAS
COMUNICACIONES



1983





Amcomm

Wishes you a Merry Xmas
with prices to prove it



YAESU FT980 GENERAL COVERAGE TRANSCEIVER

Yaesu said the FT1 was an adventure in electronics and we agreed. The FT980 is something quite different. IT'S AN ACCOMPLISHMENT IN ELECTRONICS providing the operator with a brilliantly designed transceiver with a wealth of features. Every feature has been carefully designed in to ensure the operator has MAXIMUM BENEFIT without gimmicks, while allowing INCREDIBLE EASE OF OPERATION. We'd need more than this page to do justice to the FT980 so we suggest you call in and try it for yourself or call 01-422 9585 for a beautifully illustrated leaflet with a full description. Yes it is expensive... the best usually is unless a way can be found to ease the pain... AMCOMM ARE EXPERTS AT THAT... TRY US.

THE FM MOBILES

There are many on the market these days and it must be difficult for the buyer to make a decision. DON'T LET IT WORRY YOU for we have exactly the same problem. We've searched the specs, tested the performance and analysed the reliability and our findings are simple... THEY ARE ALL GOOD... some have this and some have that, some are black, some are grey but they all have one thing in common... VALUE FOR MONEY. If you like it and it suits you then it's the one for you. It leaves only one problem... THE PRICE. Our Welsh friends are forever repeating our original copy "HELPING WHERE IT HURTS". We haven't changed, we're still easing the pain. Call 01-422 9585 and stop hurting.

ICOM ICR70 GENERAL COVERAGE RECEIVER

Our ads have said it all year "SILKY SMOOTH APPEARANCE WITH THE SILKY SMOOTH PERFORMANCE". What we did not mention was THE SILKY SMOOTH PRICE. We are still not going to but call 01-422 9585 and you will have yourself a merry christmas for sure at a price you will not refuse. Other receivers available FRG7700, KENWOOD 2000. Call for quote.



DATONG SRB2 and DATONG ANF

From the remarkable man in the north a pair of real SHOW STOPPERS... the SRB2 Auto Blanker for the nasty woodpecker... and it really works... the SRB2 locks on to the woodpecker as it appears and GETS RID OF IT just as fast, QRM GONE... QSO ON. The Automatic Notch Filter is really IMPRESSIVE... if you spend any time on the LF portion of 80mts you need to be a brave man to last the evening... with the ANF you'll lose a lot of sleep but your COUNTRIES SCORE WILL SOAR... You are sure to get one sometime why not now. Call 01-422 9585.

YAESU 757GX GENERAL COVERAGE RECEIVER

The requests for leaflets of this unit has been incredible. Most of you have the information you need to make a decision, however there is one question left to ask. CAN MR. YAESU PRODUCE ENOUGH TO MEET THE DEMAND? The competition are already in a state of depression... read on... this is the complete HF rig and includes as standard FULL BREAK IN, CW FILTER, KEYS, MARKER, IF/WIDTH SHIFT, NOISE BLANKER, SWITCHABLE AGC and RF PRE AMP. It also has AM and FM fitted. General coverage 150kHz-29.999MHz plus TWIN VFO's. Call 01-422 9585 if you require more information and we will give you a Christmas surprise with the price.

Stop Press! Yaesu Lads on Nightshift.

THE HANDHELDS

The recent rise in popularity has kept us in short supply for most of the year, but we hope to have PLENTY IN TIME FOR CHRISTMAS. If you gift wrap it he (or she) will never guess it's a transceiver. Imagine THE SHEER JOY on his (or her) face when he (or she) unwraps the neat little package. Whether a YAESU FT208 or FT708 or one of the Icom twins IC2E or IC4E our CHRISTMAS OFFER will delight you. Call 01-422 9585 for immediate despatch.



AMTECH 300B ANTENNA COUPLER

BRITISH MADE and MADE TO LAST... thousands in use throughout the world and priced to suit your pocket. Rated at 300 watts P.E.P. this coupler is suitable for coaxial fed antennas or random wires... just compare the price with anything else available and you'll understand why users say it's SUPER VALUE... at £49.95 including carriage. It really is our STAR BUY. Call 01-422 9585 for fast delivery.



ROTORS

HIRSCHMANN 250. There is no better buy on the market than this. A lightweight Rotor suitable for most VHF antennas. It's yours for £45... Carr and ins. £1.50.

SKYKING SU4000. An outstanding Rotor for large VHF arrays or light HF beams. A delightful illuminated compass readout. NICE ONE AT £85.00 CARR & INS. £1.50.

YAESU FT726R 2m/70cms/SAT

Without a doubt THE RIG OF THE YEAR and a clear indication of YAESU's view of the future of amateur radio (ring us and we will explain that). It's a bit much to expect one to be in the shack on Christmas morning but we HOPE YOU ARE ONE OF THE LUCKY ONES, because we already have conspired with a few ladies (and one gentleman) to arrange special deliveries on Christmas morning. However, whether you are BUYING or HOPING, give us a nudge and we will ring THE CHRISTMAS BELL for you. 01-422 9585 for BUYERS A SUPER PRICE... for DREAMERS a chat and a leaflet with details.

YAESU FT290RB 2m ALL MODE TRANSCEIVER

The world's BIGGEST and FASTEST SELLING TRANSCEIVER EVER, still without a competitor in sight. This versatile rig is a REAL XMAS GIFT from AMCOMM to you at a price YOU'LL NEVER SEE AGAIN. You don't believe us? Call 01-422 9585 FOR YOUR XMAS SURPRISE. N.B. Competitors please call after 6.00 p.m.

THE ICOM NEW ONES

ICOM have been busy little boys this year. THREE NEW ONES all announced at the same time. IC751 GENERAL COVERAGE TRANSCEIVER... IC745 ALSO A GENERAL COVERAGE TRANSCEIVER. The differences are shown in the full illustrated literature which is yours for a phone call. Replacing the IC251E is the NEW IC271, it looks the part and our first buyers are saying it certainly lives up to the high standards everybody has come to expect from ICOM. 01-422 9585 FOR SUPER PRICE AND SUPER SERVICE.

UNION ELEC. WORLD TIME GLOBE

INSTANT TIME AT HOME AND ABROAD... simply turn the globe to the required country and it displays a red FLASHING LIGHT on that country. Beneath, IT DISPLAYS THE TIME IN THE UK AND THE COUNTRY OF YOUR CHOICE. Long life of batteries guaranteed by automatic switch off after 30 seconds... an IDEAL XMAS GIFT AT AN IDEAL PRICE £47.50 post paid. Call now 01-422 9585 FOR FAST DELIVERY.



YAESU FT102 9 BAND TRANSCEIVER

How does it go again? XMAS COMES BUT ONCE A YEAR AND WHEN IT COMES ITS VERY DEAR... DEFINITELY NOT TRUE THIS YEAR... ESPECIALLY WITH OUR YAESU FT102. DON'T WASTE TIME AND MONEY PHONING AROUND SIMPLY CALL AMCOMM ON 01-422 9585. WE'LL GIVE YOU YOUR BEST XMAS YET AND MANY HAPPY NEW YEARS WITH THIS SUPERB TRANSCEIVER. THE PRICE? THAT WILL COST YOU A PHONE CALL.

OUR MAIL ORDER SERVICE

The words we hear most frequently are "I REALLY DIDN'T EXPECT IT UNTIL NEXT WEEK". THEY REFER TO OUR MAIL ORDER SERVICE and come both by telephone and letter. When we say "IT WILL GO TODAY" we really mean that, the same day via red label special Securicor or first class post. You have very little to do, refer to the list below, pick up the telephone, quote your credit card number and the product is on the way to you... or drop a cheque in the post and goods will be despatched on receipt. WE PROMISE YOU ONE THING, the very least you'll save is the cost of a telephone call... TET, HYGAIN, YAESU, ICOM, TRIO/KENWOOD, MICROWAVE MODULES, BNOS, DATONG, JAYBEAM, TONNA, MORSE KEYS including HI-MOUND and the SWEDISH BRASS, UNADILLA, SKYKING, HIRSCHMANN, TONO, TASCOS, JVC PADDLE, VALVES, WELZ, MUTEK, HANSEN, DAIWA and many more. If you need it we probably have it. If you've got the time we've got the phone lines. We guarantee you'll save more than a phone call and not only at Xmas. All the year round call 01-422 9585 for fast quotes and fast delivery BACKED UP BY FIRST RATE AFTER SALES SERVICE. E. & O.E.

 Amcomm

194 NORTHOLT ROAD, SOUTH HARROW, MIDD. HA2 0EN. ENGLAND. TEL: 01-864 1166; 01-422 9585. TELEX: 24263

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

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

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

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

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

Sole Distributor Lowe Electronics Ltd.
Chesterfield Road, Matlock, Derbyshire DE4 5LE.
Tel: 0629-2817, 2430, 4057, 4996

London Lowe Electronics Ltd.
Lower Sales Floor, Hepworths, Pentonville Road, London.
Tel: 01-837 6702

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

The North East Lowe Electronics Ltd.
56 North Road, Darlington, Durham.
Tel: 0328 486121

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

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

East Scotland Jayces Electronics
20 Woodside Way, Glenrothes, Fife KY7 5DE.
Tel: 0892 756962

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

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

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

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

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

Yorkshire Leeds Amateur Radio
27 Cookridge Street, Leeds LS2 3AG.
Tel: 0532 452657

Northern Ireland George Moore Electronics
7 Cyprus Avenue, Belfast BT5.
Tel: Belfast 647570

the **new** hf amateur band transceiver and general coverage receiver... the Trio TS430S



TS430S £736 inc VAT

"Digital DX-terity" is a phrase that describes simply the new HF transceiver from Trio. Combining an amateur band HF rig with the facilities of a general coverage receiver, the TS430S provides today's discerning amateur with a transceiver which enables him not only to communicate with his fellow amateurs but to listen to the broad spectrum of shortwave communication worldwide.

- * The rig covers 160-10 metres, the amateur bands, plus 150 KHz-30 MHz as a general coverage receiver.
- * USB, LSB, CW, AM modes are provided. FM is also available by adding the optional FM430 receive/transmit unit.
- * A compact and lightweight design - 270mm wide, 96mm high and 275mm deep, the TS430S weighs only 6.5 Kg (14.3 lbs) and can be said to be a true portable transceiver, ideal for both shack and mobile use.
- * The TS430S has dual digital VFO's operating independently in 10 Hz steps. Both VFO's store frequency, band and mode of operation. The tuning dial torque is adjustable to suit the operator and a step switch provides a fast frequency shift for the VFO (100 Hz steps). An "A=B" switch shifts "B" VFO to "A" VFO frequency and mode, or vice versa. There is also a frequency lock switch, RIT for VFO or memory and an up/down manual scan facility from the optional up/down microphone.
- * An all solid state transceiver, the input is rated at 250W PEP on SSB, 200W DC

on CW, 120W on FM (with optional FM board fitted) and 60W on AM.

- * The rig operates from a 13.8V DC source or by using the optional PS430, 240 volts AC supply.
- * The digital readout indicates frequency to 100 Hz (readout is internally modifiable to 10 Hz).
- * Eight memories store frequency, mode and band data. The eighth memory stores the receive and transmit frequencies independently.
- * An internal lithium battery having an estimated five year life is provided for memory back-up.
- * Memory Scan.
- * Programmable automatic band scan width.
- * IF shift for minimum QRM.
- * Tunable notch filter.
- * Narrow/wide filter selection on SSB, CW and AM (filter optional).
- * Speech processor built in.

Optional Accessories

PS430 matching AC power supply.
SP430 external speaker.
MB430 mobile mounting bracket.
FM430 FM board.
YK88C 500 Hz CW filter.
YK88CN 270 Hz CW filter.
YK88SN 1.8 KHz narrow SSB filter.
YK88A 6 KHz AM filter.
MC42S up/down fist microphone.
MC60A deluxe desk microphone with up/down switch.

TRIO

TRIO-KENWOOD CORPORATION

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

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

TR9130 TWO METRE ALL MODE TRANSCEIVER

This rig is proof, if one needed it, that TRIO do not bring out new models just for the sake of it. The TR9000 is remembered as a classic rig and today people are still asking for second hand ones. They're even a rarity on our S/H shelf. The TR9130 incorporates the improvements that all amateurs asked for, green display, reverse repeater, tune whilst transmitting, higher power, more memories and of course memory scan. TRIO's answer, the TR9130.
TR9130 . . . **£433.32** inc VAT.



TS780 DUAL BAND BASE STATION TRANSCEIVER

The TS780 is the perfect base station VHF/UHF transceiver for the enthusiastic operator. The rig has all the necessary control functions essential for operating on both today's busy two metre band and the wide open spaces of seventy centimetres. Full repeater facilities plus reverse repeater are included and the transceiver has the usual memory channels (10), two VFOs, up/down frequency shift microphone, IF shift, two priority channels, memory and band scan etc. A superb rig, I have one myself, write for a full enthuse!
TS780 . . . **795.00** inc VAT.



TR7930 TWO METRE FM MOBILE TRANSCEIVER

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

TR7930 . . . **£305.21** inc VAT.



R2000 GENERAL COVERAGE RECEIVER

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

R2000 . . . **£398.82** inc VAT.



TS930S HF TRANSCEIVER WITH GENERAL COVERAGE RECEIVE FACILITIES

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

TS930S . . . **£1150.00** inc VAT.



TR2500/TR3500 HANDHELD TRANSCEIVERS

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

TR2500 . . . **£232.53** inc VAT.
TR3500 . . . **£250.70** inc VAT.



TS530S HF AMATEUR BAND TRANSCEIVER

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

TS530S . . . **£595.00** inc VAT.



TW4000A DUAL BAND FM TRANSCEIVER

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

TW4000A . . . **£469.00** inc VAT.



just a part of the range

**LOWE
ELECTRONICS Ltd**

CHESTERFIELD ROAD MATLOCK DE4 5LE TEL 0629 2430/2817



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

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

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

UNIQUE CONTROLLERS

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



PRESET CONTROLLER

ROUND CONTROLLER

SAFE OPERATION

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

DEPENDABILITY

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

QUIET OPERATION

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

EASY MAST ALIGNMENT

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

SUMMARY

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

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

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

the **LS20XE** from **Belcom**

*The rig you will forget you are carrying.....

With overall dimensions of 140mm high, 69mm wide, 26mm deep and weighing only 260 grams (including aerial and batteries), the LS-20XE fits easily into your pocket giving perfect portable communication.

*Long range communication.....

A newly developed dual gate MOS FET is used in the RF stage of the transceiver which considerably improves receiver performance. The internal 50mm diameter speaker ensures clear audio under difficult portable conditions.

*Full coverage of 2 metre amateur band.....

The transceiver covers 144 to 146 MHz in 5 kHz steps and has repeater shift and automatic tone burst.

*Switchable output power for extended operation.....

In order to extend portable operation, transmission power level is switchable, 1w, 500mW and 100mW, so depending on the terrain and conditions, the most economical level can be selected.

*Simple to operate.....

Simplicity of operation is a special feature of this rig and many optional accessories are available. Of major interest is the matching headset SH-2 having built-in vox, this convenient accessory provides simple and safe operation whilst cycling, walking etc.



LS20XE £128 inc VAT

What is so special about it? It's the first truly general coverage VHF/UHF monitor receiver. 25-550MHz with no gaps.

Is it more sensitive than the Bearcat/SX200N/Gemscan or whatever? You're damn right it is. Measured sensitivity of 0.2µV for 12dB SINAD on FM(N) at any frequency in the band is quite incredible, and far far better than anything else available.

Does it have any spurious responses? None that we can find. With a first IF of 750MHz, there are literally no images to be found, and the design is so excellent that we have literally not found any signals that were not genuine.

Is it AM or airband only? No, you can select any mode in addition to frequency, so it's entirely flexible.

How many memory channels? 20, and they store the mode in addition to frequency, so you can leap from Radio 1 VHF FM to 2 metre amateurs, to TV sound and back to AM airband, just as you wish.

Is a power supply provided? No, you can use any convenient 12V dc supply at about 300mA. A suitable mains/12V regulated supply can normally be supplied at less than £10.00.

Is a telescopic whip provided? We are glad to say no to this one. With a high performance receiver like the AR2001, using a telescopic whip is like owning a Ferrari and fitting it with second hand remould tyres. Use an external aerial, has always been our advice. Even a simple one will be far better than a short internal whip.

What are the scanning steps? They are 5kHz, 12.5kHz and 25kHz, so all normal commercial amateur and military channel spacings are catered for.

Is there a search facility? Yes, you can enter any two frequencies and automatically search between them in any mode and any of the three channel spacings. You can also choose whether to scan low to high, or high to low. Two search speeds are available.

Is there a priority channel? Yes, any frequency and mode entered in memory 01 can be automatically monitored at 2 second intervals. If a signal appears, the receiver will hold on channel 01 until the transmission ceases.

Is a delay function provided? Yes, a 2.5 second delay can be added to the end of each transmission so that two way conversations can be monitored.

AR2001

YOUR QUESTIONS ANSWERED

HEAD OFFICE AND SERVICE CENTRE

LOWE ELECTRONICS LTD, CHESTERFIELD ROAD, MATLOCK, DERBYS. TEL: 0629 2817 or 2430. TELEX: 377482. OPEN TUES FRIDAY 9.30, 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

EMPORIUM NEWS

Good Morning,

First of all an apology, the NEW Lowe Electronics shop will not be located at 21 Moira Terrace, Cardiff. It **WILL** be in Cardiff but more of that later, watch this space!

This year, for a change, I thought it would be nice to have a **Lowe Electronics competition** to keep you all amused after the Christmas festivities, so when you have **finished the turkey**, consumed the last morsel of Christmas pudding and hopefully not choked on a 10p piece, **toasted the health of the RSGB** and success to all amateur radio dealers in the coming year then you can try our competition. A simple one really, not designed to tax you to a great deal, after all you are on holiday.

The competition is as follows: below you will find a photograph taken many years ago at what appears to be a **demonstration** of our hobby, amateur radio. In the picture you can see five small boys and for convenience I have numbered them from **one to five**, the identity of two of the boys I know. To enter the competition you have to guess the names of two of the boys pictured in the group and of course give me their respective numbers.



Mark your answers on one of your **QSL** cards or if you don't have any, a plain postcard and send them to me at our Matlock address **before the end of January**. On the first of February or thereabouts I will get one of the impartial female members of staff to select a card out of the bag, the first one having my correct answer **will win a TRIO HS4 set of headphones**.

If the winner has listed on his card the amateur radio magazines he regularly reads, he will receive, as a bonus, a 12 months warranty on the headphones. **I jest!** I would be more than grateful if you would list, on the back of your entries, the magazines you read. The information would be most helpful. So much for the Christmas competition. By the way the **following people are banned from entry**, Lowe Electronic company

employees, those who are paid their salary by the RSGB and their respective families.

The **TELEREADER** super deluxe model **CWR685E** which is the one with receive/transmit plus a high definition green monitor screen and beautiful keyboard, has been hooked up to my **TRIO TS780** for the past couple of weeks. Great fun I have had, especially with the test transmissions, so if you hear **quick brown foxes** etc then undoubtedly it's me. Seriously though, the three **TELEREADER** models that we stock are receiving much attention out in the shop and as soon as we have sufficient stock then you will also be able to see them at our shops up and down the country. **CWR685E**, £730.94 inc VAT carr. £6.00, **CWR670E**, £335.00 inc VAT carr. £6.00, **CWR610E**, £175.00 inc VAT carr. £2.50.

Last week the Company zoomed up the **Great North Road** to Darlington and at the **Blackwell Grange Moat House Hotel**, in front of an invited audience, John gave a technical lecture on the **TRIO TS930S** which was very well received. Much discussion followed the lecture and I can truly say a most informative time was had by all. If your club would like to avail themselves of the **"LOWE SERIES OF TECHNICAL LECTURES"** then please contact me here at Matlock. The 1984 lecture tour is in addition to the Lowe profile seminars on the **TRIO** product range by David and myself.

By the time you read this we should have in stock again the superb **BELCOM LS20XE** two metre pocket transceiver, still priced at £128 inc VAT, carriage £2.50. This transceiver has to be the best way of getting on two metres and provides for its owner, portable operation on a band which of late **almost guarantees a contact** at any time of day or night.

There are going to be many waiting for the **AR2001** 25 to 550MHz receiver. I have never known a piece of equipment catch the attention of so many people so quickly. **Almost all who enquire** put their names on the waiting list which has now grown to such a length that we are thinking of employing one person full time to administer it. I have used the equipment now over several weekends and must confess the **quality** of audio from such a small unit is outstanding. Over the last few weeks we have received similar questions on the **AR2001** and as an aid to you I have included on the opposite page both the questions and our answers.

By now I am sure you will have noticed that **TRIO** have the most complete range of accessories available to improve both station performance and **your operating technique**. I will mention some of the many items. Perhaps my wife will read the column this month and decide to put some thought into my Christmas present this year. After all to buy me **after shave lotion** for the last consecutive five years when I have had a beard for the last fifteen years is a bit much, unless she is trying to tell me something. I am sure that you **don't** have my problems and I am equally certain that you won't have to resort to leaving the magazine open at this page in order to receive the item of your choice.

SW100A and **B** mobile SWR meters £37.26 each inc VAT carr. £2.50, **SW200A** and **B** base station SWR meter £80.50 each inc VAT carr. £2.50, **HS4** headphones £11.27, **HS5** headphones £23.00, **HS6** headphones £16.79 carr. on above headphones £1.50, **HS7** headphones £11.27 carr. £0.75, **SWC1** and 2 optional couplers for the SW200 series £22.50 each carr. £1.00, **MC55** mobile microphone with timer and adjustable gain £37.26 carr. £2.00, **HC10** Ham clock £67.62 carr. £2.50, **SP40** high output mobile speaker £14.26 carr. £1.00 and of course desk microphone, deluxe knob, crystal filter, flexible whip antenna, **TS930S**, **TW4000A**, etc. The list is endless but I am sure that the right remark at the opportune moment will result in a happy day and contentment for the family.

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

A Christmas Message

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

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

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

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

LUKE 2 V 8 to 14

A Peaceful Christmas to Our Friends

FROM THE COMPANY THAT SUPPLIES THEM ALL...

AMATEUR RADIO EXCHANGE

Once again we are pleased to bring to your notice details of new equipment available now, or available soon - also continuing our policy of bulk purchases for best prices we are able to offer many popular lines at superb prices.

Remember of course all our equipment can be purchased by mail order on credit card. We can also offer interest free h.p. on many items.



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FT757G
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Noise Blanker Pre-Amp A.M. F.M. S.S.B. Gen Coverage.

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(And also matching
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both bands. Voice synthesiser
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70cm all mode mobile ideal for
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F.M. & S.S.B. & C.W. 2V.F.O.
repeater shift
on 2 metres 600 K.C. 70cm
repeater shift by 2nd V.F.O.



THE NEW KENWOOD TM 201A 2 metres F.M. Rig Phone for Price



-with remote tuning head

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What's the celebration about? The IC-745...a new all band HF transceiver with SSB, AM receive only, CW, RTTY and FM option.. plus, a 100KHz - 30MHz general coverage receiver.

And...the IC-745 has a combination of features found on no other transceiver at such an incredibly low price.

The IC-745 is the only transceiver today that has so many standard features, options, and accessories available.

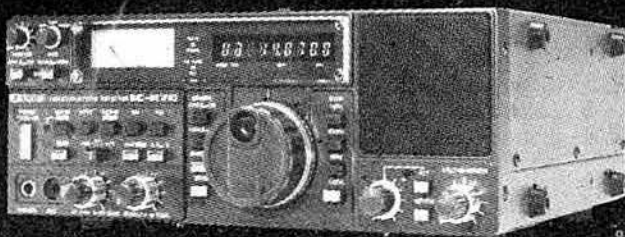
ICOM is simply the best amateur radio equipment built today. See the IC-745 at our shop and showroom at Herne Bay or contact your local authorised ICOM dealer for more information.

**Compare these
exceptional
features**

- 100KHz - 30MHz Receiver
- 16 Memories
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- IF Shift and Pass Band Tuning
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IC-R70, HF Receiver, £499.



The R-70 covers all modes (when the FM option is included), and uses 2 CPU-driven VFO's for split frequency working, and has 3 IF frequencies: 70MHz, 9MHz and 455KHz, and a dynamic range of 100dB. It has a built-in mains supply.

Other R-70 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 $0.32 \mu\text{V}$ for 12dB (S+N) - N, AM- $0.5 \mu\text{V}$, FM better than 0.32 for 12dB Sinad. DC is optional

IC-751, £969. HF Transceiver



Think about the IC-740.

One of the most popular amateur bands transceivers, make a few improvements such as adding 36 memory channels, doing away with mechanical bandswitching and then add full HF receive capability (0.1-30 MHz) which is even an improvement on the famous R70 and you get a pretty good idea of what the IC-751 is like. It is fully compatible with Icom Auto units such as the AT-500 and IC-2KL and a further option for computer control can be added. There is also a digital speech synthesizer option which will be ideal for blind operators. For power supplies you have the option of the IC-PS740 (which fits inside) or the PS-15/PS20 range for external use.

As you would expect there is a built in speech processor, a switchable choice of a J-FET pre-amp, straight through or a 20dB pin diode attenuator and two VFOs allowing split frequency operation.

Other standard features include:- 36 memory channels with scan facility and start/stop timers, a marker, 4 variable tuning rates, Pass Band Tuning, notch, variable noise blanker, monitor switch, DFM (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.

NEW! IC-120, 1296 MHz FM £419.



Thinking of 1296? Then Icom IC-120 could be the answer.

Now you can have the sophistication of today's technology on this up and coming band-all built into a unit the same size as the IC-25E, very compact...

Features include:

Frequency coverage 1260 - 1300

Adjustable Repeater Shift

6 Memories - with scanning facility

Spurious Emissions - 40dB or better

8 W and 16W (Puma) Linear Amps available shortly.

Output Power = 1 W or more

Mode:- FM

2 VFO's

Deviation + 5 KHz

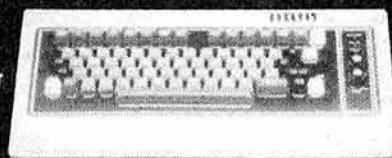
RIT

RTTY, Morse & ASCII

Shortwave listeners and amateurs are able to take more interest in other modes of transmission than speech with the latest range of decoders and senders available. As well as amateur transmissions, there is an abundance of news and other, interesting broadcasts which can be read using these space-age devices.

Some models in our range are the Tono 550, 9000E and the Telereader CWR-670, CWR-685E and CWR-610E. There is now available a professional version of the Tono 9000E, the PRO-1, which has a built-in scrambler. The Telereader CWR-670 is also available with a built-in VDU which can include a 40 column printer.

**TONO 9000E
Sender/Decoder
£669.**



Code Master CW/RTTY



**CWR-610E,
Decoder
£189.**

**TONO 550,
Decoder
£299.**



As U.K. importers of the renowned TONO and TELEREADER products, we can offer you a wide range, from a simple morse and RTTY reader which can be plugged into your TV, to a complete send and receive system with memories and built-in displays, or outputs for high-definition VDU.

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NEW! IC-271, £569. VHF Multimode Base station



Icom have made improvements to the IC-251 and brought it up to date. Power can be adjusted up to 25W on all modes SSB, CW and FM. Squelch works on all modes and a listen-input facility has been added for Repeater work. RIT shift is shown on the display. 10 Hz tuning facility. Options include a switchable front end pre-amp. SM5 desk mic Speech synthesizer announcing displayed frequency. 22 Channel memory extension - with scan facilities. Internal chopper PSU. Why not call us for further details?

IC-251E. Available at special price to clear, £479.



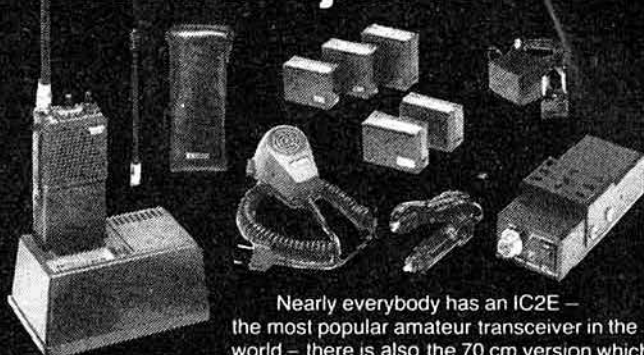
Icom produce a perfect trio in the VHF base station range, from 6 meters through 2 meters to 70cms. The IC-251E is the 2 meter station while the IC-451E is used for 70cms. The 251E is now available with Mutek front-end fitted.

IC-290D, VHF, £433. Multimode Mobile



The recently introduced IC-290H has proved so popular that we have decided to concentrate on this (25W) model 2m multimode. With its bright green display, 5 memories, scan facilities on either memories or the whole band, tone-call button on the microphone and instant listen input for repeaters, this little box really is a beauty. The 70cm version, the IC-490E has similar features (although the output is only 10W in this case).

IC-2E, VHF/FM, £179. IC-4E UHF, £199.



Nearly everybody has an IC2E - the most popular amateur transceiver in the world - there is also the 70 cm version which is every bit as good and takes the same accessories.

IC-25H/25E, £329/£369. VHF, FM Mobiles

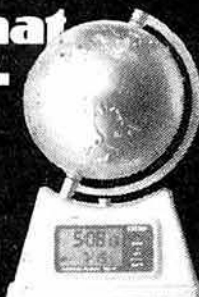


The FM mobile choice has to be the Icom IC-25E. It is so small yet boasts a powerful 25 Watt voice and a sensitive receiver. The new 25H now available has a green display and 45 Watts output. There are five easily programmable memories, and facilities for changing the repeater shift from the default value of 600kHz.

Do you know what time it is! £59.

When the globe of this digital clock is revolved, a red lamp indicating a major city in the world will blink, and the current time of that city will be displayed in place of the date. At a glance know the current times of 24 different time zones throughout the world.

This mini-globe clock stands 195mm. high and also has an alarm fitted. This useful device should stop you getting your Amateur friends, on the other side of the world, out of bed in the middle of the night.



As well as stocking the complete ICOM range of equipment suitable for European use, we also sell Yaesu, Jaybeam, Datong, Welz, G-Whip, Western, TAL, Bearcat, Versatower and RSGB publications from our shop and showroom at the address below.

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Transceiver 1.8-30MHz
Receiver 1.8-30MHz

£2199.00**DRAKE TR7A**

The Transceiver others try to copy

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£552.00**BEARCAT SCANNERS****BC-100FB £345.00**

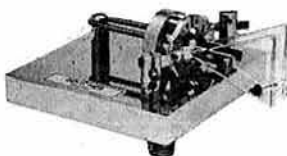
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How do they do it? - To get so much in so small a package - Just look at the features.

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FT-77 - New low price **£459** VAT incl.

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Now back in town by
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Your best buy at **£299** VAT incl.



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This famous set now comes at **£249** VAT incl.

FRG-7700 General coverage receiver

With memory **£389** VAT incl.
Less memory **£335** VAT incl.



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active antennas - complete range ex stock - Post free.

For full details of these new and exciting models, send today for our latest
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mation about these exciting developments from the World's No.1 manu-
facturer of amateur radio equipment is to send 36p in stamps and as an
added bonus you will get our credit voucher value £3.60 - a 10 to 1 winner!

FT-230R 2 metre 25 watt FM mobile

A marvellous buy at only **£239** VAT incl.



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70cm FM mobile

This is real value- for-money.

At the new price of **£259** VAT incl.

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FT-208R

FT-708R



FT-208R 2 metre FM hand-held

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FT-708R 70cm FM hand-held

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AX210N	10 ele. yagi for 2m crossed	74.95	(n/c)
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H815M25P	VP mini size 15m 2 ele.	69.50	(n/c)
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H834D	4 ele. tri band beam 10/15/20m	222.90	(n/c)
H835P	3 ele. tri band beam 10/15/20m	192.50	(n/c)
H835C	Tri band array 10/15/20m	283.95	(n/c)
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MV38H	Vertical for 10/15/20m	37.99	(n/c)
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H8210S	10 ele. dual driven yagi 2m	47.99	(n/c)
TE214	14 ele. long yagi 2m	74.40	(n/c)
SSL720	9 x 2 ele. (18) slot fed 70cm	77.20	(n/c)
H8235P	2 ele. tri band beam 10/15/20m	135.60	(n/c)
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SQ10	Swiss quad 10m	97.50	(n/c)
SQ15	Swiss quad 15m	106.90	(n/c)

YAESU ANTENNAS

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RSL145GP	1/2 wave base ant. 2m	21.20	(1.50)
RSL435GP	1/2 wave co-linear 70cm	31.60	(1.50)
HF Mobile			
RSL3.5	3.5MHz resonator & whip	12.21	(0.50)
RSL7.0	7.0MHz resonator & whip	11.80	(0.50)
RSL14.0	14.0MHz resonator & whip	11.45	(0.50)
RSL21.0	21.0MHz resonator & whip	11.20	(0.50)
RSL28.0	28.0MHz resonator & whip	11.00	(0.50)
RSL2A	Mast to suit above	5.00	(0.50)
RSM2	Gutter mount/Feeder/PL259 suit above	10.94	(0.75)
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RSL150SS	2m 1/2 wave PL259 shock spring	3.90	(0.50)
RSM2	Gutter mount/Feeder/PL259 (RSL145)	10.94	(0.75)
RSM4M	Heavy duty mag/Feeder/PL259	13.25	(1.00)
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RSL453S	1/2 wave antenna	15.50	(0.50)
ANTIFERRECE ANTENNAS			
VHF Mobile			
TAP3009	1/2 wave 3db snap-in hinged whip	13.00	(3.00)
TAP3677	1/2 wave 3db snap-in shock coil	14.56	(3.00)
TAP3002	1/2 wave unity gain snap-in hinged whip	9.96	(3.00)
UHF Mobile			
TAP3482	1/2 over 1/2 wave 3db	16.86	(3.00)
TAP3697	1/2 over 1/2 wave 5db	20.00	(3.00)
K220	Mag mount/Feeder to suit above	11.96	(2.00)

Simply phone or write and leave the rest to us

Antennas Various/Accessories

HO1	Mini beam 10/15/20m 2 ele. 1kW	139.00	(4.00)
C4	Vertical 10/15/20m	48.50	(3.00)
G4MH	Mini beam 10/15/20	88.00	(4.00)
KTL4-4	Gutter mount/Cable assy. SO239	6.90	(0.50)

DATONG PRODUCTS

PC1	50KHz to 30MHz receive converter	137.42	(0.50)
VLF	Very low freq. converter	29.90	(0.50)
FL1	Frequency agile audio filter	79.35	(0.50)
FL2	Multimode audio filter	89.70	(0.50)
ASP/A	Auto RF speech clipper (YAESU)	82.80	(0.50)
ASP/B	Auto RF speech clipper (TRIO)	89.70	(0.50)
D75	Manual RF speech clipper	56.35	(0.50)
RFC/M	RF speech clipper module	29.90	(0.50)
D70	Morse tutor	56.35	(0.50)
AD270	Active dipole RX ant. (indoor)	47.15	(0.50)
AD370	Active dipole RX ant. (outdoor)	64.40	(0.50)
MK	Morse keyboard	137.42	(0.50)
DC144/28	2m converter	39.67	(0.50)
RFA	Broadband preamplifier	33.92	(0.50)
MPU	Mains power unit	6.90	(0.50)

MICROWAVE MODULES

Transverters			
MMT28/144	10m transverter	109.95	(2.50)
MMT70/144	4m transverter	119.95	(2.50)
MMT432/144R	70cm transverter	184.00	(2.50)
MMT1296/144	23cm transverter	184.00	(3.00)
MMT70/28	4m transverter	119.95	(2.50)
MMT144/28	2m transverter	109.95	(2.50)
MMT432/28S	70cm transverter	159.95	(2.50)

Linear Amplifiers

MML28/100S	10m 100W linear amp.	129.95	(3.00)
MML70/50S	4m 50W linear amp.	85.00	(2.50)
MML70/100S	4m 100W linear amp.	139.95	(3.00)
MML144/30LS	2m 30W linear amp. 1-3W in	69.95	(2.50)
MML144/50S	2m 50W linear amp.	85.00	(2.50)
MML144/100LS	2m 100W linear 1-3W in	159.95	(3.00)
MML144/100S	2m 100W linear 10W in	139.95	(3.00)
MML432/50S	70cm 50W linear amp.	109.95	(3.00)
MML432/100	70cm 100W linear amp.	228.65	(4.00)
MML1296/10	23cm 10W linear amp.	199.00	(2.50)
MML432/30	70cm 30W linear amp. 1-3W in	99.00	(3.00)

Converters

MM1000KB	ASC11 morse converter with keyboard	99.95	(3.00)
MM4001	RTTY to TV converter	189.00	(2.50)
MM4001KB	RTTY transceiver	269.00	(2.50)
MM4000KB	RTTY transceiver with keyboard	299.00	(4.00)
MMT28/144	10m to 2m converter	29.90	(1.00)
MMC50/28	6m to 10m converter	29.90	(1.00)
MMC70/28	4m to 10m converter	29.90	(1.00)
MMC70/28LO	4m to 10m with LO	32.90	(1.00)
MMC432/28S	70cm to 10m converter	37.90	(1.00)
MMC432/144S	70cm to 2m converter	37.90	(1.00)
MMC435/600	UHF ATV converter	27.90	(1.00)
MMC1296/28	23cm to 10m converter	34.90	(1.00)
MMC1296/144	1296MHz low noise converter	69.95	(1.00)
MMK1691/137.5	1691MHz meteoros converter	129.95	(2.50)

Morse Talkers

MMS1	Morse tutor 2-20WPM Side tone	115.00	(2.50)
MMS2	Morse tutor (advanced) 6-32WPM + speak back	169.00	(2.50)

Amateur TV

MTV435	70cm 20W (PSP) transmitter	149.00	(2.50)
MMC435/600	Converter ATV UHF output	27.90	(1.00)

Preamplifiers

MMA144V	2m preamp RF switched	34.90	(1.00)
MMA28	10m preamp	16.95	(1.00)
MMA1296	23cm preamp	34.90	(1.00)

Frequency Counters

MMD650/500	500MHz digital meter	75.00	(1.00)
MMD600P	600MHz pre scaler	29.90	(1.00)
MMDP-1	Probe	14.90	(0.50)
Filters			
MMF144	2m band pass 40W max.	11.90	(1.00)
MMF452	70cm band pass 40W max.	11.90	(1.00)
Various			
MMS384	384MHz signal source	29.90	(1.00)
MMR15/10	15db 10W attenuator	11.90	(1.00)

HI-MOUND MORSE KEYS

HK702	Up down keyer marble base	24.50	(0.50)
HK704	Up down keyer	16.68	(0.50)
HK705	Up down keyer	12.50	(0.50)
HK706	Up down keyer	13.75	(0.50)
HK708	Up down keyer	11.96	(0.50)
HK808	Up down keyer marble base	39.57	(0.50)
MK704	Twin paddle keyer	10.95	(0.50)
MK705	Twin paddle keyer marble base	22.00	(0.50)

MOULDINGS

IK	lambic keyer	19.95	(0.50)
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TOKYO HY POWER

HC150	HF ATU SWR/Power meter	62.50	(n/c)
HC2000	HF 2kW ATU SWR/Power meter		
	6 POS ant. switch. 6 to 1 vernier		
	high Q coils 2kW peak 1kW	276.55	(n/c)
	continuous		
HL32V	VHF 30W linear 1-5W drive		
	Hi-LOW output	53.50	(n/c)
HL82V	VHF linear preamp output meter		
	2-12W in 35-85 + out	144.50	(n/c)
HL160V	VHF linear preamp output meter		
	1-10W in 160W + out	242.40	(n/c)
HL45U	UHF linear preamp 2-15W in		
	10-45W out	119.75	(n/c)

Antenna Rotators & Accessories

9502	Channel master med duty		
	up to 8 ele.	57.00	(3.50)
9523	Alignment bearing for 9502	15.81	(1.25)
KR400	Med/Heavy duty		
	180° meter	90.85	(3.50)
KR400RC	Med/Heavy duty 360° meter		
	Load 200Kg 1 1/2" 2" masts	114.94	(3.50)
CASTING	Lower casting set	15.00	(1.25)
KR600RC	Heavy duty 360° meter		
	Load 200Kg Rot600Kg/cm		
	Bake 4000Kg/cm 1 1/2" 2" masts	163.30	(3.50)

Antenna Switches

SA450	SO239 connectors 1 in 2 out	9.75	(0.50)
SA450N	"N" type connectors 1 in 2 out	12.75	(0.50)

Baluns

BL50A	RAK 50 ohm ferrite BALUN 1:1		
	1.8-38MHz 1kW	12.88	(1.50)
BL-40X	Balun 2K PEP 1:1	11.52	(1.50)

Dummy Loads

T30	30W DC 500MHz PL259	6.61	(0.50)
T100	100W DC 500MHz SO239	20.12	(1.00)
T200	200W DC 500MHz SO239	31.36	(1.50)
T210	Wide band 10W 1.2G-2.4G	24.50	(0.75)
AW05	Pocket RF wattmeter 5W up to 500MHz BNC	19.75	(1.00)

DRAE PRODUCTS

DRAE4	4 amp PSU	30.75	(2.00)
DRAE6	6 amp PSU	48.00	(2.50)
DRAE12	12 amp PSU	74.00	(3.00)
DRAE24	24 amp PSU	105.00	(4.00)
DRAE WM	135-450MHz wavemeter	27.50	(1.00)

"N" Connectors (Silver Plated)

N58	"N" Male connector RG58	2.25	(0.25)
N8	"N" Male connector RG8	2.40	(0.25)
N308	"N" T adaptor (three female)	2.40	(0.25)
N307	"N" L adaptor (1 male 1 female)	2.40	(0.25)
N306	"N" Double female adaptor	1.90	(0.25)
N310	"N" Double male adaptor	2.50	(0.25)
NB304	"N" Female to BNC male adaptor	2.10	(0.25)
N402	"N" Plug to SO239	2.05	(0.25)
N403	"N" Socket to PL259	2.00	(0.25)
N404	"N" Socket to SO239	1.80	(0.25)

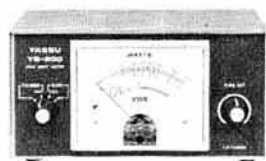
YAESU

YH55	Headphones Low Z	10.00	(0.50)
YH77	Lightweight headphones Low Z	10.00	(0.50)



SWR/Power Meters

YAESU			
YS200		52.90	(n/c)
YS2000		69.79	(n/c)



Other Makers

RF2000	Twin meter 3.5-150MHz F/Scale	18.25	(1.00)
YM1X	Twin meter 3.5-150MHz F/Scale		
	12 or 120W	14.99	(1.00)



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TRIO

TS930S	160-10m t'ceiver with gen. cov.	1,216.00	5.00
AT930	Automatic ATU 80-10m	141.75	2.50
SP930	External speaker unit	59.00	2.00
SO1	Comp unit	138.75	2.00
YK88A.1	6kHz AM filter	33.25	0.75
YK88C.1	500Hz CW filter	33.25	0.75
YK88C.1	500Hz CW filter	77.50	0.75
YK88C.1	270Hz CW filter	91.75	0.75
TS430S	160-10m with gen. cov. rec	736.00	5.00
PS430	Mains PSU for TS430S	112.75	5.00
SP430	Speaker for TS430S	29.50	1.50
MB430	Mobile mounting bracket	11.25	1.50
FM430	FM option unit TS430S	34.50	1.00
TS830S	160-10m trans. 100w	697.75	5.00
VFC230	Digital VFO with memories	243.75	5.00
AT230	All band ATU/meter	135.75	5.00
SP230	External speaker unit	41.25	2.00
DS2	DC pack for TS830S	50.25	1.50
DFC230	Digital remote cont	153.25	2.50
YK88C	500Hz CW filter	31.75	0.75
YK88C.1	270Hz CW filter	37.25	0.75
SM220	Station monitor scope	209.00	5.00
B58	Panoramic display	52.50	1.00
K81	Knob for TS930/530	10.25	0.75
YK455C	500Hz CW filter	75.50	0.75
YK455C.1	250Hz CW filter	77.75	0.75
YK88A	6kHz AM filter - TS430S	35.50	0.75
TS530S	160-10m transceiver	596.00	5.00
YK88C	TS530S External VFO	92.75	5.00
YK88C.1	200w pep mobile t'ceiver	559.25	5.00
YK88C.1	20w pep mobile t'ceiver	456.25	5.00
YK88C.1	Linear for TS120/130	167.50	2.50
MB100A	Mob mount for TS120/130	18.50	2.00
YK88C	500Hz CW filter	31.75	0.75
YK88C.1	270Hz CW filter	37.25	0.75
YK88C.1	1.8kHz SSB filter	32.50	0.75
YK88C.1	External VFO unit	98.50	2.50
YK88C.1	External speaker unit	26.50	1.75
YK88C.1	Mobile speaker unit	14.25	1.00
YK88C.1	100w aerial tuner	93.00	1.75
YK88C.1	AC for TS120/130V	57.75	2.50
YK88C.1	Trio 5 band mobile aerial	106.00	4.00
YK88C.1	160-10m 2kw linear	724.50	5.00
YK88C.1	Dual impedance desk mic	30.75	1.75
YK88C.1	Desk microphone	51.50	2.00
YK88C.1	Desk mic with up/down	53.50	2.00
YK88C.1	Desk mic with pre-amp	55.25	2.00
YK88C.1	Fist mic 50K imp.	14.75	1.25
YK88C.1	Fist microphone 500ohm imp	14.75	1.25
YK88C.1	Up/down mic for TR9000/7800	14.75	1.25
YK88C.1	Up/down mic (TS930S)	15.25	1.25
YK88C.1	HF low pass filter	21.25	1.25
YK88C.1	2m/70cm all mode t'ceiver	795.00	5.00
YK88C.1	External speaker unit	23.50	1.50
YK88C.1	Backup battery case	8.25	0.75
YK88C.1	2m multi mode mobile	433.50	2.50
YK88C.1	AC power supply (TR9000)	57.75	2.50
YK88C.1	Base plinth for TR9130	39.25	2.00
YK88C.1	25w 2m FM t'ceiver	199.00	2.50
YK88C.1	2m FM synth 25W t'ceiver	257.50	2.50
YK88C.1	2m FM t'ceiver LCD disp	305.25	2.50
YK88C.1	FM transceiver 2m/70cm	469.00	
YK88C.1	Mobile speaker unit	14.25	1.00
YK88C.1	2m FM portable t'ceiver	152.00	2.50
YK88C.1	10w amplifier for TR2300	65.75	1.50
YK88C.1	Mobile mount for TR2300/VB2300	21.25	1.50
YK88C.1	Telescopic whip ante	9.50	0.75
YK88C.1	2m FM synth handheld	232.50	2.50
YK88C.1	30w amplifier for TR2500	69.75	2.00

YAesu

FT1	Gen Cov HF t'ceiver	1,355.00	5.00
Key T 901	Curtis keyer for above	26.85	1.50
DC11	DC power cable	9.60	1.25
RAMT1	Non-volatile mem board	13.05	1.50
FMUT1	FM unit	34.90	1.50
XFB 9KCN	300Hz CW filter	39.85	1.25
XFB 9KC	600 Hz CW filter	17.25	1.25
XFB 9KA	6kHz AM filter	17.25	1.25
XF10.7KC	CW filter	11.90	1.25
FT880	Gen cov HF t'ceiver	1,150.00	5.00
SP880	Matching speaker	54.80	2.00
FT902DM	9 band AM/FM HF t'ceiver	885.00	5.00
XF89HC	600Hz CW filter for above	24.90	1.25
XF89HC	300Hz filter for above	24.90	1.25
XF89GA	6kHz AM filter for above	24.90	1.25
XF89GF	12kHz FM filter for above	26.05	1.25
PS901DM	External VFO	260.00	5.00
FC902	9 band auto SWR/PWR	135.00	5.00
SP901	External speaker	31.00	2.00
FT1012DFM	HF t'ceiver with FM	665.00	5.00
FT1012	Remote vfo for above	120.00	2.00
FAN	Cooling fan for above	14.20	1.50
FT102	9 band HF transceiver	685.00	5.00
FC102	9 band matching atu	200.00	5.00
FT102DM	Remote vfo for above	230.00	2.50
SP102	External speaker	49.05	2.00
FM:AM	Unit for above	46.00	1.00
MH188	Scanning hand mic.	13.80	1.00
FT707	HF t'ceiver 12v DC	499.00	5.00
PP707	230v AC power supply	110.00	5.00
FC707	8 band auto to match FT707	85.00	2.00
MR7	Metal rack for above	17.25	2.00
MMB2	Mobile mounting bracket	17.25	1.50
FT707DM	Digital vfo for above	170.00	2.50
FT77	8 band 100 watt t'ceiver	459.00	5.00
Marker unit		9.60	1.00
FM:Unit		25.30	1.00
PP700	PSU for FT77	110.00	5.00
ATU for FT77		85.00	2.00
160-10m linear amp		475.00	5.00
2m Multimode portable		249.00	2.50
70cm Multimode Portable		299.00	2.50
FT290/790 ni-cad pack		22.00	2.00
FT290/790 AC charger		9.20	1.00
FT290/790 carrying case		3.85	0.75
FT290/790 Mob mount		24.90	1.75
290R Linear amplifier		59.00	2.00
7m FM handheld 23W		199.00	2.00
70cm FM handheld 1W		209.00	2.00
Slow charger		8.05	1.00
Spare Ni-cad battery pack		19.95	0.75
Charging sleeve		5.35	0.75
Base master charger		30.65	1.50
Base master quick charger		50.60	2.00
Charger 12v DC		14.20	0.75
Mobile mounting bracket		6.90	1.50
2m 25W FM mob t'ceiver		239.00	2.50
70cm 10W FM mob t'ceiver		259.00	2.50
3 band all mode base station		675.00	5.00
70cm module		230.00	2.50
6 metre module		170.00	2.50
Full duplex x/band unit		90.00	2.00
0.5-30MHz gen cov rec		199.00	5.00
0.2-30MHz gen cov rec		335.00	5.00
7700 with memory unit		389.00	5.00
Memory module		98.90	1.50
DC modification kit		2.95	0.75
Antenna tuner unit		42.55	1.50
Active Antenna		38.70	2.00
Low pass filter		9.95	1.00
118-130, 130-140, 140-150MHz		78.95	1.50

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JAYBEAM ANTENNAS

T81	HF rotary dipole 1kw	69.00	3.00
T82	HF 2 element tribander	126.50	5.00
T83	HF 3 element tribander	189.75	5.00
V83	HF Vert. triband dipole	46.00	4.00
4Y 4M	4 element folded dipole	42.00	4.00
4Y 4M	4 element folded dipole	29.90	4.00
PMH2 4M	2 way phasing harness	16.10	1.50
DC1 WB	Wide band discone	41.40	4.00
LR1 2M	Vertical colinear 4.3dB	29.90	4.00
LR2 2M	Vertical colinear 2.8dB	23.00	4.00
C5 2M	5dB glass fibre colinear	54.60	4.00
LWS 2M	5 element folded	14.40	4.00
LWS 2M	8 el folded dipole	17.80	4.50
LW10 2M	10 el folded dipole	24.15	4.00
LW16 2M	16 element yagi	35.00	4.00
PM10 2M	10 element parabeam	44.85	4.00
PM14 2M	14 element parabeam	55.80	4.00
5KY 2M	Crossed 5 el yagi	28.20	4.00
8KY 2M	Crossed 8 el yagi	35.65	4.00
10KY 2M	Crossed 10 el yagi	46.00	4.00
X6 2M-X12			
PMH 2C	Dual band crossed yagi	42.55	4.00
Q4 2M	2 way phasing harness	9.80	1.50
Q6 2M	4 element quad	29.30	4.00
Q8 2M	6 element quad	39.10	4.00
C8 2M	8 element quad	44.85	4.00
C8 2M	Double 5 slot-fed yagi	25.30	4.00
C8 2M	Double 8 slot-fed yagi	34.50	4.00
SVMK 2M	Kit for vertical polar	9.20	4.00
UGP 2M	Ground plane	12.65	2.50
HO 2M	Mobile 'hals' head	6.00	2.00
HM 2M	'Halo' with 24" mast	6.60	2.00
PMH2 2M	2 way phasing harness	12.65	1.50
PMH4 2M	4 way phasing harness	28.75	1.50
C8 70cm	8dB glass fibre colln	62.10	4.00
D8 70cm	Double 8 slot-fed yagi	25.90	4.00
PM18 70	18 element parabeam	42.55	4.00
PM24 70cm	24 element parabeam	27.30	4.00
PM24 70cm	28 element multibeam	21.00	4.00
PM24 70cm	48 element multibeam	35.65	4.00
PM28 70cm	88 element multibeam	48.90	4.00
8KY 70cm	Crossed 8 el yagi	42.55	4.00
12KY 70cm	Crossed 12 el yagi	52.90	4.00
PMH2 70cm	2 way phasing harness	10.35	1.50
PMH4 70cm	4 way phasing harness	22.45	1.50
CR23cm	Corner reflector array	40.25	4.00
D15 1295	Double 15 slot-fed yagi	39.00	4.00
PMH2 23cm	2 way phasing harness	31.00	1.50

DATONG

PC1	Gen. Cov. Con.	137.40	1.00
VLF	Very low frequency conv.	29.90	1.00
FL1	Freq agile audio filter	79.35	1.00
FL2	Multi-mode audio filter	89.70	1.00
FL3	Auto filter for receivers	129.00	1.00
ASP B	r.f. speech clipper for Trio	82.80	1.00
ASP A	r.f. speech clipper for Yaesu	82.80	1.00
ASP	As above with 8 pin conn	89.70	1.00
D15	Manual RF speech clipper	56.35	1.00
D10	Morse Tutor	56.35	1.00
MX	Keyboard morse sender	137.40	1.00
RFA	RF switched pre-amp	33.90	1.00
AD270	Active dipole indoor	47.15	2.00
AD370	Active dipole outdoor	64.40	2.00
AD270-MPU	As above with mains p.s.u.	51.75	2.00
AD370-MPU	As above with mains p.s.u.	69.00	2.00
MPU	Mains power unit	6.90	1.00
RPC-M	RF speech clipper module	29.90	1.00

FDK

M.700AX	2m FM 25W transceiver	215.00	2.50
M.750X	2m FM/SSB/CW 10W t'ceiver	315.00	2.50
EXP 430	M.750 70cm transverter	249.00	2.50
SNAP-1	Clamps joins M.750/EXP 430	7.95	1.00
PS150	M.750 230v AC PSU	69.00	2.50
FDK	12v DC lead	2.95	0.75
Palm II	2m FM 2W 6 ch. h'held	119.00	2.00
Palm II TB	As above with tone burst	131.00	2.00
Palm IV	70cm 1W FM 6 ch. h'held	119.00	2.00
Palm IV TB	As above with tone burst	131.00	2.00
TM56B	Amateur scanning rec 12v	59.00	2.00
TM56B	Marine scanning receiver	59.00	2.00
BC2	Palm II 230v AC charger	4.95	0.75
BT2	Nicad battery pack	14.00	0.75
Xals	Palm II and Palm IV	3.75	0.40
Xals	for TM56B	3.75	0.40
KP100	AC/DC Electronic Keyer	69.00	2.00
ATC20	Synth air monitor	159.00	2.00
RX40	Synth FM mon	119.00	2.00
ATC12V	12v DC car adaptor	4.95	0.75
ATCC	Carrying case	4.95	0.75
T81	1750Hz tone burst	12.00	0.50

HF ANTENNAS

Mini-Products HQ-1	20/15/10m 2 el.	139.00	4.00
Mini-Products C4	20/15/10m vertical	59.00	4.00
Weiz Diamond CP5	10-80m vertical	115.00	4.00
Weiz Diamond CP4	10-40m vertical	89.00	4.00
Weiz Diamond CP3	6-10-15m vertical	49.00	4.00
Mosley T03JR	20/15/10m wire dipole	43.70	2.00
Mosley 'Mini-Beam'	20/15/10m 2 el.	135.00	4.00
Mosley T43JR	20/15/10m 3 element	177.00	4.00
Hy-Gain 14AVO	40-10m vertical	50.00	4.00
Hy-Gain 18AVT	10-80-10m vertical	64.40	4.00
HF8	80-10m vertical 200 watts	114.00	4.00
HFSR	Rodall ka for HFS	55.75	4.00
Jaybeam TB3HF	element	35.00	3.00
Jaybeam VR3HF	vertical	189.75	5.00
S-band commercial grade	1kw 80-10m dipole	46.00	2.00
		39.00	2.00

VHF/UHF MONITOR RECEIVERS

Sako SC7000	230v/12v scan mon	259.00	5.00
SK200N	Scanning receiver	289.00	5.00
BEARCAT 2020	Scanning receiver	259.00	5.00
TM56B	FM scanner 4 + 12 chan	59.00	2.00
Sound Air M161 15	channel FM monitor	39.00	2.00
SR81A	2m Amateur receiver	46.00	2.00
SR81M	Marine band receiver	46.00	2.00
SR1000E	Daiwa 1000 channel	83.00	2.00
MX400	FM synth receiver	99.00	2.00
AS2320	Fairlane VHF, UHF scan rec	149.00	2.00

ST2	Base stand and charger	51.75	1.75
SC4	Soft case and belt hook	13.75	0.75
MS1	Mob stand and power unit	31.75	1.50
MC25	Speaker/microphone	16.00	1.00
PR25	Spare ni-cad battery pack	25.00	1.00
LH2	Deluxe leather case	24.00	1.00
DC25	Power supply from 12V	16.00	1.00
TR500	70cm handheld trans.	250.75	2.50
TR8400	70cm FM mob t'ceiver	299.00	5.00
PS10	Matching power supply for TR8400	64.75	5.00

TR500	Gen. cov. multimode mob	450.75	5.00
R500	Gen. Cov. Rec 150kHz-30MHz	257.50	5.00
R1000	200kHz-30MHz rec	297.75	5.00
R2000	Gen cov rec	398.75	5.00

VC10	VHF unit for R2000.		
	118MHz to 174MHz	113.00	1.50
HC10	World time clock	67.50	1.50
TM201A	2M FM Transceiver	269.00	2.50

WELZ			
SP200	1.8-160MHz PWR/SWR	69.95	1.75
SP500	1.8-500MHz PWR/SWR	97.00	1.75
SP400	130-500MHz 150w PWR/SWR		

SP600	1.8-500MHz PWR/SWR	97.00	1.75
SP10K	1.8-150MHz PWR/SWR	24.45	1.25
SP15M	1.8-160MHz PWR/SWR	37.00	1.75
SP45M	130-470MHz PWR/SWR	51.00	1.75
SP250	1.8-60MHz PWR/SWR	49.50	1.75
SP350	1.8-500MHz PWR/SWR	59.95	1.75
AC38	3.5-30MHz ATU 400w PEP	65.00	1.75
TP05X	50-500MHz 0-5w meter	13.95	0.75
TP25A	50-500MHz 0-25w meter	17.50	1.50
TP20G	30-1500MHz 0-15w meter	139.00	2.00
CA-35A	Static protector	10.75	1.00
CA23N	Static protector	12.60	1.00
CT15A	15/50W dummy load PL259	8.50	1.00
CT15N	15/20W dummy load N plug	13.95	1.00
CT150	150/400W dummy load	37.00	1.00
CT300	300/1kw dummy load	49.50	2.00
CT03N	3w dummy load 1.3GHz	30.00	1.00
CH20A	2 way coax switch SO239	17.95	2.00
CH20N	2 way coax switch N socket	31.95	2.00
DF72C	144/430MHz duplexer	18.95	1.00
RS-455	DC PSU 3-15v 3.6A	39.00	2.00
RS-655	DC PSU 3-15v 6A	59.00	2.00
RS1100	DC PSU 13.8v 10A	75.00	2.50
RS-1150D	DC PSU 3-15v 10A	89.00	3.00

WELZ DIAMOND AERIALS

RH28	2m 1/2 wave whip BNC	8.95	1.00
RH200B	2m half wave whip BNC	18.95	1.50
RH702B	70cm 2 x 5/8 whip BNC	16.00	1.50
M285	2m 5/8th mobile PL259	8.95	2.00
M287	2m 7/8th mob	14.95	2.00
EL770E	Dual band 2m/70cm mobile	18.95	2.00
B285	2m 5/8th base with radials	15.95	2.00
GH22	2m 2 x 5/8th base	29.95	2.00
GH72	70cm 2 x 5/8th base with radials	29.95	2.00
DP100S	80-10m mobile system 100w	79.95	4.00
GLS	Gutter Mount with 4m cable	8.95	1.00
GLP	SO239 vehicle mount	2.75	1.00
SPM	Heavy duty magnetic base	12.95	1.50
TR8	Heavy duty trunk lip mount	11.50	1.50
LOR	14" elevated ground plane	19.95	2.00
LBR	Heavy duty base spring	10.50	1.50
BDS	Bumper mounting strap	9.50	1.50
BSB	As LBR with ball adjustment	8.50	1.50
EL80	Base loaded whip 3.5MHz	37.00	2.00
EL40	Base loaded whip 7MHz	32.50	2.00
CP3	6-10-15 vertical with G.P.	69.00	4.00
CP4	10-40m vertical with G.P.	89.00	4.00
CP5	10-80m vertical with G.P.	115.00	4.00
KB101	10-40m 1kw vertical	55.00	4.00
KB105	10-80m 1kw vertical	79.50	4.00
GH7	70cm 5/8 base 3.5dB	24.95	2.00

FRV7700B	118-130, 140-150, 50-59MHz	84.70	1.50
FRV7700C	140-150, 150-160, 160-170MHz	74.75	1.50
FRV7700D	118-130, 140-150, 70-80MHz	80.90	1.50
FRV7700E	118-130, 140-150, 150-160MHz	83.95	1.50
FRV7700F	118-130, 150-160, 170-180MHz	83.95	1.50

ICOM

IC740	100w HF trans 12v DC	769.00	5.00
PSU100	230v AC power supply	134.00	5.00
FM1EX2421	FM module for above	26.00	1.00
KEYER1EX2431	Keyer module for above	36.00	1.00
IC730	100w HF trans 12v DC	695.00	5.00
FL30	SSB pass band filter	29.00	1.00
IC720A	100w HF trans plus gen. cov.	949.00	5.00
PS15	230v p.s.u. for HF t'ceivers	119.00	5.00
PS20	230v chopper type unit	155.00	5.00
FL45	500Hz filter for 740/730	39.00	0.75
FL44	2.4kHz SSB filter	65.00	0.75
FL32	CW narrow filter for 720	34.00	0.75
FL34	AM filter for 720	29.00	0.75
LDX02	LDA unit for 730	13.50	0.75
ICQ30	CW audio filter for 730	14.00	0.75
TRV unit	TRV unit for 730	11.50	0.75
B10	Memory back up for 720	5.75	0.75
IC2KL	500W solid state linear	915.00	5.00
IC2KL PSU	Matching 230v AC PSU	256.00	5.00
AT100	100 watt HF Auto ATU	249.00	5.00
AT500	500 watt HF Auto ATU	349.00	5.00
CF1	Cooling fan	20.50	1.00
SP2	Matching ext speaker	39.00	1.50
TP25A	Communication phones	25.00	1.00
SM5	Base microphone	29.00	1.50
IC-R70	Comms rec 230v AC	499.00	5.00
FM unit	Plug in module	30.00	1.00
FL44	CW Narrow filter	32.50	1.00
IC251	Xtal filter	65.00	1.00
IC290E	Multimode 2m base station	479.00	5.00
BU1	Multimode 2m 12v DC	433.00	3.00
IC25E	2m FM mobile 12v DC 25 w	269.00	3.00
BU1	Back up supply	20.00	1.00
IC490	Multimode 70cm	689.00	5.00
IC45E	Multimode 70cm 12v DC	459.00	3.00
IC40E	70cm FM mobile DC 10w	289.00	3.00
IC2E	70cm SSB portable 3W	257.00	2.50
IC2E	2m synth h'held 1.5w	179.00	2.00
IC2E	70cm synth h'held 1.5w	199.00	2.00
MMB2	Mobile mounting bracket	t.b.a.	
MMB3	Mobile mounting bracket	12.50	1.00
MMB12	Mobile mounting bracket	11.50	1.00
HM3	4 pin hand mic.	12.50	1.00
HM7	8 pin hand mic.	12.50	1.00
HM9	L/S mic for IC2E/4E	15.00	1.00
HM10	Up/down scan mic.	20.00	1.00
SM2	4 pin desk mic.	29.00	1.00
SM5	8 pin desk mic.	29.00	1.00
SP3	External loudspeaker	39.00	1.50
LC1/2/3	Cases for IC2E/4E	4.25	0.75
BC25	Standard mains charger	5.75	1.00
BC30	Base hod type charger	49.00	1.00
BP2	Low voltage pack	30.00	1.00
BP3	Standard pack	23.00	1.00
BP4	Empty battery box (AA cells)	6.95	0.75
BP5	High power battery pack	44.00	1.00
CP1	Charger lead for 12V supply	4.49	0.75
DC1	12v Regulator pack	11.99	0.75
ML1	2m linear	64.00	2.00

VHF POWER AMPLIFIERS

ALINCO	30w 12v DC Amp 1 or 3w	59.00	1.00
KMCC2300/2E	IC2E 25w 12v DC amp	79.00	1.50
KMCC2300/TR25	TR2500 12v DC amp	85.00	1.50
CORONA HP80V0X	80w amp/Gasfet pre-amp	(On request)	

PS1	Tone squelch	46.00	1.00
ANF	Automatic notch filter	67.85	1.00
SRB2	Auto Woodpecker blanker	86.25	1.00

MICROWAVE MODULES RANGE

MM128/100S	10m 100W lin/preamp	129.95	2.00
MM170/50	4m 50 watt lin/preamp	92.00	1.25
MM170/100S	4m 100W lin/preamp	149.95	2.00
MM144/30LS	2m 30W linear amp	69.95	1.25
MM144/50S	2m 50W lin/preamp	92.00	1.25
MM144/100S	2m 100W lin/preamp	149.95	2.00
MM144/100LS	2m 100W (1 or 3W i/p)	169.95	2.00
MM143/20L	70cm 30W lin/preamp	129.95	1.25
MM143/50	70cm 50W lin/preamp	129.95	2.00
MM143/100	70cm 100 watt linear	245.00	2.00
MM1296/10	23cm 10 watt linear	199.00	1.25
MMC435/51	70cm ATV con, VHF out	37.90	0.75
MMC435/600	70cm ATV con, UHF out	29.90	0.75
MTV435	70cm ATV 20W t'mitter	159.95	1.25
MM1000	ASCI11 to Morse con	69.95	1.25
MM1000KB	Converter with keyboard	135.00	2.00
MM2001	RTTY to TV converter	189.00	1.25
MM4001	RTTY terminal	269.00	1.25
MM4001KB	RTTY term with keyboard	299.00	2.00
MM51	The MORSETALKER	115.00	1.25
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MMT28/144	10m linear transverter	129.95	1.25
MMT70/28	4m linear transverter	129.95	1.25
MMT70/144	4m linear transverter	129.95	1.25
MMT144/28	2m linear transverter	109.95	1.25
MMT432/28S	70cm linear transverter	159.95	1.25
MMT432/144R	70cm linear transverter	184.00	1.25
MMT1296/144	23cm linear transverter	199.00	2.00
MMC27/MW	27MHz to med wave conv	19.95	0.75
MMC28/144	10m to 2m up conv	29.90	0.75
MMC50/28	6m to 10m down conv	29.90	0.75
MMC70/28	4m to 10m down conv	29.90	0.75
MMC70/28LO	4m to 10m down conv	32.90	0.75
MMC144/28	2m to 10m down conv	29.90	0.75
MMC144/28LO	2m to 10m down conv	32.90	0.75
MMC432/28S	70cm to 10m down conv	37.90	0.75
MMC432/144S	70cm to 2m down conv	37.90	0.75
MMC1296/28	23cm to 10m down conv	34.90	0.75
MMC1296/144	23cm to 2m down conv	79.95	0.75
MMK1691/137.5	1691MHz Meteosat conv	145.00	1.25
MM2A28	10m low noise preamp	19.95	0.75
MM2A44V	2m RF switched preamp	34.90	0.75
MM2A1296	23cm low noise preamp	37.90	0.75
MM4050/500	500MHz digital freq meter	75.00	0.75
MM4600P	600MHz-10 prescaler	29.90	0.75
MMDP1	Freqcounter amp/probe	14.90	0.75
MMF144	2m bandpass filter	11.90	0.75
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MMS384	384MHz freq source	29.90	0.75
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AZDEN

PCS4000	2m FM transceiver 25W	229.00	2.50
PCS300	2m FM handheld	209.00	2.50
LC11	Leather case for above	18.35	0.75
SDX316	Speaker mic for PCS300	14.75	0.75
MC1	Spare AC charger	5.85	0.75
BP500	Spare battery pack	12.50	1.00
MEK55	Mobile boom safety mic	28.50	1.75
Mic. Plugs	for PCS3000	3.75	0.50
AS-006	Mobile ext speaker	9.95	1.75



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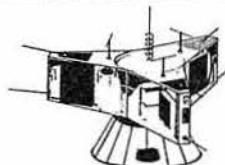


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MML432/30L	70CM 1 or 3W to 30W	£129.95
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FTV107R	Transverter c/w 2M	£89.00
FTV901R	Transverter c/w 2M	£139.00
432TV	70CM Module for above	£214.65
MMT432/28S	Transverter 432-463MHz	£159.95
MMT432/144S	Transverter 432-436MHz	£184.00
MMC144/28	Converter 2M down to 10M	£29.90
MMC432/28	Converter 70CM down to 10M	£37.90
MMC432/144S	Converter 70CM down to 2M	£37.90
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SLNA144S	2M Preamp RF switched	£37.10
SLNA144U	2M Preamp unswitched	£22.40
SLNA144UB	2M unboxed (144U)	£13.70
GBFA144E	2M Gasfet masthead	£129.90
SBLA144E	2M mosfet masthead	£79.90
SLNA145SB	FT290R Preamp	£27.40
TLNA432S	70CM switched preamp	£74.90
GLNA432U	70CM Gasfet unswitched	£52.90



MML 144/100-S

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KR60RC



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KR400	Meter controller	£97.75*
KR400RC	Round controller	£114.94
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KC038	KR400/600 Lower bracket	£12.07
KR500	Elevation rotator	£122.12*

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10XY/2M	2M 10 Ele crossed	£46.00
PMH2/C	2M Circular harness	£9.77
8XY/70	70CM 8 Ele crossed	£48.87
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MBM48/70	70CM 48 Ele multibeam	£35.65
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RAMT1	Non volatile memory board	£13.05
FMUT1	FM unit	£39.85
XF8.9KCN	300Hz CW filter	£17.25
XF8.9KC	600Hz CW filter	£17.25
XF8.9KA	6Hz AM filter	£17.25
XF10.7KC	800Hz CW filter	£11.90
FT980	Transceiver General Coverage Rx Amateur Tx	£1150.00
SP980	External speaker	£54.00
SP980P	External speaker, phone patch	£69.75
FT102	Transceiver 9 band multimode	£685.00
SP102	Speaker with audio filter	£49.05
SP102P	Speaker and phone patch	£69.00
FV102DM	Synthesized scanning VFO	£230.00
FC102	Antenna coupler, 1-2kW PEP	£200.00
AMFMUT102	AM/FM unit option	£46.00
FAS14R	4 way antenna selector	£39.10
XF82GA	6kHz AM filter	£18.80
XF82HSN	1-8kHz Narrow SSB filter	£18.80
XF82HC	600Hz CW filter	£18.80
XF82HCN	300Hz CW filter narrow	£18.80
XF455C	500Hz CW filter	£44.85
XF455CN	270Hz CW filter narrow	£44.85
FT77	Transceiver 9 band mobile multimode	£459.00
FT77S	Transceiver 9 band mobile, 10W	£399.00
MRKT77	Calibration marker unit option	£9.60
FMUT77	FM board option	£25.30
FP700	External power supply/spkr	£110.00
FC700	Antenna tuner	£85.00
XF8.9KC	600Hz CW filter	£17.25
FT902DM	Transceiver 9 band, multimode	£885.00
FT902DE	902 DM less inverter, memory and FM	£790.00
FT902D	902DM less inverter, memory and keyer	£800.00
FMU901	FM Module	£28.00
KEYT901	Curtis Keyer	£26.85
MEMT901	Memory Unit	£87.90
DC1901	Inverter (from 12VDC)	£46.75
XF89GF	12kHz crystal filter FM	£26.05
50TV	6m transverter module	£79.75
70TV	4m transverter module	£84.80
144TV	2m transverter module	£109.65
430TV	70cms transverter module	£214.65
XF8.9HC	CW filter 600Hz	£26.05
XF8.9HCN	CW filter 300Hz	£26.05
XF8.9GA	AM filter 6kHz	£26.05
FL2100Z	Linear amplifier 1200W + (PIP)	£475.00
FT707	Transceiver 100W 10-8M (8 bands)	£499.00

FP707	Mains power supply/speaker	£110.00
FV707DM	Digital VFO	£170.00
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50/726	6m module	£170.00



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430/726	70cm module	£230.00
SAT726	Full duplex module	£90.00
XF455MC	600Hz CW filter	£39.85
FT230R	Transceiver 2m FM 25W	£239.00
FT730R	Transceiver 70cm FM 10W	£259.00
FT690R	Transceiver 6m 2-5W multimode	£239.00
FT290R	Transceiver 2m 2-5W multimode	£249.00
FT790R	Transceiver 70cm 1W multimode	£299.00
SMC2.2C	Nicad cell, 2-2A/hr 'C' size	£2.70
SMC8C	Slow charger (220mA)	£8.80
MMB11	Mobile mount	£24.90
CSC1A	Soft carrying case	£3.85
YHA15	Flexible helical antenna	£5.00
FL2010	Linear amplifier 2m 10W	£59.00
FL7010	Linear amplifier 70cm	£49.00*
FT680R	Multimode transceiver 6m	£349.00
FT480R	Multimode transceiver 2m	£399.00
FT780R	Multimode transceiver 70cm	£289.00*
FT780R1.6	FT780R c/w 1-6MHz shift	£299.00*
FP80A	Power supply unit	£55.00
SC1	Station console	£138.00
FL2050	Linear amplifier 50W	£115.00
FT720RV	Transceivers 2m 10W	£199.00
FT720RVH	Transceivers 2m 25W FM	£209.00
FT720RU	Transceiver 70cms 10W FM	£229.00
FT720R	Control head	£100.00
720RV	Deck only 2m 10W	£100.00
720RVH	Deck only 2m 25W	£110.00
720RU	Deck only 70cms 10W	£130.00
S72	Switching box	£39.00
E72S	Cable, 2m long	£10.00
E72L	Cable, 4m long	£15.00
FT208R	Transceiver handheld 2-5 2M	£199.00
FT708R	Transceiver handheld 1W 70cm	£209.00
FNB2	Nicad Battery Pack	£19.95
FBA2	Battery pack sleeve (fits FNB2)	£3.05

Prices include VAT and carriage
* DENOTES SPECIAL OFFER PRICE



FBA3	Charging sleeve (for FT207 acc)	£5.35
NC9C	Slow charger	£8.00
NC7C	Base Master	£30.65
NC8C	Quick charge and PSU	£50.60
MMB10	Mobile bracket	£6.90
FRG7700	Receiver 0-15-3-0MHz AM/CW/SSB/FM	£335.00
FRG7700M	Receiver c/w 12 channel memory	£389.00
DCRG 7700	DC modification kit	£1.15
MEMG7700	Memory option	£98.90
FRT7700	Antenna tuner/switch	£42.55
FRA7700	Active antenna	£38.70
FF5	Low pass filter 500kHz	£9.95
FRV7700A	Converter 118-130, 130-140, 140-150MHz	£78.95
FRV7700B	Converter 118-130, 140-150, 50-59MHz	£84.70
FRV7700C	Converter 140-150, 150-160, 160-170MHz	£74.75
FRV7700D	Converter 118-130, 140-150, 70-80MHz	£80.90
FRV7700E	Converter 140-150, 150-160, 118-130MHz	£83.95
FRV7700F	Converter 150-160, 160-170, 118-130MHz	£83.95
YM21	Hand 600, 4 pin noise cancel	£15.70
YM24A	Hand 2k, 6 pin min, speaker/mic	£18.40
YM35	Hand 600, 8 pin scan	£15.35
YM36	Hand 600, 8 pin, noise cancel	£14.95
YM37	Hand 600, 8 pin	£7.30
YM38	Stand 600/50K, 8 pin scan	£27.20
YM47	Hand 600, 7 pin, scan control	£10.75
YM49	Hand 600, 7 pin, speaker/mic	£16.85
YE7A	Hand 600, 4 pin	£7.65
YD148A	Stand 600/50K, 4 pin	£22.60
YD844A	Stand 600/50K, 4 pin	£26.85
MD-188	Hand 600, 8 pin scan	£13.80
MD-188	Desk 600, 8 pin scan	£49.85
FSP1	Mobile speaker 8ohms	£11.15
FSP2	Mobile speaker 4ohms	£11.15
YH55	Headphones padded low Z	£9.95
YH77	Headphones lightweight low Z	£9.95
YH1	Lightweight mobile headset/boom mic	£13.80
SB1	PTT switch box for FT208/FT708	£14.95
SB2	PTT switch box for FT290/FT790	£12.65
SB3	PTT switch box for FT202	£13.80
FP4	12V power supply 4 amps	£44.45
QTR24D	World time clock quartz	£31.45
FF501DX	Low pass filter	£25.70
YP150Z	Terminated Wattmeter 5-30-150W FSD	£92.00

YAESU SPECIAL OFFERS

FTV107R Transverter c/w 2m	£89.00
FTV707R Transverter c/w 2m	£99.00
DMS 107 DMS unit for FT107	£69.00

FV707m VFO	£170.00
AMU 101 101ZAM unit	£10.00
FP107 PSU	£79.00

LEEDS	CHESTERFIELD	BUCKLEY	STOKE	GRIMSBY	JERSEY	EDINBURGH
SMC (Leeds) 257 Otley Road, Leeds 16, Yorkshire. Leeds (0532) 782326 9-5.30 Mon-Sat	SMC (Jack Tweedy) Ltd 102 High Street, New Whittington, Chesterfield. Chesterfield (0246) 453340 9-5.30 Tue-Sat	SMC (T.M.P.), Unit 27 Pinfold Workshops, Pinfold Lane, Buckley. Buckley (0244) 549563 9.30-5.00 (Lunch 1-1.45) Tue-Sat	SMC (Stoke) 76 High Street, Talks Pits, Stoke. Kidsgrove (07816) 72644 9-5.30 Tue-Sat	SMC (Humbly Grove) 247A Freeman Street, Grimsby, Lincolnshire. Grimsby (0472) 59388 9.30-5.30 Mon-Sat	SMC (Jersey) 1, Belmont Gardens, St Helier, Jersey. Jersey (0534) 77067 10-7 Mon-Sat	SMC Scotcomm 23 Morton Street EH15 2HN 031-657 2430 10-5 Tue-Fri (9-4 Sat)

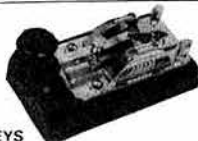
STOCK-CARRYING AGENTS WITH DEMONSTRATION FACILITIES

Stourbridge Andrew G4ESY (0384) 390916

Bangor John G13KDR (0247) 55162
Tandragee Mervyn G13WVY (0762) 840656

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

MORSE EQUIPMENT



MORSE KEYS

BKU1	Squeeze Key	£30.30	£1.20
BKU703	Straight Key	£25.70	£1.20
BKU704	Straight Key	£17.65	£1.20
BKU706	Straight Key	£14.60	£1.00
BKU707	Straight Key	£13.75	£1.00
BKU710	Straight Key	£36.40	£1.75
BKU808	Straight Key	£45.60	£1.75
BKU711	Key Mounting	£29.50	£1.50
BKU100	Mechanical Bug	£22.25	£1.75
MK701	Single Lever Paddle	£25.25	£1.60
MK702	Single Lever Paddle	£26.45	£1.60
MK703	Squeeze Key	£25.95	£1.75
MK705	Squeeze Key	£22.60	£1.75
MK706	Squeeze Key	£19.50	£1.75
IKP60	Iambic	£9.95	FOC
SR1	Straight Key	£12.65	FOC

MORSE EQUIPMENT

KP100	Squeeze CMOS 230/13-8V	£69.00	£2.00
KP200	Memory 4096 Multi Ch Mem Back Up 230/13-8V	£155.25	£2.50
D70	Morse Tutor (Datong)	£56.35	FOC
MMS1	Morse Tutor (M/M)	£115.00	FOC
MMS2	Morse Tutor Advanced	£155.00	FOC

MICROWAVE MODULES - RTTY EQUIPMENT

MM2001	RTTY to Demod./Converter	£189.00	FOC
MM4001	RTTY Transceiver		FOC
MM4001KB	RTTY Transceiver c/w keybd	£299.00	FOC
MM1000	ASCII to Morse Converter	£69.95	FOC
MM1000KB	ASCII CW conv c/w keybd	£89.00	FOC

PRICES INCLUDE VAT AT 15%
Carriage as shown

JAYBEAM

4 METRES

4Y/4M	Yagi 4 element	7dBd	£29.90	£2.20
PMH2/4M	Phasing harness 2 way		£16.10	£1.50

2 METRES

H0/2M	Halo head only	0dBd	£5.98	£1.20
HM/2M	Halo with 24" mast	0dBd	£6.55	£1.50
C5/2M	Colinear omni vert	4-8dBd	£54.62	£2.50
LW5/2M	Yagi 5 element	7-8dBd	£14.37	£2.50
LW8/2M	Yagi 8 element	9-5dBd	£17.82	£2.50
LW10/2M	Yagi 10 element	10-5dBd	£24.15	£2.50
LW16/2M	Yagi 16 element	13-4dBd	£35.07	£3.20
14Y/2M	Yagi 14 element	12-8dBd	£36.23	£3.20
PBM10/2M	10 ele Parabeam	11-7dBd	£44.85	£3.20
PBM14/2M	14 ele Parabeam	13-7dBd	£55.77	£3.20
Q4/2M	Quad 4 element	9-4dBd	£29.32	£2.50
Q6/2M	Quad 6 element	10-9dBd	£39.10	£2.50
Q8/2M	Quad 8 element	11-9dBd	£44.85	£2.50
D5/2M	Yagi 5 over 5 slot	10dBd	£25.30	£2.50
D8/2M	Yagi 8 over 8 slot	11-1dBd	£34.50	£2.50
5XY/2M	Yagi 5 ele crossed	7-8dBd	£27.02	£2.50
8XY/2M	Yagi 8 ele crossed	9-5dBd	£35.65	£2.50
10XY/2M	Yagi 10 ele crossed	10-8dBd	£46.00	£2.50
PMH2/C	Harness cir polarisation		£9.77	£1.50
PMH2/2M	Harness 2 way 144MHz		£12.65	£1.50
PMH4/2M	Harness 4 way 144MHz		£28.75	£1.50

SEVENTY CM

C8/70	Colinear Omni Vertical	6-1dBd	£62.10	£2.50
DB/70	Yagi 8 over 8 slot	12-3dBd	£25.87	£2.50
PBM18/70	18 ele Parabeam	13-5dBd	£32.20	£2.50
PBM24/70	24 ele Parabeam	15-1dBd	£42.55	£2.50
LW24/70	Yagi 24 element	14-8dBd	£27.02	£2.50
MBM28/70	28 ele Multibeam	11-5dBd	£21.27	£2.50
MBM48/70	48 ele Multibeam	14-0dBd	£35.65	£2.50
MBM88/70	88 ele Multibeam	16-3dBd	£48.87	£2.50
8XY/70	Yagi 8 ele crossed	10dBd	£42.55	£2.50
12XY/70	Yagi 12 ele crossed	12dBd	£52.90	£2.50
PMH2/70	Harness 2 way		£10.35	£1.50
PMH4/70	Harness 4 way		£22.42	£1.80
1296 MHz				
CR2/23CM	Corner reflector	13-5dBd	£40.25	£2.50
PMH2/23CM	Harness 2 way		£31.05	£1.50

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

ANTENNA ACCESSORIES

2M ASCOT ANTENNAS MOBILE

(The keenest prices)

	Complete with bases and cable	p/p
340COM	1 x Standard	£6.10 £1.50
310COM	1 x Swivel	£8.10 £1.50
344COM	1 x Sprung	£10.38 £1.50
440COM	1 x Standard	£7.71 £1.50
330COM	1 x Swivel	£10.00 £1.50
341COM	1 x Sprung	£12.31 £1.50
092	Magnetic Mount	£10.75 £1.50
350	1 x Standard	£14.26 £1.50
351	1 x Sprung	£15.01 £1.50
091	Magnetic Mt 1 x	£10.75 £1.50

MASTS & TOWERS

TT24	79' Tower c/w rigging	£626.00	DIST
TT30	101' Tower c/w rigging	£730.00	DIST
SMC16	16' Portable c/w rigging	£21.28	£2.20
SMC24	24' Portable c/w rigging	£25.88	£2.20
SPK16	16' Light duty portable	£17.25	£2.20
10P30	30' Telesc. Versatower	£388.00	DIST
13P40	40' Telesc. Versatower	£436.00	DIST
13P60	60' Telesc. Versatower	£534.00	DIST
16P40	40' Telesc. Versatower	£650.00	DIST
16P60	60' Telesc. Versatower	£739.00	DIST

COAXIAL CABLE (per metre)

UR43	50 ohm 5mm	£0.27	£2.00
UR76	50 ohm 5mm Stranded core	£0.29	£2.00
UR67	50 ohm 10-2mm low loss	£0.67	£2.50
LDF2	50 ohm 1/2" Foam Heliax	£2.85	£2.50
LDF4	50 ohm 3/4" Foam Heliax	£3.58	£2.50
307EP	75 ohm Economy	£2.21	£2.00
UR70	75 ohm 6mm	£0.30	£2.00
UR39	75 ohm 7.8mm	£0.44	£2.40
UR57	75 ohm 10.2mm low loss	£0.69	£2.50
302	75 ohm Galv. twin	£0.17	£1.50
306	300 ohm Galv. twin	£0.23	£1.50

ANDREWS HELIAX CONNECTORS

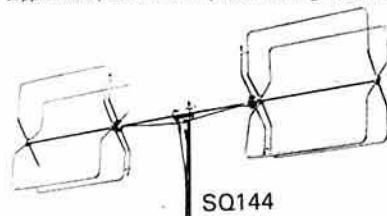
L42W	'N' Plug male LDF2/50	£12.07	£0.65
L42N	'N' Jack female LDF2/50	£12.07	£0.65
L42P	UHF Plug (PL259) LDF2/50	£12.07	£0.65
L44W	'N' Plug male LDF4/50	£12.42	£0.65
L44N	'N' Jack female LDF4/50	£12.42	£0.65
L44P	UHF Plug (PL259) LDF4/50	£11.09	£0.65



SMC-HS

HF, VHF, UHF, BASE STATION ANTENNAS

SMC-HS range of base station antennas covers from 80M through to 70cm. All have S0239M connectors and are supplied complete with all required mounting hardware.



SQ144

SQ144	2M Swiss Quad Vertical Mounting	£57.60	£2.50
	2M 1/2 c/w ground plane		
GP2M	3-4dB	£18.00	£2.50
GP144W	2M 2 x colinear 6-5dB	£27.60	£2.50
GP23	2M 3 x colinear 7-8dB	£39.85	£2.50
GP432	70cm 3 x colinear 6-8dB	£29.90	£2.50
70N2V	2M/70cm colinear 2-8dB 1/5-7dB	£29.90	£2.50
HS770	2M/70cm Duplexer 50W 30dB isolation	£15.35	£1.50
VHFL	65-520MHz Discone Rx only	£15.70	£2.50
GDX1	80-480MHz Discone 3dB	£40.25	£2.50
GDX2	50-480MHz Discone 3dB	£49.45	£2.50
GDXA	100-480MHz Discone 3dB	£33.75	£2.50
LT606	50-500MHz Log Periodic 7-8dB	£115.00	£2.50
HF5V	Trapped Vertical 10-80M 5 bands	£54.80	£2.50
HF5R	Loaded Radial Kit	£34.90	£2.50
3Y1015D20	3 ele 10, 15M Dipole 20M	£144.90	£5.00

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

ROTATORS

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



KR600RC



9502

RLD3	Bell	5 Core	Light Duty	£40.25
505	Bell	5 Core	Light Duty	£40.25
AR30	Offset	5 Core	Light Duty	£56.35
KF250	Bell	6 Core	Light Duty	£54.91
9502B	Offset	3 Core	Light Duty	£56.92
AR22	Bell	4 Core	Medium Duty	£67.85
9508	Offset	3 Core	Medium Duty	£80.21
AR40	Offset	5 Core	Medium Duty	£90.85
BT1	Bell	5 Core	4 Preset medium	£91.43
KR400	Bell	6 Core	Matches KR500	£97.75
KR500	Thro	6 Core	Elevation	£112.12
AR50	Bell	5 Core	5 Position Medium	£113.85
KR400RC	Bell	6 Core	Medium Duty	£114.94
CD45	Bell	8 Core	Heavy Duty	£136.85
KR600RC	Bell	8 Core	Heavy Duty	£163.30
HAM IV	Bell	8 Core	Heavier Duty	£258.75
KR2000RC	Bell	8 Core	Heavier Duty	£314.52
T2X	Bell	8 Core	Very Heavy Duty	£327.75
H300	Bell	8 Core	Digital Readout	£493.35
Control Cable				
RC4W	4 Way	28p/mtr	Carriage	£1.80
RC5W	5 Way	33p/mtr	Carriage	£1.80
RC6W	6 Way	51p/mtr	Carriage	£1.80
RC8W	8 Way	55p/mtr	Carriage	£1.80
9523	Support Bearing		Carriage	£2.50
9502				
KC038	Lower Mast Clamp		Carriage	£2.50
KR400 600				

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

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 front panel Hi/Low power switch), so from the car or at home you can enjoy 10M FM without having to pay £500 for an HF transceiver.

OSCAR 2 10M FM £49.00 inc

ACCESSORIES	INC	P/P
SMCGP27	Wave vertical with radials	£24.15 £2.50
SMC VA27	Wave vertical no radials	£20.70 £2.50
SMC11V11S	Glass fibre shortened ground plane	£29.90 £2.50
SMC10SE	10M Mobile whip	£13.80 £2.00
SMCGCCA	Gutter mount and cable for 10SE	£9.95 £1.80
SMCSOCA	4M cable assembly for 10SE	£5.00 £1.20
FLEXI 10	G. Whip mobile 10-80M	£49.00 £2.00
MULTI-MOBILE	G. Whip mobile 10, 15, 20M	£30.48 £1.85
FLEXIWHIP	G. Whip 10M mobile	£18.11 £1.85
GW BASE	Base for all G. Whip antennas	£5.75
SMCT3170L	Twin meter SWR bridge	£14.95 F.O.C.
SMC100P30	Low pass filter	£5.30 F.O.C.
SMCRU12	4 Amp DC power unit	£15.00 £2.00
-04-06		
FSP1	Extension L/S	£11.15 F.O.C.

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

STOCK-CARRYING AGENTS WITH DEMONSTRATION FACILITIES

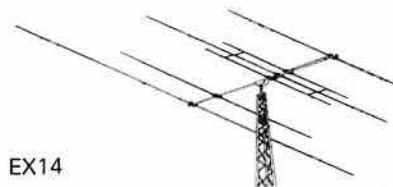
Stourbridge Andrew G4ESY (0384) 390916

Bangor John G13KDR (0247) 55162
Tandragee Mervyn G13WVY (0762) 840656

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

HF ANTENNAS

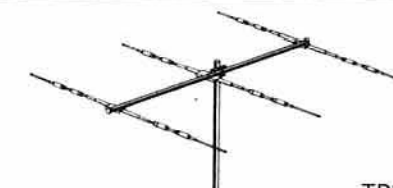
SMC have the greatest range of HF antennas eg. Multi Beams/Quads, over 20 models. Shown below is the sensational new Explorer 14—contact us for full details.



EX14

MULTIBAND BEAMS

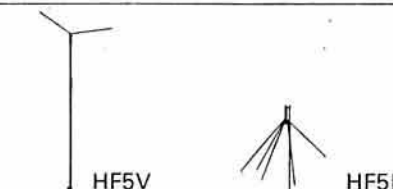
		Inc VAT	P&P
EX14	Explorer 10-20m	£325.00	£5.50
TH3JN	3 Ele 10-20m	£202.40	£3.50
TH2MK3	2 Ele 10-20m	£169.05	£3.50
TH3MK3	3 Ele 10-20m	£274.85	£5.30
TH5DXX	5 Ele 10-20m	£419.75	£6.70
TH7DXX	7 Ele 10-20m	£511.75	£8.75
TB3	3 Ele 10-20 Jaybeam	£181.70	£5.40
HQ1	Mini Quad 10-20	£139.00	£4.00
G4MH	Mini Beam 1-20	£82.50	£4.00
TA33JNR	3 Ele 10-20 Moseley	£161.00	£3.40
Mustang 2	2 Ele 10-20 Moseley	£177.10	£3.50
Mustang 3	3 Ele 10-20 Moseley	£220.80	£3.70
GQ2E	2 Ele 10-20 Quad	£189.75	£5.40
GQ3E	3 Ele 10-20 Quad	£313.95	£9.20
GQ4E	4 Ele 10-20 Quad	£446.20	£10.00
Hyquad	2 Ele 10-20	£171.35	£6.70
LP1007	Log Periodic 13-20 MHz	£1474.30	DIST
3Y1015D20	3 Ele 10-20m	£134.95	£5.00
DB10/15A	3 Ele 10-15m	£198.95	£4.80



TB3

MONO BAND BEAMS

		£67.85	£3.50
103BA	3 Ele Yagi 10m	£155.25	£3.75
105BA	5 Ele Yagi 10m	£90.85	£3.50
153BA	3 Ele Yagi 15m	£236.90	£5.90
155BA	5 Ele Yagi 15m	£178.25	£4.90
203BA	3 Ele Yagi 20m	£286.35	£7.30
204BA	4 Ele Yagi 20m	£396.75	£9.40
205BA	5 Ele Yagi 20m	£247.25	£6.50
402BA	2 Ele Yagi 40m		
18TD	Dipole Tape 10-80m		



HF5V

HF5R

VERTICALS

		£50.60	£2.75
12AVQ	Vertical 10-20m	£64.40	£2.75
14AVQ	Vertical 10-40m	£113.85	£2.75
18AVT/WB	Vertical 10-80m	£36.22	£2.75
18V	Vertical 10-80m taped	£59.00	£2.50
C4	Vertical 10-20m	£54.80	£2.50
SMCHF5	Vertical 10-80m	£34.90	£2.50
SMCHF5P	Radial Kit for above		

TRAP DIPOLE

SMCTD/	High Power 10-80m	£43.41	£2.50
HP			
SMCTP/P	Portable inc coax	£59.80	£2.50

MOBILE

Tribander	10-20m Slide sw.	£25.88	£1.50
Multiband	10-20m	£30.48	£1.50
Flexiwhip	10m only	£18.11	£1.85
Extra coils	For above to 160m	£5.70	£1.00
Flexiten	2, 10, 12, 17, 15, 20, 30, 40, 80M	£49.00	£2.00
Bases	For above	£5.75	£1.00

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

POWER METERS

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

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



FS-500H

HANSEN			£
FS710H	1.8-60 MHz	15/150/1500W	Pep 89.70
FS710V	50-150 MHz	15/150W	Pep 89.70
FS50HP	1.8-60 MHz	20/200/2000W	Pep 89.70
FS50VP	50-150 MHz	20/200W	Pep 89.70
FS500H	1.8-60 MHz	20/200/2000V	Pep 69.75
FS500V	50-150 MHz	20/200W	Pep 69.75
FS300H	1.8-60 MHz	20/200/1000	46.40
FS300V	50-150 MHz	20/200	46.40
FS200	1.8-150 MHz	20/200	Pep 50.60
FS601M	1.8-30 MHz	20/200W	Pep 51.35
FS601MH	1.8-30 MHz	200/2000W	Pep 51.35
FS602M	50-150 MHz	20/200W	Pep 51.35
FS603M	430-440 MHz	5/20W	Pep 51.35
FS210	1.8-150 MHz	20/200W	Auto SWR 55.20
FS301M	2-30 MHz	20/200W	35.65
FS301MH	2-30 MHz	200/2000W	35.65
FS302M	50-150 MHz	20/200W	35.65
FS711H	2-30 MHz	20/200W	Head 36.80
FS711V	50-150 MHz	20/200W	Head 36.80
FS711U	430-440 MHz	5/20W	Head 36.80
HB1	FS711H Coupler		23.75
VB1	FS711V Coupler		23.75
UB1	FS711U Coupler		23.75
FS5E	3.5-150 MHz	20/200/1000W	HF 37.20
FS5S	1.8-150 MHz	20/200/1000W	HF 37.95
FS7	145 & (432 MHz)	5/20/200	144 41.00
SWR3E	3.5-150 MHz	20/200/1000W	HF 25.00
SWR3S	3.5-150 MHz	F/S Meter ant.	26.45
SWR50B	3.5-150 MHz	Twin Meter	26.45
FS20D	3-150 MHz	5/20W	37.95
FS-800	1.8-150 MHz	6/30/150W	115.00
JD			
JD110	1.5-150 MHz	10/100W	13.80
MIRAGE			
MP2	50-150 MHz	50/500/1500W	Pep 100.00
S.M.C.			
S3-30L	Mini		8.80
T3-170L	3.5-170 MHz	Relative	14.95



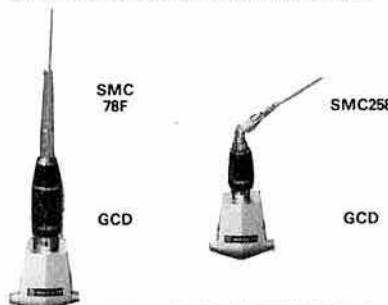
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SMC258

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RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY REPRESENTING ALL UK RADIO AMATEURS

Founded 1913

Incorporated 1926

Limited by guarantee

A member society of the International Amateur Radio Union

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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

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Affiliated societies: £14.50 (including *Radio Communication*) £8.70 (excluding *Radio Communication*)

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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 the January 1983 issue of *Radio
Communication*, and amendments are
published under "Amateur Radio News".

RSGB NEWS SERVICES

Headline News

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

GB2RS Broadcasts

Sunday news broadcasts from stations throughout the UK using the callsign GB2RS on frequencies
in the 3.5, 7 and 144MHz bands.

Details of frequencies, locations and times were last published in the June 1983 issue.

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

COMMUNICATING WITH MEMBERS

The end of 1983 marks the completion of the first full year of operation from the Society's new headquarters at Potters Bar. Inevitably, during the first six months we were heavily involved with moving, re-establishing and consolidating the administration. Nevertheless, considerable progress was also made during this period in improving communications with members, and this was covered in the annual review in the November 1983 issue of *Radio Communication*. During the last six months, the more efficient administration, possible in the new headquarters building, has enabled even more staff effort to be applied to amateur radio subjects without increasing staffing levels.

One of the major headaches in the past—for which we have had to make excuses year in, year out—was the very limited staff effort available, often at short notice, to produce specific information and news for members. We are now in a rather happier position, and can devote more staff effort to this aspect of amateur radio. For example, the enlarged news section of *Radio Communication*, the Members' Mailbag which includes comments on readers' letters, and improvements in presentation in our magazine, have happened because more staff time has been made available. The above improvements have all been warmly welcomed by members.

A special effort was made to produce a press package on the space shuttle which could be used to influence the local media. This has produced a great many press articles favourable to amateur radio—despite the shuttle's flight having been cancelled. We expect an even better coverage when it actually flies! (Saatchi & Saatchi please note.) This press package was distributed to all affiliated clubs, and reflects the greater effort being made to improve links between the Society and these bodies—after all, a high proportion of members belong to an affiliated society. Other recent steps in this same direction have included the designation of a member of staff to attend as many rallies during the year as practical.

As many members will know, the headquarters station, GB3RS, is increasingly active on all bands up to 144MHz. One of its functions is, of course, to provide a very direct link with members, and this is already proving both popular and successful. It is also hoped to make it a showpiece for *amateur* radio and *amateur* techniques. As part of this, it is intended to use as much amateur-built equipment as possible: already a high-power 144MHz amplifier is being constructed, and a recent demonstration of the Amtor equipment, now installed, greatly impressed visitors from the Radio Regulatory Division of the Department of Trade & Industry. In addition, the possibility of news transmissions direct from headquarters is being discussed.

The above, we suggest, represents significant progress in the right direction. We have every intention of expanding our efforts on behalf of members in the coming year.

David Evans, G3OUF

A SEASONAL MESSAGE FROM THE RSGB PRESIDENT



1983 has been a year of steady improvement of the facilities to members, made possible by better offices and equipment and the retention of all but one of the staff following the transfer.

The review of the relationship between the Council and committees was a stimulating experience. There is no doubt of the dedication and hard work that is put into the operation of these committees and the Repeater Management Group, and which contribute so much to the success of the Society as a whole. Much work has been done by committees in preparing papers for the 1984 IARU Region 1 Conference. Their careful preparation and effective presentation are vital to the interests of the RSGB, the IARU and the amateur radio movement in general.

The successful introduction of 50MHz working, albeit experimentally, has been a milestone. The close and cordial relationships with the Radio Regulatory Department which helped to bring this about have been maintained with the transfer of most of the staff to the Department of Trade & Industry.

The move of the National Exhibition & Convention to the National Exhibition Centre at Birmingham proved a great success. It was a real pleasure to meet members of the Society there and at the other conventions and rallies I attended during the year. Much credit is due to those headquarters staff who worked so hard at these weekend events.

Strong and enthusiastic club activity is the bed-rock of the Society. The Council Letter to clubs, the changes affecting the style and content of *Radio Communication*, and the opening up of the Membership & Representation Committee meetings to RSGB members have been positive and welcome signs of a strengthening of links between officials of the Society and clubs and individual members.

It has been a stimulating and heart-warming experience to participate in your affairs. I wish all members and the Society as a whole continued success in the future and, at this season in particular, a very happy Christmas.

Don Baptiste

Amateur Radio News

GB2RS in space

News bulletins under the callsign GB2RS are now taking place via Oscar 10—the first took place at 1115gmt on 16 October. The broadcast was made under the auspices of the RSGB and AMSAT-UK, using the callsign GB2RS: the transmission was broadcast via Oscar 10 on the downlink frequency of 145.973MHz usb, which is designated as special service channel H1. The broadcast was compiled jointly by staff of the Membership Services Department at headquarters and Ron Broadbent, G3AAJ, of AMSAT-UK, and was recorded by John Nelson at RSGB headquarters. The recording was transmitted by Graham Shirville, G3VZV, from Milton Bryan, Bedfordshire.

It is intended that this will become a regular service, with two transmissions each Sunday. Details of times and expected coverage of the next transmission are given at the end of each broadcast.

Reports on the transmissions are urgently required, and should be sent either to Ron Broadbent, G3AAJ, at AMSAT-UK, London E12 5EQ, or to headquarters. It is hoped that authorisation to use the callsign GB2AUK will shortly be given.

OSCAR 10 appears to be functioning well, but there are still problems with amateurs who simply will not observe the band plans and who conduct simplex fm contacts in the portion of the 144MHz band set aside for the amateur satellite service. These individuals are making satellite working impossible for large numbers of people: it may well be that they are not aware of the agreed band plans, but in any event it is most important that the segment

145.8-146MHz be kept clear of terrestrial transmissions. One net in West London uses 145.975MHz consistently, despite polite requests to change frequency.

Shuttle news



As mentioned briefly last month, the launch of the space shuttle *Columbia*, with W5LFL aboard, has been delayed. It appears that during the previous launch of *Columbia*, some damage to the solid rocket booster (sr) engines occurred: the rocket exhaust burned through the protective lining of the booster tailpipe to within about 0.2in of the metal nozzle during the first 2 min of the lift-off. If the nozzle had been completely burned through, the shuttle would have been sent off course and would probably have crashed uncontrollably. The difficulty is that the sr is jettisoned after launch and parachuted into the sea for recovery: it is then reconditioned by the manufacturers for re-use. In this case the problem appears to have gone undetected, or unreported, until late September, and NASA is attempting to determine the reason for this.

As we go to press, NASA seems optimistic that the launch will take place on 28 November, but see the enclosed *RSGB News Bulletin* and listen to GB2RS news broadcasts, or telephone "Headline News" for the latest information.

Another UOSAT?

The University of Surrey satellite, UOSAT, has now been in orbit for two years: it is estimated that some 5,000 amateur and professional ground stations have been receiving data from it, and the response from schools has been particularly encouraging. The UOSAT team has now produced a booklet which has been distributed free of charge to schools and which gives a guide to the capabilities of the satellite.

The publication of the booklet is timely, since the UOSAT team has commenced building a second spacecraft. A launch opportunity was identified by NASA in February 1984, and the aim of the new satellite, UOSAT-B, will be to develop the mission objectives of the original satellite. As we went to press, formal confirmation of NASA's acceptance of the UOSAT-B proposal had not been received, and we hope to have more details in a subsequent issue of *Radio Communication*.

News from New Zealand

Amateurs in New Zealand have had their requests for access to the 18 and 24MHz bands denied by the New Zealand Post Office. The latter has stated that it does not believe it is in the best interests of New Zealand users of the radio spectrum "... to prematurely release the two new bands to the amateur service, at least until the initial (IFRB) procedures leading up to 1 July 1984 have been completed. Only then will this administration know clearly the extent of the problem for any existing services

RSGB 1984 PRESIDENTIAL INSTALLATION

The installation of R. G. Barrett, GW8HEZ, as the 50th President of the Radio Society of Great Britain will take place during a

SOCIAL EVENING

commencing at 7.30 for 8pm on

Saturday 14 January 1984

at

Cardiff Castle

Admission will be by ticket only, and because of the limited number of tickets available they will be limited to two per member

Price per ticket: £3

Applications for tickets should be addressed to Heather Norman, RSGB, Alma House, Cranborne Road, Potters Bar, Herts EN6 3JW, and must be received by 20 December 1983

exchange of information and ideas between IERE members and others whose professional activities and interests are concerned with emc. Offers to participate in the group's activities, or requests for further information, should be sent to: The Secretary, EMC Group Committee, Institution of Electronic & Radio Engineers, 99 Gower Street, London WC1E 6AZ.

EMC is, of course, of concern to the RSGB: it was mentioned in last month's "Amateur Radio News" in the context of a letter from the DTI, and from the point of view of those members suffering from the effects of a lack of electromagnetic compatibility between their transmitter and a neighbour's domestic entertainment equipment, the Society can do various things to assist. The Society's own EMC Committee is always available to assist individual members with specific problems, and correspondence should be addressed to the chairman, EMC Committee, c/o RSGB headquarters. In addition, a leaflet which is available free of charge to members is intended to advise neighbours of the facts of electronic life: it sets out causes and cures in simple and non-technical language.

There seems to be a view that breakthrough problems only happen to the newly-licensed or inexperienced amateur, but this is very far from being the case: it is a phenomenon which can afflict any amateur at any time and is seldom the amateur's fault. It even happened to the Society's general manager recently...

using frequencies in the bands concerned."

Under the new arrangements, modes of emission allowed on each band have been deleted from being a regulatory requirement. Band plans have also been made a matter for the NZART, and it appears that the IARU-agreed Region 3 band plans will be recommended.

Frequencies in a twist

We regret that an error crept into the report on the licensing of the experimental pilot-ssb repeater GB3SF in the November issue. We reported its frequencies as 145·185/145·875MHz: the first was correct but two digits of the second were unfortunately transposed. The correct frequency pair is 145·185MHz (input) and 145·785MHz (output), or in other words 10kHz hf of channel R7. We apologize for the slip, and trust that not too much consternation was caused to satellite users!

This frequency pair does not form a "channel" in the accepted sense: it simply happens to be the most suitable in order to minimize interference to other repeater users and to other users of 144MHz.

EMC

The Institution of Electronic & Radio Engineers has formed a special Electromagnetic Compatibility Group, which includes biological hazards, lightning and static, coupling within systems and nuclear effects within its remit. The group will arrange meetings, sponsor papers for publication, and collaborate with other bodies for the purpose of advancing and disseminating knowledge in the field of electromagnetic compatibility (emc).

The group committee is seeking suitable papers on theoretical and practical aspects of emc for publication in the IERE journal *The Radio and Electronic Engineer*. The committee also wishes to facilitate the

THE BULLETIN IS BACK

This issue of *Radio Communication* carries the first issue of the *RSGB News Bulletin*, a new source of up-to-date information on amateur radio. This monthly insert will headline items of national and international news of interest to radio amateurs. It will not replace the "Amateur Radio News" section in the magazine, which will continue to deal with news in depth and any follow-up information.

The use of the name "Bulletin" will be evocative to long-established members, as "The Bull" was the name by which the Society's magazine was best known until 1968. Before 1968 its official name had been the *T & R Bulletin* from 1925.

Many members still refer to the magazine as "The Bull" — we can think of no happier link.

FM and repeaters on 29MHz

At past IARU conferences, and at the recent meeting of the HF Working Group, proposals for the channelization of the 29MHz band for fm and for the establishment of 29MHz repeaters did not meet with much support. However, the situation on that band appears to be changing: interest in the use of fm and repeaters is growing rapidly as suitable commercial equipment becomes available. It appears that unless some formal band plan recommendations are made soon, the increase in 29MHz fm activity may establish a *de facto* bandplan which could cause problems for the long-established amateur satellite sub-band.

In IARU Region 1, frequencies above 29MHz have been used mainly by the amateur satellite service. The Russian RS satellites use frequencies as low as 29·31MHz, and the highest frequency used by any satellite appears to be Oscar 9's 29·51MHz. In North America, and possibly elsewhere in IARU Region 2, the sub-band 29·30-29·50MHz is allocated to satellites, and repeaters use 29·52-29·58MHz for their inputs and 29·62-29·68MHz for their outputs—this equates to four channels with 100kHz split. The fm simplex calling channel frequency is 29·60MHz, and simplex operations take place mainly on the alternate 10kHz channels in between the repeater frequencies.

The frequency of 29·60MHz has become widely used throughout Europe as an fm simplex calling channel for local, continental and intercontinental working. This has also been true of fm operation in the UK, but the introduction of legal cb has caused the situation to change. Cheap transceivers which are available for this market can easily be converted to cover a 400kHz segment between 28·00 and 29·70MHz. Amateur radio dealers are already beginning to sell cb equipment which has been modified for 29MHz use, and most of it is set up to cover 29·31-29·70MHz, which

Amateur radio in the media

A half-hour programme predominantly concerned with amateur radio, "Electromania", was broadcast on Radio 4 on 15 November. Originally made for the BBC World Service, the programme featured several well-known exponents of meteor scatter and eme techniques: the Society was pleased to have been of some small assistance to its producer John Wilson, G8KIS.

The Society was also instrumental in setting up a live demonstration of amateur radio as part of an item on the "Tomorrow's World" television programme on 27 October. This was part of a feature item on the innovative "Woodpecker Blanker" manufactured by Datong, and an amateur radio link with a special event station signing GB2TW was set up by headquarters staff so that the equipment could be demonstrated. Special permission was obtained from the DTI for the presenter to depart from the usual greetings message format.

QSL Bureau news

The sub-manager for the G4PAA-PZZ group of call signs is now Mr Stuart Smith, G4PPQ. His address is 24 Blunham Road, Moggerhanger, Bedford MK44 3RA.

Christmas/New Year holiday

The RSGB headquarters at Potters Bar, the *Radio Communication* editorial office at Chelmsford, and the RSGB QSL Bureau in London SW20 will be closed from 24 December 1983 to 2 January 1984 inclusive.

overlaps with the established satellite downlink sub-band. Allied to this is the fact that several major commercial manufacturers are including an fm facility on their hf transceivers.

The Society believes that the use of fm in the 29MHz band should be encouraged, especially during the approaching sunspot minimum, in order to stimulate activity in that part of the spectrum. However, the amateur satellite service is an established user of part of this band, and frequencies between 29.30 and 29.55MHz need to be kept clear for downlink transmissions. The Society is submitting a paper to the April 1984 Region 1 Conference which proposes that the conference recommends suitable frequencies for fm and repeaters so as to minimize interference to the satellite sub-band. The paper will also propose that member societies should advise fm and other operators not to transmit in the sub-band portion.

More discussion and research will have to take place before suitable frequencies for fm and repeaters can be proposed and agreed. However, it would appear that suitable frequencies might well be 29.00-29.30MHz and 29.55-29.70MHz, with 29.60MHz designated as a simplex calling frequency. Apart from 29.60MHz, it may be desirable to restrict transmissions above 29.55MHz, or possibly 29.52MHz, in order to avoid interference to North American repeaters which can be accessed from Region 1 during good propagation conditions. Alternatively, fm simplex dx working channels could be established in 20kHz steps between 29.53 and 29.69MHz to aid intercontinental working. Internationally agreed standards for channel spacing and deviation would be necessary: a channel spacing of 10kHz would seem to be the obvious choice, with deviation limited to 3kHz.

The HF Committee would be pleased to receive any comments from members: the chairman of the committee is G3NKS, QTHR.

G3XDV turns professional

The Institution of Electrical Engineers recently hosted a conference on radio spectrum conservation techniques held at the University of Birmingham. The chairman of the RSGB's Repeater Management Group, Mike Dennison, G3XDV, gave a paper entitled "The UK 433MHz amateur radio repeater network", which presented an overview of the formation of the system, the specifications utilized and some detailed comments on various technical aspects of the system. The paper was extremely well received by the audience, and a large number of questions were asked at the end of the paper.

Continuing its policy of having meetings at various places up and down the country, some members of the Repeater Management Group made the journey northwards to Inverness for an open meeting on 15 October. An audience of about 40 heard the latest news of the repeater scene, and many questions were asked and answered during the course of the meeting.

Midlands VHF Convention

In October, the Society's vhf manager, Keith Fisher, G3WSN, opened the Midlands VHF Convention, which was attended by some 200 people. The three lectures were well attended, and the VHF Open Forum attracted about 100 people. In the course of the discussion, the matter of more basic technical articles for *Radio Communication* was raised, and the recent changes in the magazine were felt to be good.

One straw in the wind was that there was a general discussion on the idea of a novice licence in the UK. When the admittedly vhf-orientated audience were asked whether they supported the concept of a UK novice licence, not one person raised a hand.

RAIBC AGM

The annual general meeting of the Radio Amateur Invalid & Blind Club took place at the Flight Refuelling ARS Mobile Rally at Wimborne on 21 August. The RAIBC had another successful year ended 31 March, and members acquired 40 A licences and 55 B licences. There were 217 new members and 36 new representatives. Additional equipment on loan to members included three transceivers and 17 receivers.

In thanking the committee for its help during the year, the chairman, Mr W. Craig, G6JJ, paid special tribute to Mrs F. Woolley, G3LWY, and congratulated her on being elected an honorary vice-President of the RSGB in recognition of her work on behalf of the RAIBC. The chairman also referred to the essential part played by representatives in furthering the aim of the RAIBC, which is to help its members to enjoy the hobby of amateur radio. As well as assisting with the installation of equipment and its maintenance, many representatives were keeping in regular contact with members and helping them to feel that they belonged to the club.

Enquiries or offers of help should be made to the hon secretary, Mrs Frances Woolley, G3LWY, 9 Rannoch Court, Adelaide Road, Surbiton, Surrey KT6 4TE.

The Uiver Memorial Foundation

Next year is the fiftieth anniversary of the legendary London-Melbourne air race organized by McPherson Robertson. KLM, the Dutch airline, took part with the then brand-new Douglas DC2 airliner, which was the forerunner of one of the greatest aircraft of all time, the DC3 (Dakota). The KLM DC2, named *Uiver*, won the first prize in the handicap section and came second in the speed section, carrying three passengers in great comfort and 500lb of mail.

To commemorate this famous event the Netherlands Broadcasting Corporation conceived the idea of repeating the flight with the last surviving DC2 and making a documentary film, and the Uiver Memorial Foundation has been established in order to cover the extremely high cost of the project. Radio amateurs in the Netherlands have established the Uiver Memorial Award as their contribution to the project, and any profits will be made available to the foundation. The requirements for the award are somewhat complex and are too long to

be itemized here, but full details are available from either PA3BWQ at Schubert-hof 3, 2742 BT Waddinxveen, Holland, or PD0JQX, Steijnkade 31, 2805 JE Gouda, Holland. A handsome certificate is available to those meeting the requirements.

As a matter of interest, the winner of the "speed" section of the 1934 race was a British aircraft—the de Havilland DH88 Comet. This machine is currently being restored to flying condition at its long-time home of the Shuttleworth Trust at Old Warden in Bedfordshire, with the aim of celebrating the 50th anniversary of the race. Historically, the Comet is the direct ancestor of the de Havilland Mosquito, which was one of the outstanding aircraft of the second world war. The Mosquito Aircraft Museum at Salisbury Hall, Herts, can often be heard on the air with the callsign GB2MAM, and is well worth a visit for those with an interest in aviation.

Pirate broadcasters?

The callsign G6IBA has apparently been used on a regular basis in the Birmingham area: it is, however, held by the Crawley Court Amateur Radio Group operating from a centre of the Independent Broadcasting Authority at Winchester, and has never been used in the Midlands. The group also holds G4IBA.

ARRL 1984 National Convention

The 1984 National Convention of the American Radio Relay League is scheduled to take place in New York from 20 to 22 July 1984. The venue is the New York Statler in the heart of the city, and the event is on a typically American scale—ie enormous! Guest of honour at the convention will be Dr Owen Garriott, W5LFL: he is scheduled to be present at a party on the evening of 20 July which celebrates the 15th anniversary of the first moon landing and his own role in the first amateur operation in space, and he will also be the featured speaker at the convention's gala banquet on the evening of 21 July.

TOPS CW Club net

TOPS CW Club members are invited to join in one (or both) of two weekly nets in the 3.5MHz band. These take place on 3,508kHz, with 3,514kHz as an alternative, from 2pm to 4pm on Sundays and Wednesdays. These nets will enable TOPS news to be circulated until publication of the newsletter is resumed, which is expected to take place in the near future.

Non-members are invited to join in the net, provided that the proceedings do not become too unwieldy. The net control station will normally be the TOPS club station, GW6AQ.

Scopex crash

The well-known firm of Scopex, who made oscilloscopes and other test gear, has been forced to call in a receiver: this is a sad event for a number of reasons. One is that the company's products were deservedly popular with amateurs, and many shacks

contain a Scopex oscilloscope; another is that the company was the first in the world to produce an oscilloscope with a liquid crystal display.

Many members will be concerned about future repairs to their instruments. A new company, Mendascopex, has as one of its directors the person responsible for the design of all Scopex analogue instruments. The company is, therefore, in a position to offer service back-up to owners of Scopex equipment and collection and a free estimate are available. Write to Mendascopex Ltd, Otter House, Weston Underwood, Olney, Bucks MK46 5JS, or telephone Bedford (0234) 712445.

UK Firefighters Net

Anyone who is employed in fire fighting or fire engineering—including those in the Services, petrochemical industry and private fire brigades, and on oil rigs and at oil terminals—and who would like to join the Firefighters Net is invited to write to Mr D. C. Walker, G4DCW, 39 Elm Court, Kingsley Park, Birkenshaw, Bradford, W Yorkshire BD11 2PF. Alternatively, listen for the net at: 1130gmt, Mondays and Thursdays, on 7,085kHz; 1100gmt, Saturdays, on 7,070kHz; 1900gmt, Tuesdays and Fridays, 144.21MHz; all modes ssb except 1830gmt Tuesdays and Fridays (fm) on 144.725MHz.

Calling car rally enthusiasts

Paul L. P. Rogers, G6JMK, is looking for a number of radio amateurs to join him in a national rally championship next year. He needs a co-driver/navigator and service crew who live in the Leeds area to help plan and prepare a suitable car. Any suitably qualified enthusiasts can contact him any evening or weekends on Guisley 77804.

New RAE class

A new RAE class aimed at the December 1984 examination will commence on 11 January 1984 at the Kirklees Adult Education Centre, Greenhead College, Huddersfield. The course will consist of 30 lessons, each commencing at 6.45pm on Wednesdays. The tutor is P. Mercer, G6CPM. For further information telephone Huddersfield 38454, daytime.

A Raynet tie for Christmas

A tie with the Raynet motif on a navy blue background makes an ideal Christmas gift. Obtainable from Jane Balestrini, Merrivale, Willow Walk, Culverstone, Gravesend, Kent, price £2.90 including p&p.

Sidebands

According to the Korean Amateur Radio League, one of the crew of the Korean Airlines Boeing 747 which was shot down recently was HL1LJ from Seoul.

The *National Geographic Magazine* September 1983 had a 30-page retrospective of satellite history: Oscar 8 was included in the article.

UHF repeaters GB3HU and GB3BD have

recently become operational after site changes.

During a demonstration of Amtor to a delegation from the DTI at headquarters recently, an antenna fault caused an swr of about 11:1 and a transmitter output power of about 0.5W on 14MHz. The system carried on working perfectly...

Standard black RSGB badges are presently out of stock, but are expected to become available in February 1984.

A new technical specification for land mobile radio in the 174-225MHz band has recently been published by the DTI. Among the user groups to be assigned channels in this band will be the national power industries, which will be displaced from the 105-108MHz band when it is re-allocated to fm broadcasting. The 174-225MHz band becomes vacant when 405-line television closes on 31 December 1984.

The Edgware & District Radio Society is proposing to begin the New Year by sponsoring a CW Straight Key Evening commencing at 1900 on 1 January 1984; the 144MHz band will be used, and the call will be "CQ SKE". The 1984 3.5MHz SKE is set down for 29 March, again commencing at 1900.

One of the most popular 144MHz GB2RS newsreaders, G3CHN at Kingsbridge, Devon, has retired and is moving to the Isle of Wight. He read his last bulletin on the morning of 22 October 1983, and his superb coverage and clear diction will be sorely missed. Roger received a report from a station in Sweden at the end of his final news bulletin, which was an excellent way to complete the job—the Society would like to wish him well at the new QTH and to thank him for his excellent work.

Mobile Rallies Calendar

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

11 December 1983 — Leeds & DARS Third Annual Christmas Rally, The Civic Centre, Pudsey, nr Leeds. Open 10.30am. Admission free. All the usual facilities. Enquiries from traders to A. A. Alexander, G6CJI, QTHR.

5 February 1984 — Bury RS Ham Feast, Mosses Community Centre, Cecil Street, Bury. Talk-in on S22. Open 11am. Refreshments available. Bring & buy. Details from H. F. Bridge, G3VC, 17 Raglan Avenue, Whitefield, Gt Manchester M25 5US, tel 061-773 8824.

18 March 1984 — Pontefract & DARS Components Fair, Carleton Community Centre. Open 11am-4.30pm (10.30am for disabled people). Talk-in on 144MHz fm, S22. Aimed at home constructors. Trade stands, RSGB bookstall, bring & buy and raffle. Details from A. Mason, G4TGU, tel 0532 871484, or N. Wittingham, G4ISU, tel 0977 792784.

1 April 1984 — White Rose ARS Rally, The University of Leeds. Details from A. N. Bramley G4NDU, QTHR.

8 April 1984 — Buxton Mobile Rally, Transport Museum, Buxton, Derbyshire (next to railway station). Open 11am (10.30am for disabled). Admission 50p, under 14yrs free if accompanied by adult. Talk-in on 144 and 432MHz. Ample car parking. Snack bar and cafeteria. Numerous trade stands. Details from G6MIF, tel Buxton (0298) 6174.

6 May 1984 — Anglo-Scottish Rally, Kelso, organized by the Kelso ARS, Junk, bring & buy and trade stalls. Full catering facilities and bar. Details from Bruce Cavers, GM4UIB, Kelso ARS, c/o Community Centre, Kelso, tel 0573 24654.

13 May 1984 — Swindon Radio & Electronics Rally, Oakfield School, Marlowe Avenue, Swin-

don, Wilts. Doors open 10am. Talk-in on S22 and SU8/GB3TD. Trade stands, cartoon film show, displays, refreshments, free car parking. Details from Ken Saunders, G8SFM, QTHR, tel 066-689 307.

13 May 1984 — Otley ARS Northern Mobile Rally. Flower Show Hall, Great Yorkshire Showground, Harrogate. Open 10.30am. Overnight accommodation and caravan site available. Details from H. Moore, G3CQQ, 269 Leeds Road, Ilkley, LS29 8LL.

20 May 1984 — Drayton Manor Mobile Rally. Drayton Manor Park, nr Tamworth, Staffs. Organizer N. Gutteridge, G8BHE, QTHR, tel 021-422 9787. Full details to follow.

27 May 1984 — East Suffolk Wireless Revival. Suffolk Showground, Ipswich. Organized jointly by Ipswich RC and Marlesham RS. Details later. Information from J. Tootill, G4IFF, QTHR.

10 June 1984 — Elvaston Castle Mobile Rally, Elvaston Castle Country Park, 5 miles south-east of Derby on the B5010. Organized by the Nunsfield House ARG. Opens 10am. Talk-in will be provided by GB2ECR on both 144 and 432MHz. All the usual facilities including bring & buy sale and flea market. Full on-site catering facilities. Further details from Ian Cage, G4CTZ, QTHR, tel Derby (0332) 799452. Trade enquiries to Mr R. Woolley, G4HJ, tel Ashbourne 43241.

24 June 1984 — Longleat Amateur Radio Rally, Longleat Park, Warminster. The Bristol Unicorns Marching Band will be with us again this year, plus all the usual Longleat Park attractions for the family. Details from B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, tel 0272 848140.

1 July 1984 — Worcester & DARC Annual Mobile Rally, Droitwich High School, Ombersley Road, Droitwich. Open 11am to 5pm. Attractions will include "Strawberry Fields" and children's fancy dress competition. Details from sec A. C. Lindsay, G4NRD, QTHR.

22 July 1984 — Anglian Mobile Rally, Stanway School, Colchester, Essex. Open 1000-1700. Talk-in on 144MHz. Further details from G3YAJ, tel 0206-39 3938.

29 July 1984 — Rolls Royce ARC (Barnoldswick) Mobile Rally, Sports & Social Club, Barnoldswick. Open 11am. Details from Leslie Logan, G4ILG, QTHR.

26 August 1984 — Preston ARS 17th Annual Rally, Lancaster University. Details to follow.

23 September 1984 — Lincoln Hamfest, organized by the Lincoln Shortwave Club, on the Lincolnshire Showground (4 miles north of Lincoln City on the A15). Opens 11am-5.30pm. Talk-in on 144MHz (S22) and 432MHz (SU8). Ample car parking, caravan and camping facilities, refreshments, licensed bar. More trade stands than in previous years, many attractions for junior ops. Facilities for the disabled. Further details from G8VGF, c/o City Engineers Club, Central Depot, Waterside South, Lincoln.

Special Event Station

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

20 November—17 December 1983, GB0WCY

The Isle of Man ARS will operate a station to commemorate World Communications Year and the opening of the new philatelic bureau headquarters of the Isle of Man Postal Authority. The station will operate from the famous TT Race Grandstand, Douglas, Isle of Man. There will be multi-band operation and a special QSL card will be sent to all stations contacted. Details from sec GD4GWQ, Mrs A. Matthewman, 20 Terence Avenue, Douglas, Isle of Man, tel 0624 22295.

Other Events

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

10 December 1983 — RSGB AGM, IEE, Savoy Place, London.

14 January 1984 — RSGB Presidential Installation, Cardiff Castle, Cardiff.

24 March — RSGB National VHF Convention, Sandown Park Racecourse, Esher, Surrey.

28-29 April 1984 — RSGB National Amateur Radio Exhibition, National Exhibition Centre, Birmingham.

COUNCIL PROCEEDINGS

A brief report of the Council meeting held on 13 August 1983

Present: Mr D. E. Baptiste, CBE (President, in the chair), Dr E. J. Allaway, Messrs G. A. Griffiths*, F. D. Hall, L. N. G. Hawkyard, Mrs J. Heathershaw, Messrs H. M. Holmden, G. R. Jessop, I. J. Kyle, T. I. Lundegard, W. J. McClintock, H. S. Pinchin, D. M. Pratt, K. E. V. Willis (members of Council), R. L. Glaisher (chairman, HF Contests Committee), D. A. Evans (secretary/general manager), and Ms H. M. Norman (minutes secretary).

*Also in attendance as chairman, Raynet Committee.

Mr Baptiste congratulated Dr Allaway on his recently attained "Golden Needle" award from the Austrian national society, OVSF. Mr Baptiste said that the award, given for outstanding service to OVSF or amateur radio in general, was well deserved, and Dr Allaway's presence when representing the RSGB abroad added prestige and dignity to the Society.

The President welcomed Mr Glaisher, chairman of the HF Contests Committee.

Apologies for absence were received from Messrs Barrett, Bazley, Cornish, Fisher and Hutchinson.

Committee chairmen

The chairmen of the HF Contests Committee and the Raynet Committee were invited in turn to take part in discussions with members of Council on the reports of their respective committees, recommendations and future plans.

Appointment of committee chairmen

Council considered the list of proposed committee chairmen, as recommended through the Forward Planning Group. These appointments were confirmed:

Mr M. S. Appleby, G3ZNU	VHF
Mr R. G. Barrett, GW8HEZ	Membership & Representation
Mr M. Dennison, G3XDV	Repeater Working Group
Dr D. S. Evans, G3RPE	Technical & Publications
Mr R. G. Flavell, G3LTP	Propagation Studies
Mr R. J. Hughes, G3GVV	IARU
Mr P. F. Jobson, G3HLF	EMC
Mr N. O. Miller, G3MVF	Exhibition & Rally
Mr P. G. Murchie, G4FSG	Microwave
Mr B. O'Brien, G2AMV	Finance & Staff
Mr G. C. Oxley, G8MW	Education
Mr D. M. Pratt, G3KEP	Licensing Advisory
Mr D. Thom, G3NKS	HF

A recommendation from the Forward Planning Group that Mr J. H. Quarmby, G3XDY, be appointed chairman of the VHF Contests Committee, following the resignation, due to ill health, of Mr F. Mathews, G8ACJ, was agreed.

Committee recommendations

Council approved the following additional committee expenditure:

- Microwave Committee**—£500 for the purchase of special components for resale.
- VHF Committee**—in principle, an allocation to establish beacons for which there was a particular need and which could not be met by volunteer effort.
- VHF Contests Committee**—£1,000 for assistance, if required, in connection with the adjudication of the 1984 IARU vhf/uhf contests; up to 1,500 entries were expected.

Amendments to the next edition of the "Green Book" were agreed after discussion. Approval was given to change the name of the Repeater Working Group to Repeater Management Committee.

Membership and representation

Council noted:

- reduced subscriptions granted to a further 14 members;
- the waiving of subscriptions in respect of a further 15 members on health and disability grounds;
- the granting of affiliation to the following: Amateur Radio Enthusiasts Club, Harlow, Essex; Anglo Scottish Repeater Group, Dumfriesshire; Bishops Stortford ARC; Dunfermline Radio Society; Durham ARC;

Edenbridge ARS, Kent;
Itchen Valley ARC, Hants;
Keighley ARS;
Marconi Avionics ARS, Kent;
Marconi RS, Stanmore, Middx;
Mayland & DARC, Essex;
North Cambs 70cm Repeater Group;
North Cornwall RC;
RAF Halton AR&EC, Bucks;
Reading School ARC, Berks;
Stirling & DARC;
Swansea Radio Amateurs Constructors' Club;
Thornbury & DARC, Avon;
Wirral Contest Group.

Region 10. The results of the recent ballot were noted as:

E. J. Case, GW4HWR, 54 votes;
R. Jones, GW4HOQ, 31 votes.
Mr Case was therefore elected representative for Region 10.

Region 8. The Swale ARC had nominated their chairman, Mr M. Elliott, G6NEY, for the position of representative for Region 8. This had been acknowledged and passed to GW8HEZ for consideration by the Membership & Representation Committee.

Region 14. Council noted a letter of resignation from the regional representative, Mr Kusin, GM4HCO.

Area representation. The following appointments had been made:

R. Adam, GM4ILS, Moray area;
C. M. Goadby, G8HVV, Cambridge;
C. W. Weller, G4ONH, Braintree and district.

Transmission of morse by Class B licensees

A paper prepared by the Licensing Advisory Committee on this subject was discussed at length, and it was agreed in principle by 11 votes to 1. Amendments to the wording were discussed and it was agreed that Mr Pratt and the general manager would draft a final statement for submission to the RRD.

Raynet frequencies on the 144MHz band

Mr Griffiths introduced a paper which had been produced as a result of a meeting between representatives from the Raynet and VHF committees. While recognizing that it was not ideal, it was a viable compromise. Mr Griffiths felt the proposals contained in the paper were sensible and worthwhile and he commended them to Council.

It was noted that some groups had spent money on equipment which would now be superfluous.

After discussion, the paper was accepted. The details would be published in *Radio Communication*, and the paper would be sent to Raynet controllers.

Recommendations for awards/trophies 1983

Proposals for the Founder's Trophy, Mullard Award and Calcutta Key were discussed by Council.

HF manager's report

Dr Allaway stated that the HF Committee was aware of channelized fm signals on 28MHz from converted cb equipment. (Frequencies needed to be properly co-ordinated to avoid interference to the space band.)

VHF manager's report

Mr Fisher had submitted a written report dealing principally with the subject of the use of cw by Class B licensees which Council had already discussed.

It was agreed that a letter from the vhf manager should be sent to all 50MHz licence holders reminding them that the number of licensees was limited and asking them to let the Society know if they wished to relinquish their licence, thus enabling someone else to participate in the experiment.

Microwave manager's report

At the Zurich Conference in April, the RSGB suggested that there was a strong possibility of our losing common international working frequencies in the microwave part of the spectrum because of decisions being made by individual national administrations without any international planning. The RSGB had proposed that steps

should be taken as a matter of urgency to reduce the chance of this happening.

The much-publicised possibility of Belgium losing all its microwave bands up to 10GHz had underlined these fears in a most dramatic way, although the subsequent withdrawal of the original plans for reconsideration has given cause for hope. Nevertheless the RSGB proposals for a survey of non-exclusive allocations (or potential allocations), and some form of co-ordinating group to handle the information with the objective of promoting common working frequencies, can be seen to be most appropriate at this time.

Financial report

The auditors had now completed the annual audit and a first draft of the accounts had been produced. These showed a surplus of income over expenditure of approx £27,000 before tax. This was considered to be satisfactory in a year in which they Society had moved premises, involving a substantial amount of expenditure and additional work. The secretary/general manager commented that he still considered this level of surplus to be very small, and in practice several more staff, who were badly needed in some areas, could turn such a surplus into a deficit with relative ease.

The secretary/general manager referred to the introduction of direct debit for membership subscriptions, which it was hoped would be introduced during 1984.

Secretary's report

Mr Evans reported a 5.13 per cent increase in Society membership during the 1982/3 financial year. Such an increase could be described as satisfactory though the rate of growth had slowed down. However, he noted that with 5,498 new members enrolled, this was still one of the highest levels of new member input in the Society's history. The real reason for the lack of growth was not at the joining end, but rather that more members were now not renewing their subscriptions. This reflected the economic situation and the fact that many new members were not continuing with the hobby for a variety of reasons.

Mr Evans commented on the recent changes in content and presentation of *Radio Communication*, and described the logistics of out-putting news to members via GB2RS, the Headline News Service, *Radio Communication* and the *Council Letter*.

The report concluded by discussing staffing, with particular reference to membership services and planning matters, book production, and the fact that interviews for a technical officer were taking place during September.

OBITUARIES

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

Mr W. G. Johnson, G2BJY

Walter "Geoff" Johnson died on 3 October, aged 74. Until his recent illness he had been a keen cw operator, and was known as a "perfect gentleman".

Mr E. Mathews, G3RZB

Eddie Mathews died on 22 September, aged 60. He was very interested in the construction and operation of hf equipment. He was a member of Shefford RS, and entertained the members with his "Magic Circle" expertise.

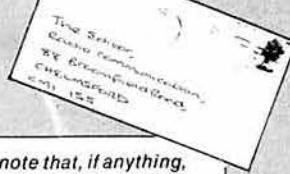
Mr D. J. Porter, G8LVX

David Porter died on 2 August, aged 30. He was an active and keen amateur who was often to be heard on 144 and 432MHz. He was an active member of the Radio Society of Harrow and had recently served on the committee. Dave was always willing to help out in any of the club's activities and was known for his friendly and pleasant manner.

Mr T. A. Wignall, G6OKG

Tony Wignall, who died recently, was always a cheerful member of his local 144MHz net, although severely handicapped.

Members' Mailbag



A HARDY PERENNIAL

Sir—Another weekend has passed and again it has been marred by yet another 48h contest. Listen almost any weekend and one hears 5NN234 followed by QSL. Whether signals are S4 or S9 they all qualify for the 5NN rating. Even call signs are skipped and a simple "de G1ABC" rates as a call to another station.

May I suggest that in future no actual QSOs take place but all participants send their call signs from time to time and everyone writes down on their log sheet as many call signs as they can hear putting of course 5NN in and 5NN out against each.

More seriously, however, I would suggest that the many societies of the world get together and have, say, four weekends per annum when they all have a contest together. Alternatively, if every weekend is to be a necessity then only 25 or 50kHz of the various bands shall be utilized for such contests and anyone operating outside these limits shall be disqualified.

I have yet to discover the object of a contest. Everyone uses a similar black box plus a linear and three or four-element beam—so what?

Norman F. O'Brien, G3LP

This is a perennial and world-wide problem. Each national society, and there are now 118 of them, and indeed almost every amateur radio magazine, seems to want the prestige of its own contest (or even a series of them). Certainly there is a good deal of support for contests, and they can often engender the very best in "team spirit", and it cannot be denied that contests often produce interesting dx which could not otherwise be worked—portable contests still test the ability of amateurs to work under conditions which are akin to those which could conceivably be found under emergency conditions. The IARU has an ongoing commitment to bring a semblance of order to the contests calendar, and the RSGB has always been keen to see some rationalization: no doubt the matter will be raised again at next year's Region 1 Conference in Italy.

6 to 4 WITH YOUR HELP

Sir—I wonder if through your columns I could make a plea on behalf of all other G6s who are trying to attain 12wpm at cw by listening to those stations that transmit slow morse such as Locking, G3GNS, of the RAFARS, on 3-5MHz. Over the last three or four months this particular frequency has been virtually unreadable at 12wpm, and if I didn't know better it would seem almost like deliberate jamming. Up-to-date expensive rigs have built-in filters which go some way to overcoming adjacent signals, but everybody cannot afford up-to-date equipment.

I, fortunately, have just passed the magic test and will soon be a G4 myself, so therefore I no longer require the aid of the "tutor stations", but please, gentlemen, leave these frequencies clear for those who do need them.

While writing, I would like to answer G3XIZ's comments regarding the ease of the current RAE. Amateur radio is a hobby, and the longer one spends at a hobby the more knowledgeable one becomes. To call the current RAE paper "simple" is unkind, to say the least. The number of people who fail proves that what is simple to G3XIZ is not necessarily simple to others. I know a few who, after failing the RAE, might be offended at being branded simple. Perhaps our knowledgeable friend is also one of those who, when holding a QSO, finds he has nothing to talk about except radio and electronics, which quite honestly I find a bore. I for one am unable to recall circuits and

diagrams from the "top of my head", but do not consider that that makes me a poorer amateur. There are plenty of "old hands" here in Cornwall more than ready to help and advise "non-technics" such as myself when a problem arises. My advice to G3XIZ is: stop resenting the fact that someone appears to be getting something a little easier than you did, and think of all those new friends there are to talk to.

Brian Lewis, G6VXT

DO YOU USE A COMPUTER?

Sir—I would like to hear from readers who use a computer in connection with their amateur radio activities. In particular, I would appreciate details of any over-the-air program exchanges.

Peter Davis, G3ZXU,

Room 301, Dept of Engineering Technology,
Paddington College, London W2 1NB.

PRICE COMPARISONS

Sir—Numerous letters have been written comparing the prices of amateur radio equipment between the UK and other countries. I have just returned from a trip to the USA, and I am surprised at the difference in prices of antennas.

The following comparisons are made from prices quoted in the July 1983 issue of QST and the September 1983 issue of Radio Communication. Prices quoted are minimum prices, taking into account sales tax etc, and an exchange rate of \$1.50 to the £1.

USA	UK
18AVT/WBS Hygain—\$87 (£58)	£113.85
TH5DXX Hygain—\$306 (£206)	£419.75
TH7DXX Hygain—\$369 (£246)	£511.75
Minibeam HQ1—\$139 (£92.60)	£139.00
Rotator Ham 4—\$195.95 (£130.66)	£258.75
So, a TH5DXX and a Ham 4 would cost £336.66 in the USA and £678.50 in the UK.	

I should have brought them back with me!

R. Briggs, G3UDX

This is an interesting comparison, although it appears to exclude import duty and VAT. Import duty currently runs at about 11 per cent for antennas, and there is 15 per cent VAT on top of that. Even so, there is certainly something of a difference—perhaps the cost of transporting American equipment across the pond is part of the answer!

OBSERVING BAND PLANS

Sir—How long will it be before the amateur band plans become mandatory? The reason why I ask is probably obvious to beacon-band enthusiasts. Some amateurs will insist on using the beacon band to QSO. It's just not on fella (haven't heard a y! or xyl—yet!).

I use the beacon band for propagation tests, and some amateurs will use these frequencies. Please, please, please, use the correct spectrum for QSOs and make us all happy.

J. A. Holmes, G4LRS

The bandplans in the UK are voluntary—in other words they are not part of the licence—and they depend on what could be called a "gentleman's agreement" to work. Unfortunately, there will always be those few who feel that their licences entitle them to transmit anywhere they wish in a particular band, and one such individual can make life impossible for the many others who are trying to behave in a responsible way. The Society publicises band plans wherever possible—they will next appear in the January 1984 issue of Radio Communication, for example—but whether the band plan should become a mandatory part of the licence is a matter for

debate. It is interesting to note that, if anything, the trend seems to be to deregulate—see the "News from New Zealand" in this month's "Amateur Radio News", for example—and this places the onus squarely on individual amateurs to observe the band plans appropriate to their location. By the way, band plans are NOT invented by the RSGB: they are the subject of international agreement on the part of the national radio societies (118 of them) who are, by agreement, trying to fit the maximum number of amateurs into a given space.

WHERE DO OLD RIGS GO?

Sir—Reading the correspondence column in the October issue of Radio Communication, I note once again a reference to the difficulties of home construction with regard to the cost of the bits and pieces. We tend to forget that the source of many of our components in the immediate post-war era, government surplus, has now just about disappeared.

What happens to all the commercially-produced amateur gear of a few years ago? I know of no shop that maintains a stock of the older equipment, serviceable or unserviceable, but useful for spares or rebuilds at a sensible price. There are plenty of shops that specialise in secondhand TVs, perhaps from £50 in working order. Surely a transceiver that cost an equivalent amount to a colour TV five or six years ago is by the law of the market-place worth no more than that £50 or so?

I can only assume that the advertisers in "Members Ads" expecting to get some 60 per cent of the new price for their elderly six or seven-year-old "mint complete with original packing Traesu" leave it on some dark shelf when no offer is made, with the thought that some day they will get the asking price. Or else they quietly accept the offer of a dealer who, rather than put it on the market at an economic price, slips it under a road roller somewhere! If all this 6 to 10-year-old gear came on the market at the price it is worth, then I feel a lot of the problems of the newcomer to the hobby would be solved.

Myself, I would love to rake around in a pile of old discarded gear to see what bits I could use in a home project—but where does it all go?

E. W. Elliott, G3BYV

A good point—what DO you do with your old rig?

WHERE ARE THE GMS ON 144?

Sir—For almost three months this marvellous summer, GB3ANG—the 144MHz beacon near Dundee—has been audible here in Dorking, Surrey whenever I chose to listen for it. In the same period, I have heard exactly three GMS on cw and one on ssb.

GB3CTC—the Cornish beacon—has been similarly audible all the time, but the tally of Cornish stations was 27.

Can someone explain this for me? Don't GMS operate 144MHz any more? Or has GB3ANG simply got a superb location?

Wally Blanchard, G3JKV

We suspect that Wally is being the tiniest bit provocative! One of the headquarters staff living in London is very badly sited to the north and north-west, but he still manages to work Scottish stations from time to time on 144MHz (the score this year has been seven) when conditions are reasonable—in fact G1 and EI counties and squares have been much harder to come by despite a somewhat better take-off in their direction. Perhaps it is a matter of being in the right place at the right time.

MICROCOMPUTER APPLICATIONS

by MARCUS D. BOWMAN,
BSc(Hons), GM4LVW*

Born in 1952, Marcus Bowman has had an interest in radio since his schooldays. After graduating from the University of Strathclyde in 1974 with a BSc (Hons) in mechanical engineering, presenting a thesis on an application of computer graphics in engineering, the following year was spent studying for a teaching certificate and the RAE. After some considerable time, a microcomputer was employed to help achieve a pass in the cw test.

First licensed in 1981 with his present call, Marcus is active on the hf bands, with a particular interest in rtty, using an Apple 2 and a homebrew terminal unit. Occasional excursions are made to 144MHz; and to 432MHz for fast scan television, using homebrew equipment.

Employed as a teacher of mathematics and computing, he is deeply involved with the use of mini and



microcomputers in education. He is a member of the Ayr Amateur Radio Group, and has lectured to local amateur radio groups on the use of the microcomputer in amateur radio.

Introduction

How strange! Here we are in the middle of the microcomputer revolution, and yet we radio amateurs have a problem. At the end of every earnest discussion about the merits and demerits of the various microcomputers on the market, someone whispers quietly: "Well, I know I can use a computer for contest logging, but what else can I do with it?"

It is an important question, so here are a few very brief notes on the more interesting applications of the microcomputer in amateur radio.

RTTY

RTTY (RadioTeleType) operation holds many delights for the micro-owner, for this is a mode to which the micro is ideally suited. In fact, the micro significantly enhances operation in this mode, compared to the use of a teleprinter.

In an rtty transmission a code is used to represent letters and numbers as a series of high and low audio tones, and amateurs normally use the CCITT

No 2 code (often called the Murray code). Using this code, an rtty signal consists of a series of characters, each character comprising:

- (a) a "start" element which denotes the beginning of a character code;
- (b) a five-element code corresponding to the character being transmitted; and
- (c) a "stop" element which denotes the end of the character code.

Each element is of a clearly defined duration.

On the amateur bands, the most common rtty transmission speeds are 45·45 and 50 baud, where baud rate = $1 \div (\text{duration of the shortest element})$. At 45·45 baud, element durations are:

Start element = 22ms

Each element of the character code = 22ms

Stop element = 33ms

At this speed, the total duration of a character signal is $22 + (5 \times 22) + 33 = 165\text{ms}$

At 50 baud, element durations are:

Start element = 20ms

Each element of the character code = 20ms

Stop element = 30ms

At this speed, the total duration of a character signal is $20 + (5 \times 20) + 30 = 150\text{ms}$

While a millisecond may seem like an extremely short interval of time to a human being, it is a very long time to even the most humble micro, which will be quite happy when measuring time intervals of a few microseconds.

Each individual element of the character code is sent as either a high tone (typically 1,445Hz) or a low tone (typically 1,275Hz). These tones correspond very nicely with the high and low logic states which can be generated by a micro, and it is easy to arrange the conversion from logic states to tones, and vice versa, by using a simple interface.

To receive and decode rtty signals, the essential requirements are:

1. A reasonably stable receiver, capable of resolving usb signals.
2. A receive decoder that accepts the audio output from the receiver and
 - (i) filters this audio signal, separating and identifying the high and low tones; and
 - (ii) translates these tones into logic states.A good receive decoder will also enhance the high and low tones, taking account of fading on one or other tone, and attempting to provide a perfectly-shaped signal with nice sharp edges at the transitions between tones.
3. A suitable program for the micro, which examines the output from the receive decoder, checking the logic state at regular intervals. When a

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Encoding and transmitting rttv signals demands:

1. A suitable program, which translates a keyboard character into the corresponding five-element code, adds start and stop elements, and sends all seven elements along an output line in the form of logic states.
2. A simple two-tone oscillator capable of generating tones of 1,445Hz and 1,275Hz. Selection of the tone produced should be made by a logic switch (eg a single transistor) operated by the micro's output line. The chosen tone may be fed into a transmitter.
3. A transmitter (usb).

Terminal units may be purchased ready-made, or constructed at a considerable saving. Similarly, suitable software already exists for many popular machines such as TRS-80, Pet, VIC, Apple, BBC, ZX81, Spectrum, UK101. It is also relatively easy to write a basic receive and transmit program, although this does demand the use of short machine code routines to handle the input and output lines. Basic being too slow.

However, all of the above may be easily accomplished by a conventional teleprinter. How then does a micro enhance rtty?

The answer lies in the software

A good tty program will, typically, provide a split-screen display in which the screen is divided horizontally into three portions. Signals being received are decoded and displayed on the upper portion of the screen. The splitting of words at the ends of the lines can be avoided by automatically inserting a carriage return/line feed at the appropriate points, regardless of whether the transmitting station sent such a signal, or not. For convenience the receive portion of the screen scrolls independently of the rest of the screen, and may be cleared at any time without affecting the rest of the screen.

When sufficient memory is available, the received message may be stored in a buffer (simply an area of memory set aside for incoming characters). This buffer may be displayed at any time, stored on a disk or cassette tape for recall later, or sent to a printer if hard copy is required. The lower portion of the screen displays the contents of a live transmission buffer. This allows text to be entered from the keyboard in preparation for transmission. So, if you are a slow typist, here is your chance to set up the text of your transmission during the other station's over!

This kind of operation is possible simply because the micro works so quickly. Even though the input line is being examined at regular intervals while decoding an incoming signal, there is still time to check the keyboard, then update the contents of the receive and transmit buffers and display these, before it is time to examine the input line again. In addition, the transmit buffer can often be filled with pre-prepared text from disk or cassette.

The central portion of the screen is used to display the characters actually being transmitted. This portion often scrolls sideways, from right to left, the character about to scroll off the left-hand edge of the screen



Fig 1. RTTY hardware. A home-made terminal unit surmounting a standard ssb transceiver

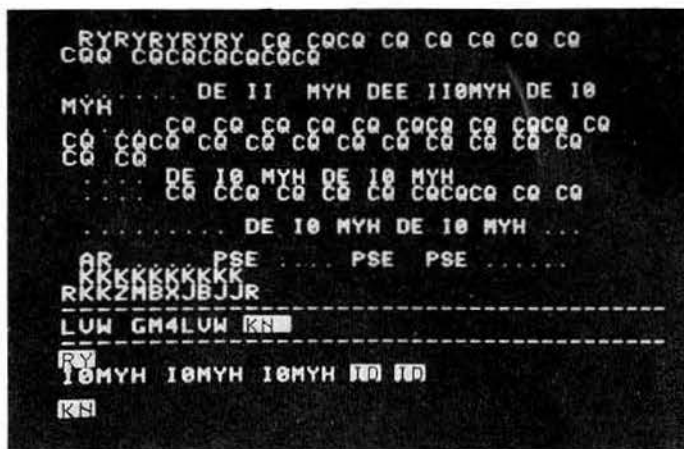


Fig 2. A three-way split-screen rty program in action. Top: receive buffer. Centre: outgoing signal (travelling from right to left) being transmitted. Bottom: type-ahead transmit buffer. Inverse characters are replaced by pre-programmed messages on transmission; eg ID becomes DE GM4LVW

representing the character currently being transmitted. When in receive mode, this portion of the screen can be used to display prompts for various commands which may be used to control the program.

Pre-programmed messages, callsigns and the like may be stored inside the program and recalled by one or two keystrokes, after which the computer will identify and fetch the message required. Where sufficient memory is available, the transmit buffer may be of a substantial size (perhaps as large as 10,000 bytes or characters in a machine with 48k of memory). This allows such entertaining tricks as the transmission of pre-programmed pictures composed by using the normal keyboard characters—very amusing, and guaranteed to liven-up any OSO!

Several other useful facilities are normally provided in a good program. First, the receive and transmit speeds may be varied on command. A few sophisticated programs actually determine the speed of the incoming signal for themselves, although this feature seems to be more common in commercial rtty units. Second, an additional output line is often used to remotely switch the transceiver from receive to transmit. By means of this facility the keyboard may be used to control the transceiver via a relay or solidstate switch. Many programs automatically provide a switching signal when commanded to begin transmission or reception. Third, licence regulations demand that the operator's callsign be sent in cw or telephony at the end of each rtty transmission. This can be accomplished easily and automatically by using another output line to key a cw tone oscillator, sending a pre-programmed callsign.

ASCII

Once a basic rtty program has been written, there is no reason why some other code should not be substituted for the Murray code. On the amateur bands ASCII (American Standard Code for Information Interchange) is being used with increasing frequency, and transmissions of this type very often take place at a much higher speed than the normal rtty transmission. This allows a speedier transfer of information, and can be a real test of typing skill, as characters are transmitted faster than a two-finger typist can enter them! Pre-programmed messages and type-ahead live transmit buffers are very important at these speeds.

Exactly the same equipment may be used for Murray code and ASCII, the only difference between the two being in the composition of the codes.

Amtor

Taking the concept of rty a stage further, it is possible to produce a very effective error-correcting rty system, using Amtor.

Imagine two micros locked together by employing two 1kHz clocks. During a transmission, one micro acts as a "master", and transmits groups of three characters. The other micro acts as a "slave", and receives these groups of three characters. The code used is a seven-bit error-checking code, so the slave can determine whether there are errors in the characters it has received. If an error is detected in a character group, the slave signals the master and requests a repeat; if not, a "received with no errors" signal is sent, and transmission proceeds to the next group. When the master ends the transmission, the slave may begin transmitting, and the roles are reversed.

Since the micros are locked together by the clocks, they will remain in sync even if the signal disappears altogether. The system can even compensate for drift in the clocks, since the micros can note the time at which each logic transition occurs during the other's transmission, and compensate if required.

This system can pass rtty signals in a substantially error-free fashion, even under the most difficult conditions.

CW

The morse code differs from the Murray and ASCII codes in that individual characters do not have a constant number of elements: eg "A" has two elements, while "H" has four. However, there is a definite relationship between the lengths of the individual elements at any given speed. That is:

The basic unit of duration is one dot length.

One dash = three dots.

The space between individual elements of a character is one dot.

The space between complete characters is three dots.

The space between complete words is seven dots.

(The definition of the space between complete words seems to vary between five and seven dots, depending on the source of the definition, but it is a fixed length, having accepted a particular definition.)

As a matter of interest, since a speed of 12wpm is of special interest to amateurs, it is worth noting that at 12wpm the duration of a single dot is 100ms.

Since morse can be considered as a signal composed of two tones (ie "tone" and "no tone", corresponding to key down and key up), the same basic technique may be used to receive and transmit morse as is used for rtty. The interface is slightly different, since reception only requires one tone to be detected, and transmission only demands that one tone be generated.

Unfortunately, cw differs from rtty signals in one important respect. Most cw is generated by humans, and this leads to certain problems centred mainly on speed, or the duration of the individual elements in the morse code. While another human can continue to decode a cw transmission in which the speed of transmission varies widely and rapidly, most currently-available software fares rather badly. One widely-used technique for coping with speed variation, using a micro, is to repeatedly calculate and store a running average of the durations of the individual elements being transmitted (dot, dash and space). Incoming elements are then compared with these averages, before deciding which element has been received. This technique is quite successful, provided any speed variation is gradual. Rapid speed variations, "weighting" of elements, and badly-formed characters all cause problems for the computer, and usually result in gibberish on the screen.

Computer-to-computer morse is an entirely different matter, of course, since a transmission may take place at a constant speed, with accurately determined element lengths. There are already applications here for fast message handling, eg meteor scatter at 200wpm (1,000 letters/min). In fact, computers may allow much higher speeds to be used reliably.

FSTV

In recent years the upsurge in the level of activity on 432MHz fstv (fast scan television) has matched the explosion of interest in computers. This may be due in part to the availability of purpose-built commercial transceivers, or perhaps to a realization that video is very much a mode of our times. The



Fig 3. FSTV caption

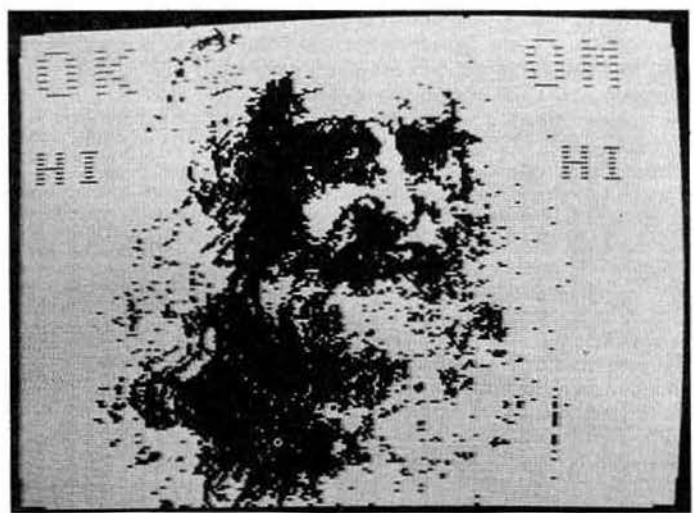


Fig 4. FSTV caption

basic equipment required for a fast-scan tv station is:

- (a) a transmitter;
- (b) a receiver (often an up-converter to allow incoming video to be displayed on a domestic tv receiver), and
- (c) a video source.

While the computer can play no part in fulfilling requirements (a) or (b), it can make a large contribution as a video source. As well as sending video to its own monitor, there is no reason why the computer cannot also supply video to the transmitter. As a result, anything which can be displayed on the computer's screen can be transmitted. In addition, fstv is a real-time mode, so that moving images may be transmitted with ease. "Space Invaders" now presents an extra challenge, with video on 432MHz and audio on the 144MHz talkback channel! Scores so far have been disappointingly low!

The resolution which can be achieved on the screens of most micros does not compare with the video which can be obtained from a decent camera, but the effects of animated graphics and titles make the computer a most useful tool in this mode. Where a transmitter is fitted with two video inputs, effective use can be made of a camera feeding one input and a micro feeding the other. Scenes produced by the camera can be separated effectively by switching to a computer-generated picture which will allow time for the camera to be set up for the next shot.

Colour transmissions are all the rage these days, due, no doubt, to the falling price of colour video cameras. However, some micros now boast a colour video output designed to drive a colour monitor. This, of course, allows colour video to be transmitted inexpensively.

The addition of a disc drive allows pictures to be composed on the screen of the micro and stored for display later. This allows a series of pictures to be recalled from disc in a specified sequence, and displayed or transmitted. Furthermore, pictures recalled from disc may be modified before or during display, eg call signs and captions can be added to any pictures.

SSTV

An sstv (slow-scan television) picture contains 128 lines, and each frame takes approximately 8s to transmit (or receive). Transmissions are made by using audio tones in the range 1,200-2,300Hz. A tone of 1,200Hz is used to indicate the start of a new frame, while frequencies in the range 1,500-2,300Hz are used to denote the levels of grey "seen" as the picture is scanned; 1,500Hz representing pure black, and 2,300Hz representing pure white. As in fstv, the micro may be used as a video source, even if this means focussing a camera on the screen of the computer. However, since digital techniques are commonly used in sstv, in fast-slow-fast converters, a number of interesting possibilities present themselves.

Fast-scan video cameras are now in common use to input video to a converter before transmission, so a micro may be used in place of the camera, feeding the screen picture to the converter. Programming the micro to display several different pictures on its screen, in sequence, is fairly easy, especially since there is normally no need for movement in real-time in this mode.

Colour sstv signals are currently sent as three individual components; the red, green and blue portions of a frame. Reception involves storing these three frames in memory, then adding them to produce one correctly-coloured frame. When the video source is a camera, filters may be used to

select, in turn, the red, green and blue components of a picture. Replacing the camera by a micro makes it possible, using a suitable program, to display in turn only the red, green and then blue portions of the composite picture. Those coloured filters for the camera can be put into store.

A rather different approach has been taken by some software designers. Some time ago, WB4JMD (Chris Galfo) wrote a remarkable program for the Apple 2 which attempted to allow this computer to encode and decode sstv signals using no external hardware (except a transceiver, of course!). Once a picture had been composed on the Apple's screen, the section of memory containing this picture was scanned, and a series of tones was produced at the cassette port; the frequency of the signal corresponding to the light level represented by the contents of each memory location. For example, if the contents of a memory location indicated that the corresponding point on the screen was white, a "white" tone was sent. When receiving the audio tones of an sstv transmission, these were fed in through the cassette port and repeatedly examined. If a "black" tone was received, the screen point currently being scanned was left unlit; if a "white" tone was received, it was lit.

Unfortunately, this method of handling an sstv signal digitally suffers from the severe disadvantage that only two light levels are possible on the screen of the Apple, ie each point may be lit or unlit. A decent digital sstv system really needs to be able to recognize 16 light levels or shades of grey. So, while the Apple's program will handle a picture composed only of black and white, it fares badly with the normal sstv transmissions which contain up to 16 shades of grey. For this reason, most attempts at using this system to resolve sstv pictures result in a badly-distorted rendition of the original, which may be barely recognizable.

This program was originally written for American standard sstv pictures which use a slightly different format from those generated in the UK, because of the difference in mains frequency. However, the program has subsequently been modified by a skilful Dutch amateur. Although unsuccessful at the moment, there may come a time when micros may be able to handle sstv directly. This would require larger memories, and the ability to display up to 16 shades of grey on the screen simultaneously.

In sstv, as in any other mode, distortion may be caused by QSB, QRM and other similar effects. Some useful work has been carried out using a computer as an aid to reconstituting or enhancing received sstv pictures which have suffered distortion for some reason.

Tracking

Many amateurs possess programs for predicting the positions of the various amateur satellites. Once calculated, this information may be used to position an antenna for satellite working. It is then a small step, requiring only a suitable interface, to allow the micro to calculate the position of the satellite and then rotate the antenna by controlling a pair of rotators via relays or solidstate switches. Furthermore, once locked onto a satellite, the micro can be left to update its calculations continually and make the antenna follow the path of the satellite.

The required interface between the micro and the rotators may be home made, being driven from the game port or similar output port. As an alternative, send the control signals to the micro's RS232 port (if it has one) and use the matching RS232 interface now available commercially for controlling the latest generation of microprocessor-controlled rotators which are appearing in the shops.

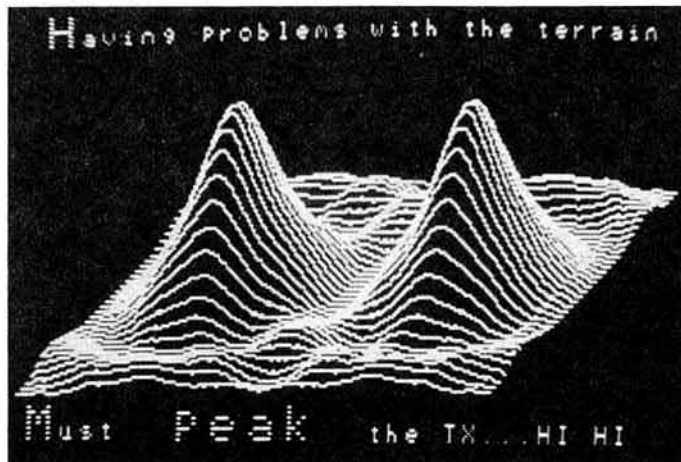


Fig 5. FSTV caption



Fig 6. SSTV caption being transmitted. The legend at the bottom is used on reception, and shows how the incoming signal is being interpreted

Data

Data appears in many forms, but on the amateur bands the format chosen should be one of the recognized CCITT codes. Data transfer opens up several interesting possibilities in connection with computers. Consider, for example, a program capable of sending high speed ASCII or Murray code. If, like many rtty programs currently available, this program allows the transmission buffer to be filled from a file held on disc or tape, computer programs may be exchanged, given suitable conditions.

The program code will pass from the transmission buffer of the station sending the data to the receive buffer of the station listening. Since it is important that an error-free transfer results, it is worth making use of some of the more sophisticated techniques available (eg Amtor), to minimize the possibility of corruption of the data. This means that it is likely that programs will not be transmitted in the form in which they are held in memory, but in an encoded form. So a program in memory will be encoded in a standard data format and saved as a file, perhaps on disc. This file will be read into a transmission buffer in a data transmission program, and transmitted. The receiving station will capture the data in a buffer and save it as a file, on disc. Later, a decoding program will read the file and translate it into the format required by the computer so that it may once again be recognized as a computer program. There are interesting parallels here with the notion of telesoftware.

RFI

One rather annoying problem appears almost as soon as a micro is introduced into the shack—rfi. High-speed internal clocks, and large quantities of internal digital switching, all "enclosed" in a plastic case cannot fail to generate (or pick up) rfi. Solutions seem to vary according to individual circumstances, the positioning and screening of micro and transceiver being important. The following suggestions may help:

1. Move the micro further away from the transmitter.
2. Place rf screening between the micro and the transmitter.
3. Check all bands—some may be substantially interference-free (eg 14MHz), others may not (eg 28MHz).
4. Screen all leads entering and exiting the micro.
5. Screen the micro internally, using tinfoil, then earth the screen.
6. Use mains filters—some cheap and nasty 9V computer psus are very "dirty".
7. Wrap interconnecting leads around a ferrite ring.
8. Move the antenna feeder further away from the micro.

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PROVIDING LOCAL COVERAGE ON VHF & UHF

by CHRIS MORCOM, G3VEH;
MIKE DENNISON, G3XDV;
and JOHN MORRIS, G4ANB

This article presents some of the results of the experiences of repeater groups over the last decade in trying to provide good local coverage. A practical 432MHz antenna for local coverage is described, and hints on mounting are given.

OVER THE LAST DECADE, repeaters in the UK have come a long way. A few experimental units in the early days have grown into today's well-established, nationwide, coherent (well, almost) networks on 144 and 432MHz. Experimental and development work continues, notably with such projects as microwave, atv and ssb repeaters, but in the more familiar area of vhf/uhf fm many lessons have already been learnt. This article is intended to be the first in an occasional series describing some of these lessons, particularly where the results can be useful in other fields.

In bringing repeaters on the air, amateurs have had to re-think many of their basic ideas. A conventional amateur station is used for, typically, a few hours a day, always has an operator in attendance, and its general aim is usually to make contact with more or less similarly equipped stations as far away as possible. A repeater is a very different kettle of fish. It must be available 24h a day, has no operator, and must provide a service for mobile stations within a predefined area but no further. With these differences it is hardly surprising that much of the traditional lore of amateur radio just does not seem to work when applied to repeaters.

This article is concerned with the last of the differences mentioned above. For a given transmitter power and receiver sensitivity, the service area of a repeater is determined by the antenna, its location, and the surrounding terrain. Moving mountains around to tailor the coverage is usually a bit on the impractical side, so careful attention must be paid to the antenna and its siting.

We shall start by looking at what a local coverage antenna should do, and give a few hints about how the right performance can be achieved. Then a practical antenna will be described. This antenna was originally designed for 432MHz but has been successfully scaled up for 144MHz. Finally, a few notes about mounting the antenna will be given.

Chris Morcom, C Eng, MIERE, G3VEH, has been licensed since March 1966 and was a member of the Pye Telecommunications Amateur Repeater Group responsible for the building and maintenance of GB3PI, the first UK 144MHz repeater. He was also involved in the formation of the Repeater Working Group and became its chairman in 1974 and also a member of the VHF Committee. In September 1979 he became chairman of the VHF Committee and remained so until December 1982. He is at present technical manager for the Mendip Repeater Group.

Professionally, having trained and worked with Pye Telecommunications Ltd for 11 years, he joined the Mobile Radio Research Group at Bath University where he is currently involved in researching "area coverage techniques" for mobile radio.



Mike Dennison, G3XDV, was licensed in 1968 at the age of 17, after three years as an swl, and for many years has been involved in the administration side of amateur radio. He has been an RSGB area representative, contest organizer, slow morse practice transmitter, secretary of East Kent Radio Society, and founder member and secretary of Kent Repeater Group. He was elected as a member of the RSGB Repeater Working Group in 1977, and has been its chairman for the past four years. Formerly active on all bands 1.8 to 432MHz, mostly on cw, RWG and family commitments restrict his present operating to mobile on 432MHz.

Mike is a technical officer with British Telecom working on trunk circuit maintenance, and is married with two young sons.

John Morris, G4ANB, is a Lancastrian by birth, a Welshman by breeding, a temporary Londoner by economic necessity, and a permanent peripatetic by inclination. About a decade ago he was G8ESQ and will soon be GM4ANB. Within amateur radio his main interests are vhf and uhf (according to location), computing (according to time availability), and setting the amateur world to rights (according to company and licensing hours). He does not allow his photograph to be published.

Besides repeaters, the antenna design and associated comments may be of interest for other applications where good local coverage is needed, such as talk-in stations, GB2RS broadcasts, Raynet control, or local net working.

"DX" and "local" antennas

The traditional requirement for an amateur vhf/uhf station is to work as far as possible. Most antennas, including those intended for fm, are designed with this in mind. In the present case, however, the aim is to provide saturation coverage up to 40km or so and then radiate as little as possible further away. Amateurs and professionals alike have found that the solution lies in choosing the right antenna and then siting it correctly.

A very common mistake is to regard height above sea level (asl) as all important. In fact it is the height above ground level (agl) that is the most important factor in determining local coverage, while the height asl largely determines the "radio horizon" or dx range. The worst combination is large height asl but small height agl, which produces uneven local coverage with many shadows but good dx coverage. Good dx coverage will result in receiving and being received by unwanted stations; in other words, co-channel interference. The effect of small height agl is made even worse by ground reflection and absorption. Fig 1 shows the effect of increasing the antenna height agl, by using a taller mast or mounting the antenna further up a communal tower. Local shadows are filled in, but the height asl is not increased significantly and so the dx range stays about the same.

To take full advantage of the ability to "see" into the valleys, the antenna must provide a good signal below the horizon (0° elevation). It is all too tempting to use high-gain colinears or mobile antennas. Unfortunately, the gain of a colinear is obtained by sacrificing the radiation above and below the horizon. The above-horizon signal is unwanted anyway, but the radiation below the horizon is the very signal most wanted by those providing local coverage.

On a high site an antenna optimized for 0° elevation can produce a similar effect to low height agl; good dx coverage—which in this case means interference—but poor close-in saturation coverage (Fig 2(a)). Someone using a hand-held rig in a valley a few kilometres away will have

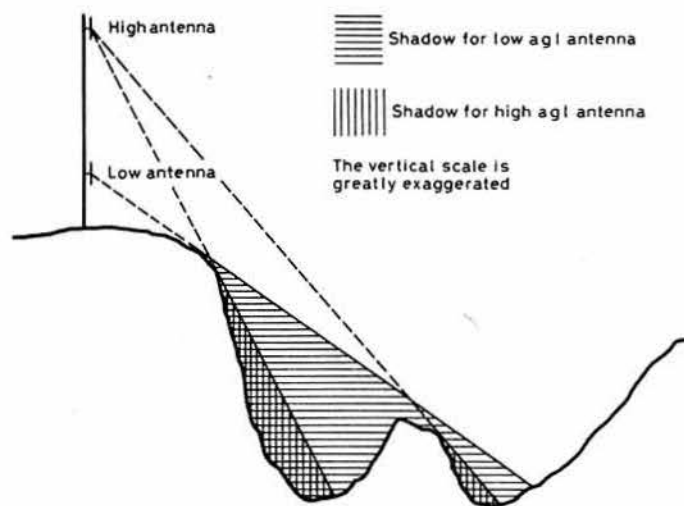


Fig 1. Schematic demonstration of the way increasing antenna height agl can fill in local shadows

difficulty, but a hill-top fixed station at the other end of the county will romp in.

Antennas designed for mobile use usually have maximum radiation at an elevation of 10° or so above the horizon (Fig 2(b)). This is just the job for working the repeater on the local hill, but will be very poor when used as the repeater antenna itself—unless there are a few aeronautical mobiles among the users.

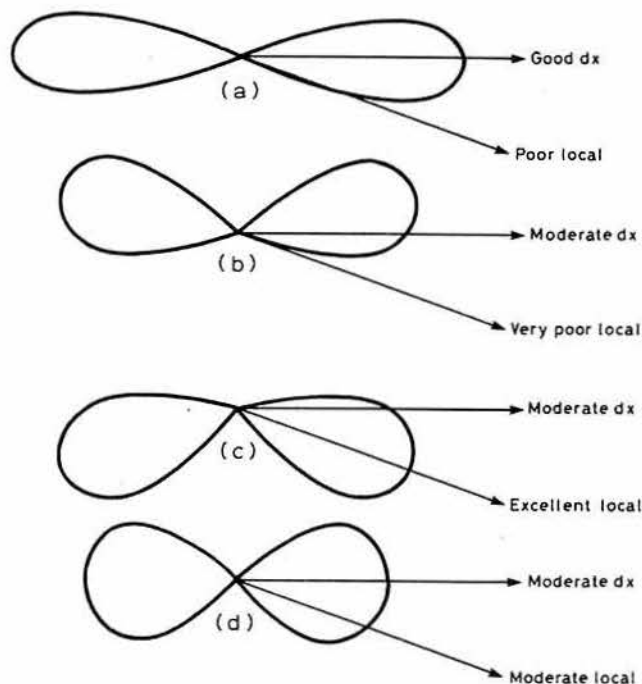


Fig 2. Possible vertical (E-plane) radiation patterns for omnidirectional antennas. (a) "DX" antenna, optimized for 0° elevation. (b) Typical mobile antenna with most radiation above the horizon. (c) Theoretically optimum pattern for local coverage, with most radiation below the horizon. In practice this is very difficult to obtain. (d) Practical alternative. (Note: vertical scale greatly exaggerated)

The best solution is obviously to use an antenna which radiates mostly below the horizon (Fig 2(c)). This can be achieved by using stacked dipoles and a critically-designed phasing harness, but because of the great many factors involved it is not easy. Commercial antenna manufacturers will build a suitable harness given all of the appropriate data, but this is prohibitively expensive and the result cannot be used at other sites or with different antennas. Given the amateur propensity for changing everything in sight at the drop of a hat, this would be a severe disadvantage.

An attractive alternative from the amateur point of view is to use an antenna with a wide vertical (E-plane) radiation pattern centred on the horizon (Fig 2(d)). This will invariably mean some sort of dipole.

At this stage good old human nature steps in. Both the Repeater Working Group and those involved commercially in community repeaters have found that it is extremely difficult to persuade someone to throw away an "8dB gain" antenna and replace it with a "boring old dipole" with no gain. It should be remembered that gain is only useful when it is in the right direction; "gain" in the wrong direction is worse than useless because it is obtained at the expense of the wanted signal. It is a bit like a man who wants to get from Manchester to Bristol and catches a train to Glasgow. He may be travelling at high speed but he is certainly not getting any closer to his goal.

Thus in the best of all possible worlds a repeater antenna would send most of its power tilted down towards the ground. In the real world this is a bit tricky, but the preceding hand-waving argument indicates that a moderately-broad-beamwidth antenna radiating towards the horizon would be a suitable alternative. But what exactly is meant by "moderately-broad"? Without going deeply into the mathematics, one may observe that when viewed from a vehicle a repeater antenna is rarely more than a few degrees above the horizon—say five at most—except when so close to the antenna that signal strength is no problem. Thus it is reasonable to expect that the antenna beamwidth will be sufficiently wide so long as plenty of power is sent out at 5° below the horizon. This indicates that a moderately-broad beamwidth is only about 10° or so!

Now a beamwidth of only 10° cannot really be considered broad in normal terms, and nearly all omnidirectional antennas will in fact be much wider. This seems to show that the best antenna for local coverage would, after all, be a high-gain colinear.

That is the theory, but the practice, and experimental evidence, differ. Given a conflict between theory and practice it is always best to junk the theory and rely on experience. The fact is, then, that time after time it has been found that a simple, broad-beamwidth antenna, such as a dipole, provides much better all-round coverage than one with a lot of gain. No-one has come up with a really convincing detailed mathematical explanation of why this should be so, but the experience of repeater groups has time and again backed up the finding.

Those who have tried the experiment of using dipoles have usually been pleasantly surprised. This has often come about by accident, such as when the normal high-gain antenna has been replaced by a temporary dipole during maintenance or repair work. It has frequently been reported that against all expectations the dipole worked just as well as, or even better than, the "white stick" and that reports of co-channel interference became less frequent. This runs quite contrary to most amateurs' intuitive predictions, and it would certainly be a shame if such a surprising but useful result should be confined to repeater circles.

Local antenna guidelines

To sum up, the following points should be kept in mind when the aim is to give saturation coverage of the local area and minimize interference to and from distant stations:

1. The height of the antenna asl (or more accurately, above the average terrain within 50–60km) determines the radio horizon or dx range.
2. The height agl determines the local signal strength and number and size of shadows.
3. For really satisfactory operation, antenna heights of at least 15m agl on 432MHz and 30m agl on 144MHz are recommended.
4. Notwithstanding the above figures, the best general rule is to put the antenna as far from the ground as possible.
5. Avoid monopoles, especially on high sites. Dipoles will generally be found to give better performance because of their more appropriate radiation patterns.
6. Remember that gain is only useful when it is in the right direction. "Gain" in the wrong direction is worse than useless and can actually result in poorer performance.

The G3VEH full-wave dipole

The G3VEH full-wave dipole is designed for ease of side mounting on towers, poles or buildings, and also to give a little gain. The radiation pattern is moderately broad and centred on the horizon, and thus ideal for providing saturation local coverage.

Fig 3 shows the outline construction. The dimensions given are for 432MHz but the design can also be scaled up for 144MHz.

The antenna consists of a full-wave dipole and a $\lambda/4$ matching section with an adjustable shortening bar and balun. The matching section is normally enclosed in a section of plastic drainpipe for protection from the environment. Construction is moderately easy and no exotic materials are needed.

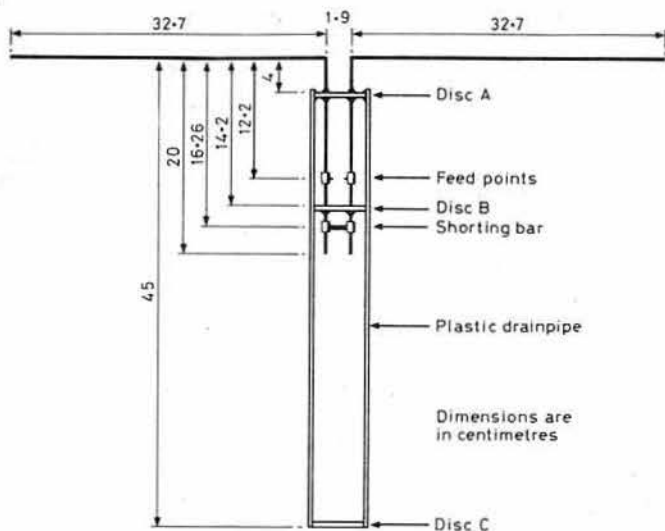


Fig 3. Outline construction of the G3VEH full-wave dipole. All dimensions in centimetres

Construction

The elements and matching section are made from two lengths of 3.175mm (0.125in) diameter brass rod with a right-angle bend in each. Discs A and C are cut from approximately 3.5mm thick perspex to be a tight fit inside the plastic drainpipe that will be used. Both discs should be roughened with sandpaper on each side. Disc A should have two holes drilled to be an interference fit with the brass rods, as shown in Fig 4. Disc C should have a single hole which is a clearance fit to the UR76 feeder cable. Note that RG58U cable is equivalent to UR76 and may be used instead.

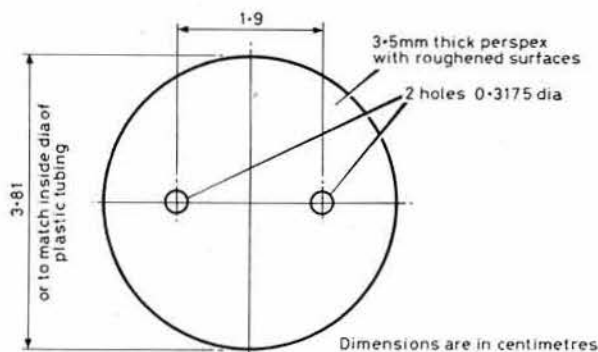


Fig 4. Drilling details for disc A

Disc B is cut from single-sided pcb and should be a sliding fit inside the pipe. It should be etched to leave two 9mm squares of copper around the holes through which the rods will pass to allow soldering. Three more holes should be drilled to accept UR76 cable, as shown in Fig 5.

The $\lambda/4$ sections of the two elements should be passed through the holes in disc A. Two connector block sections with the plastic stripped off may then be slipped on, one to each rod, followed by disc B. The two radiating elements should now be *carefully* lined up and the rods soldered to disc B with generous fillets of solder.

Disc A can now be positioned as shown in Fig 3 and "V" grooves about 1mm deep cut into each rod on each side of the disc. A mixture of adhesive/hardener compound (Araldite or similar) should then be applied around the rods on both sides of the disc and allowed to cure slowly to avoid excessive shrinkage. The grooves in the rods and roughened surfaces of the disc will aid bonding and help prevent the rods twisting free.

When the compound is *completely* dry two more connector block sections may be put on the ends of the matching rods and linked by soldering a length of 1-2mm diameter wire to them so as to form a lockable "trombone" adjustable shorting bar. The balun and feeder cables should now be passed through disc B, linked together, and the inners soldered to the first pair of connector blocks to form an adjustable feedpoint. Fig 6 shows the details of the matching section and balun wiring. The feeder and balun braids should be strapped together. Note that the balun should be an electrical $\lambda/2$ of UR76 (or RG58U). As the velocity factor of the cable is

0.67 this means that the physical length should be 23.2cm for 433MHz.

The UR76 feed tail should be about 1m long. Cut a 45cm length of plastic drainpipe of approximately 3.8cm (1.5in) inside diameter and slide it over the tail, but not yet over the matching section. Pass the feeder through disc C and connect an "N" type or bnc plug to the end. The antenna is now ready for electrical testing. With a good 400-500MHz vswr meter (Bird ThruLine or similar if possible) and a low-power transmitter, check for a reasonable match with the dimensions as in Fig 3. The "trombone" short and feedpoint may be adjusted as necessary.

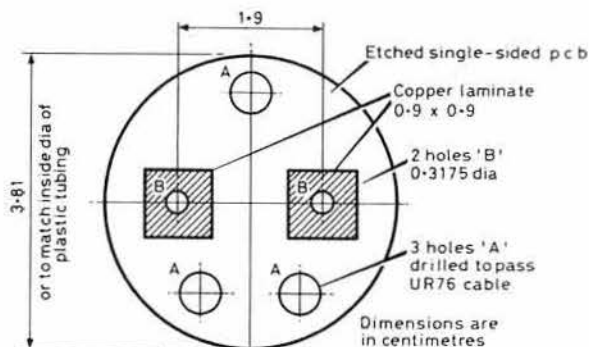


Fig 5. Details of disc B

If everything looks good the plastic pipe can be passed over the matching section as far as disc A, which should sit about 1mm down from the end. Check the vswr again and adjust the short and feedpoint if necessary.

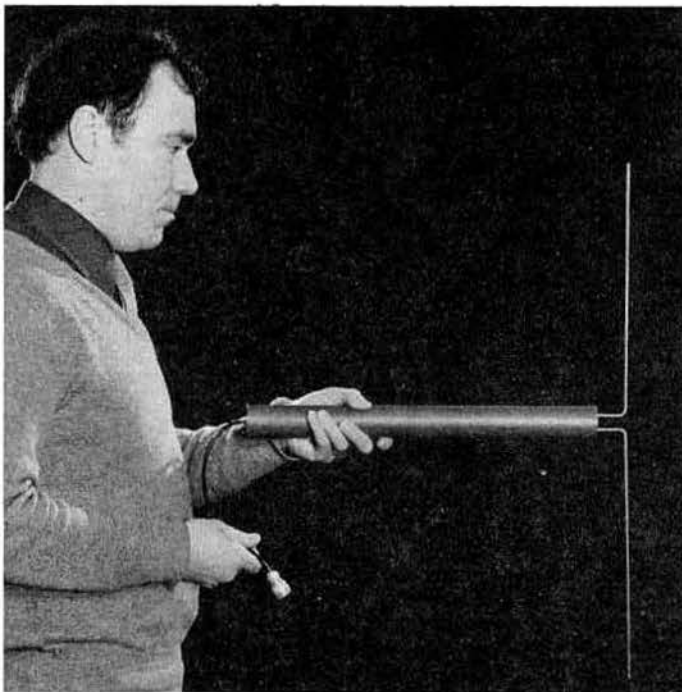
The final vswr should be better than 1:1.1. When this has been achieved, disc A can be sealed into the pipe with adhesive/hardener compound. This should be applied to both sides of the disc, and it will help bonding if the inside of the pipe is also roughened with sandpaper. Disc C can finally be passed up the cable and sealed into the other end of the pipe in the same way. The feeder entry may also be covered with a silicone rubber sealant to allow for flexing.

This completes construction of the antenna. The photograph shows a finished version being held by G3VEH, its creator.

Performance

The G3VEH full-wave dipole has been extensively and successfully used and tested in the field. The measured gain at the horizon of a production version was approximately 2.8dB over a $\lambda/2$ dipole (5dBi).

Two of the antennas have been in use at the University of Bath uhf



G3VEH holding a completed full-wave dipole for 432MHz

Antenna mounting

In an ideal world all antennas would be mounted in free space and so would perform exactly as predicted. In practice, at least until the lighter-than-air antenna is invented, some sort of supporting structure must be used; mast, tower or building. (In this section the word "tower" will be used generically to mean any structure upon which an antenna is mounted.)

A tower must, by definition, be vertical; and as an antenna for local working will usually also be mounted for vertical polarization, the tower will inevitably affect the horizontal (H-plane) radiation pattern. In other words, as soon as a painstakingly-designed and carefully-constructed omnidirectional antenna is put into use by fastening it to a tower, it will no longer be omnidirectional.

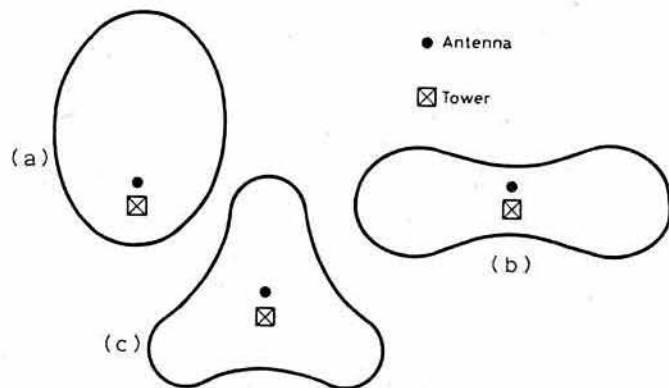


Fig 7. Typical effect of a tower on the horizontal (H-plane) radiation pattern of an omnidirectional antenna at various antenna-tower spacings. (a) $\lambda/4$; (b) $\lambda/2$; (c) $3\lambda/4$

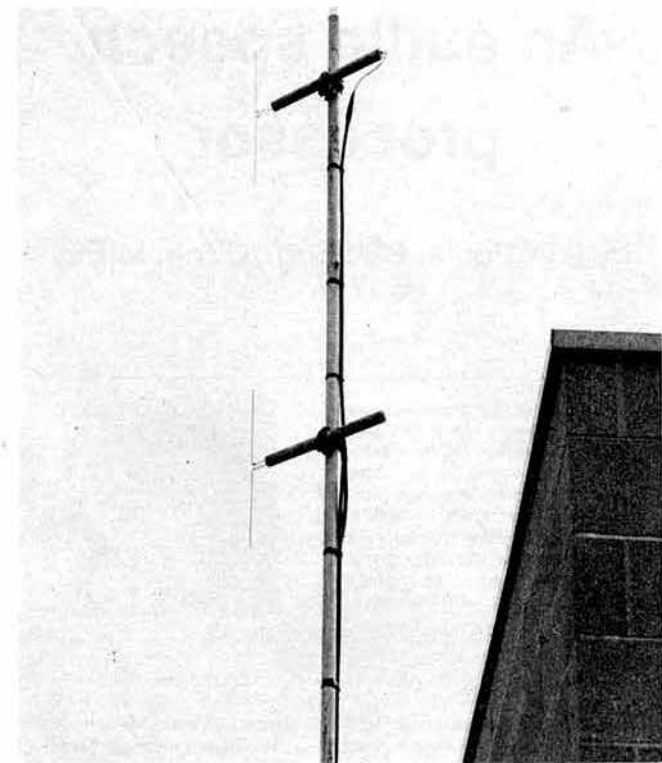
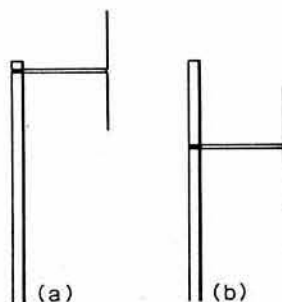
The current flowing in the antenna will induce current in the tower. Both the antenna itself and the tower will then act as radiators of rf power, and the two signals will interfere with each other. In some directions the interference will be destructive, giving "nulls" (directions of little radiation). In others the signals will reinforce each other, giving "lobes" (direction of good radiation). This is the same principle as that used in the Yagi antenna. Parasitic elements, usually a reflector and several directors, are used to make most of the rf go in one direction. A tower will also act as a parasitic element, but in this case the result is usually not so beneficial.

Full calculation of the effect of a given tower on the radiation pattern of a particular antenna is very difficult and complicated, and usually only approximate. Four general rules, applicable to most towers and antennas, and confirmed by experiment can, however, be given [1]:

1. The presence of a tower will split an omnidirectional radiation pattern into a number of lobes, separated by nulls.
2. The number of lobes and nulls will in general be equal to the number of quarter-wavelengths between the antenna and the tower (Fig 7). A $\lambda/4$ spacing will give a single lobe in the forward direction, with a null behind. With a spacing of $\lambda/2$ the rf will be "squeezed out sideways", giving nulls fore and aft. Lobes at approximately 0° , 120° and 240° will be seen when the spacing is $3\lambda/4$, and so on.
3. As might be expected, the effect of the tower, ie the depth of the nulls, will generally decrease as the distance between the antenna and the tower increases.
4. Again as might be expected, broad towers generally change the radiation pattern more than thin ones. A broad tower can effectively act as a reflective screen stopping most of the rearward radiation.

The tower itself can of course theoretically be used deliberately to tailor the radiation pattern of an antenna to give extra coverage to difficult or distant areas, or to put a null in the direction of another transmitter on the

Fig 8. Mounting positions for side-mounting antennas, such as dipoles: (a) is wrong and will give most radiation above horizon, (b) is correct



The antenna installation at the GB3UB uhf repeater, consisting of two G3VEH full-wave dipoles

repeater, GB3UB, for several years; one for reception and one for transmission (see photo). With the elements spaced $\lambda/2$ from the support pole and 1.5m vertical separation, an astonishing 58dB isolation has been confirmed under all weather conditions. Similarly mounted $\lambda/2$ dipoles showed only 48dB isolation. With the full-wave dipoles 2m apart, the isolation increased to 62dB. As most repeaters need a nominal 75-80dB isolation between transmitter and receiver to avoid any desensitization, only a minimum of additional notch filtering is necessary. This can considerably reduce the insertion losses of extra filters, to say nothing of the money saved.

The GB3UB installation has survived extremes of weather with flying colours. Even with a good 2cm radius of ice on two occasions, no loss in performance was noticed even at the extremes of the normal service area.

Weight and windage are both at an absolute minimum with the G3VEH design and so its electrical and mechanical properties make it a prime contender when an antenna for saturation local coverage is needed. It is equally suitable for fixed, portable/transportable and temporary applications. Since its development for GB3UB, several other repeater groups have adopted the design and have found it well suited to their purpose.

A scaled-up version of the antenna using flat cable for the stub section is in use on 145MHz at the GB3WR repeater installation, and has proved equally successful. Particular attention must be paid to mechanical strength when using the antenna on vhf because of the large size; a shade over 2m from end to end of the radiating elements.

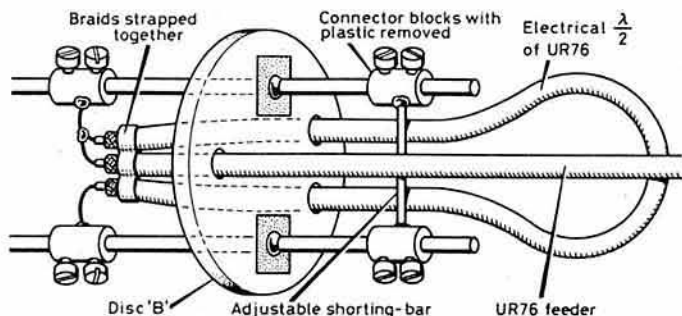


Fig 6. Details of the matching section and balun wiring

same frequency to avoid co-channel interference. In practice it is usually impracticable to do much more than provide a little screening by putting the antenna on the side of the tower away from an unwanted direction. An attempt to do anything more fancy will almost inevitably entail a long, painstaking process of cut and try.

The presence of the tower can also alter the vertical (E-plane) radiation pattern if care is not taken. There is a simple rule here: never put the antenna at the top of the tower (Fig 8a). The mounting should be such that the highest point of the antenna is *lower* than the top of the tower (Fig 8(b)). Putting the antenna at the very top will, by Murphy's Law, modify the radiation pattern so that most of the power goes uselessly above the horizon; just the situation we have been striving so hard to avoid. By keeping the antenna low, a more symmetrical arrangement is obtained and the radiation maximum should stay on the horizon. This factor is even more important than the gains obtained by raising the height agl by a few metres.

Antenna mounting guidelines

The following mounting hints may be useful when omnidirectional local coverage is required. They apply to *all* side-mounting antennas, such as $\lambda/2$ or other dipoles, including the G3VEH design.

1. If the supporting structure can be chosen (ie an already existing tower is not to be used) keep the diameter as small as possible consistent with mechanical strength and stability. If possible the diameter should be less than $\lambda/10$; 7cm on 432MHz and 20cm on 144MHz.
2. Keep the antenna as far from the tower as possible. To be really omnidirectional the spacing should be at least two wavelengths, although in practice local coverage is far more determined by the terrain than the odd decibel of gain variation. A spacing of $\lambda/2$ (34.6cm on 433MHz) is recommended as a minimum for the G3VEH full-wave dipole.
3. Antenna-tower spacings of even numbers of quarter-wavelengths (eg $\lambda/2$, $3\lambda/2$ etc) generally produce cleaner radiation patterns than odd numbers ($\lambda/4$, $3\lambda/4$, $5\lambda/4$ etc).

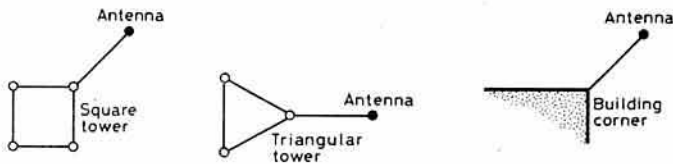


Fig 9. Schematic plan views of optimum positions for mounting omnidirectional antennas on large structures, such as lattice towers or buildings

4. On large rectangular or triangular towers or buildings, the antenna is best mounted sticking out from a corner (Fig 9).
5. If there is any direction where preferential radiation would be useful, put the antenna on that side of the tower, at least for the first try.
6. Similarly, if there is any direction where a null would be useful, put the antenna on the opposite side of the tower at first.
7. *Never* put a side-mounting antenna at the very top of a tower. The highest point of the antenna should be lower than the top of the tower.

Conclusion

Guidelines on the design and mounting of vhf/uhf antennas for saturation local coverage have been given, along with details of a tried and tested antenna for 432MHz. Even if the antenna is not built, the other notes should still prove useful. Some of the comments may appear rather vague. They are; deliberately so. Antenna design and use is an incredibly complex subject when examined in minute detail, more of an art than a science. Nevertheless, the hints may give some food for thought and perhaps a little guidance, and it is in this spirit that they are presented.

Reference

- [1] "Performance of uhf/vhf antennae adjacent to metal structures", A. H. Andrews, *Electronics Technology*, 13 (1979) 210.

Acknowledgements

The authors would like to thank Mark Gould, G4OKE, for useful discussions during the preparation of this article; Colin Wilson for taking the photographs; and members of repeater groups around the country for passing on their practical experiences. □

An audio speech processor

by I. D. Poole, BSc(Eng), CEng, MIEE, G3YWX*

Licensed in 1969 after four years as a short wave listener, G3YWX's activity is now mainly directed towards cw and ssb on the hf bands, although some time has been spent on 144MHz. He is employed at Newbury Data Recording, a computer peripheral manufacturer, as a project leader in the printer division.



IN THESE DAYS of high-efficiency communication, little has to be written about the advantages of speech processing. While many people prefer not to use a processor when making contacts under good conditions, it becomes a very desirable commodity when making contacts under marginal conditions—providing as much, if not more, effective gain than, for example, the standard type of hf linear, and at a fraction of the cost.

The idea for this project was conceived after a secondhand hf transmitter which did not possess a processor was acquired. While not wanting the expense of a linear, together with any tvf problems which it may have caused, it was felt that extra gain would be exceedingly useful, especially as the antenna was not particularly good.

Accordingly the design was started. The design aims of the processor were that it should be reasonably cheap, the circuitry should be fairly simple, and the audio should still sound intelligible despite the fact that it had been processed. The first decision to be made was whether to use clipping or compression. While compression does average-out the average level of speech, the high transient peaks still remain and force the average level of modulation down; whereas clipping removes these peaks and enables the average level to be higher. Therefore it was decided that a clipper should form the basis of the system.

However, having designed audio clippers before, one of the limitations which had been found was that the level of clipping altered between different microphones, different emphasis on various words etc. Many of these variations are difficult to accommodate using a manual gain control, and because of this it was decided to precede the clipping stage with a compressor, ie an amplifier incorporating an automatic gain control.

The next decision to be made was whether to use af or rf clipping. While rf clipping is undoubtedly superior to af clipping, in order to keep the design relatively simple, and the cost to a minimum, it was decided that af clipping should be used. The drawback of af clipping is that many of the distortion products created in the clipping process remain within the audio band, tending to make it sound less intelligible and less natural. Accordingly great care was taken during the design stage to monitor the output signal both directly and also via the transmitter to ensure that the signal remained pleasant to listen to while providing a useful amount of gain.

Circuit description

The circuit diagram, Fig 1, can be divided into five main blocks: input buffer with rf filtering; amplifier with automatic gain control or compressor; amplifier with limiter; and the power supply.

The input buffer performs two main functions. The first is to provide a higher impedance to the microphone than the 150 Ω which would be presented by the SL6270 (IC1) when operated in a single-ended mode, as it is in this circuit. As the microphone to be used possessed a 600 Ω impedance, R1 was chosen to match this. Other impedances can be chosen

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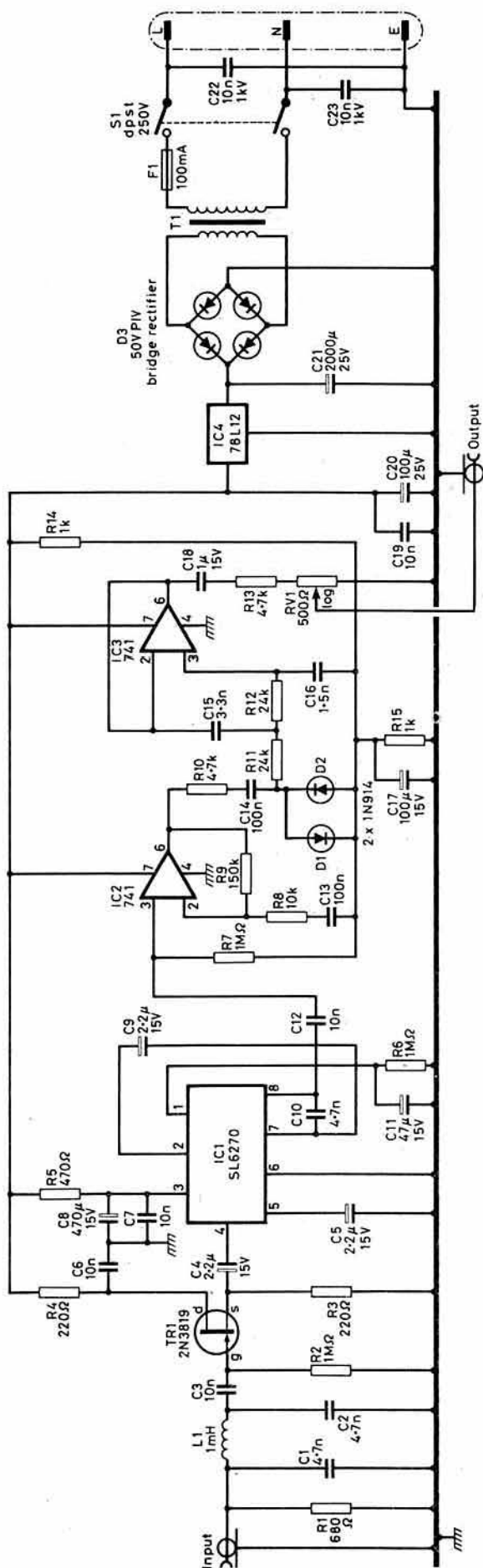


Fig 1. Circuit diagram of the af speech processor

provided that the filter impedance does not become the dominating factor as mentioned below. The fet can be almost any general purpose depletion mode device, and it is operated in a common source configuration to provide a low source impedance to the following stage. The second function provided by this stage is to provide rf filtering to remove any stray rf which may be picked up on the microphone lead. The filter, which is designed with a 600Ω impedance in mind, is provided by L1, C1 and C2. Should a higher input impedance be required, then C1 and C2 can be decreased accordingly, and R1 increased.

The following stage based on the SL6270 (IC1) forms the compressor or level control. The circuit values have not been changed from those recommended in the data sheet as they produce very acceptable results. With these values the attack time ie the time for the output to return to within 10 per cent of its original value, after a large step in input level, is 20ms, and the decay rate is 20dB/s. The output from the SL6270 is held almost constant over a 50dB input range with agc action taking effect when the input rises over a few hundred microvolts. This will mean that any speech directly into the microphone will cause agc action to take place, but background noise should not rise to an unacceptable level during speech pauses.

If the microphone has a very high output and it is required to reduce the sensitivity of the processor, then this can be accomplished by placing a resistor across pins 7 and 8 of IC1 in parallel with the internal gain controlling resistor. The value of this external resistor can be calculated from the fact that the gain is proportional to the overall resistance of both the external resistor and the internal 10kΩ resistor. It is suggested that the value of the external resistor should not be less than 680Ω, but this is very unlikely as it represents an extremely large reduction in gain. The frequency response of this stage was made to be 300Hz to 3kHz so that the unwanted frequencies are reduced prior to clipping. This is especially important for the low frequencies where limiting of the out-of-band frequencies would produce harmonic distortion within the wanted frequency range.

The output from the SL6270 is 90mV rms which is insufficient to drive a pair of back-to-back diodes into conduction, and therefore the output is amplified using IC2 which is a 741 in the classic non-inverting configuration. The gain of this stage is approximately 16, which is sufficient to drive the pair of diodes into conduction to provide the clipping. Almost any silicon diodes could be used here, but 1N914s were used in the prototype because of their availability. The use of back-to-back diodes will not produce true hard limiting owing to the turn-on characteristic of the diodes, and does in fact give a form of instantaneous compression. The use of the diodes is quite satisfactory because the series resistor has been included to increase the source resistance against which the diodes are operating, thus ensuring a sufficiently hard limiting characteristic.

The output from the clipper is then filtered to remove the out-of-band distortion products. This stage is again based on a 741 (IC3), configured in this case to give a second-order lowpass filter producing a roll-off of 12dB/octave. This was considered to be adequate, especially in view of the fact that this circuit was designed for use with a single-sideband transmitter which itself would provide extra attenuation. However, if a steeper roll-off is required, additional identical stages can be added providing a further 12dB/octave/stage. The output from this stage is then connected to the output via R13 and R16, which act as an attenuator to prevent overloading of the transmitter audio input stage.

Power supply

The power supply is fairly standard and warrants little comment on the design. Although a 78L12 is specified and was used in the original, it would be quite acceptable to use a 7812 if one was to hand. Similarly the specification on the transformer is not tight. In the prototype a 1.2VA transformer was used providing 12V rms which when smoothed produced about 15V, providing sufficient drop for the regulator to operate correctly. As long as the transformer will provide sufficient current and 12 to 15V rms output, the circuit should operate correctly.

Construction

The construction of the unit was fairly straightforward, but a few points may save work and enable the unit to operate first time. As it is likely that the unit will be operating in an area of fairly high rf, it is necessary to construct the unit in an rf-tight case. All leads entering the case should be decoupled immediately on entry to prevent re-radiation within the unit. Also, all incoming earth leads in the prototype were taken straight to the case, and one connection was made between the circuit board and the case to ensure that any earth loops were avoided.

There should be little difficulty in obtaining most of the components for

Components list

R1	680Ω	C1, 2, 10	4.7nF
R2, 6, 7	1MΩ	C3, 6, 7, 12, 19	10nF
R3, 4	220Ω	C4, 5, 9	2.2μF 15V
R5	470Ω	C8	470μF 15V
R8	10kΩ	C11	47μF 15V
R9	150kΩ	C13, 14	100nF
R10, 13	4.7kΩ	C15	3.3nF
R11, 12	24kΩ	C16	1.5nF
R14, 15	1kΩ	C17	100μF 15V
RV1	500Ω variable log	C18	1μF 15V
L1	1mH	C20	100μF 25V
T1	12-0-12V rms	C21	2,000μF 25V
F1	100mA	C22, 23	10nF 1kV
D1, 2	IN914	TR1	2N3819
D3	50V piv bridge rectifier	IC1	SL6270
S1	DPST 250V	IC2, 3	741
		IC4	78L12

this design. The only component which may present difficulty in locating a supplier is the Plessey SL6270, as it is probably not the most common of the Plessey series, but it can be obtained from Ambit International, 200 North Service Road, Brentwood, Essex.

Conclusion

The unit has been in use for several months, and the results have been very encouraging. Reports on the air have indicated that the modulation does not sound unduly processed, while still providing a useful increase in gain. Although the reports have varied considerably because of their subjective nature, it was clear that the unit was giving at least one S-point of gain, and several stations reported more.

It is felt that the project has been successful, fulfilling the design aims of providing a useful amount of gain while keeping the cost and complexity low. The reports mentioned above show that the unit is effective, and using all new components the units should not cost more than £20, including the case.

Sporadic-E observations in 1983

by R. A. HAM, BRS15744*

APART FROM a few minor events, mainly around 50MHz, in April, the typical and more widespread disturbances of the 1983 sporadic-E season began on 12 May and ended 100 days later on 19 August—some 13 days shorter than the 1982 season.

During the 1983 season, sporadic-E manifestations, mostly disrupting radio and television signals between 40 and 80MHz, occurred on 44 days, compared with 38 days in 1982 and 39 days in 1981. The majority of the author's daily observations were made around 0830, 1330 and 1830bst, and the sporadic-E events logged at each session are indicated by the dark squares in Fig 1 under times A, B and C respectively.

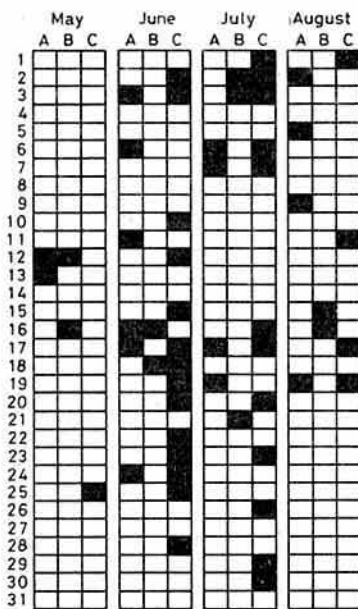


Fig 1. Monthly distribution of sporadic-E during the 1983 season

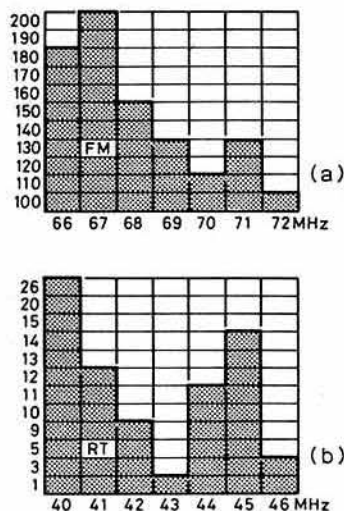
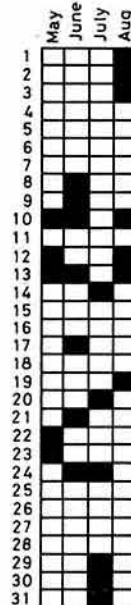


Fig 2. (a) East European fm stations heard in the UK. (b) European radiotelephone stations. (c) Solar radio noise recorded by the author at 143MHz

(c)



Equipment

Throughout the period the author used an ex-army R216 vhf communications receiver, and a SX200N scan receiver to check for broadcast dx between 40 and 100MHz. JVC CX610GB and Plustron TVR5D television receivers were used to locate both colour and monochrome, PAL and SECAM, 625 line pictures in Band 1, between 48 and 68MHz. The main antenna used was a horizontally mounted Band 1/111 Yagi, and the signals gathered were fed to each set via an Antiference XS3 distribution amplifier.

Early warning

As in previous years the television synchronizing pulses transmitted on ChE2, 48.25MHz, and ChR1, 49.75MHz, monitored by the scan receiver, were used by the author for early warning of sporadic-E.

It is generally known that signals such as these pulses around 50MHz are among the first to appear and the last to fade away when sporadic-E is present. During many of the events listed in Fig 1, the signals from the 28MHz beacons in Germany—DF0AAB, DK0TE and DL0IGI; Hungary—HG2BHA; Spain—EA6AU; and Norway—LA5TEN, increased in strength and proved to be another positive indicator when a disturbance was spreading downward toward the 10m band.

Continental broadcasting stations

On all days indicated in Fig 1, the peak of the prevailing disturbance reached around 80MHz, causing fm broadcast signals to be received in many parts of the UK from a variety of eastern-European stations, between 66 and 73MHz, whose intended range is within the bounds of their own country. The frequency distribution and the number of times such stations were logged, between each megahertz, is illustrated in Fig 2(a). Despite the fact that these signals were exceptionally strong for most of the disturbance, they were usually subject to deep and sharp fading at the beginning and near the end of each event, which is typical of sporadic-E propagation.

European radiotelephone stations

Throughout some of the disturbances listed in Fig 1, signals from a variety of European radiotelephone stations were audible at the lower end of Band 1, and although these signals were very strong, they varied in number according to the intensity of the event. During the 1983 season the author counted 76 such stations, distributed between 40 and 46MHz, Fig 2(b), compared with 60 in 1982 and 93 in 1981.

Solar activity

Twenty-five days of solar activity were recorded by the author at 143MHz, Fig 2(c), between May and August, compared with 26 days and 38 days respectively for the two previous years. Once again there is no positive evidence to make any direct comparisons between sporadic-E disturbances and the "active" sun.

*Faraday, Grayfriars, Storrington, Sussex.

EPHEMERIS

Satellite news and views

by R. O. Phillips, G4IQQ*

MANY OBSERVERS have commented that operation through amateur satellites would soon drift into the black box syndrome, which is now so prevalent on some of the amateur bands. Fortunately this is far from being the case, as a short listening session either on the satellites or one of the satellite discussion nets will testify. It is true that many, if not most, operators use commercial transmitters and receivers, but with satellites that is just the beginning. The use of computers is immensely popular, ranging from calculation of orbital elements, doppler shift and maximum usable distances to active control of antenna systems. Others have devoted their attention to the optimization of small antenna systems, particularly in the area of helical antennas, which can provide significant benefits due to their circular polarization properties. At a time when amateur radio is considered by many to have lost much of its earlier pioneering objectives, such developments in the field of amateur satellites can only be a healthy sign.

Satellite status reports

AMSAT Oscar 10

Initial results of tests on the mode L (1,269-435MHz) transponder turned out to be rather disappointing, with downlink signals some 20dB lower than expected. One potential cause of the problem was identified as being further damage caused by the collision with the third stage of the launcher. After detailed consideration of the likely effects of damage to the L-band antenna, this line was dropped and attention focused on an antenna switching relay. It was decided to try the effect of cycling the relay, and luckily some improvement in the overall performance of the transponder was noted. The exact cause of the degradation had not been identified at the time of writing though there were signs of a gradual improvement in performance.

Activity on the mode B (435-145MHz) transponder continues at a very high level. The only difficulty was an anomalous switching event on 30 September and several days after. The most likely cause seems to have been a higher than normal temperature for the power amplifier which triggered the thermal shut-down mechanism. No damage is thought to have been caused to the transponder, and the trigger point for the shut down has been raised slightly.

On Sunday 16 October a small addition to the history of amateur radio was written when a specially prepared version of the RSGB news bulletin was transmitted via the Oscar 10 mode B transponder. The transmission was made by Graham Shirville, G3VZV, with the callsign GB2RS, and using the satellite's H1 special service channel—downlink frequency 145-973MHz upper-sideband. It is planned to continue with the news service each Sunday at times calculated to provide maximum useful coverage, i.e. low elevation angles over land masses. As soon as approval has been obtained it is proposed to use the callsign GB2AUK (AMSAT UK) for the news transmissions.

UOSAT

The operating schedule remains the same as indicated last month with the 2-4GHz beacon activated on alternate weekends.

RS

RS6 and RS8 continue to enjoy good health and high levels of activity.

Satellite proposals

In the October issue I outlined the proposals for the UOSAT-B satellite now under construction. A nominal launch date of March 1984 is being assumed, though no confirmation had been received by the end of October. Considerable progress has been made on the design and fabrication of the spacecraft, but no further details on the payload have been made available.

More information is becoming available on the proposed Japanese amateur radio satellite which is scheduled for launch around the end of 1985. The spacecraft will carry two transponders—Mode A (145-29MHz) and mode M (1,268-436MHz) and is intended to achieve a circular orbit of altitude 1,500km. The transponders should exhibit high sensitivity allowing the use of simplified ground equipment. □

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

(Reproduced by authority of the C&GoLI)

STATISTICS

Year	No of candidates completing exam	OVERALL RESULTS	
		UK candidates qualifying for award	No
1981	5,869	3,961	67.5
1982	8,176	5,478	67.0
1983	7,540	5,315	70.5

Component No	Name of component	No of candidates	COMPONENT RESULTS FOR THIS EXAMINATION SERIES			
			Distinction %	Credit %	Pass %	Fail %
1-01	Licensing conditions and transmitter interference	7,169	9.9	48.4	18.8	22.9
			77.1%			
1-02	Operating practices, procedures and theory	7,191	13.5	42.7	23.5	20.3
			79.7%			

REPORTS ON MULTIPLE-CHOICE QUESTION PAPERS

PAPER 1-01

Syllabus topic or objective	No of items	Comments on performance of candidates
Amateur licences: Types and qualifications, licence A: Validity, places, purposes and frequency bands	32	Very well answered by nearly all candidates. Some candidates were confused with the difference between alternative and temporary premises.
Licence requirements	34	Very well done, but almost a third of the candidates thought that the licence required that transmitters should be maintained so that they do not cause interference to audio equipment. There was also some misunderstanding about the entries in the logbook of a mobile station. There were a number of candidates who were of the opinion that messages could be addressed to amateur stations in general.
Transmitter interference	34	Although the more able candidates had no difficulty with this section some did not understand the causes of excessive bandwidth and mains-borne interference.

PAPER 1-02

Syllabus topic or objective	No of items	Comments on performance of candidates
1. Operating practices and procedures	8	All questions were well done by nearly all candidates.
2. Electrical theory	18	Most candidates did well in this section. The less able candidates had some difficulty with series and parallel resonant circuits and with the application of transformers.
3. Solidstate devices	15	Generally well done, but most candidates did not have an understanding of peak inverse voltage in relation to a half-wave rectifier circuit. The remaining questions did not cause difficulty.
4. Radio receivers	15	Many candidates did not know the reasons for the choice of i.f. in a superheterodyne receiver. Greater attention needs to be given to the relative advantages of high and low intermediate frequencies. Some candidates did not appreciate that a mixer stage, while changing the frequency of the input signal, does not affect its deviation.
5. Transmitters	15	Most candidates were able to obtain high marks in this section. The question relating to the function of a balanced modulator was not well done, but the other questions attracted high marks.
6. Propagation and aerials	17	The questions on propagation and aerials were quite well done. The question asking for the impedance at the end of a half-wave coaxial cable still causes difficulty for some candidates.
7. Measurement	12	Questions in this section were well answered apart from the one requiring the input power of a transmitter amplifier stage to be calculated. There were indications that some candidates did not understand how to determine the power output of a transmitter.

In general, candidates were well prepared for the examination. The proportion of candidates obtaining a successful result was higher than in previous years. □

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the basis of a complete kit that could be put together in an evening with the TCA440 making an excellent direct-conversion receiver, completely balanced to reduce hum and microphonic problems. With external oscillator, audio filters, age applied to rf, it can make a brilliant receiver throughout the range 1.8 to 30MHz.

"Consider also such devices as the TDA1083, available from Ambit. This works on a.m./fm and will also work on ssb with an external product detector and higher-value C (100µF) to increase the age time constant. It provides 0.5W af output and I have used the device as an excellent back-end for an ssb receiver with more than 70dB age range, although the internal mixer/oscillator is rather limited for amateur-band work. The i.f. strips of this device, on the other hand, are very quiet, provide high gain and are direct coupled. This device also makes a grand signal tracer af to hf. It has low drain, works on 3 to 12V dc and also provides a basis for an excellent portable receiver."

On the other hand, Ted Elliott, G3BYY, has found when building 10.7MHz ssb generators based on the Plessey ic devices and commercially distributed pcbs that good carrier suppression cannot always be achieved. After several experiments he found that the addition of a neutralizing capacitor (set at about 34pF) connected between the output pin back to the audio pin and adjusted together with the normal balancing resistor could at least bring the carrier below 40dB, although this is still not as good as he previously found readily achievable with discrete components. He feels that constructors and those firms producing ready-made pcbs do not always appreciate the importance of good component layout with some of the ic devices. He blames layout rather than the devices for such problems.

Radiation hazards

Dr Ian White, G3SEK, and Roger Blackwell, G4PNK, of NRPB, have drawn attention to the paper presented by Henryk Cichon, SP9ZD, a member of the IARU Region 1 EMC Working Group, and Hubert Trzaska, of Wroclaw Technical University, at the 5th EMC Symposium at Zurich a few months ago: "RF Hazards and the Radio Amateur". G3SEK and G4PNK, whose work in this field is well known, write: "The Polish authors have measured E-fields around a number of typical amateur hf stations, and their conclusions agree rather well with our own (*Rad Com* February 1982) which were based on vhf/uhf measurements. At hf you are likely to be in the near field of your antenna, so E-field rf exposure limits are an appropriate basis for comparison. The present or proposed limits in Western countries are currently about 500V/m at 3.5MHz, decreasing as (1/f) to about 60V/m at 28MHz, and staying at that lower value through 144MHz. SP9ZD's measurements were as follows:

1. On 14-28MHz 500W to a three-element trap tribander 5m above the roof ridge produced E-fields of 1-2V/m in the attic and 0.5V/m upstairs. Fifteen centimetres away from the transmitter, and all along the feeder, the E-field was 25V/m, dropping off rapidly to 0.5V/m at distances more than 1m.
2. On 3.5-28MHz 500W to a trap vertical on a flat roof produced 150-250V/m on both lower floors. The shack was on the ground floor, and fields of 0.5-1V/m on both the ground floor and the first floor were mainly due to radiation from the feeder: up to 60V/m was observed at 15cm from the feeder or the rig. (So it seems that G6XN is right—it is very difficult to keep stray rf currents off the feeder of a "groundplane" antenna with radials—G3SEK.)
3. In contrast, 150W on 3.5 and 7MHz to a trap dipole fed with a balun produced only 2-5V/m around the transmitter and feeder.
4. The worst case reported by SP9ZD was that of a 42m (138ft) long-wire strung between two five-storey steel/concrete buildings. Part of the antenna was vertical, 1m away from the wall, and led down to the shack on the first floor. With 100W on 3.5-28MHz, E-fields of 20V/m were measured in parts of both buildings. On 3.5MHz the transmitter case felt "hot" when touched, and the E-field close to the surface of the metal case was 1kV/m.

"The situations reported by SP9ZD are representative of a wide range of amateur hf stations, so what can we learn from them? In most cases the E-fields were well below the Western limits, and even below the much more restrictive Polish limits, so normally there seems little cause for concern about rf hazards from amateur hf stations, especially when the limited duty cycles of amateur transmissions are taken into account. However, severe symptoms of 'rf' in the shack (eg as indicated by tingling sensations when touching supposedly grounded metal objects) ought to be eliminated. 'RF in the shack' isn't contributing to the strength of your signal—except in tv and hi-fi sets—and it may be hazardous."

What could be a potential but seldom-recognized rf hazard has also been brought to my notice by Bill Hall, G6ZRB. He recently attended a local society meeting with someone who had just passed the RAE, and arranged for another amateur to demonstrate to him two-way operation on his

144MHz 25W mobile equipment. While this took place G6ZRB stood beside the car with his head only a few inches away from the antenna. That night he awoke with violent head pains above his right eye which persisted until noon the next day. He wondered if this could have been induced by the rf radiation.

While it would be near to impossible to say definitely whether or not this was the case, undoubtedly it is unwise to stay with your eyes only a few inches from a 144MHz 25W transmitter antenna. It was now usually recognized that handheld transceivers with "rubber duck" antennas pose a potential hazard if the rf output is more than about 7W because of the proximity of the antenna to the eyes, which are the most sensitive organs to non-ionizing radiation.

I do not recall having seen any previous comment on potential risk to a spectator watching operation from a stationary vehicle. While the chances are that G6ZRB's head pains were not caused by rf, it does seem worth warning people not to stand so close to a vhf antenna radiating more than a very few watts.

VK2ABQ's hibernating dipole

Fred Cator, VK2ABQ/G3ONC, whose well-known bamboo wire beam first saw light of day in *Electronics Australia* just 10 years ago (October 1973, and then *TT* in January 1974) continues to experiment with compact antenna elements that depend on bends rather than using the less-effective loading coils. He calls his latest idea the "hibernating dipole". The 14MHz version can be built on a framework of four 6ft (1.82m) wooden dowels: Fig 2. When erected as shown (bird's eye view) it provides horizontally-polarised signals, but it can equally well be mounted, quad fashion, to provide vertical polarization. With the element about 3ft (0.91m) above ground, VK2ABQ carefully resonated it to 14MHz; when elevated it resonates about 14.15MHz. As would be expected, such an element is of higher Q and lower radiation resistance than a straight wire dipole, so that the bandwidth for a given change in swr is reduced. He warns that no attempt should be made to correct for the imbalance that appears at the feedpoint, since this results in some directivity and a noticeable front-to-back ratio even on a single-element system. He has also found it possible to use the 14MHz element as an extended dipole on 21MHz, when the centre impedance rises. He has also used two 0.62in (15.87mm) aluminium tubes for the centre section, then requiring only two wood dowels. He has also investigated an elongated bent dipole of this type as the driven element of a Yagi array.

VK2ABQ refers to the shape of the structure as a "right-angle diamond shape" but his sketch looked like a square. However, if it were a square the total element length on 14MHz would be roughly 46ft (14.02m) whereas his notes indicate a length of 36ft (10.47m) (trimmed down for resonance) on 14MHz, and 24ft (7.31m) on 21MHz, which seems about right in view of the bends. I therefore assume that the sides are separated by rather less than the full 6ft (1.82m) lengths of the dowels.

VK2ABQ makes no strong claims for performance although he admits to working into Europe with the element only 12ft (3.65m) above ground.

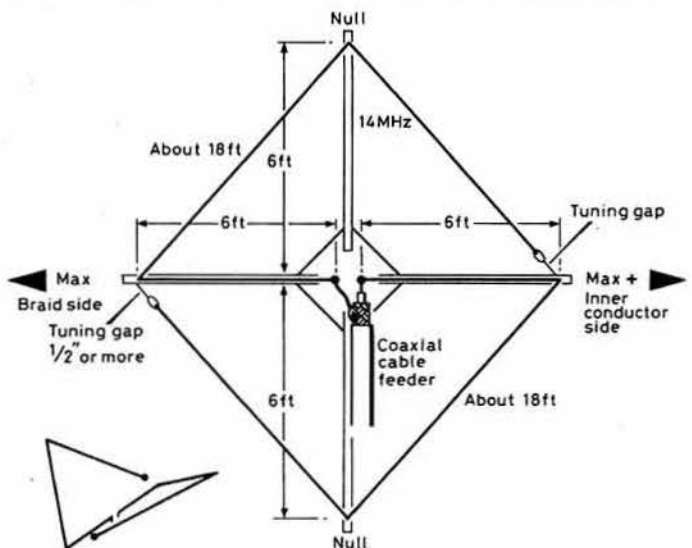


Fig 2. VK2ABQ's compact "hibernating dipole" providing some directivity with only a 6ft turning radius on 14MHz. On 14MHz total element length about 36ft trimmed accurately down to resonance (bent element will be longer than a straight one)

Its main virtues, he believes, are small size, turning radius only 6ft (1.82m) on 14MHz, and full resonance without traps or loading coils. It would be interesting to compare results with the helical-wound compact dipole as described in the October 1983 *TT*.

The absorbing Yagi element again

TT (November 1982) presented the novel ideas of John Beech, G8SEQ, on the use of strategically-placed resistor-loaded antenna elements intended to absorb rather than radiate, in order to reduce sidelobes or, more specifically, to improve significantly the front-to-back ratio of Yagi and other antenna arrays. One of his two designs was for a portable dipole-plus-absorber element intended for 144MHz df applications.

Since then two other contributors to *TT* have questioned the technical basis of this idea on theoretical grounds. Another possible problem in using absorber elements for such specialized applications as moonbounce (eme) was raised by Pat Gowen, G3IOR, who noted that if the absorbing resistor dissipated appreciable power during transmission it would heat up and act as a blackbody radiator during reception, and so could limit receiver sensitivity.

In *TT* (June 1983) Les Moxon, G6XN, was particularly worried about the two-element df array, while in August Dave Gordon-Brown, G3UUR/W, suggested the whole idea might even be a hoax. Both of these writers made it clear that although they had found the idea intriguing they had not attempted to try it out in practice.

John Beech, G8SEQ, has since replied to their criticisms. It is not intended this month to present his arguments in detail, but simply to reiterate that he remains entirely convinced that the absorbing element really works; that it absorbs *all* the signal power it receives, re-radiating it only in the form of heat (infra-red radiation, but mostly the heat is simply convected away).

He maintains that results on the simple df antenna are reproducible without using a balun, though he does add a new warning to anyone building a similar antenna for serious df work: "It gives very good results on distant stations, but recent experiences have shown that it gives very poor nulls on local signals. This is (apparently) because modern vhf receivers are so sensitive (or possibly, without a balun, due to pick-up on the outer-braid of the coaxial cable?—G3VA). I could not get a null when closer than about one mile from a 2.5W transmitter using a 5λ/8 whip on a car roof, even when cross-polarizing the signal."

While refraining from entering into this debate on the absorbing element, I must admit that I still find G8SEQ's original claim of a 75dB f/b ratio with his 13-element array an astonishingly high figure, although not queried by the critics.

Highpass filters for cbi suppression

Antiference Ltd, of Aylesbury, who make many antennas for tv and vhf/fm broadcast reception, have marketed two coaxial plug-adaptor-type highpass filters which are intended to reduce 27MHz cb interference, but which might prove a useful aid in tackling video cassette recorder interference etc. Type TVI-U is intended to plug into uhf tv receivers, and is claimed to reject 27MHz signals by some 50dB or more. Type TVI-X is intended primarily for use on vhf/fm Band 2 radio sets, but can be used over the range 85 to 860MHz although the rejection is reduced to about 25dB. In each case insertion loss is given as 1.5dB (vswr 1.7:1). These fully-screened, compact filters are retailed in "Videopack" form by local tv/radio dealers etc at around £4 each: Fig 3.

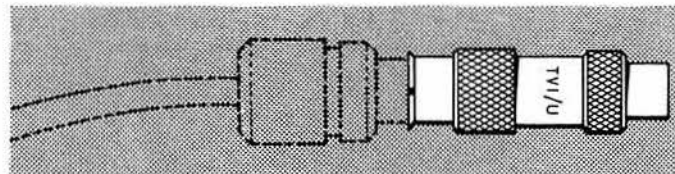


Fig 3. The Antiference tv highpass filter type TVI-U is basically intended to reduce 27MHz cb interference, but provides more than 50dB suppression on hf signals

The manufacturer's information makes it clear that these filters cannot be expected to be effective in cases where a high-power transmitter is very close to the receiver (ie they do *not* function as "braid-breakers"). Nevertheless a TVI-U filter fitted in the antenna socket of a vcr machine having a wideband rf amplifier might help to clear up this new, and serious,

form of tvi, at least from hf transmissions, provided that the trouble is not arising from direct breakthrough of 3.5MHz signals etc into the tape-head amplifier. One cannot imagine even irate neighbours refusing to allow one of these neat, inconspicuous filters to be fitted to their new toy, although the price does not encourage widespread free distribution!

More on rf switches

The notes from George Jessop, G6JP (*TT* August 1983) on the home-construction of stud-type switches suitable for use in high-power antenna tuning units, linear amplifiers etc, have encouraged Tom Walshaw (one-time G2PI and contributor to *The Model Engineer*) to add some useful comments. he writes:

"I have made scores of these switches (not all for radio work) and still have two I made in 1934 that are as good as new. I always use twin leaves, but if beryllium copper can be had this is better than phosphor bronze—much stronger and springier. The best arrangement is a twin leaf of hard-temper copper backed up with a beryllium copper spring leaf. There is no real need to file out the slots in the screws (though I make my studs from raw bar on the lathe!). Instead, set the slots radial to the centre spindle. The studs then self-clean. If a 'break-before-make' switch is needed the leaves tend to fall in the spaces, if the studs are set further apart; so I set in a narrow 'dummy' between the active studs (Fig 4) to support the leaves in



Fig 4. Use of narrow dummy studs in home-made high-power rf switches when "break before make" characteristics are required

transit. I suggest 20swg is a bit thick for the leaves; 26g (0.05mm) or even 28g is good enough if twin leaves are used. Finally, a double coil spring washer between the retaining collar and the shaft bush helps to give even tension and a nice smooth operation."

Battery progress

The increasing importance of batteries, both disposable and rechargeable, as power sources for portable, mobile and even fixed installations, has been stressed many times in *TT*, despite the fact that energy from a primary battery tends to cost several hundred times as much as mains power.

A recent development is the use of lithium batteries, with their high energy density, in a UK consumer-electronics application. This is for the much-publicised Sinclair pocket television set, which could bring the problem of tvi to field-day stations! This interesting little set runs from a Polaroid lithium battery which provides about 15h operation. These batteries are being supplied to set owners at a cost of just under £10 for three batteries; Polaroid themselves intend to market their batteries in the UK although possibly at a higher unit cost.

A 1983 paper on "Lithium inorganic batteries for consumer electronics" by Nikola Marincic, of Battery Engineering Inc, an American firm, notes that lithium inorganic batteries offer 10 to 12 times the energy density of most manganese-alkaline batteries, but that they do impose some serious limitations when used in consumer applications, arising from the inherent volatility of lithium. These include the requirement for stainless-steel packaging, hermetically sealed construction and welded glass-to-metal seals. Current progress, however, is being made to improve the safety factor by the incorporation of fuses, the provision of rupturable vents to prevent build-up of excessive pressure, and better glass seals. Lithium batteries were discussed in some detail in *TT* October 1982.

From the USA have come also reports of advances in the standard low-cost "work-horse" battery in the form of improved carbon-zinc cells refurbished with a zinc-chloride electrolyte and oxidation-resistant coated-paper separator; it is claimed that at low and intermediate drain over relatively long periods, these provide a performance comparable with alkaline cells at roughly one-third of the cost.

Progress is also reported in improving the energy density and reliability of nickel-cadmium cells intended for consumer applications, including better active-material deposition, nickel sintering, and optimization of nickel concentration permitting the construction of sealed cells that can deliver 23Wh/lb and a four-to-one reduction of failures.

Various forms of "maintenance-free" lead-acid batteries are continuing to emerge, including those with the space between the internal plates filled by a liquid or quasi-liquid electrolyte. These now form an alternative to jelly-acid (gel) lead-acid units for consumer electronics.

In respect of the conventional lead-acid vehicle battery, it may be recalled

that Tom Walshaw outlined in *TT* (August 1981, p725) a method of refurbishing cells suffering from severe sulphation by carefully emptying the cells, washing them out with distilled water and then filling them with a solution of Glauber's salts (sodium sulphate). Recently one of my non-amateur colleagues was faced with a large battery that would not take a charge: he gave his battery Tom's dose of Glauber's salts and reports complete success, with the battery now back in regular use.

Impedance-bridge test unit

There is still considerable scope for finding new applications for standard ic devices. In *Electronics* ("Designer's casebook", 8 September 1983, p 124) two Indian engineers, Vilas Jagtap and Vidyut Bapat, describe a simply-constructed, low-cost impedance bridge that turns a signal conditioner ic into a production-line tester that could also fulfil a useful purpose on any workbench, for measurement of the value of unknown resistors, capacitors etc. This is based on the Signetics NE5520 signal-conditioning ic plus a dual op-amp (TLO84), 50-0-50 μ A meter and a few discrete resistors and capacitors.

Fig 5 shows the functional block schematic, while Fig 6 provides the complete circuit diagram. The NE5520 forms the synchronous detector and phase reference oscillator; the TLO84 acts as error amplifier and lowpass filter. The reference voltage of the bridge is supplied internally to the detector, so that the bridge requires only two "arms": Z1 of "known" value and Zx the unknown impedance. Capacitor Ct determines the frequency of oscillator ($f_{osc} = 110/Ct$ where Ct is in microfarads).

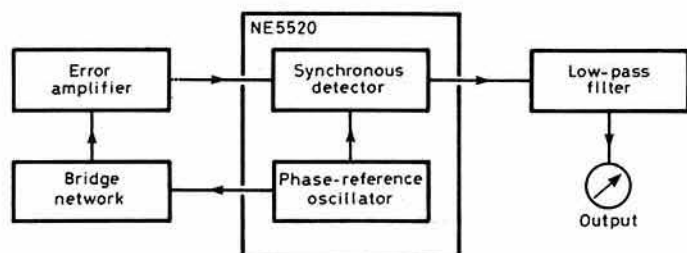


Fig 5. Basic principle of simple impedance bridge tester based on NE5520 signal conditioner ic

The authors describe the use of the instrument as follows: "Initially, to balance the bridge, Z1 is made equal to the reference impedance Zr. This is done by trimming Z1 until the output is zero. Known values are now connected in place of Zr, and the meter deviation is calibrated in terms of impedance. The bridge is now ready to measure an unknown impedance Zx. A resolution of 0.01 per cent is easily achieved with this circuit."

Unfortunately no information is given on the range of values over which the instrument is most effective or whether it is suitable for the measurement of inductive impedance.

The electromagnetic groundplane antenna

TT August 1983 provided some information on the electromagnetic groundplane loop (emgl) antenna as described by Hans Wuertz, DL2FA, in his *cq-DL* series "The dx antenna and its image". A subsequent article

Fig 6. Circuit diagram of impedance bridge tester with a TLO84 dual op-amp providing the error amplifier and lowpass filter. After calibration with known reference values (Zr) the bridge can resolve unknown impedances (Zx) with a resolution of about 0.01 per cent

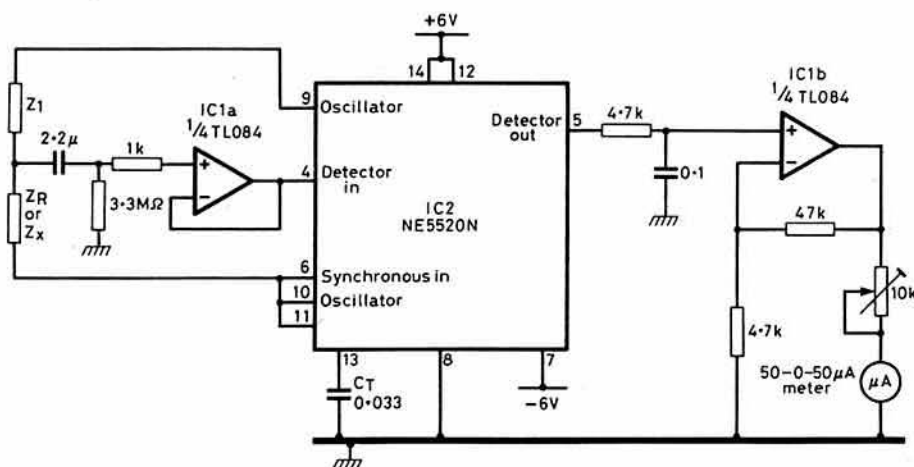


Table 1—EMGA dimensions

Band (MHz)	a (m)	b (m)	x (m)	y (m)
3-5	13.16	6.58	3.55	0.42
7	7.04	3.52	1.90	0.21
14	3.48	1.74	0.94	0.10
21	2.33	1.17	0.62	0.07
28	1.68	0.84	0.46	0.05

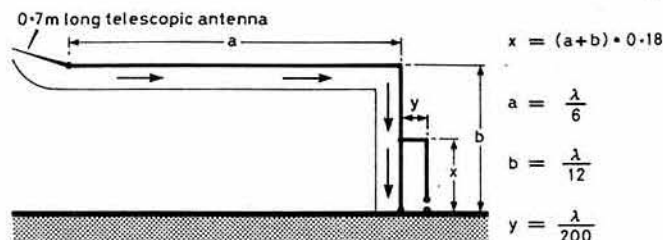


Fig 7. The low-profile electromagnetic groundplane antenna (emga) as described by DL2FA. Element and matching section uses 4mm diameter copper wire

in this series (*cq-DL* No 6/83 pp 278-9) dealt with the related but open-ended electromagnetic groundplane antenna (emga). This forms a single-band antenna requiring a support height only $\lambda/12$ above ground, yet claimed to come close to the effectiveness of the conventional $\lambda/4$ monopole vertical antenna. The emga consists simply of a $\lambda/4$ element bent over so that it has a $\lambda/6$ horizontal span and $\lambda/12$ vertical section. At the end of the element, formed from 4mm diameter copper wire, is a short telescopic car radio antenna, extending to 0.7m, to permit trimming to resonance. As for the emgl, the matching section shown in Fig 7 can be replaced by an inductive coupling loop. DL2FA's dimensions for the traditional hf bands are given in Table 1. It should be stressed that since the impedance of such an element is roughly about 12 Ω , it is highly advisable to use a good earthing system (eg earthing mat plus radials). No information is given by DL2FA on its use with elevated radials, or with a counterpoise.

GaAs devices on 144MHz

TT February 1982, pp141-2, included details of a high-performance 144MHz receiver front-end using one of the Mastushita 3SK97 GaAs dual-gate mesfets as rf amplifier, followed by an MD151 doubly-balanced mixer as described by F6CER (*Radio-REF* October 1981). Subsequently GW8AAP and G4FRE (*TT* April 1982, pp318-9) added further information on the 3SK97, including circuit and layout information on the JA6CZD 432MHz preamplifier (about 18dB gain, 0.9dB noise factor) and expressed surprise at the use of this uhf device on vhf.

Nevertheless the attractions of the mesfet in providing both low-noise and good strong-signal performance have continued to be reflected in 144MHz designs. Dennis Mitchell, K8UR (*Ham Radio* March 1983) provides comparative data for a number of different GaAs devices when used on 144MHz, including the ALF1023 by Alpha Industries which in the USA retails at about US\$12. He showed that at 144MHz the performance of both medium and high-cost GaAs devices, ranging from US\$12 to about

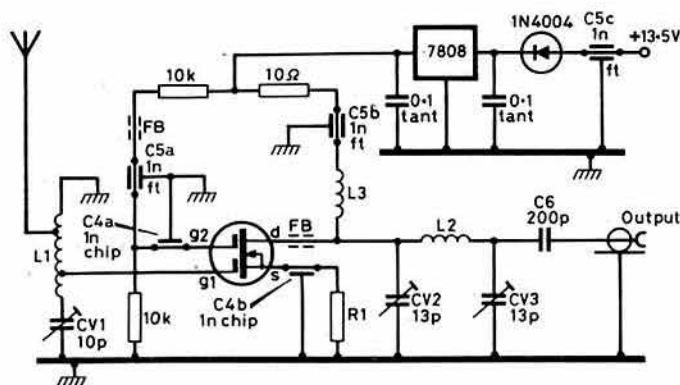


Fig 8. F6CIA's 144MHz preamp using 3SK97 mesfet. R1 about 1500, adjust for Id of 15mA. L1 seven turns silvered copper 1.5mm on 12mm diameter former. G1 tap 0-33t from CV1. Ant tap 1-25t from earth. L2 4 to 5t silvered 1mm former 6mm diameter. L3 rfc 1μH

US\$44 (AT8110, NE21889, NE72089, MGF1402 etc) tends to be very similar, roughly 0-6dB noise figure, 19dB gain, third intercept point about +28dBm. K8UR, who is an applications engineer with Alpha Industries, did not include in his comparative data either the lower-cost 3SK97 or the more recent Motorola MRF966, although these high-volume lines would appear to provide a 144MHz performance that most amateurs would find entirely adequate.

K8UR points out that GaAs devices are particularly useful in improving 144MHz receivers (or preamplifiers) where first-stage overload is a problem. He warns of advertisements for vhf receivers with claimed 0-2dB noise figures however, noting that while noise figure measurements are relatively easy to make, noise figure accuracies are inherently uncertain.

French amateurs also still appear convinced that the 3SK97 provides good value-for-money on 144MHz. In *Radio-REF* August/September 1983, pp938-9, Sylvain Klingebiel, F6CIS, provides circuit and layout diagrams for a "bas prix" (low-cost) 144MHz preamplifier using the 3SK97 with a claimed 0-7dB and +7dBm intercept point, though of course it will be appreciated that a preamplifier means that the extra gain will make it easier to overload the receiver proper with strong local signals. Fig 8 shows the circuit diagram including built-in voltage regulator. Fig 9 provides a suggested layout.

When dealing with high-cost GaAs fet devices requiring both negative and positive supplies, it is very important to ensure that a negative voltage is *always* present between gate and source when a positive voltage is present between drain and source (ie much as with high-power valves but the effects are even quicker). Failure to provide negative gate-source voltage ($-V_{gs}$) at the same time as or before positive drain voltage ($+V_{ds}$) can lead to *immediate* destruction of the device. This is a vitally important consideration where a dual-polarity psu is used. A fail-safe psu for GaAs fet amplifiers is described by Geoffrey H. Krauss, WA2GFP in *Ham Radio* September 1983, pp32-6.

It was as long ago as 1967 that RCA announced the development of misfets (metal interface semiconductor field effect transistors) using the intermetallic compound GaAs, pointing out that the high electron mobility,

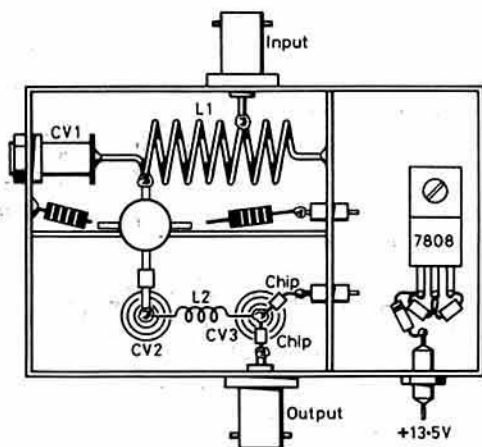


Fig 9. Layout of 3SK97 preamp

wide band gap and the semi-insulating properties of gallium arsenide make it virtually the ideal semiconductor for fet devices. Unfortunately for many years it has proved difficult to produce suitable GaAs material using large volume production techniques. Although the problems are gradually being overcome, it would perhaps be over-optimistic to expect low-noise uhf misfets and mesfets ever to come down to the price levels of silicon devices.

Fusing mobile power

The prime aim of every mobileer is—or should be—to ensure that in no way does his equipment, or its operation, represent a potential hazard to driver, passengers or any other persons. Safety should always be given the highest priority. An incident reported recently in *QST* underlines that an inadequately-fused rig can result in a moving vehicle catching fire; the chances of this happening may be very small, but even a small risk of such an incident should not be treated lightly.

Hank Garretson, W6SX, in *QST* September 1983, shows how a potentially dangerous electrical fire in his car, while travelling at 55mph, was caused by a short-circuit in the power lead of his mobile rig. Because the lead was fused only at the equipment end of its power cable, and was not of sufficient capacity to cause the vehicle fuse to blow, the short-circuit resulted in a heavy current in the cable, causing it to heat-up and shed burning insulation which promptly set fire to parts of the vehicle.

In the event, he was able to put out the fire before any serious damage was done, but the incident has prompted him to put forward three recommendations:

(1) It is a good idea to check your mobile installation periodically for possible loose connections, cut or chafed wires.

(2) In addition to the fuse(s) that protects your rig, make sure *every* wire you install is adequately fused at the power *source*. Alternatively, rely on the car fusing by making sure the wires you install going to the rig are at least the same or bigger gauge than the wires of the 12V source you are tapping.

(3) Carry a fire extinguisher.

W6SX reflects: "All this may seem like overkill, but, believe me, all you need is one fire at 55mph to become a believer."

Also in the same issue of *QST*, Merv MacMedan, N6NO, argues that for mobile operation it is "imperative" to fuse *both* positive and negative battery leads. He failed to do this. The result was that his Clegg 220MHz transceiver carried for a short damaging period the several hundred amperes taken by his starter motor. This happened when the main negative lead to the engine block loosened and his rig formed a bridge. He notes that single fuses are usually safe enough if your rig's negative lead is connected to the car chassis. But many manufacturers of mobile rigs now recommend that the power connection for the rig should be made as close as possible to the battery in order to reduce electrical noise problems etc. Some firms now provide fuses in both leads (at the equipment end) but a lot of equipment is only fused in one lead.

In any installation, mobile or domestic, it is always worth remembering that one needs to take into consideration the possibility of a combination of faults occurring at the same time. An installation adequately protected against a single fault may be a considerable hazard against a double fault.

On a rather different tack, it is reported that some electronic breath analyzers used in North America have been found to provide inaccurate readings when subject to strong rf fields. Some American drivers have had their cases dismissed on the grounds of possible rfi. "Not guilty, your honour, I had been putting 20-over-nine into the local repeater and accidentally left the rig on when the officer stopped me".

Semiconductor round-up

Power rf devices for 1,296MHz do not exactly grow on trees even now. However, two useful devices—SD1520, providing 1W output, and SD1511 (8W)—formerly difficult to obtain in one-off quantities, are now being retailed in the USA as the SD1588 and SD1599 respectively at around US\$35 each—a price that emphasizes that uhf rf power semiconductor devices should be handled with care.

Motorola have marketed a range of rf power mosfets, using the tmos technology (Motorola's reply to Siliconix's vmos) and including devices capable of delivering at 150MHz rf outputs from 5 to 125W. These are the MRF134, 136, 171, 172 and 174. All are intended for use in vhf amplifiers operating from 28V supplies. They provide minimum gains ranging from 9 to 13dB. Like other power fets offered by other manufacturers, these offer useful advantages compared with more conventional rf power bipolar transistors: higher input impedance, lower noise figure, lower intermodulation distortion, and a stage gain that can be more readily controlled. Prices in North America (quantity unknown) range from about \$10 for the MRF134 to over \$70 for the MRF174.

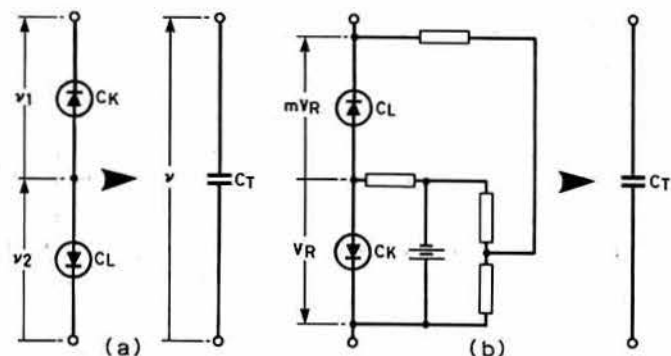


Fig 10. Basic arrangements for compensating varactor tuning diodes to reduce non-linearity effects: (a) series connection of two diodes; (b) series connection of two diodes with different bias voltages

Although the use of varactor tuning diodes instead of variable capacitors is becoming common practice these days, it is important to be aware of the fact that varactor diodes still suffer from drawbacks. In particular, remember that a resonant circuit that employs diodes will show non-linear characteristics and generate intermodulation and cross-modulation distortion. Basically this is because diode capacitance varies not only with the bias voltage used for frequency control, but also with rf signal voltages. A paper by Tai Sasaki and Hiroshi Hataoka of the Japanese National Defence Academy ("Investigation of intermodulation in a tuning varactor", *IEEE Trans on Broadcasting*, Vol BC-29, No 2, June 1983, pp77-81) considers methods of compensating against this unwanted distortion by the use of a fixed capacitor or another diode with appropriately divided bias voltage: Fig 10 outlines these basic approaches. The mathematical analyses presented in the paper indicate that such methods, if correctly applied, can greatly reduce the non-linearity effects, although suggesting that some earlier papers on varactor compensation were over-optimistic.

On the other hand, Dr Michael Ball, G6EQX, feels constructors need no longer be put off by undue fears of stability problems in solidstate amplifiers. He writes: "I recently designed and built a three-stage 144MHz amplifier (2N3375/2N4128/2N6084), 1W in, 50W out, for little more than the cost of the transistors. Much to my relief it worked first time, is unconditionally stable, and is now used daily for mobile operation. The stability I attribute not to luck but to having stuck closely to: (a) a modified ARRL design for a single 2N6084 amplifier; (b) the device manufacturer's data sheets and recommended test circuits; and (c) the principles noted under 'power amplifier hints' in *Amateur Radio Techniques*, 7th edn, pp30-1. The cost has been kept down by standardizing throughout on ordinary 100pF mica compression trimmers (12 at 10p each) rather than using the more costly uhf types or mica chip fixed capacitors."

Impedance and the groundplane

Over the past few years there has been a growing tendency among scientists to challenge some important aspects of Einstein's theories of relativity and Darwin's theory of evolution; controversies that may never be resolved to everyone's satisfaction. There has also been the introduction of a "chaos concept" that postulates that some problems are too complex ever to be solved. *TT* is more fortunate; some of our debates tend to come to acceptable conclusions!

For instance, there has been the simmering question of the impedance of a $\lambda/4$ vertical radiator when used with elevated radials, and when used with an extensive set of buried radials, large earth spikes or an earth mat. Fred Brown, W6HPN, whose remarks in *TT* November 1981, p1033, threw doubt on the basic efficiency of groundplane antennas, has now conceded that the elevated gpa has a radiation resistance of around 19 Ω , whereas for a $\lambda/4$ monopole mounted on a large ground system the figure is 36 Ω . However, while now accepting that his earlier notes unfairly maligned the elevated gpa, he still feels that this should not obscure the fact that, as he indicated in 1981, a $\lambda/4$ radiator over a large conducting ground plane, with its 36 Ω impedance, does have -3dB gain (ie 3dB loss) at zero elevation angle. And he notes that this includes the important practical case of a $\lambda/4$ vhf radiator mounted on a car roof.

Dud Charman, G6CJ, also makes a valuable contribution to this discussion. He agrees that in the past a number of professional antenna experts have mistakenly concluded that there is a 3dB loss between an ideal vertical, with extensive ground system, and the elevated gpa, as the result of overlooking the basic fact that all the power in a radiating element *must*

radiate. A fallacy resulting from the fact that none of the experts appear to have actually checked their theoretical calculations. G6CJ writes:

"I did, many years ago, at vhf. The result was a radiation resistance of 'less than 20 Ω ' as I duly noted in the *RSGB Handbook*, along with a gpa having a folded radiating element to match 70 Ω feeder. Also a design with sloping radials to match 50 Ω with roughly 45° depression."

G6CJ explains the significance, in this connection, of the radiation resistance as follows:

"In the ideal grounded monopole the electric field and its return current in the ground is symmetrical about the antenna, giving the well-known value of $R = 36\Omega$. With insulated radials the field is not symmetrical, but must 'close-in' on the radials and thus reduce the coupling between the antenna and whatever it is that the waves travel in: down goes R . The radials (if they are tuned and equal) provide only a point of zero potential against which to drive the radiator. There is a little leakage from the radials, but only from pairs of opposing currents at an average small spacing, and this can be neglected in a simple analysis. An antenna system puts out 72W of power with 1A in a dipole, 1.4A in the 'ideal' $\lambda/4$ vertical and 2A into the 18 Ω gpa. Perhaps the past confusion has arisen by writing I for current and then forgetting that its value changes when going from 36 to 18 Ω radiation resistance."

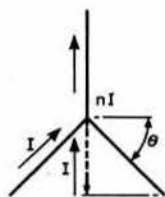


Fig 11. Drooping radials and groundplane antenna basics

"When the radials are sloped downwards they form a virtual extension of the $\lambda/4$ radiator (Fig 11) carrying the same current, I, at the feedpoint. This leads to a simple formula $R = 18(1 + \sin \theta)^2$ that seems to work pretty well. If θ is 90° we have a $\lambda/2$ dipole and R becomes 72 Ω . The solution for 50 Ω is $\theta = 42^\circ$."

G6CJ and several other readers have pointed out that in G3UUR's Table 1 the bracketed expression involving electrical angular lengths, say x , is in fact more simply put as $\tan(x/2)$. It may also be worth noting that in Table 1 it is the factor l/λ and not just l that is the "proportion of the wavelength" factor.

G6CJ adds that with a radiation resistance of 18 Ω , a typical Z_0 of 500 Ω , the end impedance will be about 14,000 Ω : "You cannot run coaxial cable to the centre of an underground plane, and it is difficult to step 14,000 Ω down to 50 Ω in a damp matching box in the garden without heavy losses. One could halve the value by using two wires spaced about 1ft apart. But it is much better to extend the radiator to about $5\lambda/16$ and retune in the box. The impedance would then be much lower but still high enough to lose most of the effect of a 50 Ω spike connection!"

Notes and news

One notes from field day reports etc that equipment has not yet achieved zero-defect status. An example of an expensive blow-up comes from Tom Ward, G2FKO. He writes:

"I was listening on my FT101B receiver and decided to switch on the heaters, preparing to make a transmission: There were some arcing noises from the receiver, and a small puff of smoke. In that instant the two pa valves were destroyed and some other damage done. Nothing untoward was indicated on the meter, and I had not begun to transmit. After nearly destroying another pair of valuable Toshiba 6JS6Cs in the diagnostic process, the fault was found to be the C13, the coupling capacitor between the plate of the 12BY7A driver stage and the pa grids. This had failed, applying +300V to the 6JS6C grids and also causing R15 and R18 in the pa bias network and R14, the screen resistor, to burn out. The reason for no warning from the meter was, of course, that it was acting as receiver S-meter and not showing pa cathode current."

"In retrospect, I recall the standing current of the pa valves had been unstable for a time, varying from day to day, and climbing a bit during the transmission. If you notice such symptoms it might be worth replacing C13 (80pF 1kV working) for pennies rather than waiting for the valves to go."

True enough, of course, but unfortunately capacitors can still fail without *any* prior warning. The experience points also to one of the snags with multi-functional metering. □

AS WE COME to the end of another year, we can look back and see that it was on the whole a good one for vhf—perhaps not quite as exciting as the previous one due to a decline in auroral events, but with enough happening to satisfy most operators, whatever their particular interests within the framework of amateur radio. Perhaps the most significant events in 1983 were the issue of the limited number of 50MHz permits, and the microcomputer explosion. Hopefully we shall one day have an allocation in the 6m band available to all, while the micro has become so much a part of the amateur radio scene that it seems inevitable that it will become as commonplace in the shack in future as are the in-line power meter and similar accessories today. We must also not forget that during the year the most advanced satellite to date, the Phase 3 Oscar 10 was finally placed in orbit, though not without its problems, and it must be of great satisfaction for amateurs to have this positive proof of their links with such high-technology, financed by voluntary subscriptions and donations.

Repeater news

There is news this month on some 70cm repeaters. First, GB3BD (Bedford) on RB4, and GB3HU (Hull) on RB10 have had site changes approved, and in due course reception reports from the new locations will be much appreciated. Next comes news from Jeff Clarke, G3TIS, manager of the Kent Repeater Group, to the effect that GB3CK on RB0 was restored to service on 12 June and has worked well since. It is located centrally in the county, and intended to cover Ashford, part of the Weald, the outskirts of Maidstone, Sittingbourne and Faversham, thus providing a link with the North Downs.

GB3CK has been completely rebuilt. It uses an antenna comprising four stacked dipoles, giving a cardioid radiation pattern which favours the Ashford direction. The array is some 10m above ground, the site being 192m asl. With the very flat Romney Marsh area to the south this should provide excellent coverage right down to the coast in that direction. The transmitter is based on an "Ultra Lion" unit, the repeater module being the work of G8SUY. Logic, derived from an 8035 microprocessor, was also built by G8SUY, and is essentially the same as that used on the Kent 2m repeater GB3KN. For reception a Pye 460 unit is used, with extensive extra screening added, together with filtering of the audio and power leads.

The final task was the construction of a duplexer to enable a single antenna system to be used. The one now in use uses six cavity resonators which were of commercial origin, but requiring considerable mechanical modification to operate in the 70cm band. This work was undertaken by G6TTB. Getting these properly set up caused problems, so in the end the Repeater Management Group was contacted and Mike Senior, G4EFO, who is an expert in this particular field, lent a hand and achieved the necessary isolation. The repeater uses only 5W erp at present, but an increase of 3dB is planned for the future. G3TIS reminds users that to access GB3CK, initially tone plus speech is required. A toneburst followed by the announcement of call sign will be enough to open the repeater. This is a nice account, as is usual with repeater reports, of a dedicated group of people working towards a common end, each contributing his/her own expertise for the benefit of a much wider group of operators who will later use the system. It is also interesting that the services of the Repeater Management Group were again successfully utilized (see 4-2-70 October 1983).

On a less-pleasant note, as reported elsewhere at the time, the Norfolk repeater GB3NN on RB2 was closed down by the Society following investigations into allegations of infringements of the licence conditions. This is a reminder that all repeater licences are held by the RSGB as one of the requirements of the licensing authority. It is hoped that "service will be restored" after the formation of a new repeater group in the area.

Meteor scatter

John Matthews, G3WZT, is well known for both his ms operation and his articles on this subject. Back in June he gave some very useful information on showers, and he has written again to prepare operators of this mode for the forthcoming Geminids. Astronomical data suggest that this shower will

peak around 13-14 December with a zhr (the "hourly rate") of 55 (compared with Perseids, 65, and Quadrantids, 120). However, G3WZT says that his logs for the past years indicate that there is a very definite peak for "easy contacts" on 12 and 13 December between 2000 and 2400gmt, with the best results being obtained between easterly and northerly headings. He also notes that this also conforms with theory. Try to get some skeds if possible as this will greatly improve your chance of completing a contact. G3WZT makes a plea for operators on the random ssb channel to set their clocks very accurately. In a one-minute period, an over-run of 20s by one nearby station and an early start-up by another can very seriously eat into the already short receiving period. It is a useful tip to listen now and again during the transmitting period to check whether your clock is widely out compared with the "masses"!

The 432MHz ms cw contact between expedition station G4PVM and DK1PZ, reported in 4-2-70 October 1983, has been the subject of further correspondence, this time from Chris Bartram, G4DGU. Chris feels that he was misquoted by my comment that he "has queried whether any completed contacts have ever occurred". Back in June, Chris and G3WZT were quoted as saying that they were agreed that 432MHz ms was a "masochistic pastime", and went on to ask whether anyone had completed a "valid" contact. Since then, no station has come forward to claim one until the more recent G4PVM-DK1PZ QSO.

G4DGU says that he has no reason to doubt that *most* of the reported contacts actually took place. However, 432MHz ms is a "very chancy" business, and the probability of completing a contact, even within a 6h sked, is very small indeed. G4DGU is not exactly inexperienced in these matters, and therefore retains a certain cynicism over some of the claims in the past—such as a QSL card received claiming a transatlantic ms contact which was never completed!

G8VR has a few cards from quite exotic call areas received after skeds where not a ping was heard yet the "other end" claims reception of a full "Roger-report" and callsigns! However, before the anti-ms brigade cry "I told you so!" let me say that, like most of us, I have a similar number of such cards claiming contacts on tropo, aurora and Es which in fact never took place. *C'est la vie or la guerre*, whichever way you like to look at our hobby.

GM4IHJ received excellent tv pictures via ms during the Orionids shower on 19 October. Try this technique during the next main showers if you have a suitable tv receiver.

Aurora

Auroral events have remained somewhat scarce, but GM4IHJ (Fife) caught one during the afternoon of 4 October to end what he termed "many months of auroral drought". With him it started around 1450gmt, and went on until after 1700gmt, by which time it had become much weaker. On 144MHz stations as far south as Belgium and northern France were quite strong with GM4IHJ at the peak of the event, but most of the time John was checking frequencies other than 144MHz, as his main interests lie in propagation mechanisms rather than in clocking-up large totals of stations worked. During his checks he found that beacon FX7THF was audible with auroral tone, as were GB3CTC and GB3VHF (at 58A). Closer to him, GB3ANG and GB3LER were strong signals. He could also hear the reliable beacon DL0PR. Auroral radars in Uppsala on 142.48MHz and Wick on 153.2MHz were inaudible however.

A general coverage receiver for vhf is, of course, a useful station accessory not only for auroras but also for sporadic-E checking. The elderly but well-engineered Eddystone 770R fits this bill very well, and these are often available secondhand. A wide-band preamplifier ahead of these older valve receivers works wonders, though there is a certain merit in having a "deaf" receiver to monitor major events, since if anything is heard it indicates that signals are indeed very strong!

GM4IHJ also had a chat via satellite with SM3AKW, who is located in JW square on a tiny speck of land in one corner of a square mostly covered by water. SM3AKW has 4 × 16-element Yagis on 2m (plus 16 × 21-element Yagis on 70cm). He is active during auroras, but being so far north feels that auroral Es is the best way for him to work into most parts of the UK (see 4-2-70 August 1983). SM3AKW recently worked G14OPH for his first-ever

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

auroral G1 contact. GM4IHJ says that from Fife he can work 20 stations in southern Norway and Sweden, Latvia and Estonia for each station heard, let alone worked, in northern Norway or Sweden. Comments from the OY stations or the Shetlands operators in connection with this would be most interesting. GM4IHJ also reports a brief aurora on 18 October between 1830 and 2010gmt, followed for about 1h by auroral Es.

From overseas

Bo Nilsson, SM7FJE, is a very well-known vhf/uhf operator, as is his father Arne, SM7AED. Between them they work all the accepted vhf/uhf modes, and have given many operators their first contact with GQ square or more remote spots when they go on expeditions. Bo has sent a copy of a new venture, the *2m News Sheet*. It lists stations active in various "rare" squares, and comments on whether they work tropo, ms, aurora etc. It is intended to mail this to selected operators, but the pair say that the main qualification to participate is that you keep them supplied with information on dx material, expeditions, activity from rare QTH locations etc. For further information, write to Bo Nilsson, Spångatan 7A 5tr, S-211 44, Malmö, Sweden, or catch him on the 14MHz vhf net where he or SM7AED can often be heard.

Evidence of the growth of vhf interest around the world comes from Andrew Kay, VK2YGL, who recently visited G8VR to discuss plans for reviving an Australian publication *6 UP* which used to be issued monthly in the form of a newsletter but then went into decline. Future plans are to produce it as a periodic handbook under the guidance of Roger Harrison, VK2ZTB, who was responsible for publishing the original version between 1971 and 1974. Must be something to do with being upside down on the other side of the earth in that they plan to call it *6 UP* where we would call it *6 DOWN*!

EA7ID says that when he worked into the UK on 2m ssb on 4 September during a very short Es event, he was not at the home QTH but at Punta Umbria, Huelva, QTH WX66g. He was also the second operator of the station, which has a special significance in Spain, so if you send him a card please mark it "Second Op EA7ID". His address is Hacienda Torrequemada, Bollullos de la Mitacion, Seville.

Doug Friend, VK4AIZ, plans to visit England in March or April next year and to take out a reciprocal licence for vhf operation. He will be based on the north London outskirts initially, and will no doubt make a few hearts flutter with his accent and the new-style call he should get.

Bud Weisberg, K2YOF, in New Jersey, USA, says that during solar cycle 21, now "winding down", he had contacts with 32 UK stations, all crossband, with Bud transmitting on 50MHz. All this was prior to the issue of special 50MHz permits. It gave him much enjoyment to do it, and he wishes to extend his thanks to the 6m operators for their co-operation (see also under *Awards*).

K2UYH usually chairs a net on the Oscar 10 downlink on Saturday and Sunday for setting-up eme skeds and exchanging moon data—frequency 145.950 ± 5kHz.

Tropo

The coming of winter, with the clocks being set back, proved to be less of a bleak occasion this year due to some very excellent tropo over the weekend of 22/23 October. It started on the Saturday, and at mid-day, Northern Ireland stations were able to work into OK on 144MHz. A very large high-pressure area was stationary over northern Europe and Scandinavia, and some evening fog in the Thames estuary signified the possibility of a temperature inversion, so it was not surprising to find the 2m band wide open later. Almost all night the band was packed with signals from OZ, SM, D, Y22, and, if one dug a little deeper, OKs could be found. Around midnight cw signals started to come through from Poland, and many G-SP contacts were made. G3IMV worked SP1, 2, 5, 6 and 9. It is somewhat unusual to have an opening to these particular areas. SP1AAY (IO), SP6FUN (IL), and SP2LU (JN) were among the strongest Poles who gave many stations their first contact with that country and new squares. At the same time some of the Swedish stations from HR, HS, HT and JT were extremely strong signals. The event was still in progress on Sunday morning, 23 October, enhanced by the appearance of some UP stations on cw. G2CIW called CQ and was answered by UP2AN (MO). Later many G stations made UP contacts on the key, and the cw end of 2m sounded more like the bottom end of 20m than a vhf band. G3POI made excellent use of his vast antenna system to work several of the USSR and Polish stations, many of which were inaudible on more conventional antennas. The dx continued right through the Sunday with much activity cw and ssb. An SM called G8VR to say that an OZ was working in to Hungary, but neither the HG signals nor the SPs were being heard well in Sweden, propagation appearing to be generally east-west, or northeast-southwest.

The action was not confined to 2m however, for 70cm followed much the

same pattern. G4LOJ in Norwich could not operate for the entire weekend on the band, but when he did, worked SP9FG (JJ) for a new country and square, plus half a dozen OKs and some Y22/23 stations. He also heard the Scandinavians, with the OZ beacon a strong signal off the side of his beam. German stations complained to him that at the peak of the activity on Sunday morning they could not hear the OKs being worked by the Gs, the signals apparently going "over the top".

This tropo opening of 22-23 October was indeed a big one and reports are coming in thick and fast. On 2m cw, G4GUF (Lowestoft) worked SP1AAY (IO); SP2AOZ (JO); SP5IWV, SP5AOK, SP5HC, and SP5AD, all in KM; SP6FUN (IL); and SP3BLR (HM). Others worked were UP2BKH (KP), UP2BEA (LQ), UQ2GMD (LR), and UP2BJB and UP2BIG in LR. Even better perhaps were contacts with OH1AWW and OH1DP in LU. Robert then switched to 432MHz and worked SP5AD again, plus SP1JX (IO) and UQ2GLO (KQ).

John Nelson, G4FRX (Hampstead), used only 9W to work OK1DEF/P (HK), SP1AAY (IO), and SP2LU (JN), plus other new ones, for him, in contacts with Y23 and SM. His take-off in the direction of the dx is very poor, but John is well on his way to a QRP Senior Award on 144MHz. G4BWG had a contact with UP2AY (MO). Several worked this square, which is an incredible distance for midday tropo conditions.

On 25 October, G3LQR (Suffolk) worked UA3LBO (OO) on 432MHz over a distance of 2,041km. He also worked UR2HD (LS), UQ2GLO and UP2BJB, and heard UC2ABT (NN). This is incredible dx, especially for 432MHz. Further openings on both 144 and 432MHz on 25-26 October into southern France and Spain gave many stations new squares and countries.

Propagation warning beacons

Back in 1981, 4-2-70, then under the guidance of John Morris, G4ANB, published some thoughts and comments on the merits and disadvantages of adding propagation information in coded form to the beacon transmissions. GM4IHJ, commenting in the August 1981 issue, felt that some discretion should be exercised in making any decisions towards this end; he was of the opinion that the two most useful things a beacon should transmit are its callsign and a steady carrier, since the steady signal permits accurate measurement of frequency and doppler shift, leading to much more erudite studies on multipath effects, scintillation, diffraction etc. Not everyone will agree with this, of course, and recently a new group of supporters for propagation warning beacons has come forward, represented by Michael Tubby, G8TIC. He and his colleagues suggest the following outline specification for such a system:

1. "PW" beacons to be separate from present beacons.
 2. 144MHz band to be used to provide benefit for the majority.
 3. Data to be sent in cw at 12wpm (possibly 170Hz fsk rtty at 45-45 or 50 bauds also).
 4. Beacons to provide information on vhf/uhf/shf bands and modes when appropriate, such information being abbreviated and sent in data "frames".
 5. Transmission could consist of callsign followed by the first "frame", callsign, second "frame" etc, with a maximum of 10 "frames".
- The format might be:
 GB3PWB ABC DDD EE FF GG, where:
 A = Band
 B = Type of propagation
 C = Grade
 DDD = Three-digit bearing
 EE = Two-letter square representation
 FF = Two-digit hours indicating time of observation or expected event
 GG = Two-digit day of month showing day of observation or expected event. (This would allow advance warning of auroras etc.)
 A typical line of data in this format might then look like:
 GB3PWB 3T6 120 YM 15 24, which translated would become "Moderately good tropo on 2m from YM square to an area like mid-Germany at approximately 1500gmt on the 24th day of the month." G8TIC's suggested coding has been omitted above due to lack of space, but the general concept proposed should be obvious.

Michael goes on to say that information and control of the beacons could be sent on an XD telephone line by 300 baud CCITT ASCII, and be accessible to those possessing the phone number, password and micro-computer with modem. He suggests RSGB/HQ or VHF Committee members.

With the crowding of the 2m and other bands these days, the introduction of extra beacons would be a very difficult matter. Even the existing beacon frequencies have to be fought for regularly, as there is a strong lobby among those who never use them and feel that they simply take up precious space on the bands. On the other hand, the hobby is fast becoming more technological and, as mentioned earlier, there is a thirst for situations in which data is transmitted, processed and put to useful purpose. Readers' opinions on G8TIC's outline proposals would be very welcome. Michael feels so strongly about it that he would be prepared to undertake the design and construction of such a beacon if a suitable site and antennas, plus the

necessary authorization to operate, were forthcoming. If ever we get to the point where I can dial up a beacon in Yugoslavia to be told "No Es for three days" the hobby will have lost some of its appeal for me, but the grass might then get cut more often during the "season"!

EME

Although most readers will feel that eme is beyond their means, much interest can be gained by listening "off the moon" when some of the big guns are operating. With a 16-element Tonna on 2m, several of the bigger USA stations can be copied if one knows where to look and when the action is happening. If there is sufficient interest, information on this mode will be printed from time to time. There are some excellent micro programs for moon position information. Generally a 16-element antenna will "see" the moon below about 18° elevation provided your location gives a good clear view of it. Moonrise can be used to hear some of the European and other stations as long as you know when they are operating. A little study with a globe will give some idea of what areas of the earth have a view of the moon at any given time. However for the more sophisticated, that doyen of the micro, John Branegan, GM4IHJ, has written a very elegant program known as "Moontalk". It is written for the 48K version of the Sinclair Spectrum, and currently is only available for that micro. It is based on ideas suggested by G3IOR and GM4JJJ, and the full program offers six "menus":

1. Lunar astronomical parameters
2. Lunar tracking data
3. Lunar footprint on mercator map of the world
4. Doppler calculations
5. Propagation chart
6. Cosmic noise target

While some of these features are of interest only to the active eme operator, GM4IHJ points to a growing band of listeners, many of them still at school, who track satellites and generally engage in any possible space activity which provides them with applications for their micros. While some of the above features of GM4IHJ's program are self-explanatory, some may be less obvious. The "footprint" is a graphics display of a map of the world, with an area representing that part of the earth which would be visible if observed from the moon superimposed on it. Thus any two stations within the footprint could attempt an eme contact.

The cosmic noise target is also interesting, particularly for those who can elevate their antennas. John's program gives the azimuth and elevation of cosmic noise sources close to the moon, which can be used to check receiving equipment as well as eme propagation conditions. Typical ones are Cassiopeia, Cygnus A, Taurus A and M87 Virgo A. The value of cosmic sources is that, unlike the sun, they do not vary. To swing an antenna across the sun and record 10dB of noise is relatively meaningless since it depends on solar activity at the time, but to record an increase of 3dB when pointing at Cygnus A says something about your receiver.

GM4IHJ will be refining this program as time goes on, and it has the promise of becoming a valuable tool for amateurs outside the purely eme mode of operation. Write to G3IOR, QTHR, for further details.

Meanwhile, although eme listening can be very interesting and provide information on the quality of one's receiving equipment (the ultimate antenna range!), the path is not reciprocal. In the excitement of seeing signals from K1WHS move your meter, do not be tempted to call him back with 100W of cw to a 16-element Tonna, as the mathematics of the situation indicate that he will not hear you. You may also be ruining a carefully-planned schedule set up by someone else, especially if (like me) you call on the frequency during the formal 2 min listening period. EME skeds are usually set up on the vhf net during weekends, particularly when the 20m band is open to the USA and Canada.

432MHz eme has the advantage of using smaller antennas, so that for a given area of backyard, a greater antenna gain can be realized. Earlier this year some information was printed here about G4DGU's 8 × 21-element antenna stack which he was using for eme. Chris has never felt that this antenna was "gainy" enough, and he has since replaced it with a "small" 4m diameter stressed dish. With this he can hear his own echoes—the fourth antenna he has used which enabled him to do so!

The power game

Rodney Hoffman, G6NQX, of Margate, uses a TR9000 running 10W of ssb into a five-element Yagi from a location only 80ft asl. He has worked 54 squares on the band in his first year of operation, and during the tropo opening on 23–25 September was amazed to have I2FAK (EF) in Milan reply to his CQ call. Other contacts during the opening were with LX2GM (DJ) and HB9MY (EH); while in a contact with F2RN (DI) the French operator revealed that he was using only 6W into an 18-element antenna, though the QSO was conducted at S8 both ways.

Derek Buckley, of Canterbury, was out portable with an IC2E during the same event, and with 150mW output into a helical antenna worked G6SNQ/P (YJ), which works out at quite a lot of km/W. He has also worked into Holland using 1.5W.

In the past, George Grzebieniak (Chiswick) has carried out fascinating experiments using micro-power, making skeds with stations outside normal range for the power used and, with ms procedure, completing contacts by bouncing signals off any aircraft which happened to be in the path between the stations.

4-2-70 frequently receives reports such as the above, which indicate what can be done with very low power on the vhf bands. So just how much power do you need? Unfortunately there is no simple answer to this complicated question, but there is little doubt that most of the time we tend to use much more power—several times more in most cases—than is needed for reliable communication. In the very early days of vhf/uhf when all equipment had to be homebrew, an amplifier using the old 829B valve with about 80W input, feeding a 4-over-4 skeleton-slot antenna meant that you were a "big" station. We worked quite a lot, considering the much smaller vhf population in Europe at the time, but QRM was almost non-existent—a very important point.

The tendency today is to go out and buy a commercial "box" and to add a "linear" as soon as possible to stoke up the power. Many commercial amplifiers almost invoke the Trade Descriptions Act by being so termed, while the setting-up and operating instructions supplied by manufacturers are often totally inadequate for a newcomer to amateur radio, who these days probably has no "valve" experience, yet is plunged into handling a 4CX250B. Rather like putting a learner-driver into the cockpit of a Formula One racing car! Some of the solidstate "linears" have no external controls at all, nor metering facilities, so the user can do little more than plug it in and hope it performs properly.

Although I am told that there are still areas in the UK where the vhf bands are as bereft of signals as "hen's teeth", anyone living near an area of high-density population such as the southeast will know just what a problem it can be to operate on our vhf bands, particularly 2m, when conditions are good. With such high power being used and with so much "splatter" from poorly adjusted amplifiers, the problem is compounded, and will get very much worse if the amateur population increases, as it surely will.

If you have never tried reducing power, do so and note the results. Most of us know that having made a contact, power can be reduced to almost ridiculous levels without loss of communication. The reason that it can be difficult to get an initial contact with QRP is that when everyone else is using much more power than needed, the QRP man becomes a small voice in the crowd. During the opening of 22–23 October I decided to practice what I am preaching and switched out the 4CX250 to go barefoot on a FT225RD with power level at about 10W. I got 559 and 579 reports on cw from SP and Scandinavia, while ssb reports were only a couple of S-points below some of the very big "guns".

If life were perfect, the way to get a high effective radiated power (erp) would be to use a very big antenna and relatively low power to feed it. This way, any spurious responses from the amplifier or "prime mover" would be at low level, and the antenna would radiate them less efficiently than the "proper" signal to which the antenna system should be tuned. It is quite amazing how tv can disappear when the "wick is turned down". This, I know, is a very controversial subject, but if we do not clean up our signals, the cb channels will soon sound like night-time in a monastery by comparison. See you on QRP soon?

VHF/UHF awards

The growth of activity on our bands has resulted in a considerable increase in the number of award applications received by Jack Hum, G5UM, the vhf awards manager, over the past few months. Some general points need clarification. Claims may be made for all categories of operation, namely home base, portable (anywhere), mobile and "stroke A" (alternative QTH), but the categories cannot be mixed in a given claim. Because of this, Jack says that when a QSL is made out, any suffix should be clearly written on the card. For example, if you worked G5UM/P, do not send a card to G5UM, as for award purposes this is a different station altogether. David Hudson, G6OVO, of Birmingham, has raised some other issues. He asks whether the card should clearly show the country and county worked (especially in the case of the British counties which merged or changed name in 1975). He also cites the case of a G-station operating from the Isle of Man who sent a card with simply the call altered to "GD" without any QTH information to support it. Basically the information on the card should be enough to enable the awards manager to interpret it in the required way. The squares locator system is a boon in this respect since a QTH locator will position the station to a remarkable degree, but matters could still be in doubt if a location was very close to the border-line of a square if the square

itself were not identified on the card. Many of the rarer European locations fail to appear in squares notation on cards, though the situation is very much better than a few years ago. If confirmation of a particular country, square or county is needed for award purposes or for any other reason, it is a good idea to write on the back of your card "Please confirm HN square for an award", or "I need confirmation of YU pse om", and try to get your card to the other end first. In the past I have returned cards with the request that information on location be added if this was missing and confirmation was important enough to justify such action. The awards manager will never reject a card outright if there is the slightest chance of it being interpreted to comply with the rules. At the same time his workload is such that applicants should do all they can to lighten his load by ensuring that they themselves remove as many ambiguities as possible from their claims.

Before getting on to the matter of actual award recipients, there are one or two more points which may be of interest. "Stickers" to upgrade earlier awards to a higher category are now available on 432MHz for 15 countries plus 70, 80 and 100 squares worked. The top level sticker for 144MHz is currently for 250 squares (30 countries) but the way things are going this may have to be extended eventually since the "top" stations on this band have already reached the 300 squares and 50 country levels.

Other awards are available from the *Short Wave Magazine* (QTH Century Club), while many European societies issue awards of various types if you fancy risking your precious cards in the overseas mail. Bud Weisberg, K2YOF, has reminded us of some awards specifically for 50MHz operators, for example:

DXDC. Issued by the Six-Meter International Radio Klub for contacts made with 10 dx countries (ie overseas) on 6m. Fee is US\$3. Contact Dick Lent, W5NKG, QTHR.

50MHz DX Award of Japan. Issued in classes, according to licence category, for two-way 6m contacts with 20, 10, 5 and 2 DXCC countries. Fee is US\$3 or send eight ircs to JA7GZA. Bud says it is a very pretty award but took him four months to collect after application.

European Continent: Run by *73 Magazine*. Twelve contacts required with *73 Magazine's* own counties list. Award can be endorsed for two-way 6m or crossband 6m contacts. Fee is US\$4, and KE7C is the man to contact (QTHR).

Coming now to the recipients of awards, the lists are getting so large that it is not an easy matter to print all successful applicants. The situation is further complicated by the fact that many 1,296MHz awards are made, often accompanying an application for a lower frequency band, and microwave topics are in the able hands of G3WDG.

There are, however, one or two recent awards which should not pass without comment. On 1 January 1983, Cliff Jeffery, G6ADE of Maltby, S Yorks, made a successful claim for the 144MHz Senior Award, following this up five months later with cards to support a Senior on 432MHz. By September Cliff was able to claim a 1,296MHz Standard Award, and thus became the first G6-plus-three station to gain the coveted Supreme Award, receiving certificate No 50. This is a phenomenal achievement, not the least in obtaining the cards to support the claims in so short a time, so many congratulations to G6ADE.

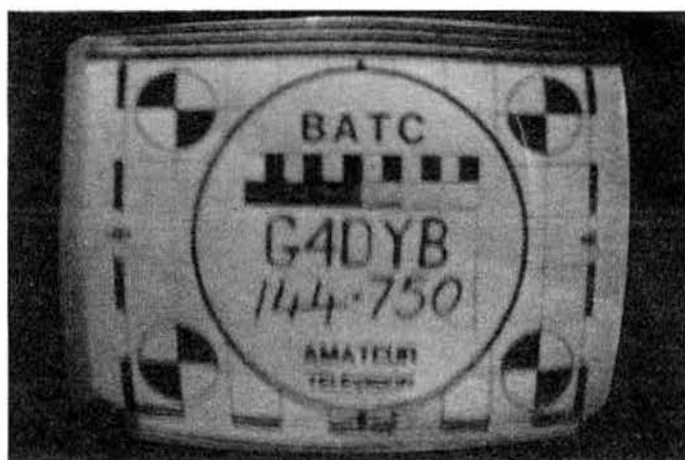
A multiple claim from G8ULU (Whitstable) brought him Senior Transmitting certificates for 144 and 432MHz bands, an update of his 144MHz squares category to 18 countries, 80 squares, plus an initial squares claim for 432MHz at the 13/50 level. His package of cards also included two claims for 1,296MHz!

Amateur television

Graham Shirville, G3VZV, sent some very useful reports following a study he carried out in connection with possible interference between the recently launched Oscar 10 and atv signals.

In mode U, Oscar 10 uses the familiar 70cm uplink and a 2m band downlink. The uplink frequencies are well within that part of the band normally regarded as the province of the European atv operators. This means that atv signals could well be received by the satellite and re-radiated on the 145MHz downlink. During the weekend of 10-11 September, G3VZV monitored the downlink frequencies (145.825-145.975MHz). This period was chosen as it coincided with the European ATV Contest, and activity was expected to be high. In 1982 some 350 stations were estimated to be active, no less than 120 submitting contest entries. G3VZV chose times when it was likely that the satellite would be most vulnerable to the reception of atv transmissions; these were just as the satellite approached los on the evening of Saturday 10 September, and shortly after aos on Sunday morning, 11 September. At no time were any atv transmissions heard on the downlink, and Graham concludes that simultaneous operation of atv and A10 in mode U is possible on 435MHz.

If any operator *should* note any such interaction between these two modes, would he/she please write to Graham, QTHR, or to 4-2-70.



Some "off-the-air" photographs of atv transmissions during the European ATV Contest. Photos: G8ADE

Finally . . .

As this is the festive season, I would like to take this opportunity to wish all readers a very happy Christmas. May 1984 be a bumper year for you in all respects. The sun may be on a downward cycle, but we should get an occasional aurora, meteor scatter is there for the taking, the Es "season" only a few months away, and the air still full of interesting satellites. Then there are all those microprocessor experiments and developments plus atv, rty, or just talking to your mate around the corner on fm, so things could be a great deal worse. Some of the winter tropo openings can be quite good too.

Many thanks for all the letters, notes, phone-calls, calls-on-the-air etc, which make my own lot such a rewarding one. I sincerely hope that you will keep them all coming.

Send any news intended for the February issue to arrive not later than 17 December (late news about a week later, but remember the Christmas mail!).

Low frequency dxing

At about this time of year most dxers start to devote much of their time to chasing dx on the lower frequency bands. There are probably many newer members of the Society who are totally unaware that bands like 3-5MHz can provide dx outside Europe. DX is actually available on 7 and 3-5MHz throughout the year, but during the shorter days of winter the bands are transformed into major dx carriers as operators the world over try to add much-needed countries, zones etc to their all-time scores.

The best propagation occurs at dawn and dusk, but even several hours before sunset (or after sunrise) signals can be heard from outside Europe. Many newly-licensed operators, and some not so new, still have an infuriating habit of conducting local QSOs in the top 10kHz of the 3-5MHz band, which are recommended for dx working. This dx segment should be used during, say, 1000-1400gmt only for local traffic. At all other times during December and January dx signals can be heard. On 7MHz no such "gentleman's agreement" exists, but again there are favoured spots where the dx tends to congregate away from the broadcasting (b/c) QRM. Let us look at the favoured frequencies on both bands.

On 3-5MHz ssb, with the VKs and JAs only allowed in the top 7kHz, ie 3,793-3,800kHz, of the European phone band, sheer bedlam can exist when the band is open to those parts. The JAs tend to favour 3,797kHz, while the VKs use 3,795 or 3,799kHz. The W6 and 7s use 3,789kHz, as do some of the Far East dx (VS6, 9V1 etc). The Russians prefer 3,640kHz, and the Greeks 3,598kHz. It can be seen that there are many favoured spots which need to be monitored to get the best from the band.

On 7MHz much dx will be heard between 7,040 and 7,045kHz, as this small segment is normally clear of b/c QRM. 7,080-7,085kHz is another good spot, but b/c QRM tends to obliterate most of this segment during the evenings. 7,090kHz is a disaster area at any time of the day! The very best dx is normally reserved for what is known as the "grey line" times. In G, these are roughly ± 45 min of sunset and sunrise times during the middle of winter. Over the last few years I have heard stations from W6, W7, DU, FK8, JA, KH2, VE7, VS6, YB and ZL on 3-5MHz ssb between 1500 and 1640, all at good strength and perfectly Q5. The best period is roughly from 29 December to 7 January, particularly for W6/7. To hear the west coast of USA on 3-5MHz at our sunset is probably one of the high spots of a listener's "career". Signals peak for only 10min at most between 1545 and 1555 at the turn of the year, and very few Gs are there to take advantage of the path. You will of course need a decent antenna to work them, but any low angle antenna will probably pull the signals through for the swl. On 7MHz the grey line path does not seem to me to be so noticeable, as during mid-winter afternoons much dx from the east can be copied—one UM8 was logged here at 1410 last year. The USA ssb does not use our part of 7MHz, so tuning between 7,150 and 7,300kHz will be needed to bring in signals from those parts. Much of that segment is inundated with b/c QRM, but several clear spots exist and the Ws can be heard. Stations on the west coast of the USA favour 7,167kHz, but 7,190-7,210kHz will provide the majority of W dx, although a clear spot around 7,245kHz is also worth monitoring. Grey line conditions also exist at our sunrise, and stations have been logged from FO8, FK8, JA, KL7, VE7, W6/7, and 5W1 between 0720 and 0850 on 3-5MHz ssb, again at good strength and Q5. Some W6/7 signals logged here have been quite outstanding over the last couple of years. Serious dxers will find the *DX edge* an invaluable aid for this grey line dxing as it clearly shows the sunset and sunrise times, and by following the "curve" what is possible in the way of exotic dx can easily be seen. (Available from RSGB Publications (Sales)).

On 7MHz ssb 1730 is a good time to monitor the band, as Africa, the Pacific and the Far East can be heard. Last winter ZL4BO, 5N8ARY and 6W8DY were regulars at this time, together with assorted JAs and YB0s. When conditions are favourable on 3-5MHz ssb, good dx could be audible from 1500 right through to 1000 the next day. On 7MHz, dx is possible for an even longer period, with W signals audible until 1100, and JAs possible at lunchtime while working Scandinavians. The band has dx possibilities for virtually 24h.

Having given away all my trade secrets, I hope that these few tips on the best times and frequencies will provide the basis for a successful lower frequency season.

Lower frequency band challenge

Now, a chance to put the foregoing tips into practice. Following the successful If challenge last January, I have decided to run another using the same rules. So for January 1984 the challenge will be to amass as many points as possible based on the number of countries heard on 7, 3-5 and 1-8MHz as follows:

7 and 3-5MHz: each European country logged counts one point, each dx country logged counts three points.

1-8MHz: each European country logged counts five points, each dx country logged counts 15 points.

A prize will be awarded this year for the best entry from a Society member, the best entry from elsewhere, and a special prize will be awarded for the best entry from any swl who has a BRS number higher than 50,000. (Last year's winner of this prize will not be able to claim this special prize this year!) Entries to me before 20 February 1984, giving date, time, RS(T), points claimed and the *full* call signs of the stations heard. Good luck!

1984 Countries Table

With competition still keen among contributors to this year's table, there seems no good reason to abandon the table in 1984. In response to various suggestions, there will be one change next year. In addition to the usual rules, next year another column will be added showing the number of *different* countries logged during the year. The other rules are as follows: the table will reflect the number of countries on each band (1-8 to 28MHz, excluding 10, 18 and 24MHz of course) taken from the RSGB Countries List (to appear in *Rad Com* January 1984) between 1 January and 31 December 1984. Each new country should be noted and the *totals only* (not a list) for each band, a grand total, number of different countries, and modes used, should be sent to me by the first deadline date quoted in this column each month. The starting score will be 150. The All-Time List will continue to appear at quarterly intervals (March, June, September and December), but at least one update every six months will be needed to keep a place in the table. The starting score will remain at 750; entrants to the yearly table in 1983 with scores in excess of 750 will automatically be entered into the All-time Table if an entry has not already been made. It is also worth remembering that both tables are open to G6, G8 and G1 licensees.

UBA Contest 1983

Marc Domen, ONL6945, has sent the three-quarter mark scores for the UBA's all-year-round contest. Highest Society member in the phone section was still Dave Whitaker, BRS25429, who lay in ninth place, while John Goodrick, BRS44395, still heads the British cw contingent in third place. Final results will be available during next February and will be published in due course. I have no information as to whether the UBA intends to make this a yearly event.

CW reporting

A4XJP's comments have prompted John Goodrick, BRS44395, to write. He compliments A4XJP on his morse and considers it readable and not too fast. John's top speed was around 28wpm over a two-hour period, but he now feels 25/26wpm is his best. He also feels that any swl who can only read 15-18wpm should be able to get the bones of a QSO, even with speeds of up to 22wpm in good conditions. John considers that today's operators are troubled by "fancy" keying devices which they cannot master. There are many first-class morse operators who can send far faster than John can read, but there are very many more who in John's opinion cannot even send their own call sign three times in a row without causing confusion! It is felt that many operators, including Gs, run a "K" or "R" into their call sign eg "G9XXR FB" (G9XX-R-FB) or "G9XXK" (G9XX-K). He feels that operators must realize that many listeners have receiving equipment inferior to their own and do not have the benefit of directional arrays, which make all the difference to the reception of any station.

One last point is that John stresses the importance on cw (and ssb, too) of never giving a false RST report. If a station is 339, then say so, and explain that the quality of your antenna is not too good. By giving 599 reports when the station is only 539, you only have yourself to blame if the recipient comments on a wrongly copied call sign and accuses you of not being able to read morse!

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

VHF report

When I wrote last month's piece under this heading, I did not anticipate what was perhaps the best tropospheric lift of the summer occurring after the final copy date! Here in London the period from 23 to 27 September provided good dx to the east and south. Y30BLI/A, Y23NK/P, Y38SI/P and Y25GI/P were active from FK and FL squares. Best dx on 23 September was DG8MCN/M in FH square. The 25th provided the best conditions of the year to the central and southern parts of France, as well as many HB9s. FIADT/P (BE12g), F1GXX (ZF50h), F6CTJ (AG40b), FIHGO (AF51a), F1DV (BG78a), F6FMO/P (BF26a), F1DIS (CF15j), F1GHW/P (AE01b) (using only 10W to a four-element beam), and F1BYM (ZE25e) were copied. On the 26th, stations in XI, YI and ZH were strong, while on 432MHz GU and GJ stations were audible. The 27th was also spent on 432MHz adding some of the nearer European QTH locator squares to a small all-time total.

Joan, BRS62088, entered the Cray Valley RS 144MHz Contest and managed a good score. During the good tropo she heard Y23NK/P (FK35h), ON7YC (CK53c), DL2DAS (DL57c), DC9ZK/P (DK12f), F6FHP/P (AE21g), F1GTU (AF64a), F6EQQ/P (YI34j), and F6ECI/P (AF57b). On 432MHz, DF4KT (DL76d) provided her first German station on the band.

Further afield, Dave Whittaker, BRS25429, experienced rotator problems and found his beam locked between 320° and 360° during the late September tropo. Off the side of the beam (!) he heard OE2CAL (GH16c), F6HPP/P (BJ), Y46XI/P (FL) and DL1MBV (F179h). On the QSL front, he offered OE3BEA (HI29b), Y21VC/P (HN41j), F1DV (BG78a), Y23SB (FN58d), Y31SM/A (GL53g), E12DJ (WN50f), F6EQG/P (Z172b), LX1JA (CJ10d), LA1BM (CT47c) and SM1MUU (JR24b). These took his confirmed squares total to 109.

Martin Parry, BRS2543, has added a Mutek preamp to his 70MHz set-up. On 432MHz he caught G4ANT in AM square for a new one. On 144MHz, F6CYB (BH), ONs and DKs in BK and DK square, PA0 and ON stations in BL and CL squares were heard. Best dx was LX1JA in CJ square. Next summer, Martin promises an even better receiving set-up on all three bands mentioned here.

Further good tropo conditions were noted by Dave Whitaker on 23 October when he heard 12 countries in 38 squares. His best logging was without doubt OZ1FOW in GO02a. Other dx logged included OK1KHI/P (HK29b), DG2NJ/P (FK69j), DB2RR (FJ58f), OZ1EYX (GQ73h) and OZ1CSI (HP75h).

DX news

Activity from BV, CY0 (St Paul Is), ZK9, BY and, in particular, HK0 has meant increased occupation of the bands, which during the early part of October also coincided with an upturn in conditions, including 28MHz. Many have noted an improvement in their yearly scores, and have been able to cross off several blank spaces in countries-wanted lists. CY0SPI seems to have provided most of our reporters with a new one. Dave, BRS25429, caught it on five bands, 21 to 1.8MHz—the 1.8MHz signals being 57 at 0545. Robert, BRS8841, logged it on phone and cw on both 7 and 3.5MHz and on 14MHz cw. Martin, BRS2543, also found it on 3.5 and 7MHz ssb, together with VE1CBK on Sable Is on 3.5MHz ssb.

The HK0 trip was a well-organized affair and their signals were heard at this QTH on all five bands on ssb. It was particularly pleasing to catch such a rare bird on 7 and 3.5MHz for two new ones. BRSs 50134, 25429, 1066, 62088, 48909 and 8841 all managed to catch their signals on at least one band. Most reporters had some good dx to report. Andy Smith, BRS50134, mentioned 3B9FK, BY1PK and 9U5JB (via ON5NT) for new ones, but also heard BV2A/0, ZD9YL, VP8ALD (South Orkney), YJ8TT, IZ9A and FK0AQ. Robert Small, BRS8841, managed I2BVS/BV, ZK9RW, 4K1GDW (South Shetland Is), 9Y4RD/ST0 and 4S83EA. Paul Crankshaw, BRS48909, boosted his 7MHz score with T32AF, CE0ERY, YJ8MP and UM8MCY, while 3.5MHz came up with ZL4OY/C, and 14MHz with KE4UX/KH9. Brian Wainwright, BRS44703, fresh from his RAE pass, mentioned VR6KY, ZK2RS, VS5DD and FH8CB. Dave Whitaker, BRS25429, flushed out BY1PK on 14MHz, VK0GC on 7MHz, and TL8CK on 3.5MHz for three new ones. My xyl, BRS62088, certainly chose her moments to spin round the bands, collecting VK0GC, the HK0, 3X4EX, VS6CT and A24JH, as her best dx. The star band, however, seems to have been 1.8MHz, where much interesting traffic has been located. The following are stations mentioned in some of the mail—EA8QL, EA9KQ, SV1DT, SV8CS, 4Z4DX, 7X5AB, 5N8ARY, CY0SPI, 4U1ITU, RD6DNE, EZ6GAW, RO5OVT, SV5OX, 5B4JE and T77C. All these were on ssb. The band is likely to become even busier, so this may well become the band to watch during the winter. Rumour has it that Europeans have worked into ZL and other exotic places on cw.

1983 UHF/VHF SQUARES/COUNTRIES TABLE

Station	QTH	70MHz	144MHz	432MHz	Total	Via*
loc	Square	Countries	Square	Countries	Square	Countries
BRS32525	AL	—	107	26	10	170 a,b,d
BRS25429	ZN	—	110	25	—	135 a,b
BRS2543	YN	21	6	19	14	136 a,b,c
RS49875	YN	—	45	14	16	83 a
RS49327	YN	—	43	14	16	81 a
BRS62088	AL	—	49	15	11	80 a,b
ARS53844	YN	—	28	10	11	53 a

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

ALL-TIME COUNTRIES LIST

Station	28	21	14	7	3-5	1-8	Total	Mode
BRS25429	277	308	333	247	227	71	1,463	ssb
BRS32525	269	305	319	250	250	61	1,454	ssb
BRS25901	256	291	325	201	227	31	1,331	ssb
BRS8841	252	289	312	208	191	41	1,293	ssb/cw
BRS48909	211	248	258	173	134	44	1,068	ssb
BRS1066	190	207	264	163	104	64	992	ssb/cw
BRS44703	191	211	216	152	145	48	963	ssb
BRS18529	130	190	238	144	110	44	872	ssb
ORS45992/7Q7	206	242	249	87	37	0	821	ssb
ORS44395	153	204	223	117	69	46	812	cw
BRS50134	149	182	216	110	119	32	808	ssb
ORS46084/7Q7	188	228	234	104	43	1	798	ssb

1983 HF COUNTRIES TABLE

Station	28	21	14	7	3-5	1-8	Total	Mode
BRS8841	141	212	225	141	126	33	878	ssb/cw
BRS48909	137	202	214	135	113	34	835	ssb
BRS2543	120	195	196	130	133	29	803	ssb
BRS25429	137	189	178	125	132	42	803	ssb
BRS44703	113	164	178	113	120	43	731	ssb
ARS53844	99	171	160	97	74	25	626	ssb
BRS44395	106	168	150	100	60	33	617	cw
BRS1066	82	138	137	103	71	45	576	cw
BRS50134	88	128	137	95	97	26	571	ssb
RS49327	100	142	163	66	47	12	530	ssb/cw
ORS45992/7Q7	114	169	179	47	11	0	520	ssb
ORS46084/7Q7	103	161	147	62	20	0	493	ssb
RS49875	80	138	155	53	31	5	462	ssb
BRS25901	73	84	101	52	67	10	387	ssb
BRS42979	45	66	87	48	65	23	334	ssb, rtty, ssb
BRS18529	15	54	74	70	94	17	324	ssb
E1835	22	53	100	25	23	3	226	ssb
BRS62088	15	25	45	50	49	8	192	ssb

Newcomers

Alan Pilton, BRS53624, wrote from Abha, Saudi Arabia, but his home QTH is Maltby in South Yorkshire. In exotic parts on business, Alan will be returning home this month to resume listening with a Yaesu FR101B and a T2T five-band vertical antenna. He is hoping to coax his son into joining the Society so that he can share in the hobby as well.

John Hartin, who wrote as RS53932/5A, uses a Sony ICF2001 together with a sloping long wire. When at home he lives in Limavady, Northern Ireland, and uses the receive side of a Yaesu 101ZD. He is particularly interested in the awards sponsored by the Society, and the yearly table which forms part of this column. Hopefully, he will have much success with both ventures.

Ceri Jones, BRS53051, uses a Trio R600 with a long wire at his QTH at Barry, South Glamorgan. As a newcomer, most of the stations logged represented new countries. His main interest lies in 21MHz, where he has logged J37AH, HH5CB, J5HTL, CT2DG, TU2IJ and W1ACZ/AM as his best dx to date.

Here and there

Dave Shapiro, ARS53844, reported the receipt of his first QSL card, from a VS5—not a bad way to start off a QSL card collection!

Stan Porter, ORS45992/7Q7, wrote with news from Malawi. XU1SS and XU1KC were the best catches on 21 and 28MHz in early August (QSL both via JAIHQ), and many WCY call signs were logged: eg VK3, TO6, A82, 6U1, 6U0, ZM1, 5B0 and DF7. He also mentioned the quarterly magazine *Ham-Stamps* devoted to both hobbies: for more information, send two 10c stamps to LA5NM, Box 210, N-9401, Harstad, Norway. With radio conditions quite poor at Stan's QTH, he had been spending some time bird-watching, trying to spot rare species. Just like monitoring the hf bands really!

John Goodrick, BRS44395, commented on a full contest diary during September and October. He is one of a growing number of listeners who enjoy participating in such events. He also listened during some of the 28MHz slps, with varying results. It is hoped to have the results tabulated within the next month or two, and a full report will appear in this column.

Finale

That brings to a close another year's *SWL News*. Hopefully, all readers will have a good festive season. News, views, comments and final scores for the 1983 tables for the February 1984 issue should reach your scribe by 13 December.

Microwaves

by Charles Suckling, G3WDG*

Oscar 10 mode L

The Mode L transponder on board Oscar 10 is now functioning well. There were some problems initially, when the transponder was very insensitive, but these have now been cured and the transponder is fully operational. It is activated on Wednesdays and Saturdays for 2h around apogee. The recommended uplink eirp is 44dBW (about 25kW), for example 100W to a 5ft dish.

At present most activity is in the 100kHz segment in the centre of the transponder passband, as the transponder seems to be 3dB more sensitive there than at the band edges. This corresponds to uplink frequencies of 1,269.4-1,269.5MHz, and downlink frequencies of 436.6-436.5MHz. As an example of what can be worked, I worked eight stations during the 2h period on 15 October using 100W to a 5ft dish on the uplink, and a 14-el Yagi feeding a GaAs fet preamp on the downlink. The lowest-power station copied was using 10W to a loop-Yagi. Stations heard so far with outstanding signals include DJ5BV, K6MYC, OE9XXI, VE7BBG and DJ8QL.

On the technical side there seem to be a number of ways of generating a signal at 1,269MHz. I am using a Microwave Modules varactor tripler driven with 10W at 423.15MHz. This produces about 6W at 1,269.45MHz, which drives a two-valve pa to about 100W output. There was no problem retuning the equipment from 1,296 to 1,269MHz. For ssb service the standard high-level mixers will retune without difficulty. The Microwave Modules transverter could probably be modified easily by changing the oscillator crystal. It is not possible to use this transverter for 1,269MHz by feeding it with 117MHz ssb, which at first sight seemed attractive. However, Microwave Modules are now producing a transmit converter especially for mode L use.

Regarding antennas, most 1,296MHz antennas should work at 1,269MHz without much, if any, degradation in performance. I have used the VHF/UHF Manual disc/dipole dish feed at 1,269MHz with good results, and G3JVL has commented that his loop-Yagi design will also work well at this frequency—indeed, DJ5BV is using an array of these Yagis for his uplink antenna. For the downlink, the best antenna possible should be used in order to receive the lower power stations.

Stations experienced with the mode B transponder will find one operational difference with the mode L transponder: it is necessary to track the satellite more carefully, owing to the narrower beamwidths of the uplink antennas. A knowledge of German also seems to be desirable, as this is by far the commonest language heard at the moment on mode L!

Operating news

Dave Sellars, G3PBV, writes that the lift at the end of September enabled him to work some good dx on 1-3GHz from his Devon location. On 25 September seven stations were worked in six countries: G6GN, GU8FBO, HB9AMH/P (DH), F1DPX (ZH), DK8VR (DJ), ON5GF (CK) and F1BUU (ZE). Next morning the GB3BPO, ON5SHF and DB0JO beacons were all loud, and there was strong pulse interference all over the band. Dave has heard this before and after, but never as strong. On the 27th, ON5SHF was again heard and ON5NK (BK) worked. At 2100 a 750km "pipe line" to DL square opened up, and Dave worked DD8DA, DC8DC/A and DL4EBB, all with very strong signals. The next evening he worked G4PEC and G8PNN, both in ZP, and heard G3NWU and G8LZM in ZO. G8SFI, G4FXW, G8SWZ, G6ADE, G4KGC and G4LRT were also worked.

G3PBV was also active in the October contest, and added AK square to bring his squares total to 25 (in eight countries and 32 counties).

Expedition news

Richard Hope, GW8TVX, has sent in a summary of the results achieved on 1-3GHz by the GB2XN expedition. The site used was 23km ENE of Holyhead, XN59a. From 7 to 11 August they were running 1-3W into a 4x23-el array, and worked 20 stations in 13 squares. A good opening to Holland and Germany took place on the 9th and 10th, and they worked a number of Continental stations. The best dx was DB6BX in DM46c, at 774km. G8TFI then joined the expedition, bringing with him his 175W pa,

and they added another 15 stations, some of whom could not be worked before with the low power equipment. Richard feels that the expedition was very successful, despite the windy weather, which made operating quite difficult at times. Special QSL cards have now been printed and sent out. It is hoped to organize another expedition next year.

Alford slot construction

Constructional details of omnidirectional horizontally-polarized Alford slot antennas for 1-3 and 2-3GHz, published in this column (August 1981 and June 1983), omitted to describe the method used to bring the semi-rigid cable to the feedpoint of the antenna; this is done by bringing it up the inside of the tube. The other end of the cable can either be terminated by a suitable connector mounted in the bottom of the antenna tube, or brought out through the bottom of the tube and then terminated.

Activity from GM on 1-3GHz

Tom Melvin, GM8MJV, writes that he and GM8MNG are now operational on 1-3GHz with 10W and 2W respectively. Both are working on power amplifiers and they hope to have everything running by Christmas. They are happy to arrange skeys with anyone wanting to work YP square. Tom is QTHR, tel 031-553 2662.

DX on 10GHz in the USA

In a recent letter to G5UM, Jim Hagan, WA4GHK, reports a 472km contact made on 10GHz on 23 August between WD4NGG at Hilton Head Island, South Carolina, and WA4GHK, located 4.8 miles north of Sebastian Inlet, Florida. Signals were S5 on cw both ways using 10mW phase-locked gunnplexers. Antennas were 4ft and 2.5ft dishes. This was their fifth attempt at this coastal path. WA4GHK has also worked K4NTD at 160km overland via a highly obstructed path.

2-3GHz eme tests

The first test in a new series to stimulate interest in 2-3GHz eme took place on 25 September. The DF0EME group in Frankfurt transmitted for 1h to enable other stations to test out their receiving equipment. With their rather powerful system (klystron transmitter to a 30ft dish) they are capable of generating quite a strong signal, in eme terms, off the moon. During the 1h period they changed power several times. At the G3WDG/G4KGC QTH, their signal was copied at the lowest power level used (150W). We were using a 13ft dish and a 1.5dB noise figure preamp.

It is intended to organize further tests, when it is hoped that a number of other stations will be listening, including VE4MA, W4HHK, W1JR, OK1KIR and OE9XXI. The link budget calculations indicate that DF0EME should be audible with as little as a 4ft dish, provided that a good preamp is used. Anyone interested in listening in during the next test should contact G3WDG for more information.

Awards corner

John Tye, G4BYV, recently became the first station to receive a five-Squares award for 3-4GHz. The last card needed came from G3LQR: John and Simon have been trying to work each other for a long time on 3-4GHz, and recent equipment improvements at both ends made the QSO possible. John now has nine squares on this band—AM, CK, DL, FO, EN, EO, CL, CM and FS. The best dx so far is SM6HYG at 903km.

G3ZEZ's 973km contact with SM6HYG on 5-7GHz on 12 July qualified him for a distance award, the first to be issued for this band. It is believed that this contact may well be a new 5-7GHz world record. G3ZEZ worked SM6HYG on 2-3GHz, and this qualified him for a distance award on this band also, the sixth to be issued.

The good conditions over the summer helped a number of stations to make 600+km contacts to gain the distance award for this band. Recent awards went to G8KPS, G8RYK, G8KAX, G8IEM, G8PSF and G4OIG.

On 10 July, a number of 10GHz stations assembled on Axe Edge, near Buxton, to work GW3PPF/P on the Black Mountains, over a 162km path. As a consequence, five of the company were able to earn their "first contact beyond 150km on 10GHz" certificates (the sixth, G8AGN/P, had won his a year earlier). Phil, GW3PPF, then sent the QSL cards direct to G5UM, so that the five could get their awards with the minimum of delay! The stations involved were G4OLO/P, G8SWZ/P, G8ASW/P, G4FHQ/P and G3KEU/P. All the contacts were made using low-power wideband fm.

It is worth recording that all Supreme awards issued so far this year have included 1-3GHz operation. To claim the award it is necessary to have gained either three Senior awards or two Seniors plus one Standard 1-3GHz award. The latest Supreme awards issued went to G8PNN and G3TDG.

1-3GHz squares awards have been issued recently to GM8MBP (35), G6DER (5), and G8ULU (5). G4LRT joins G4BYV with 20 squares confirmed on 2-3GHz.

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QRP

by Rev George Dobbs, G3RJV*

Commercial QRP equipment

For many QRP operators a lot of their pleasure in the hobby comes from the satisfaction of using equipment they have built themselves. *Sprat*, the journal of the G-QRP Club, and the *G-QRP Club Circuit Handbook* both give testimony that home construction is alive and well in the amateur radio world. Over the last few years there has also been a small range of commercial low power amateur radio equipment. Some of this equipment has been quite simple in design and inexpensive. A lot of these transceivers are no longer made but can often be bought secondhand for very reasonable prices. Within the QRP literature there are many ideas and circuits for modification and improvement of such equipment. I have never seen a comprehensive list of commercial QRP transceivers, past and present, so I will attempt to remedy that with the information below.

TenTec equipment

TenTec of Sevierville, Tennessee, are probably the best known makers of QRP equipment, and their earliest products were the PM series of transceivers. The TenTec Powermite series included:

PM1: An 80-40m direct conversion transceiver. RF power: 2W dc input. Receiver sensitivity better than $1\mu\text{V}$. Output metering and receiver sidetone.

PM2: A PM1 in a full case—the PM1 had just a base and front panel.

PM2B: An 80-40-20m version of the PM2.

PM3: A 40-20m direct-conversion transceiver. RF power: 5W dc input. Used the same receiver board as the PM1 and PM2.

PM3A: A PM3 transceiver plus integral break-in keying with adjustable delay.

The PM series can still be found on the secondhand market at reasonable prices, and many circuits are available for their improvement and modification. TenTec began by selling the printed circuit modules for the PM series. Some of these are still around but tend to be rare items. Also worthy of note is the TenTec RX10, a direct conversion four-band (80-40-20-15m) receiver which like the PM series appeared in the late 1960s and early 1970s.

The TenTec Argonaut series:

The TenTec Argonaut is a high specification, 9MHz i.f., superhet transceiver for cw and ssb operation on 80-40-20-15 and 10m. The transmitter power is 5W dc input with full break-in facilities on cw operation. The Argonaut series, in sequence, was the Model 505, 509, and ended with the 515. Each superseded the other but there is insufficient space here to give full specifications or list the improvements of each model. Sadly the Argonaut 515 ceased production in the spring of this year and will not be replaced. The manufacturers reluctantly point out that it is as expensive

to produce a high specification low power transceiver as it is to produce one which runs on conventional power. TenTec do still produce the Argosy which has a genuine low power facility. The Argonaut series has been regarded as the "Rolls-Royce" of QRP equipment and I have used both the Argonaut 505 and 515 to good effect.

Heathkit equipment

My introduction to low power amateur radio operation came through building the Heath HW7 transceiver kit. This was a three-band (40-20-15m) direct conversion transceiver which ran about 2 to 3W dc input. The HW7 was well known for its microphonic receiver and unpredictable transmitter-receiver offset but many are still in use and mine worked 40 countries on 20m with a dipole. The HW7 was superseded by the superior HW8 which also included the 80m band and has a much better receiver. These two transceivers are probably the most modified pieces of radio equipment since the advent of amateur radio, and there are enough ideas and circuits for the HW7 and HW8 to fill a reasonable sized book. There are many of these transceivers about and they are fairly common on the secondhand market.

Add a receiver

In this column in October the circuit of the GM30XX OXO transmitter was featured, one of the favourite "fun rigs" among QRP operators. A natural extension to this circuit is the addition of a simple direct conversion receiver board. The circuit shown here is one used by several QRP operators to provide receive facilities from an existing oscillator. A dual gate mosfet mixer accepts the oscillator signal from the OXO transmitter on gate 2 and mixes it with the input signal tuned by the tuned circuit around L1. The audio beat note appearing at the drain of the mixer is amplified by a discrete three-transistor high-gain amplifier. The input is provided with a simple rf attenuation control, and two diodes protect the input from rf overload. The output from the audio amplifier is suitable for medium or high impedance headphones. If only low impedance headphones are available these could be used via a matching transformer such as the common LT700 or a similar component culled from a scrap transistor radio.

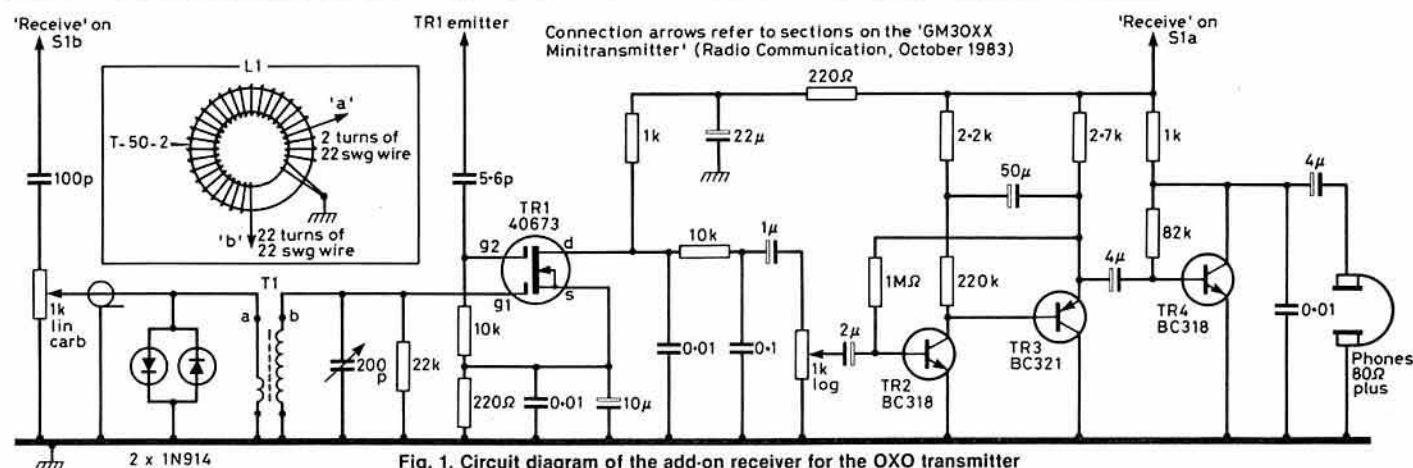
Interfacing with the OXO transmitter is very simple. The oscillator drive is taken from the emitter of TR1 (see Fig 1 of the OXO transmitter circuit in *Rad Com* October 1983) and the signal input and 12V line are taken from the transmit-receive switch, S1. L1 should be capable of peaking signals on the 7, 10·1, and 14MHz amateur bands.

As a receiver, this arrangement might not be in the superior class, but it is capable of surprising results considering its simplicity and cheapness. Fred Garrett, G4HOM, has used this circuit with the OXO transmitter to good effect both from home and as a portable transceiver on 7 and 14MHz. Experimenters will probably like to improve the front-end tuning and attempt some audio filtering to increase selectivity, but even in the basic form this little circuit is a viable amateur bands receiver. It costs next to nothing and is a lot of fun. Perhaps that is what a hobby is all about.

The QRP Circuit Handbook

In 1982, the G-QRP Club published a 100-page handbook of circuits previously published in *Sprat*, the club journal. The sale was restricted to G-QRP Club members, but it has now been reprinted and is available by mail order from RSGB Publications (Sales). If you are interested in a book full of circuit ideas, with notes, for a whole range of transceivers, transmitters, receivers, station equipment, equipment modifications and small circuits, you will enjoy it. □

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The Month on The Air

by John Allaway, G3FKM*

THIS MONTH'S COLUMN appears at the end of yet another year, and the writer would like to thank all those who have supported and contributed to it during 1983. This applies to everyone—including those who are pro- or anti- phone, cw, lists or anything else! We are lucky to be in a position to air our prejudices, and may this long continue . . .

G3KMA is anxious to trace the whereabouts of Bob Smith who operated from C21BS in late 1980/early 1981. Roger believes that he returned to Weston-super-Mare. Would anyone with information please contact G3KMA, QTHR?

G4NDL reports that the callsign G4UTN is being used by an operator calling himself Roger and claiming to be in South Devon. "G4UTN" was heard in QSO with ZL on 14MHz.

G2DBT reports that a QSL addressed to VS6CT via G5VS at the address given in October *MOTA* has been returned marked "Box cancelled".

G3FAS wishes it to be known that he is not the QSL manager for 5N6SKD for whom he is receiving cards.

DX news

PZK has announced that the licences of all Polish amateurs have now been restored as from 1 October.

DXNL says that KC4AAA, in Antarctica, is often to be found around 0800 on 14,210kHz. Likewise 4K1GDW, who is on or near 14,005kHz or 14,025kHz after 2200 with rather chirpy signals. 8J1RL is located at Syowa Base in Lutzow-Holm Bay, and at least one operator will be there until March 1984—the area between 14,200 and 14,220kHz is favoured from 1200. Y83ANT continues to be active on 21,030 or 21,180kHz after 1400, or on 14,030 or 14,180kHz after 1730—he now has a quad antenna. DXpress says that DF3LK will be on from Akta Bay using the callsign DP0AA from now until February. He will work on all bands with cw, ssb, rty and sstv, but mostly between 14,010 and 14,025kHz and 14,200 and 14,220kHz from 1800 to 1900. He has a log-periodic antenna, and dipoles for 3.5 and 1.8MHz as well as a long wire (430m long) running N-S. VK0GC was expected to leave Macquarie in mid-November but may return to the island in a year or so.

T30AT was expected to be back in W Kiribati by now following leave in the UK. He is often on 14MHz after 1830 and is planning to be on the lower frequency bands during the winter. N2EDQ/KH7 keeps various schedules between 0300 and 0900 in the 14,280–14,330kHz and 21,350–21,400kHz phone bands.

K6ZM has been touring around the Pacific area and may already have been active as 3D2ZM and A35ZM. From the end of November he was expected to be in Niue. C21RK is still being reported in the 0500–0700 period around 7,080kHz, and he is sometimes accompanied by 3D2AM, YJ8RG, FK0AQ, ZK2RS and or ZL2AAG. C21FS is the secretary of the amateur radio society on Nauru and says that no visitors' licences are being issued at present.

H44IA is to be found most Sundays on 21,285kHz after 1100, and has also been on 7,085kHz in the evenings.

Another station has come on the air from the eastern part of Burma. This is 1Z9C, and it has been worked on 21MHz ssb. DX News-Sheet received a note from A51PN saying that both A51TY and he have been closed down for many months and that licences are not issued to foreign visitors. In a letter to PA0GAM, Pradhan said that amateur radio is banned in Bhutan until 1985 but did not make it clear if this merely applied to visiting amateurs.

New operators were due to arrive on Crozet Is in November. FR0GGL will be on the air as FB8WJ, and F6EAY as FB8WK. No replacements are announced for FB8X and there is also no news of anyone taking over from FB8ZQ who is due to leave this month. FB8ZQ has been operating regularly near 7,003kHz from about 1700.

UK1PGO often comes on the lower end of 14MHz (around 14,030kHz) after 1330 and after 2000. JW5QAA is located on Hopen Is and will be there until next May, and a new operator, Ivar, has recently arrived on Bear Is and has the callsign JW5CI. The latter intends to be very active in contests. Jan Mayen, JX5DW, suffered damage to his 1f antennas but should be on

the air again now. Knut, JX9VCA, will be on the island until April. W01IN is now in the Faeroe Is, and will be OY8R until April.

The position of HB9AAX/ET3 was unclear at the time of writing but he was believed to be in Ethiopia. His status for DXCC may be known later, and he may have left by now.

6U0JU is expected on the air from Juba University in S Sudan, and 6U0WCY has been a regular attender on the net on 14,315kHz at 1800. From Zaire, 9Q5JE is reported to be found on 21,345kHz at 1600 every Monday.

DX News-Sheet says that G3SYM is now in Libya working for the telecommunications ministry. If he gets a licence he will take equipment back with him from the UK after his Christmas leave. The same source says that QSLs for VS9AP and VS9AQ QSOs between October and December 1958 are available from the address in "QTH Corner".

Overseas news

G4HL has received a note from 3B8CF who thinks that many UK stations have problems in finding his address (see "QTH Corner"). All cards for contacts with VQ8CF, VQ8CFB, 3B8CF, 3B9CF, 3B7CF, 3B6CF and VQ9SM should be sent there, and 100 per cent QSLing in receipt of cards is promised.

Derek, G3JSV, was told by 7Q7LW during a recent QSO that the listed Malawi QSL Bureau address is no longer functioning and that cards sent to that box number are causing some embarrassment to all concerned. (Other journals please copy.)

The August 1983 issue of the *BARS Bulletin* included the excellent news that the Bangladesh Wireless & Frequency Allocation Board has decided to reintroduce the amateur radio service in Bangladesh. At first permission will be limited to Bangladeshi nationals. This breakthrough comes as a result of four years of systematic pressure from BARS. It is not known when the first licence will be issued.

Amateur radio is flourishing in Indonesia. A copy of an article written by YB2AU says that since the national society ORARI was formed in July 1968 over 10,000 members have joined, about 80 per cent of whom are located in Java. Indonesia is divided into 10 call areas: 0 = Jakarta, 1 = W Java, 2 = Central Java, 3 = E Java, 4 = S Sumatra, 5 = W Sumatra, 6 = N Sumatra, 7 = Kalimantan (Borneo), 8 = Sulawesi (Celebes), and 9 = Eastern Indonesia. There are three types of licence: (1) Novice—for local communication on 3.5MHz. Stations use the YD prefix. (2) Advanced class—for internal communication on all bands except 14MHz using the YC prefix. (3) General class—for international communication using all



John Allaway recently attended WARIC, Tokyo, and is shown here with, l to r: Mr Wang Qingya, deputy secretary general of BY1PK; John Allaway, G3FKM; Yang Jianyuan, manager of BY8AA; and Mrs Xia Xuehlin of the All China Sports Federation (International Department)

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John, VK5KO. Photo: G3HZG

bands, with the YB prefix. Foreign amateurs from countries with reciprocal agreements become special members of ORARI and are issued with calls with suffixes in the AAA to AAZ series.

Bob Parkes, P29PR, now has a new address (see "QTH Corner"), unfortunately attempts to get Boxes 73 or 7373 were too late! Activity during the summer months was restricted due to the very high static level caused by local power lines. However, this was expected to improve when the rainy season began in late October.

G3ZVK reports that 5Z4CV is erecting delta-loops for 3·5 and 7MHz and that schedules were to be arranged. John keeps a schedule with 5Z4CV at 1700 on Mondays on 21,332kHz.

Andrew Steele, RS84589, has reported on the results of the special activity by HC1JB during June. Equipment included an FT101, Icom IC701, several Heath HW101s and on 7MHz a linear was used. Countries total was 62, and 1,619 QSOs were made. Andrew is director of the English Service at HCJB, and the operation used the regular broadcast antennas where possible. Where this was not possible, others were erected by HCJB engineers. This was a special WCY activity and QSLs are available via the bureaux or by direct mail (one irc please) from HC1JB, PO Box 691, Quito, Ecuador.

Expeditions

Preliminary information on an expedition to Clipperton Is has been received from WB6GFJ (FO0FB) who had recently just returned from a meeting of FO8 operators in French Polynesia who have obtained landing permission and a licence. An extract of an item written by FO8IW (president of CORA, the radio club in Tahiti) reads as follows: "After many difficult obstacles have been overcome the 1984 expedition to Clipperton Is has been organized and is now in the final stages of preparation. It is planned for some time during March or April and when final transportation has been arranged dates will be announced. The group (as of August 1983) is to consist of FO8BI, FO8DO, FO8EM, FO8IW, FO8JD, WB6GFJ, W6OAT, W6SZN, N6PO and K1CC. Others will probably join it. The callsign issued is FO0XX and this will be used for all operation. Activity will be on all bands 1·8 to 28MHz and will be divided equally between cw and ssb. Every effort will be made to observe propagation paths so that all parts of the world will be worked—and operators named so far can speak French, Spanish, Japanese, Polish and Russian as well as English!

GM3OXC reports that the GB2BP event from the Magnus oil platform from 13 to 18 September hit a spell of poor conditions. Activity was therefore mostly on 7MHz (where the best dx worked was ZL4) and a total of 850 QSOs was made with stations located in 58 countries—401 of these were with the UK (including 251 in G and 97 in GM). An FT101B and a whip antenna sticking out from the platform structure were used. Special QSLs are available—for direct reply send to BP Dyce, Aberdeen, or otherwise via the RSGB bureau. Listener reports will also be answered.

Your scribe had the pleasure of renewing acquaintance with Iris and Lloyd Colvin at the ARRL National Convention in October. They were looking fitter (and younger) than ever and anxious to get started on their South American tour. The plan calls for operation in Colombia, Ecuador, Peru (using the special callsign 4T4WCY), Bolivia, Chile, Argentina, Uruguay and Paraguay, and also from some of the rarer countries and islands if opportunity presents itself. Activity will be on the low ends of all bands with special concentration on the 1·8, 3·5, 7 and 10MHz bands. Iris and Lloyd ask people to limit QSOs to one per band per mode from each country and QSLs should be sent (as always) to the address in "QTH Corner".

MOTA ALL-TIME COUNTRIES TABLE

Scores at 15 October. Bandleaders in bold type							
Callsign	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total
G3KMA	78	217	288	328	330	315	1,556
G3GIQ	51	177	220	328	328	307	1,411
G3MCS	30	189	238	317	318	304	1,396
G3UML	3	187	198	327	294	254	1,263
G3HTA	50	159	204	303	280	241	1,237
G3XTT	73	162	197	258	272	241	1,203
G4DYO	41	109	164	300	294	282	1,190
G4FAM	41	147	207	264	262	242	1,163
G2DMR	37	137	142	285	288	252	1,141
G3RUV	6	142	157	183	284	232	1,104
G3NOF	4	79	72	339	317	274	1,085
G3XJS	26	102	116	274	286	272	1,076
GW4BLE	11	147	160	259	258	240	1,075
G3TXF	40	158	168	249	247	206	1,068
G3IGW	87	129	228	217	192	170	1,023
G3RUR	1	122	144	272	242	219	1,000
VK9NS	22	133	194	257	215	166	987
G3XQU	1	93	128	262	255	231	970
G3YMC	66	88	139	209	223	173	898
G3JFF	25	78	112	232	225	179	851
G3JJG	28	72	92	189	237	189	807
G4BWP	20	98	109	154	179	234	794
GM3PPE	35	116	140	180	168	138	777
G4KPE	1	146	159	173	160	130	769
G4LJF	1	83	90	216	181	181	752
GM3YOR	48	66	110	174	171	171	740 (cw)
G4GGY	2	100	76	182	142	100	602
Average	31	127	157	253	246	220	1,035

The next table will appear in the March issue—entries to G3GIQ please by 15 January. Next year this table will show "current" countries in the June and December issues. There will also be a new all-band table of countries worked after 1 January 1984—first entries to G3GIQ please by 15 February.

Mats Gunnarsson will be operating as HC1SK/HC8 from Isla Santa Cruz in the Galapagos Is from 27 December to 2 January. He will be found around the following frequencies: 3,512, 7,005, 14,005, 21,005 and 28,005kHz (on cw), and 14,195, 21,295 and 28,495kHz on ssb. For direct QSL an sae plus two ircs is requested via the address in "QTH Corner".

SM0AJU and SM0DJZ are activating 5H3BH again between 22 November and 6 December. QSLs, for this expedition only, should be sent direct to SM0DJZ (see "QTH Corner"). Other cards should continue to go via SM0EAL. It is emphasized that no cards should be sent direct to Dar-es-Salaam.

Top band

Conditions seem to have been good, and undoubtedly the news of the month is that G3BDQ managed a contact with ZL2BT at just before 0700 on 3 October—this is believed to be the first G-ZL QSO on the band for a number of years. The opening was for only 5min, and ZL2BT's signal peaked at S6 for about 30s. This was followed by a second QSO on 5 October at the more predictable time of 0622, but with signals not so loud. A further ZL contact was made at 1740 on the same day—this time with ZL1AH. John has also worked VK9NS on the band—this one at 0644, and the opening lasted only 4min. KH6DL was also worked at 0637, and 9V1LO at 2108, as well as DU1EJ at 2130. Quite an exciting spell, which makes one wonder how such comparatively strong signals on such a low frequency are propagated over such vast distances. (A final "final" from G3DBQ, received just before closing date, reported a QSO with VK6HD at 2118.)

28MHz

Alan Taylor, G3DME, IBP co-ordinator, reports that W3VD is now on the air from the Applied Physics Laboratory at the Johns Hopkins University in Laurel, Md, on 28,296kHz. Part of the transmission is "FM 19 APL"—an indication of its location according to the Maidenhead Locator System—the actual site being at 39 10N, 76 60W.

1983 28MHz Countries Table

G3VOF—185	G4OBK—92	G4RPX—37
G3XQU—171 (ssb)	G4GGY—92 (ssb)	G3JFF—36
G3KHZ—171	G3TXF—91 (cw)	G3XBM—35
G3GIQ—151	G4GOF—78 (ssb)	G3KSH—30
G3JFH—135	G3XTJ—66 (cw)	G3PSM—26 (cw)
G3KDB—108 (cw)	G4EHQ—56	GM4RFE—26
G3SXW—104 (cw)	G4PEL—56	G4PXT—25
G3XBY—101	G4PKP—49	G4FVK—20
G4MUW—94	G4SDZ—48	

Honor Roll

September QST contained the latest listing of stations who have confirmed contact with at least 306 of the current 315 countries on the DXCC list. UK calls are as follows (second total is "all time"): mixed category—G3AAE 315/360, G3FKM 315/358, G3FXB 315/358, GM3ITN 315/349, GW3AHN 315/360, G2FSP 314/351, G31VJ 314/354, G3HCT 313/350,

QTH CORNER

C30AKA via G6JNS, Red Lion Cottage, Holt Heath, Worcester, WR6 6TA.
CR9G PA0GMM, Tweeboomlaan 117, 1624 EC Hoorn, NH, Netherlands.
CY0SPI via VE1ASJ, 2316 Rothesay Road, East Riverside, Saint John, NB, E2H 2K5, Canada.
HC1SK/HC8 via SM6DYK, K. Johansson, Pilvagen 4, S-520 50 Stenstorp, Sweden.
HK0TU via HK3DDD, E. Rojas M, Apto 25827, Bogota, Colombia.
AD1S/KH5 AD1S, PO Box 32735, Oklahoma City, Okla, 73123, USA.
I2BVS/BV Mario Ambrosi, Via Stradella 13, 20129 Milano, Italy.
I2MQB/BV via K9WJU, J. Swartzendruber, 1720 S 13th St, Goshen, Ind, 46526, USA.
HH50B R. Parkes, Box 2778, Boroko, Papua New Guinea.
P29PR via G4CTQ, S. T. May, 77 Chaucer Drive, Lincoln.
G4CTQ/ST2 via N6ADI.
V30 via K80G, T. Heger, 14129 Locust, Olatha, KS, 66062, USA.
V3A via W8BI, Dayton AR A'ssn, Box 44, Dayton, Ohio, 45401, USA.
W8BI/VE2 via VK2WU, Box 31, Winnalee, NSW, Australia 2777.
VK2WU/LH via N6CW, T. Baxter, 4639 Katherine P1, La Mesa, Cal, 92041, USA.
VP2VDH via G3AAE, 75 Roundmead Avenue, Loughton, Essex.
G3AAE/VP9 D. Parr, Silverdale, Well St, Starcross, Nr Exeter, Devon.
VS9AP via JAHQG, Y. Arisaka, 1107 Zaimokuza, Kamakura, Kanagawa, Japan.
VS9AQ YASME Foundation, PO Box 2025, Castro Valley, Cal, 94546, USA.
XU1SS Mal Geddes, Box 2462, Harare, Zimbabwe.
YASME Ham Radio Outlet, 2620 W La Palma, Anaheim, Cal, 92801, USA.
Z23JO S. Mandary, 6 Shastri Rd, Candos, Quatres Bornes, Mauritius.
ZF2FL (22/11/83 to 6/12/83 only) J. Hallenberg, Siriusgatan 106, S-19500 Mersta, Sweden.
3B8FC
5H3BH

G4CP 313/360, G5VT 313/358, G2FYT 312/348, G3JAG 312/333, G3LQP 312/330, G3UML 312/336, G3JEC 311/334, G3IOR 310/345, G5RP 310/337, G3OQR 310/339, G2BOZ 308/351, G3HTA 308/330, G3GIQ 307/333, G3RUX 307/323, G3ZAY 307/320, G3KDB 306/322, G3MCS 306/322 and G3SIH 306/318. In the telephony list: G3FKM 315/354, G5VT 313/358, G3NLY 312/336, G3IVJ 312/350, G3JEC 311/334, G3UML 311/335, G3TJW 310/327, G5AFA 310/328, G3ZBA 309/326 and G3SIH 306/318.

Welcome

To the following who joined the Society during September: EA7BFW, OZ1AWJ, VE5AFZ, VP8ZV, WA2UDT and 9M2CW. New non-licensed members include K. Balfour (W), M. Olivieri (I), K. Magnusson (TF) and D. Raicha (SZ).

Contests

EA DX CW Contest

1600 3 December to 1600 4 December

CW only. 1.8 to 28MHz (but not 10, 18 or 24MHz). Single-operator and multi-operator sections. Contacts must be with EA or EC stations or their special prefix equivalents. A station may be worked once on each band, and exchanges consist of RST and serial number (from 001). Spanish stations will send RST and province code (NB Ceuta and Melilla count as two provinces—CE and ML). Each QSO counts one point for European entrants, three for others. The multiplier is the number of provinces worked on each band added together. Logs should indicate date, time, callsign, info sent, info received, if new multiplier, and points claimed. Enclose summary sheet giving callsign name and address, category of operation, names of operators (in multi-op category), number of QSOs, multipliers and points on each band, and the usual signed declaration. Plaque and award for winner, trophy and award for continental leaders and award to first in each DXCC/WAE country. Spanish provinces are (District 1) AV, BU, C, LE, LO, LU, O, OR, P, PO, S, SA, SG, SO, VA, ZA. (District 2) BI, HU, NA, SS, TE, VI, Z. (District 3) B, GE, L, T. (District 4) BA, CC, CR, CU, GU, M, TO. (District 5) A, AB, CS, MU, V. (District 6) PM. (District 7) AL, CA, CO, GR, H, J, MA, SE. (District 8) GC, TF. (District 9) CE, ML. Entries must be posted no later than 14 January 1984 and sent to URE, PO Box 220, Madrid, Spain.



Neville, G3RFS, was in Jamaica from 29 July to 10 August during which time he made 800 QSOs as 6Y5FS—including five with the UK on 1.8MHz

40m World SSB Championship Contest

0000 to 2400 7 January

75m World SSB Championship Contest

0000 to 2400 8 January

160m World SSB Championship Contest

0000 to 2400 15 January

RTTY World Championship Contest

0000 to 2400 25 February

All organized by 73 Magazine. Rules available from G3FKM (sase please).

"Airtel India" International DX Contest

0000 3 December to 2400 4 December

CW only. This contest is being organized to celebrate WCY, and there was a phone section in November—unfortunately details were received too late for insertion in the November issue. There are single-operator, single- and multi-band categories, and multi-operator, multi- and single-band categories. No crossband, split-mode, or split-frequency contacts allowed. QSOs with India on 14, 21 and 28MHz count two points, and on 3.5 and 7MHz four. QSOs on the new WARC bands also count four points (as do those with zones 2, 7 and 8) although it is against IARU policy to operate contests on these bands at present. The multiplier is the number of VU postal zones worked on each band. Exchanges consist of RST plus operator's age (00 for ladies), VUs will give RST postal zone and age. A generous supply of awards is listed. Send logs to reach Capt D. Dasan, "Airtel India", "Clara", 5-8 Versova Cross Roads, Off Four Bungalows, Andheri West, Bombay-400 058, India, no later than 20 December. All entrants are asked to include six 100s to defray certificate posting costs etc.

Awards

Das Wurttemberg Diplom

To celebrate 30 years of amateur radio in the DARC district of Wurttemberg, the Sindelfingen section is offering this award to all licensed amateurs and listeners for contacts/confirmed reports with/from stations in DOKs and VFDBs in the district. These include DOKs P01 to P51, and VFDB DOKs Z17, Z18, Z26, Z29, Z46, Z48, Z55 and Z58, and special DOKs (such as DW and IBO) are only valid with the date—ie IBO 83. Contacts/reports should be after 31 December 1982 and each station counts once per band and mode, all one-band or mode endorsements will be noted. European applicants require 100 points (in at least 25 DOKs) for Class 1, 75 points (in 20 DOKs) for Class 2, and 75 points (in 15 DOKs) for Class 3. Send certified list of QSLs plus DM7, USA \$4, or 10 100s to: DARC e.v. OV Sindelfingen P42, Award Manager, Postfach 566, 7032 Sindelfingen 1, FR of Germany. Points are graded as follows (listed by mode order: fm, ssb, cw, rtty and sstv) P and Z DOKs 1, 3, 4, 5, and 5; club stations and special DOKs 2, 4, 5, 6 and 6; and DOK P42, DL0DW and DL0IB 3, 5, 6, 7 and 7 respectively.

Yeovil ARC Award

Work or hear any 22 British stations with the last letter of the call to make-up the words "Yeovil Amateur Radio Club", on or after 1 July 1983 on any bands or modes. Send certified list of QSOs (by club official or two amateurs) plus £1, USA \$2, or 10 100s to F. W. Parkhurst, 56 Cromwell Road, Yeovil, Somerset BA21 5AW.

Around the bands

Conditions on 28MHz seem to have been rather good just before closing date—consideration of the 28MHz table seems to suggest that it may be worthwhile starting again from 1 January 1984 just to encourage activity!

Thanks go to the following for logs submitted: G2s CDT, HKU, G5JL, G3s BDQ, BFR, GIQ, GVV, GM3ITN, G3s JFF, IMW, KHZ, KSH, SXW, UML, VOF, G4s CNY, EHQ, JVG/SM0, GW4KGR, G4s LDS, MUW, NXG/M, OBK, PEL, RVV, UOL and VGK.

Stations using cw are listed in italics.

1.8MHz. 0500 HB0NL. 0600 AA1K. 1800 UA3PFN. 2100 UA9ACZ, 5N8ARY. 2300 RF6FFW, UA9s, 4X4WT.

3.5MHz. 0300 KG4CD, VP2KBZ, ZF20BN. 0400 CN2AQ, LU1XFM. 0600 HH2VP, XE3LPV, YS9EW, ZL 4U1VIC. 0700 CY0SPI, N7RK (Ariz), W6SZNTI2, W9YT, ZL4AP, ZL4DKM. 1800 ZLs. 2000 A71s AD, BJ, UA0AG. 2100 EA9EU, JA. 2200 YB5ASO. 2300 W3TB/TF, U18VO1/W1-2 W5JW/3A, KCTUUI5N6.

7MHz. 0000 CT2CQ, HZ1AB, VP2KBZ. 0100 FB8ZQ, J28DN, 0500 KL7, VK (to 0700), W7AM, ZL (to 0700), W5JW/3A. 0600 FK8AO, KL7Y, VP2KM, W6, XE1EGM, ZK9RW. 0700 HH5CB, HK0TU, JA, VP2MF, YS9EW. 0800 VK0GC. 1500 W6. 1900 JT1AO, SU1RK, 7Q7LW, 9V1VP. 2100 CY0SPI, W5JW/IB0, JA, 5N8ARY. 2200 YB5ASO. 2300 CY0SPI, JWSNM, OX3ON, VU2BK, 4S7WP, 6Y5IC.

10MHz. 0600 OE1GAS/IB0, VK (to 0800), ZL2BJ, 9H1BB. 0700 JA1XYB. 0800 JA6HN. 1800 ZL1AH. 2100 JA6HW. 2200 KV4DB, PZ1DV.

14MHz. 0500 HK0TU. 0600 KH6IJ. 0700 CE0EVG/Z, FO8QY, JD1BBR, W5RZS/KH8, P29PA, T2GSH, T32AE, VK0GC, 6C1AO. 0800 BY1PK, CE0AE,

WG4WIDU, UK1PGO, 5W1DZ, 9M8PW. 0900 A35JL, JA, VK, Y11BGD, ZL. 1000 FK8EJ, XU1SS, 1400 9Y4RD/SU, VS6DO, 1600 CR9G, JA, SU1RK, 1800 A71AD, I2NIN/BV, FR0FLO, 4U1VIC, 5V7RE, 9M2YK. 2000 OH2JLT5, TJ3QA (?), VK2-VK7. 2100 CY0SPI, T77C, 4K1F, 4S7EA. 2200 VQ9JD, W6-W7. 2300 VP2VA.

18MHz. 1500 DJ, G, GW, GI. 1800 H5AFU, VP8ANT, DL2GGI/YV5.
21MHz. 0700 JA (to 0700), 0800 BY4AA, BY8AA, J28EC, VK, ZL. 0900 VK9ND, YJ8TT, 4S7WP, 5W1DQ, 1000 FK8CE, Y11BGD, 6U1WCY, 8Q7AN, 1100 H44DX, KC7UU/5N6, 9N1MM. 1200 C21FS, G4KXL/DU1, FK0AQ. 1400 G3AAE/VP9, 5R8AL. 1500 HK0TU, VS6CT. 1600 ST2SA, TL8DC, 3D6AK. 1700 S79WHW, VP8ANT, W6-W7 (to 2200), 9Q5JE. 1900 W6QL/HK3, VP8AQA, 5V7RE. 2000 HH2WL, VP8MT, 4K1GDW.

24MHz. 1700 VP8ANT.
28MHz. 0800 ZD7BW, 5N23RTF. 0900 A4XJV, G4KXL/DU1, S83H, YB5ASO.

1000 AX6NCW, KG6JJH, VQ9JD. 1100 A71BH, FR7BP, WA0OII/KH2, RH8EAK. 1200 A92P, J28DX, JY9CL, VK8NNN W (to 1900). 1300 CE0ZT, DF3NZ/ST3, TR8JD, 3B6CD. 1400 VS6DO, 3B9FK, 3X4EX. 1500 K6MYC/CE0, H5AE, TR8IG, ZD7BW. 1600 AP2ZA, W6QL/HK3, VU2CK, HB9BVL/5N0. 1700 CY0SPI, FH8CB, VP8ANT, 7Q7LW. 1800 D44BS, VE7, W6, W7QK, Y83ANT. 1900 HK0TU, PY1DOQ/T (Trindade). 2000 HH2VP, ZF2GE.

Thank you to all contributors—and to the authors of the following.
Long Skip (VE3GCO), Lynx DX Group Bulletin (EA2JG/EA3CBQ), DX'press (PA0GAM), CQ Magazine (W1WY), DXNL (DL3RK), the DX Bulletin (K11M), the Long Island DX Bulletin (W2IYX), DX News Sheet (G3XTT/G3ZAY), and the Ex-G Radio Club Bulletin (G13OEN/W6).

Please send all material for February to arrive no later than 30 December.

HF propagation predictions for December 1983

Using the table

The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band, ie % = 0000, % = 0200, % = 0400 etc.

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

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		37	74			89	993			288	889	2		541	766	678	844		986	643	346	889	††5	3	3	†††		
Malta		36	541			89	986			1	287	789	62		663	765	568	985		998	642	246	899	†††	4	4	†††	
Gibraltar		3	331			38	886				88	889	72		342	186	667	984		898	763	335	899	†††	†3	2	5††	
Iceland		33				5	885				38	899	4		12	77	778	841		786	165	457	887	†††	†32	24	5††	
ASIA																												
Osaka		1				51				85	1			1	264	332	1	3		31	124	654			2	4†		
Hong Kong		54	1			88	5			166	651			2	33	355	431		1	1	125	785			2	4†3		
Bangkok		78	62			179	872			136	678	1		3	3	347	644		2	1	124	787			2	4†5		
Singapore		45	43			168	882			126	678	1		2	3	347	754		1	1	124	786			2	4†3		
New Delhi		77	5			278	85			225	674			521	2	346	346		73	1	124	788		5	2	4††		
Teheran		88	74			388	982			1	634	678	211		753	311	347	866		873	1	124	788		†5	2	4††	
Colombo		78	85			268	994				113	678	311		42	1	347	866		51	1	124	788		2	4	4††	
Bahrain		86	63			477	882			2	522	578	421		853	2	247	877		872	1	14	788		†5	2	45†	
Cyprus		88	871			399	997			331	766	689	742		886	633	457	998		997	311	135	898		††4	2	5††	
Aden		76	661			366	796			4	411	378	753		943	1	146	898		872	1	14	788		†4	2	455	
OCEANIA																												
Suva (S)						2	441				26	677	1			54	357	3		131	124	2						
Suva (L)		21				76	521	221		11	276	567	631		1	453	236	4		121	13	2						
Wellington (S)			1			15	63				76	675				64	357	2		31	124	1				2		
Wellington (L)						21				11	75	434	421			253	235	31		31	13	1						
Sydney (S)		23	31			77	861				266	677	1			43	347	51		11	124	51			2	2		
Sydney (L)						13	1				66	54	632			43	335	63			11	13	41					
Perth		34	31			268	763				136	678	31		1	3	347	853			1	124	762				43	
Honolulu											1	2	4		23	42	326	41		4	331	124	1			4		
AFRICA																												
Seychelles		23	42			355	773			2	1	378	753		821	1	146	898		83	1	14	788		†	4	45†	
Mauritius		34	541			255	786	1		52	1	368	864		851	1	46	899		72	1	14	788		4	4	4††	
Nairobi		64	551			265	686	21		61	411	258	985		963	1	26	899		872	1	4	788		†4	4	4†5	
Harare		23	442			155	577	42		75	311	147	997		983	1	15	899		862	1	2	788		†4	4	4††	
Capetown		13	553			1	55	577	431		85	311	126	898		983	1	3	699		872	1	378		†4	4	4†	
Lagos		68	776	1		11	86	668	642		88	351	126	899		996	52	3	799		788	3	588		5†5	2	2††	
Ascension Is.		26	544				77	667	322		774	62	112	689		999	43	1	489		888	51	168		†††	2	3†	
Dakar		18	766	1			78	668	631		775	74	114	798		999	451	1	589		878	72	268		55†	4	4†	
Las Palmas		17	776	1			69	989	61		444	87	667	986		999	574	335	799		989	842	112	589		†††	52	2††
S. AMERICA																												
South Shetland		2	233			56	666	211		564	75	432	345		466	343	1	13		233	31							
Falkland Is.		2	244			47	665	321		565	75	211	245		688	452	13			467	52				34	2		
Rio De Janeiro		3	212			27	545	321		555	75	111	267		999	462	37			888	73	15			†5†	4	2	
Buenos Aires		2	113	1		36	545	42		555	86	21	135		899	463	14			688	731	2			35†	4		
Lima		775	2			876	41			213	14	621	123		678	253	3	3		588	731	1			25†	4		
Bogota		774	1			875	41			113	4	621	133		768	243	3	14		788	631	2			455	4		
N. AMERICA																												
Barbados		1	875	2		5	865	62		213	16	511	255		768	343	2	37		887	731	15			†54	4	2	
Jamaica		486	2			876	51			1	2	13	631	133		657	243	3	15		788	631	1	2		455	4	
Bermuda		587	2			2	887	61		1	2	16	643	463		657	244	31	147		878	631	1	15		†55	4	2
New York		277	1			798	61			1	3	665	552		657	144	332	246		878	631	11	15		†55	4	2	
Mexico		56	1			87	4			1	11	463	111		457	153	33	2		478	631	11			5†	4		
Montreal		276	1			698	6			1	4	665	652		556	144	343	346		877	631	11	25		†55	4	2	
Denver		3				38	4			1	1	66	531		456	4	143	223		478	531	111	1		25†	4		
Los Angeles		2				7	3			1	36	42			356	43	43	111		268	531	121			4†	4		
Vancouver						1	2			1	17	62			355	42	135	432		368	431	123	111		3†	4		
Fairbanks						1	2	113	4		2	113	4		453	43	346	642		356	231	124	432		23	4		

The provisional mean sunspot number for September 1983 issued by the Sunspot Index Data Centre, Brussels, was 50.9. The maximum daily sunspot number was 81 on 5 September, and the minimum was 32 on 20 September. The predicted smoothed sunspot numbers for December 1983 and January, February and March 1984 are, respectively: (classical method) 68, 66, 64 and 63; (SIDC adjusted values) 69, 67, 65 and 64.

Contest News

VHF/UHF contests in 1984

Late in 1982 the VHF Contests Committee decided to review the general rules and contests calendar in depth in order to make contests more attractive to participants. Comments were invited through the December 1982 4-2-70 and via GB2RS. Further input was obtained at a vhf contests forum at the RSGB exhibition at the NEC, and also at the 1983 VHF Convention. A large number of letters and notes were received, which were discussed over a six-month period during 1983. The resulting changes appear in the "Contests Calendar" published in this issue of *Radio Communication*, and also in the general rules which will be published in the January 1984 issue. This report sets out the reasoning behind the changes. At the end of 1984 the rules and calendar will be reassessed in the light of the response from entrants, so comments will again be welcomed.

The inclusion of QTH in contest exchanges received a lot of comment, virtually unanimously against its use. In contests where QTH is required stations working large numbers of Continentals have an advantage over those with mainly inter-G contacts, in that less time is needed for each contact, and there is less information to record. Accordingly, contests in 1984 will *not* require the exchange of QTH information, other than on 70MHz where Continental stations do not distort the results. The spare QTH column on the log sheets can be used to record any comments against particular contacts.

To add a new flavour to two existing contests, the 144MHz and 432MHz Low Power Contests will introduce a "county chasing" element requiring the exchange of county information, with a multiplier for each county and country worked, which will be applied to the final score calculated using the radial ring system.

The existing radial ring scoring system was carefully scrutinized. Analysis of results on 144MHz indicates that some areas of the country seem to be at a disadvantage, and various multiplier schemes were discussed to redress the balance. However, no equitable system retaining the simplicity of the existing arrangement could be devised, so the radial ring scheme will continue to be used as at present. The 144MHz Fixed Station Contest will have certificates awarded on the basis of RSGB zones to encourage more entries from those areas that tend to be at a disadvantage in the results table. If successful then other events may also have awards on a zonal basis.

Some major changes have been made to the contests calendar for 1984. In general the existing events will be retained, but with several changes of date. RSGB events will continue to be held to coincide with other European contests on the first full weekends in March, May, July, September, October and November. A major change is the move of the 1,296MHz and 432MHz Trophy Contests to June, when the weather is a good deal kinder than in April, particularly in the north. A new 1,296MHz and 2,320MHz two-band event is to be introduced in August

to help develop activity on the higher band. Another important move is the bringing together of the 144MHz and 432MHz Low Power Contests in one weekend at the beginning of August, with the 432MHz event on the Saturday evening, and the 144MHz on the Sunday. This should encourage the portable stations to make full use of a weekend on the hill tops.

The 144MHz contest missing from the 1983 calendar has now been restored in its traditional slot in mid-to late-May, but there will be no 144MHz section in the early May contest, which is a uhf/shf event where 144MHz is used for talkback on the microwave bands. On 70MHz the Fixed Station Contest has been reintroduced in late October, with the Trophy Contest moved to mid-September.

Several events are unaffected—VHF NFD will be similar to this year's event, as will the 144MHz Trophy Contest and the various Cumulative Contests. Starting times for 24h events will be 1400gmt to agree with those on the Continent.

The general rules remain substantially the same in content, but with some editorial changes to simplify and clarify them. Please read the rules carefully before the contest and when preparing the entry. Normally rules will be published at least one clear month before the contest date. Most results will be published three to four months after the contest, although investigation of alleged contraventions of rules may result in delay. Results are usually announced on GB2RS as soon as possible after approval by the committee.

Complaints of poor signal quality are becoming more prevalent and take up a lot of time. Committee policy is not to penalize stations without at least two independent unsolicited complaints containing sound technical arguments, and the complainants must have contacted the station concerned at the time and noted what action if any was taken to clear the problem. Difficulties will inevitably arise where stations operate in close proximity, particularly since the strong signal performance of many standard "black boxes" is not good.

The use of borrowed professional equipment in contests produced some comments. Any ruling on this matter would be difficult to enforce without large scale inspection of stations, and it might be difficult to determine whether items were owned, hired or borrowed. While the committee encourages the use of professional test gear to check that equipment is performing correctly, the use of other equipment borrowed by groups on terms that could not be matched by others less fortunate than themselves is to be discouraged.

The committee will be looking for feedback on these changes via the 427 cover sheets, and through personal contacts at exhibitions, conventions and rallies during 1984.

John H Quarmby, G3XDI
Chairman VHF Contests Committee

Cumulative Contests 1984 rules

By popular request, a further series of mini-contests will be held in early 1984. These will broadly follow the format and rules of previous events in this series, except that a 7MHz section has been added.

Dates and times: 1-8MHz. Tuesday 17 January and Thursday 26 January. Both sessions from 2000 to 2200gmt.
3-5MHz. Saturday 7 January and Sunday 15 January. Both sessions from 1000 to 1200gmt.
7MHz. Saturday 21 January and Sunday 29 January. Both sessions from 1000 to 1200gmt.

Frequencies: All contacts should be within the following band segments: 1,835 to 1,865kHz, 3,520 to 3,550kHz, 7,015 to 7,040kHz.

Exchanges: RST followed by a serial number (commencing with 001).

Operators: All entrants must be members of the RSGB. Both single-operator or club entries will be accepted (but entries must state which section). Single-operator entries should show if the entrant is a member of an RSGB affiliated club or society.

Listeners: Logs from short wave listeners will be welcomed. These logs should show the callsigns and reports from both the stations that are in contact.

Scoring: Each completed contact (or logged exchange by an swl) scores three points.

Logs: All logs should be sent to RSGB HF Contests Committee, c/o R. L. Glaisher, G6LX, 279 Addiscombe Road, Croydon CR0 7HY, to arrive not later than Monday 14 February 1984.

Certificates: A certificate will be awarded to the entrant in each section who submits the most accurate log. In the event of there being several faultless logs, the award will go to the entrant having the highest score. The swl certificate is subject to a minimum of three logs being received.

Affiliated Societies Team Contest 1984 rules

1. The general rules for RSGB hf contests, published in the supplement to the January 1983 issue of *Radio Communication*, will apply.

2. **When.** 1300 to 1700gmt, Sunday 8 January 1984.

3. The Affiliated Societies Team Contest is a competition between teams of stations, each team or teams representing an RSGB affiliated society. Each such society is encouraged to enter as many stations and teams as it can.

4. (a) A society entering one team will have its placing determined by the aggregate scores of the five highest scoring stations in its team.

(b) A society may enter more than one team. The aggregate scores of the five highest scoring stations will be placed in team "A", the next five highest scoring stations placed in team "B", etc.

5. (a) **Eligible entrants.** Each operator must be a member of the society he represents, but need not be a member of the RSGB.

(b) Each station may be single- or multi-operator, but no operator may use more than one callsign during the contest period.

(c) All stations representing a society must be operated within 50 miles of the normal society meeting place.

(d) No station may represent more than one society.

(e) In the case of a society with national coverage, eg RNARS, each team may define a different society meeting place, but this should be a place of recognizable significance, eg a naval base. For all purposes, other than the indication of affiliation, each such team entry will be considered to be entirely separate.

6. **Contacts.** CW (A1A), only in the band 3,510 to 3,590kHz.

7. **Exchange.** RST and serial number commencing 001.

8. **Scoring.** Each contact will be worth 10 points.

9. **Entries**

(a) Each individual entry shall conform to the general rules. In particular

each log must be accompanied by an hf contest summary sheet (Form HFC2). All entries from one society are to be sent in one package to RSGB HF Contests Committee, c/o D. J. Lawley, G4BUO, 220 Shipbourne Road, Tonbridge, Kent TN10 3EL. Packages underpaid and bearing postage-due stamps will be returned to the sender.

(b) Each package must include a declaration signed by an officer of the society that each entrant is a member of that society, and the normal meeting place address must be given.

(c) There should also be included a note stating the number of teams representing the society. If the package does not include this information it will be assumed that the society wishes to enter only one team.

(d) Packages must be postmarked not later than 23 January 1984.

10. Awards

(a) The Edgware Trophy will be awarded to the leading affiliated society.

(b) A certificate of merit will be awarded to the station having the highest individual score.

(c) A certificate of merit will be awarded to the leading affiliated society in each RSGB zone.

432MHz Low Power & SWL Contest results

This contest was very popular with 20 entrants in the Fixed section and 30 in the Portable section. It is also encouraging that entries were received from all over the country, including Scotland.

Conditions were reported as average to excellent, depending on which part of the country entrants operated from. East coast stations generally benefitted from the remains of a very good opening to the Continent and Scandinavia, and some very fine dx was worked despite the low power levels.

Logs were generally of a good standard, although one station lost points for not logging full QTH information. G3GXI/P was disqualified under General Rule 15. Congratulations to the winners and runners-up in all sections. Certificates of merit go to G8FEZ, G4MDZ, G3EFX/P, G4DDU/P and BRS32525. Checklogs were received with thanks from G6CZE and G2DHV.

G4KGC

FIXED SECTION

Posn	Call sign	Points	QSOs	Best dx	Km	Antenna	QTH
1	G8FEZ	1,471	136	SM6CMU	1,051	17-el	AL56
2	G4MDZ	1,275	123	SM6CMU	995	4 x 19-el	AL76
3	G4BVY	670	104	PA0ERW	547	2 x 21-el	YM79
4	G6JND	445	59	DB6BX	418	Silver 70	AL68
5	G8VLL	443	41	OZ7IS	889	21-el	AM27
6	G3GJL	382	68	GM4NBS/P	385	2 x 19-el	YM58
7	G8KOW	307	73	F6BOX	492	21-el	ZL38
8	G8KEN	272	26	OZ9FW	879	19-el	AL77
9	G6DKN	233	37	GM4NBS/P	365	19-el	YM36
10	G4TAW	230	57	PE1CKK	361	19-el	AL51
11	G6CHD	229	39	G8FEZ	312	19-el	YN78
12	GD2HDZ	218	28	G3EFX/P	450	18-el	XO68
13	G4AFJ	202	32	GM4AEQ/P	351	18-el	ZM05
14	G4NZK	193	43	GM4AEQ/P	361	18-el	ZM41
15	G3HRY	193	38	GM4NBS/P	420	48-el mb	ZM77
16	G6GJD	167	28	G8FEZ	392	2 x 48mb	YN15
17	G3ZVL	165	43	ON4ASL	331	19-el	ZL45
18	G8SRL	162	43	PA0JNH	413	19-el	ZL67
19	G6PFR	125	29	G4APA/P	243	18-el	ZL08

PORTABLE SECTION

Posn	Call sign	Points	QSOs	Best dx	Km	Antenna	QTH
1	G3EFX/P	1,500	175	DK1KR	797	2 x 21-el	OK10
2	G4DDU/P	1,176	133	DB1DP	723	21-el	YP18
3	GM4NBS/P	1,151	85	PE1GHK	613	4 x 16-el	YP20
4	GM4AEQ/P	1,056	82	G8SJP/P	612	2 x 88mb	XP75
5	G8AAP/P	1,003	92	OZ1FER	843	46mb	AN61
6	G4CDA/P	929	142	ON7MB	506	2 x 21-el	ZN61
7	G3WOR/P	927	135	GM3GX/P	559	19-el	ZK09
8	GW4ERP/P	895	126	DG1BP	689	2 x 19-el	YN75
9	G4NVA/P	813	117	OZ9FW	920	4 x 19-el	ZN53
10	G6CMG/P	713	114	GM4NBS/P	430	48mb	ZL01
11	G3UAX/P	556	101	DL1EBR	529	2 x 48mb	ZL53
12	GM8MJ/P	552	52	G4DDU/P	551	4 x 21-el	YP18
13	G4APA/P	496	92	G8FEZ	363	4 x 19-el	YN37
14	G4LIN/P	482	85	G16ATZ/P	477	21-el	ZM70
15	G4RUL/P	473	81	DJ9UX	491	48mb	AK11
16	G3UUP/P	459	101	F6BOX	550	4 x 8-el	ZL26
17	G3XWZ/P	419	78	PE0MAR	430	Parabeam	ZN62
18	G6ISY/P	409	89	GM4AEQ/P	536	4 x 19-el	ZK06
19	G4SDS/P	404	65	GM4NBS/P	556	4 x 21-el	YN28
20	G6LJO/P	357	70	GM6LNM	338	48mb	YN77
21	G8HRC/P	353	90	G3IZD/P	366	2 x 21-el	AL32
22	G6LEX/P	343	65	G4MDZ	365	4 x Silver	YN29
23	G4SSS/P	328	42	GM4AEQ/P	449	2 x 21-el	YL72
24	G4KKC/P	327	67	PE1CQO	388	2 x 48mb	AL56
25	G8GBY/P	312	52	PE0MAR	397	2 x 21-el	ZO77
26	G3IZD/P	306	40	G3EFX/P	410	8/8	YO65
27	G8HSG/P	304	55	PA0FRE	408	2 x 21-el	YN07
28	GM4EZJ/P	234	32	G6CMG/P	404	2 x 18-el	YP42
29	G8KGI/P	180	38	F6BOX	172	19-el	ZK05

SWL SECTION

Posn	Station	Points	QSOs	Best dx	Km	Antenna	QTH
1	BRS32525	144	48	GW4ERP/P	280	19-el	AL41

Check logs received with thanks from G6CZE and G2DHV.

September 144MHz Trophy & SWL Contest results

Prospective contestants for this year's trophy event were greeted by appalling weather conditions for the start of the contest. Not only did low temperatures and heavy rain make station setting-up difficult, but hurricane-force winds made antenna erection hazardous. Of those who did risk large arrays aloft a number suffered from bent masts, stripped rotator gears or broken elements. Wisely, the majority settled for smaller or lower antenna systems.

Fortunately propagation was somewhat better than the weather, although deep QSB tested operator abilities at times. On Saturday a dozen or so EA

stations appeared, to provide many with their best dx. The Spanish stations were workable from the Channel Islands right from the start of the contest and as conditions gradually improved contacts were made as far north as ZO square.

The dx contacts to EA and southern F had little effect on the overall scores of the leading stations, however. As in previous years these were dominated by large numbers of contacts with Germany and the Low Countries, and it is not surprising to see last year's winners featuring again. The winner of the single-operator section by a large margin was again Geoff Brown, G4JICD, who will be awarded the Thorogood Trophy. In the All Other Stations section the winner was the Parallel Lines CG, who will be awarded the Mitchell-Milling Trophy, also for the second year running. Runners-up, GW4ALG/P and G4APA/P, will receive certificates. The leading GM entry was from GM4CCC/P, who may be eligible for the GM4HAM Trophy.

G3VPK

SINGLE-OPERATOR SECTION

Posn	Call sign	Points	QSOs	QTH	Power	Best dx	Km
1	G4JICD	7,928	591	YJ70	+26	EA2BAK	911
2	GW4ALG/P	3,985	490	YL06	+20	EA1EH/P	1,103
3	G8YDW/P	3,968	511	ZN11	+25	EA1TH/P	1,290
4	G4ARI	2,528	435	ZM24	+20	EA1RCR/P	1,184
5	G6WTD/P	1,578	148	XM17	+22	PA3APH/P	610
6	G6OVU/A	1,072	64	XK57	+20	EA2BAK	1,080
7	G6EPN/P	1,055	154	ZL41	+14	EA2LY	932
8	G8IEM	1,028	100	ZK16	+20	EA1RCR/P	980
9	G4AGQ	929	138	ZL66	+10	EA1RCR/P	1,027
10	G4DFI	881	100	AL41	+22	EA1RCR/P	1,155
11	G8RBT	793	145	ZL20	+20	F1KSL	550
12	G3YDY	785	124	AL23	+16	EA1RCR/P	1,070
13	G4TXA	730	156	YN37	+19	F6CTT/P	479
14	G3HRY	728	104	ZM77	+22	EA1RCR/P	1,106
15	G6ACM	444	68	ZL57	+10	F9VB	431
16	GM4SGB	409	63	YQ62	+10	G4CVI	605
17	G6JGQ	395	65	YM47	+15	F1ARR	427
18	GW8XAN	360	50	YL34	+20	F6APE	511
19	G6TTW	355	50	ZL29	+13	G1ATAP/P	484
20	G6NWF	304	58	YN78	+19	ON5UG/P	475
21	G8AKB	268	50	ZM27	+10	GM6LNM	428
22	G8GGG/P	233	65	YN38	+5	G4CRA/P	290
23	G4PIQ	225	49	AL16	-2	G4APC/P	311
24	G6THQ	198	36	AL07	+4	G4JICD	371
25	G6WZU	170	36	AL07	+4	G4APA/P	304
26	G8NMQ	141	31	ZL37	+20	PE1ML/P	399
27	G6OKU	136	30	ZN54	+12	F6CTT/P	406

ALL OTHER STATIONS SECTION

Posn	Call sign	Points	QSOs	QTH	Power	Best dx	Km
1	G4LIP/P	11,443	910	AN61	+26	EA1TH/P	1,245
2	G4APA/P	9,691	724	ZO48	+26	F6CJG/P	985
3	G4MRS/P	9,085	781	AM67	+26	EA1TH/P	1,152
4	G4BWG/P	8,653	710	AL67	+25	EA1EH/P	1,057
5	G8BQX/P	7,093	625	AK14	+26	EA3JA	934
6	G3EFX/P	6,862	612	ZK10	+26	EA3JA	964
7	G8SJP/P	6,107	555	AL02	+25	Y23SB/P	791
8	GW4ULX/P	5,839	595	YL15	+26	FLAIS/P	1,110
9	GW4ALE/P	5,773	721	YM05	+26	DL8GP	818
10	GW3OXD/P	5,771	670	YM55	+20	DL5DAV	727
11	G6EKR/P	5,706	505	AL56	+24	EA3JA	999
12	G6XKU/P	5,545	570	AL45	+26	DC6NY	801
13	GD4IOM	5,250	436	XO67	+26	EA2LY/P	1,262
14	G4DEZ/A	5,236	537	AL34	+26	EA1RCR/P	1,029
15	G1ATAP/P	5,088	421	XO51	+26	PA3APH/P	724
16	G8HRC/P	4,868	446	AL17	+23	EA1RCR/P	1,126
17	G4SIV	4,865	395	ZM29	+25	F6EAP/H	857
18	G4CRA/P	4,863	535	AL14	+20	DKOHA	736
19	G4NUT	4,640	513	ZM77	+26	EA1RCR/P	1,123
20	G3ISO/P	4,165	489	ZK07	+22	EA1RCR/P	996
21	G6VWH/P	4,052	518	ZL34	+26	EA1TH/P	1,050
22	G8YQT/P	4,024	495	AL56	+22	GM4AFF/P	664
23	G4KDL/A	3,943	383	AM49	+22	OK1KRG/P	833
24	G4JFW/P	3,925	482	ZM27	+26	F1GYA/P	837
25	G4NVA/P	3,826	496	ZN53	+26	DL8GP	739
26	G3WQK/P	3,699	322	AK12	+20	DC6NY	781
27	G6APZ/P	3,665	532	ZN72	+24	DL0NX/P	720
28	G4HUP/P	3,642	524	YM10	+25	EA1TH/P	1,196
29	G3WRS/P	3,620	407	ZO46	+23	EA1TH/P	1,366
30	GM4CCC/P	3,438	336	YP42	+22	G4JICD	696
31	G3GJU/P	3,430	498	YM70	+26	F6GZC/P	1,134
32	GW3EOP/P	3,423	385	YL23	+23	F6GZC/P	1,119
33	G4ILI/P	3,406	477	YL20	+20	EA2LY/P	984
34	G8SRY/P	3,333	471	ZL33	+25	EA1RCR/P	1,049
35	G4NOK/P	3,313	424	ZN23	+20	F6BWH/P	945
36	G3WKS/P	3,162	403	AL73	+20	EA1TH/P	1,027
37	G4UHF/P	3,127	475	ZL15	+26	F6KAW/P	1,116
38	G4CAR/P	3,080	444	ZM21	+26	F6EVA/P	1,144
39	G3UHF/P	3,069	392	ZN61	+24	EA1TH/P	1,231
40	G4TVI/P	2,995	353	AL24	+26	DF900/P	637
41	G3YMD/P	2,920	310	AL67	+22	DC6NY	722
42	G6WWR/P	2,763	466	ZL77	+23	EA1RCR/P	977
43	G6CHL/P	2,592	444	ZN61	+21	DL9GS	655
44	G4SSS/P	2,410	232	YL72	+24	F6GZC/P	1,062
45	G6CAO	2,395	337	ZL39	+25	EA1TH/P	1,063
46	G3TBK/P	2,315	333	ZN78	+20	F1KNO	662
47	G2XV/P	2,299	317	AM72	+16	G3CFH/P	590
48	G4OHM/P	2,228	424	YM50	+22	EA2ALW/P	1,006
49	G6RVC/P	1,635	324	YN30	+19	DL0SEP	714
50	G4GTT	1,768	332	ZL38	+20	EA3JA	1,020
51	G6LJO/P	1,759	341	YN70	+16	F1BDE	539
52	G3ULT/P	1,737	235	ZL54	+20	EA3JA	1,035
53	G8COI/P	1,571	287	ZM71	+14	DK0GR/P	704
54	G3RSC/P	1,538	314	ZM31	+19	F1DBE/P	710
55	G6HML	1,446	180	AM44	+19	DJ6JK	582
56	G4TAW/P	1,419	246	AL52	+19	GM4MFL/P	693
57	G4SNX/P	1,364	182	YN37	+20	EA1RCR/P	1,214
58	G6BSE/P	1,312	172	AM64	+18	EA2LY/P	1,029
59	G6KGO	1,296	233	YN47	+20	G4JICD	465
60	G8TRS	1,212	245	ZM32	+23	F6HMQ/P	484
61	G4EKT/P	1,150	160	ZN18	+20	F6APE	718
62	GM6SXF/P	1,142	123	YO63	+14	ON4XG/A	784
63	G8WDC/A	1,132	214	YN55	+25	F1CUT	603
64	GM4MFL/P	1,033	130	YR72	+22	F6CTT/P	859

Posn	Callsign	Points	QSOs	QTH	Power	Best dx	Km
65	G13CFH/P	877	80	WO05	+20	G6XKU/P	661
66	G81GQ/P	753	131	ZM16	+15	F1KNO	657
67	G6XQN	666	117	ZN64	+16	PA3BPC/P	443
68	GM4HAM	620	68	YP05	+20	PA3APH/P	644
69	G3YZD	371	75	ZL07	+26	PA0CKV/P	406

SWL SECTION

Posn	Station	Points	QSOs	QTH	Best dx	Km
1	BRS32525	965	158	AL41a	EA1RCR/P	1,035
2	BRS52543	498	84	YN15c	F6CTT/P	514
3	BRS62088	119	23	AL41a	F6ETI/P	440

Entry from G4ORC/A disallowed: Rule 14.

Check logs received from G2DHV, G3ZMF/P, G4SFY, G5AQQ, G6PJB, G6HXU, G8LNC/P and BRS25429.

IARU Region 1 HF Field Day 1982 results

The top ten stations listed by the 1982 HF Field Day Manager were as follows:

OPEN SECTION

Callsign	QSOs	Multipliers	Points	Callsign	QSOs	Multipliers	Points
GW4ACC/P	1,213	145	603,200	C30OH/P	1,083	146	550,472
G3RCV/P	1,007	157	589,849	DL0ET/P	988	134	518,044
DK9RX/P	863	181	563,634	DL0CS/P	878	152	516,800
G3WAS/P	1,022	154	563,468	G3WOR/P	998	139	516,663
DL0XT	903	158	550,472	G3KLH/P	1,078	133	494,627

RESTRICTED SECTION

Callsign	QSOs	Multipliers	Points	Callsign	QSOs	Multipliers	Points
GD3AHD/P	862	116	356,236	G4EKT/P	414	90	155,250
DL0EH/P	539	119	259,539	DL0EO/P	392	93	149,637
DK5JM/P	572	104	232,544	GM8MJ/P	540	73	141,693
G4AYM/P	625	75	181,200	DK0OI/P	448	70	134,820
GM3NEO/P	542	87	180,003	G4MHC/P	442	73	132,422

The stations listed will be receiving certificates via DARC in due course.

If any group wishes to receive the complete results it should send a stamped addressed envelope to: RSGB HF Contests Committee, Mr D. S. Booty, 139 Petersfield Avenue, Staines, Middx TW18 1DH.

Mid-Thames DF Qualifying Event results

After three solid weeks of sunshine the "Almighty" decided to give Hampshire a dash of water, but not until most competitors had started out on the event; in fact the sound effect tapes for the transmitters were thus redundant as the thunder was real.

Station A, G4MDF/P, run by a rather soggy Paul Hawes, G4CKW, was a little weak at the start, but caused little problem later. It was located on the south side of Little Frensham Pond among the reeds, some 14km from the start on bearing 167°. This station had about 1,800ft of wire draped among the trees and bushes on the south side of the pond, which was tuned against some barbed wire running across a fence which ran through a shallow part of the water/mud of the pond. Parking was near the far end of this fence, thus some competitors were heard splashing in the mud and were smelt before being seen. Comments heard near this location were: "It's not this side I'm sure" — splash from 4ft away, and "There's no cover here anyway" — don't you believe it.

Station B, G3MDC/P, Graham Taylor, was located atop Selbourne Common, literally atop, as he was well hidden 10ft off the ground in a large beech tree. As can be imagined there was no cover on the ground under the tree's branches, which together with a spiral antenna about 600ft long caused some consternation.

The organizer wishes to thank all helpers: Roy, G8CKN; Russ, G6WVQ; Howard, G6VXR; and Graham's y! Mary, for leading the competitors away so effectively and deliberately, and also my xyl for the hard work on the teas. Tea was held with some trepidation at G8APB's QTH and was generally enjoyed by all. At least everyone found one transmitter and thus congratulations to Trevor Gage who wins the High Wycombe Trophy and also qualifies for the national final, together with Chris Wells, subject to official confirmation.

Posn	Name	Club	Station A	Station B
1	T. Gage	Mid-Thames	1447.5	1540
2	E. Mollart	Mid-Thames	1510.25	1608
3	C. Wells	Mid-Thames	1612.75	1512
4	P. Lisle	Mid-Thames	1613	1513.5
5	B. Bristow	Mid-Thames	1614.75	1501
6	D. Holland	S Manchester	1619.25	1515.5
7	A. Williams	Braintree	1619.5	1514.5
8	I. Butson	Colchester	1620	1513
9	R. Goodearl	Mid-Thames	1621	1514
10	B. Poole	Mid-Thames	1621.75	1515
11	W. Pechey	Mid-Thames	1623.25	1514
12	P. Clark	Chelmsford	1515	1627.5
13	D. Newman	Slade	—	1514.5
14	C. Merry	Dartford Heath	1533	—
15	M. Easterbrook	Dartford Heath	—	1541
16	C. McKenzie	S Manchester	—	1542
17	G. Whenham	Coventry	—	1610
18	H. Willis	Mid-Thames	—	1611
19	P. Woollett	Dartford Heath	—	1611.5
20	A. Judd	Mid-Thames	1615.75	—
21	N. Woodley	Mid-Thames	1618.5	—

T. Gage and C. Wells qualify for the National Final.

Salisbury DF Qualifying Event results

Sunday 10 July was a warm sunny day—perhaps a little too hot for the 26 teams assembled at the start of Salisbury's df—near the end of Boscombe Down runway!

Most headed first for the more distant A station, G2FIX/P, 14 miles to the west, hidden in thick brambles on the highest part of Great Ridge, just off the Old Sarum to Mendips roman road. Station B, G3FKF/P, nine miles south in

Great Yews—in an effort to confuse "sense"—used a loop of fine steel wire over a mile long, almost surrounding the woods.

Tea at the Activity Centre was arranged by Elizabeth, xyl of G4NWJ. Thanks to all the operators, and to Sir Evan Nepean, G5YN, who managed the event. The Salisbury R&ES enjoy running these events and appreciate the great support given by competitors from all over the country.

Posn	Name	Club	Station A	Station B
1	P. Lisle	Mid-Thames	1532	1440
2	E. Mollart	Mid-Thames	1430	1536
3	G. Whenham	Coventry	1435	1536.5
4	A. Williams	Braintree	1442	1537
5	B. North	Mid-Thames	1420	1537.5
6	A. Judd	Oxford	1431	1538
7	B. Bristow	Oxford	1420	1538.5
8	C. Merry	Dartford Heath	1440	1539
9	C. Plummer	Mid-Thames	1440.5	1540
10	D. Newman	Slade	1431	1541
11	I. Butson	Colchester	1424	1542
12	T. Gage	Mid-Thames	1442	1549
13	R. Vickers	Slade	1443	1552
14	M. Hawkins	Chelmsford	1554	1500
15	C. Wells	Mid-Thames	1559	1440
16	R. Goodearl	Mid-Thames	1610	1459
17	B. Mephem	Mid-Thames	1430	1617
18	P. Tyler	Mid-Thames	1442	1619
19	M. Easterbrook	Dartford Heath	1441	1620
20	S. Holly	Salisbury	1531	1623
21	B. Poole	Mid-Thames	1629	1537
22	N. Woodley	Mid-Thames	1532	—
23	P. Woollett	Dartford Heath	—	1533
24	P. Yeates	Salisbury	1534	—
25	D. Yorke	South Manchester	—	1538
26	W. Pechey	Mid-Thames	—	1540

A. Judd and C. Merry qualify for the National Final

BARTG Autumn 144MHz RTTY Contest results

After the above average conditions which prevailed during the autumn contest of last year, the propagation during the latest contest left a lot to be desired. Almost all of the contestants commented on the poor conditions and many of the portable stations had adverse weather conditions to contend with as well.

These two factors produced a slightly lower entry than last year, although it is interesting to note that most of the drop occurred among the single-operator fixed stations. One possible explanation is that stations with poor locations/low gain antenna systems always suffer under flat conditions and therefore assume that the level of activity is poor and do not bother to operate.

The possibilities for long distance contacts were obviously not as good as last year and distances attained were on average about 30-40 per cent lower. Fewer Continental stations were in evidence, but special mention must be made of Andre, ON7CB, who provided nearly half of the UK entrants with their best dx.

Presentation of logs was much better and in general the claimed distances were much more accurate, possibly due to better computer programs.

The levels of rf power were, again, not high but it is interesting to note that as a generalization the multi-operator stations were using higher power than many of the single operator home-based stations. Antenna systems now seem to be falling into a more regular pattern with the 16- and 17-element Tonnas and Yagis topping the list, and when antennas and height above sea level are examined, the height would seem to be of secondary importance.

The Ealing Challenge Cups will be awarded to G3NNG and G4IVV/A respectively. Congratulations to them both.

G8CDW

SINGLE-OPERATOR SECTION

Posn	Callsign	QSOs	Points	Best dx	Km	Antenna	Power out	QTH asl (metres)
1	G3NNG	53	283	ON1BRR	440	16-el Tonna	100	122
2	ON7CB	21	233	G3VPC	459	4 x 16-el Tonna	100	10
3	G6CZV	36	153	ON7CB	378	16-el Tonna	75	91
4	G4SWY	51	149	ON7CB	339	9-XY Tonna	150	152
5	G6MOJ	44	112	ON7CB	342	17-el Tonna	40	40
6	G8IEM	25	105	G6GWD	206	6-el Quad	100	3
7	G6GWD	22	104	G3WOR/P	206	6-el Quad	80	37
8	G4PEY	35	103	ON7CB	339	6-el Quad	75	—
9	G4OTV	33	85	G3VPC	164	8-el Quagi	30	107
10	G6OUA	29	73	ON7CB	335	17-el Tonna	100	166
11	G8ABI	24	57	ON7CB	339	9-el Yagi	70	91
12	G8LWY	23	53	G4IVV/A	180	8-el Yagi	100	—
13	G8APB	16	48	G4IVV/A	241	16-el Tonna	15	213
14	G8CDW	25	47	G4IVV/A	150	6-el Yagi	12	30
15	G8GOJ	13	23	G3FJE/A	83	8-el Yagi	30	—



The South Manchester RC contest group: L to r: G4IRB, G4JLG, swl Julian Grammar, G5MUR, G4LVI and G8RGZ (saluting), at their October top band df contest. Photo: G4ROM

Contests Calendar

3-4 December	TOPS Activity Contest (Rules in November MOTA)
3-4 December	Airnet India International DX (Rules in December MOTA)
3-4 December	EA DX CW (Rules in December MOTA)
4 December	144MHz Fixed (Rules in October issue)
8, 16 December	28MHz Activity (Rules in October issue)
1984	
January-April	70MHz Cumulative
7 January	40m World SSB Championship (Rules in December MOTA)
7, 15 January	3.5MHz Cumulative (Rules in December issue)
8 January	AFS (Rules in December issue)
8 January	75m World SSB Championship (Rules in December MOTA)
14-15 January	White Rose RS SWL (Rules in November issue)
15 January	160m World SSB Championship (Rules in December MOTA)
17, 26 January	1.8MHz Cumulative (Rules in December issue)
21, 29 January	7MHz Cumulative (Rules in December issue)
22 January	Swale ARC 144MHz (Rules in October issue)
25 January	RTTY World Championship (Rules in December MOTA)
29 January	Swale ARC 432MHz (Rules in October issue)
4, 5 February	7MHz Phone (Rules in September issue)
5 February	144MHz CW
11 February	1st 1.8MHz
19 February	432MHz Fixed
25, 26 February	7MHz CW (Rules in September issue)
3, 4 March	144/432MHz & SWL
10, 11 March	Commonwealth (Rules in November issue)
17 March	Town & County
1 April	ROPOCO 1
8 April	432MHz CW
15 April	Low Power
May-September	10GHz Cumulative
May-September	Microwave Cumulative
5, 6 May	432MHz-24GHz
19, 20 May	144MHz & SWL
20 May	Region Round-up
2, 3 June	HF NFD
3 June	70MHz & SWL
9 June	1,296MHz Trophy
10 June	432MHz Trophy & SWL
23, 24 June	Summer 1.8MHz
7, 8 July	VHF NFD & SWL
15 July	Low Power Field Day
4 August	432MHz Low Power & SWL
5 August	144MHz Low Power & SWL
19 August	1,296/2,320MHz
26 August	ROPOCO 2
1, 2 September	SSB FD
(prov)	
1, 2 September	144MHz Trophy & IARU VHF & SWL
16 September	70MHz Trophy & SWL
October-December	432MHz Cumulative
October-December	1,296MHz Cumulative
6, 7 October	432MHz-24GHz & IARU UHF
7 October	21/28MHz Phone
21 October	21MHz CW
28 October	70MHz Fixed
3, 4 November	144MHz CW & Marconi Memorial
10, 11 November	2nd 1.8MHz
12, 20, 28 November	28MHz Cumulatives
6, 14, December	
2 December	144MHz Fixed
16 December	70MHz CW

MULTIPLE-OPERATOR SECTION

Posn	Callsign	Allowed QSOs	Points	Best dx	Km	Antenna	Power out	QTH asl (metres)
1	G4IVV/A	46	358	GW8ELR	445	4 x 9-el Tonna	100	35
2	G3WOR/P	56	178	ON7CB	324	2 x 16-el Tonna	100	241
3	G3VPC	23	137	ON7CB	459	17-el Yagi	90	84
4	G4RWM/P	48	134	ON7CB	307	16-el G2BCX	100	168
5	G4LOO/P	40	125	ON7CB	356	14-el Para	150	229
6	G6SXC	33	115	ON7CB	264	6-el Quangi	25	64
6	G3FJE/A	31	115	ON7CB	334	10-el XY	200	46
8	G6TVO	19	59	G4IVV/A	251	10-el XY	100	—
9	G6IIF	4	18	G3NNG	153	8-el Yagi	10	44

SHORT WAVE LISTENER SECTION

Posn	Callsign	Allowed QSOs	Points	Best dx	Km	Antenna	Power out	QTH asl (metres)
1	NL 4483	11	75	G4NNG	350	5-el Fracaro	—	—

The contest manager also gratefully acknowledges the receipt of check logs from G6PBR, G6XBM, and G6ZDD.

ROPOCO 2 1983 results

Many entrants commented on the flat conditions, but despite this an enormous entry was received: of the 50 logs which arrived in time for checking the average number of QSOs was 41, and an incredible 69 per cent



Winners of the Bridgend & DARC Castles Contest. L to r: Peter, GW4RMI; David Weekes, GW4RNM (Maesteg); Dave Thomas, GW3RWX (Cardiff); and club chairman Wilf, GW3XHJ. Photo: David Williams

of those active during the contest sent in a log. There were noticeably fewer postcode garbles, many points being lost due to incorrect copying of callsigns or RST. Some good codes emerged nevertheless: SN5E76J, SN5E26W and 29JE are a selection. Competitors are reminded that, however mangled a postcode has become, it should be passed on faithfully and not "reconstructed".

A close battle for first place was won by Ray Gerrard, G3NOM, by a margin of three points over Derek Cox, G3KKH. G3KKQ and G3NKS claimed the same score and could not be separated during checking, so they take joint third place. G3TVW and G4EBK submitted the only logs to emerge from checking with no points lost. The dedication of some entrants is amazing: G4FNC wrote up her entry on the day before her wedding to G3RZP; G4KLQ operated /P from the Grand Union Canal and G3JJG borrowed a receiver and dug out a 1964 Princess transmitter to get on the air, while awaiting the arrival of a new black box. Another operator related how he got three days "jankers" when in the services for mis-reading a signal and causing 90,000 gallons of oil to be taken on board a tanker in error—there was no ROPOCO in those days to gain practice!

Just over a third of entrants commented on the suggestion to bring forward the contest to assist those in Scotland. Here the HF Contests Committee is in some difficulty as the majority felt 0900 was early enough to start on the "day of rest" (several ops overslept), but we have some sympathy with the GM's complaint. It has to be said that only two entries were received from north of the border: would an earlier start encourage more GMs or merely improve the position of these two?

G3GMM noted that there were no GWs in the ROPOCO 1 results, and wonders if Wales has any postcodes. The adjudicator then received a log from G3SB, who had recently moved from GW so no answer there, but the day was saved by GW3HCL who remarked that he switched on the rig, found the contest under way and got involved. That's ROPOCO!

G4BUO

Posn	Callsign	Points	Posn	Callsign	Points
1	G3NOM*	604	26	G3SHY	355
2	G3KKH*	601	27	G4GLC	353
3	(G3KKQ)*	547	28	GW3HCL	351
4	G3NKS*	547	29	G4IUZ	350
5	G3TXF	544	30	G4HZF	348
6	G6UT(G3WUX)	538	31	G3HKO	341
7	G3TVW	520	32	G4UML	333
8	G4BUO	507	33	G4MUL	332
9	G3PDL	498	34	G3SB	330
10	G4MCC(G4HIU)	494	35	(GM3OXC)	328
11	G4ARI	492		G4OTV	328
12	G4OBK	470	37	G4KRS	321
13	G4IZZ	467	38	G3MKR	317
14	G4BOU	436	39	G4OKN	304
15	G3SJE	431	40	G3AWR	292
16	G3JJG	427	41	G4KLQ/P	288
17	G4EBK	410	42	G4OGB	284
18	G2HLU	404	43	G3BPM	268
19	G3CCZ	400	44	G3JKS	247
20	G3YCP	388	45	G4FNC	242
21	G3SWH	380	46	G3GMM	200
22	G4HZV	377	47	G4KGG	197
23	G3LWI	372	48	GM4LVW	187
24	G3JJZ	367	49	G4NSE	152
25	G4PIQ	365	50	G4PVB	104

Checklogs received from G3BWR, G3SXW, G4FAM, G4KDL, G4ODV and G4RFA.
*Certificate winners

Amateur Radio Awards (2nd edn)

This book, now revised and updated, contains details of most of the popular hf awards from all parts of the world, together with details of several swl and vhf certificates.

Country, prefix and zone lists, and maps, are given where appropriate, and many photographs of certificates are included to whet the award hunter's appetite.

80 pages; paperback; 246 by 184mm; 1980

Obtainable from
RSGB Publications (Sales)

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 in the January 1984 issue.

RSGB affiliated organizations are requested to report all programmes and news items to their regional representatives regularly. Information for inclusion in the February issue should reach them by 10 December and for the March issue by 14 January 1984.

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 QTH (correct in the current RSGB Call Book) unless otherwise stated.

All clubs welcome visitors and would be pleased to hear from potential new members.

REGION 1—RR W. R. Parkinson, G3FNM, 141 Norris Road, Sale, Cheshire M33 3JR. Tel 061 973 1472.

Accrington (NW Repeater Group)—15 December, 8pm. Globe Bowling Club, Willows Lane, Accrington. Sec Howard Aspinall, G3RXH.

Ainsdale (AARC)—6 December, Ainsdale Scout HQ. Alternate Tuesdays (Noggin and natter), Railway Hotel, Ainsdale. At an extraordinary general meeting, due to the death of the club's chairman, G2OA, and the resignation of the sec and treasurer, the following were elected, chairman, George Evans, G4IQK, and treasurer, John Rands, G6XFD. Details from new sec David W. Norris, G4TUP, 148 Sefton Street, Southport PR85DA.

Barnoldswick (Rolls-Royce ARC)—7 December (Film show by Linn, G8LWK), 4 January (Surplus equipment sale). Rolls Royce Sports & Social Club. Sec Leslie Logan, G4ILG, tel 0282 812288.

Blackburn (East Lancs ARC)—6 December (AGM), 7.30pm. Shadsworth Leisure Centre. Pro Graham Pountain, G4MWW, tel 0254 678933.

Bury (BRS)—13 December (AGM followed by wine and cheese), 6, 20 December (Informal). Details from sec Brian Tyldesley, G4TBT, 4 Colne Road, Burnley, tel 0254 24254.

Fylde (FARS)—6 December (Christmas party), 20 December (Informal with morse class), 3 January (AGM), 7.45pm. Kite Club, Blackpool Airport. Sec Wally Poupard, 14 Beach Street, Lytham, tel 0253 734596.

Leyland (LHARG)—12 December, 9 January, 7.30pm. Astley Sports Club, Hallgate, Astley Village, Chorley. Sec Arthur Jolly, G4JCO.

Liverpool (L&DARS)—Tuesdays, 8.15pm. Wavertree Conservative Association, Church Road, Wavertree. Further information from new sec, Alan White, G6XBN, 325 Blodie Avenue, Liverpool L19 7NE, tel 051-427 3243.

Macclesfield (M&DRS)—Second and fourth Tuesdays each month, 8pm. New venue, The Fermain Club, Oxford Road, Macclesfield. Details from sec Dave Lucas, G6HLQ, tel Macclesfield 28610.

Manchester (MUARS)—Wednesday afternoons. Students' Union. New officers of the society are:

chairman, Khee Chan, G5MUR; treasurer, Mike Ellis, G4ROM; sec, Richard Skobelski, G6ROQ. Informal meetings at UMIST Union Bar, Thursdays, 9pm, with members of UMIST Radio Society. Enquiries to G3VUM.

Manchester (SMRC)—9 December ("IC fabrication", by Peter Bradbury, G4EXK), 16 December (Tape and slide lecture), 23 December (Xmas party), 30 December (Closed), 8pm. Sale Moor Community Centre, Norris Road, Sale. Informal meetings Mondays in club shack. Sec David Holland, G3WFT, tel 061-973 1837.

Preston (PARS)—8 December (Christmas party), 22 December (To be announced). Lonsdale Club, Fulwood Hall Lane, Fulwood, Preston. Details from George Earnshaw, G3ZXC, tel 0772 718175.

Warrington (UK FM Group Western)—1 December, 5 January. Grappenhall Community Centre, Bellhouse Lane, Warrington. Sec Gordon Adams, G3LEQ, tel 0565 4040.

Woodford (RATEC)—the club reports a new committee: chairman, Roger Law, G8VLR; treasurer, Peter, G6MOQ; sec Nigel Spear, G4RW1, 58 Cheadle Road, Cheadle Hulme, Cheshire. Meetings, 8pm. British Legion Club, Moor Lane, Woodford.

REGION 2—RR to be appointed

Barnsley (B&DARC)—Mondays, 7.30pm. Warren Hotel, Quarry Lane, Barnsley. The club is in the process of preparing new premises, which will include a 90ft tower. Details from K. W. Roberts, 2 Earning View, off Twibell Street, Barnsley, tel Barnsley 297365.

Barnsley (UK FM Group Northern)—4 December, 7.30pm. The Royal Hotel, Barnsley. The club thinks it would be nice to see as many members as possible at these monthly meetings. Details from sec G4LUE.

Goole (GR&ES)—6 December (Natter night), 13 December ("VHF propagation", by Geoff, G8ERX), 20 December (Christmas party), 27 December (Operating night), 8pm. Junior Chamber Buildings, Boothferry Road, Goole. The new committee for 1983-4 is as follows: chairman, G3VBI; sec, G8IOH; treasurer, G8ERX; membership sec, G8VHL; and G6REL, G6AJM and G6EEQ. Details from G8IOH or G8VHL.

Halifax (H&DARS)—6 December (Christmas "rag-chew" and pie & peas supper, xyls welcome), 20 December ("Domestic video recorders", by Fred Bennewitz, G6BPH), 7.30pm. The Running Man PH, Pellon Lane, Halifax. Details from sec David Moss, tel Halifax (0422) 202306.

Halifax (Northern Heights ARS)—14 December (Social night), 8pm. Bradshaw Tavern, Bradshaw, Halifax. Sec G6CJL, 5 Park Fields, Moor End Road, Halifax HX2 0RF, tel Halifax 54635. Club net frequency 145-275MHz.

Leeds (White Rose ARS)—4 December (Open day at Moortown RUFC, Farmos, Leeds 17. GB2WCY will be in operation). Meetings Wednesdays, 8pm. Moortown RUFC. Details from G4OAT.

Maltby (MARS)—2 December (Novelty electronics), 9 December (Three in a row?), 16 December (Family entertainment). Methodist Church Hall,

Blyth Road, Maltby. Sec G3ZHI, tel 0909 814911.

Menden (Pennine ARS)—New club. Meetings fortnightly. The Olive Branch Inn, Manchester Road, Menden. Details from J. S. Shaw, G4RAJ, 48 Oaklands Drive, Dalton, Huddersfield HD5 8PR, tel Huddersfield 35955.

Mirfield (Spenn Valley ARS)—8 December ("Video cassette recorders", by M. Baker, G4OTL), 22 December (Christmas social), 8pm. Old Bank Working Men's Club, Mirfield. Details from sec G4MNV, tel Heckmondwike 409739.

Otley (OARS)—Tuesdays, 8pm. RAOB Club, Otley. Correspondence to joint secs A. Jordan, G6SPU, and P. Tootill, G6OAC, tel 0532 504381.

Wakefield (W&DRS)—13 December (Christmas social evening, Holmfild House Bar, 8pm), 27 December (On the air-natter night), 8pm. Room 2 Kingswell Suite, Holmfild House, Denby Dale Road, Wakefield. The society has two 144MHz 16-element Tonna beams, and a Datong morse tutor, which can be hired by members. Details from sec Walter Parkin, G8PBE, tel Wakefield 378727.

REGION 3—RR L. W. Craven, G4EQI, Grass Moor, Radford Road, Alvechurch, Birmingham B48 7DT. Tel 021-445 1347.

Atherstone (AARC)—8 December (Night on the air, G4LCQ or G3ARC), 7.30pm. Tudor Centre, Coleshill Road, Atherstone. Sec G6BEO, tel Hinckley (0455) 212051.

Birmingham (Midland ARS)—December activities to be announced on GB2RS. 294a Broad Street, Birmingham B1 2DS. Sec G8BHE, tel 021-4229787.

Birmingham (South Birmingham RS)—14 December (Christmas party and constructors contest), 7.45pm. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY. Sec G8RGQ, tel 021-459 8312.

Bromsgrove (BARS)—Newly affiliated. 13 December (Rev G. Dobbs, G3RJV on "QRP operating"), 8pm. Rigby Lane School, Bromsgrove. Sec Alan, G4LVK, tel 021-445 2088.

Bromsgrove (B&DARC)—9 December (Annual Christmas party in large club room), 8pm. Avoncroft Art Centre, Bromsgrove. Asst sec G4NWQ, tel 021-476 6965.

Coventry (CTARS)—Mondays, 7pm. Winfray Annexe, Coventry Technical College. Chairman Roger, G3ZFR, tel Coventry (0203) 365117.

Halesowen (MEB Sports & Social Club—Radio Section)—13 December (Christmas meeting, yls and xyls welcome), 8pm. MEBHQ Social Club, Mucklow Hill, Halesowen. Sec G4RWH, tel 021-747 8784.

Hereford (HARS)—2 December (Subject to be announced), 17 December (Annual quiz), 8pm. Lord Scudamore School, Friar Street, Hereford. Sec G4CNY, tel Hereford (0432) 273237.

Kidderminster (K&DARC)—6 December, 20 December (To be announced on GB2RS), 8pm. Aggborough Community Centre, Hoo Road, Kidderminster. Sec G8WOX, tel Kidderminster (0562) 751584.

Malvern Hills (MHRAC)—13 December (AGM), 8pm. Red Lion Inn, St Ann's Road, Malvern. Sec G4GFX, tel Malvern (06845) 62900.

Redditch (RRC)—8 December ("Longbridge repeater", by G8PYT and G4NZK), 8pm. WRVS Centre, Ludlow Road, Redditch. Sec G3EVT, tel Alcester (0789) 762041.

Stafford (S&DARS)—Newly affiliated. Tuesdays, 8pm. Coach & Horses Motel, Pasturefields, Staffs. Sec G4RSW, tel Stafford (0785) 46306.

Stourbridge (SIARS)—5 December (Informal meeting), 19 December (Yuletide-type meeting), 8pm. The Garibaldi, Cross Street, Stourbridge. Sec G8JTL, tel Lye (593) 4019.

Stourbridge (Wordsley RC)—Newly affiliated. First and third Thursdays in each month, 8pm. Vine Inn, Camp Hill, Wordsley, West Midlands. Sec Andrew, G4TGM, tel Kingswinford (2) 295082.

Stratford-upon-Avon (S-upon-A&DARC)—12 December (Activity night on the air, test equipment available), 7.30pm. Control Tower, Bearly Radio Station, Bearly, Nr Stratford. Sec G8OVC, tel Stratford (0789) 750584.

Sutton Coldfield (SCARS)—12 December (Natter night), Central Library, Sutton Coldfield. Sec G8TUR, tel 021-353 2061.



Fylde ARS on their visit to air traffic control at Blackpool Airport. Controller Ron Riley explains equipment to members who included G4JAJ, G5ND, G3FTD, and G4DPI. Photo G3AEP

Warwick (Mid-Warwickshire ARS)—6 December ("Satellite working", by Adrian Chamberlain, G4ROA), 8pm. 20 December (Christmas dinner, venue to be arranged), 61 Emscote Road, Warwick. Sec Carol, G6LKP, tel Southam (092681) 4765.

Worcester (W&DARC)—19 December (Christmas and skittles party). Old Pheasant Inn, New Street, Worcester. 5 December ("CW operating", by R. Dobbinson, G3RGD), 8pm. Oddfellows Club, Worcester. Sec G4NRD, tel Evesham (0386) 41508.

Speakers willing to give occasional one hour talks on amateur radio subjects are urgently needed by Midlands clubs in Region 3. Anyone wishing to offer their services, please contact Leo Craven, G4EQI, RR3, on 021-445 1347.

REGION 4—RR M. Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ.

Buxton (BARS)—13 December ("Japanese women", a talk by Ron Plant, G5CP), 7.30pm. Egerton Hotel, 36 St Johns Road, Buxton. Sec Derek Carson, G4IHO, tel Buxton 5006.

Derby (D&DARS)—7 December (Bring & buy), 14 December (Constructor's contest), 21 December (Christmas party), 28 December (Natter night), 7.30pm. 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.

Derby (NHARG)—2 December (Amateur tv evening), 9 December (The great egg race/problem solving competition), 16 December (The year in retrospect), 23 December (Mince pie evening), 30 December (Shack night), 7.45pm. Nunsfield House, Boulton Lane, Derby. Sec Ian Cane, G4CTZ, tel Derby 799452.

Grimsby (GARS)—1 December ("Explosives", by G8RIW), 8 December (10MHz transceiver project), 29 December (Talk on astronomy), 7.30pm. Cromwell Social Club, Cromwell Road, Grimsby. Sec Reg Scarlett, G4HZF.

Ilstock (IARS)—due to fire, all organized meetings are curtailed until further notice. Sec Ted Bowen, G4JKQ, tel Ilstock 60396.

Lincoln (LSWC)—14 December (Christmas social night), 28 December (Activity night/night on the air), 8pm. City Engineers Club, Waterside South, Lincoln. Sec Pam Rose, G4STO, tel Gainsboro 788356.

Melton Mowbray (MMARS)—15 December (Bring & buy sale and presentation of the G3FDF Trophy), 7.30pm. St John Ambulance Hall, Asfordby Hill, Melton Mowbray. Sec Richard Winters, G3NVK, tel Melton Mowbray 63369.

Nottingham (ARCON)—1 December ("Bits and bobs from the past" by G4NZU), 8 December (Forum), 15 December (Activity night), 22 December (Christmas quiz), 29 December (Activity night), 5 January (Forum), 7.30pm. Sherwood Community Centre, Woodthorpe House, Mansfield Road, Nottingham. Sec Phil Barber, G4OSL.

Newark (N&DARS)—1 December (Computers in amateur radio, by G4FUO), 5 January (AGM), 7.30pm. Palace Theatre, Appleton Gate, Newark. Sec Roger Hiscock, G4MDV.

REGION 5—RR J. S. Allen, G3DOT, 77 Rosslyn Crescent, Luton LU3 2AT.

Leighton Linlade (LLRC)—4 December (144MHz fixed contest), 5 December (Meeting), 19 December (Meeting), 7-10pm. Vandyke Community College, Road A64, Vandyke Road, Leighton Buzzard. Sec Peter Brazier, G6JFN, tel Heath & Reach 270.

Peterborough (GPARG)—22 December (A visit to a local pub/restaurant to celebrate Christmas and to conclude another successful club year). Meetings 7.30pm. Southfields Junior School. Sec Frank Brislley, G4NRJ.

Sheffield (S&DARS)—22 December (The chairman's wine and mincepie night), 29 December (No meeting), 8pm. Church Hall, Sheffield. Sec Alan, G4PSO.

Wellingborough (Nene Valley RC)—7 December (Natter night and closing date for entries for the Construction Trophy), 14 December ("Cambridge repeater group GB3PI", by G8HVV), 21 December (Natter night and Christmas buffet), 8pm. Dolben Arms, Finedon. Club closed on 28 December and 4 January. Sec Lionel Parker, G4PLJ, tel Wellingborough 79539.

All club secretaries not mentioned here—RR5 had to fly out to Korea before the closing date of this column, so if you have any items of club news please make use of the RSGB News Bulletin and Headline News service. Thanks for all your support over the last year. Enjoy amateur radio and have a happy Christmas. *John, G3DOT/RR5 es xyl.*

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HA3 7EA.

Banbury (BARS)—The club night has had to be altered to the last Thursday in each month. St Paul's Church Hall, Warwick Road, Banbury. For details contact sec T. Burrell, G8OZH.

High Wycombe (Chiltern ARC)—14 December (Get-together and film presentation). Details from sec G3NCL.

Maidenhead (M&DARS)—1 December (Home construction contest), 20 December (Christmas social). Details from Roger Hemmings, G3VCT.

Newbury (N&DARS)—13 December (Christmas social). Details from sec Mike Fereday, G3VOW, tel Newbury 43048.

Vale of White Horse (VoWHARS)—The December meeting will be the Christmas social. Details from sec Ian White, G3SEK.



West Kent ARS showed their appreciation to Dave Rumens, G3BOO, for his work in designing, building and maintaining the GB3WHA 432.81MHz beacon. He is shown here (left) receiving a tankard from society president Hugh Richards, BR540902. Photo A. Nevison, G4OSH

REGION 7—RR to be appointed

Biggin Hill (BHARC)—13 December (Sale of surplus equipment), 8.30pm. St Marks Church Hall, Church Road, Biggin Hill. Details from sec Ian Mitchell, G4NSD, tel Biggin Hill 75785.

Crystal Palace (CP&DRC)—17 December (Film show and social evening). All Saints Church Parish Rooms, Beulah Hill SE19. Details from sec Geoff Stone, G3FZL.

Redhill (Reigate ATS)—Third Tuesday in each month, 8.15pm. Constitutional & Conservative Centre, Warwick Road, Redhill. Details from sec Chris Barnes, G8FEE, 3 Black Dog Walk, Northgate, Crawley, W Sussex RH10 2HL, tel 0293 23425.

REGION 8—RR M. Elliott, G6NEY, 20 Haysel, Sittingbourne, Kent ME10 4QE.

Dover (SEKYMCAARC)—7 December (Natter night), 14 December (Film on lasers, G4IMP, and Christmas raffle), 21 December (Christmas social at Swingate Inn, nr Guston), 28 December (Sunshine special). Dover YMCA, Codwysheurst, Leyburne Road, Dover CT16 1SN. Details from G3VSU, tel Dover 822738, or G8YZZ, tel Dover 852533.

Thanet (RCT)—13 December (Pre-Christmas social), 27 December (No meeting), 8pm. Grosvenor Club, Margate. Details from Ian Gane, G4NEF.

Tunbridge Wells (WKARS)—2 December (EGM and films including "Voices in orbit", courtesy of British Telecom), 8pm. Adult Education Centre, Monson Road, Tunbridge Wells. 6, 20 December (Informal), 8pm. Drill Hall, Victoria Road. Details from Brian, G4MXL, tel 0892 32877, after 7pm.

REGION 9—RR W. J. Colclough, G3XC, "Highview", Indian Queens, St Columb, Cornwall TR9 6LL. Tel 0726 860485.

Axe Vale (AVARC)—2 December (Club dinner), 7.30pm. Cavalier Inn, Axminster. RAE classes with George Smith, G8AOJ, take place at St Clares Adult Training Centre, Seaton. Sec Peter Peach, G3GOS, The Firs, Goldsmith Lane, All Saints, Axminster EX13 7LU, tel 0297 34259.

Camborne (Cornish RAC)—1 December (Visual social evening). Computer section: 19 December (Graphs and histograms), 7.30pm. Diary note for 1984: mobile rally, 15 July. Contact Simon Rodda, G4PEM, for further details of venue. *Wanted:* club teapot—it makes all the difference to have a nice cuppa during the interval!

Exeter (EARS)—12 December (QSL card meeting at the community centre), 7 January (Christmas dinner), 7.30pm. Community Centre, St David Hill, Exeter. First and third Mondays in each month (Informal), Scout HQ, Emmanuel Road, Exeter. Details from pro Rodger Tipper, G4KXR, tel Exeter 75858.

Newquay (N&ORS)—7 December ("Amateur radio past and present", by G3XC), 21 December (Christmas nosh-up, pint and pasty, final details from sec), 7.30pm. Drill Hall, rear of Crantock Street, Newquay. Contact Pat King, G4GFU, tel 0872 71133.

Plymouth (PRC)—12 December (Christmas quiz), 17 December (Christmas social, details from pro),



The wedding of Sandra Simmons, G4JQL and John Wayman, G4DRS, was an amateur affair! L to r: Andrew, swl; Ken, G5BQR; Dave G4IAR; Steve, G4E0F; Judith, G4IAQ; Bob, G4GEE; Nick, G4OGI; John, G4DRS; Alan, G4PSO; Sandra, G4JQL; Derek, G4JLP; Lorraine, G4OCX; Neil, G4HUN; Mick, G4ALR; John, G8JKR; Alison, G4KQD; Martin, swl; Ray, swl; and junior ops Jill and Emma.

7.30pm. Tamar School, Paradise Road, Millbridge. Contact sec Dave Whitbread, G6EQM, tel 0752 20224.

Saltash (S&DRC)—2 December (Surplus equipment sale), 16 December (Christmas social evening at Holland Inn), 7.30pm. Toth H, Burraton, Saltash. Contact S. Hills, 5 Wearde Road, Saltash, tel Saltash 4461.

REGION 10—RR R. J. Case, GW4HWR, 2 Abbey Close, Tyrhiw, Taffsweil Mid-Glamorgan CF4 7RS. Tel 0222 810368.

Cardiff (CRSGBG)—12 December (Social evening), 7.30pm. Pantmawr Hotel, Tyla Teg, Pantmawr Estate, Whitchurch, Cardiff. Contact GW4HWR for details. Sec Cyril Laws, GW6ZHP, tel Cowbridge 3212.

Best wishes for Christmas and the New Year to all members in Region 10. For clubs who have not sent me news of meetings for December, please make use of the RSGB news service. I hope to hear from many more club secretaries during 1984. *RR10.*

REGION 11—RR B. H. Green, GW2FLZ, 1 Clwyd Court, Tan-y-Bryn Road, Colwyn Bay, Clwyd LL28 4AH. Tel 0492 49288.

Colwyn Bay (Conwy Valley ARC) (GW6TM)—8 December (TBA), 7.45pm. Green Lawns Hotel, Bay View Road, Colwyn Bay. Sec J. N. Wright, GW4KGI, 46 the Dale, Woodlands, Abergele, Clwyd, LL28 7DS, tel 0745-823674.

Rhyl (R&DARC) (GW4ARC)—5 December (Film on the Coastguard Service), 19 December (Social evening), 7.30pm. 1st Rhyl Scout Club, Tynewydd Road, Rhyl. New officers for the club: W. O. John, GW6PVL, chairman; T. A. Lovell, GW6RNA, treasurer; and sec John McCann, GW4PFC, 67 Ashley Court, St Asaph, Clwyd LL17 0PL, tel 0745-583467.

REGION 12—RR M. R. Hobson, GM8KPH, 4b Tummel Crescent, Pitlochry, Perthshire.

Fort William—Members in Fort William have formed an *ad hoc* group which meets on the first Thursday of each month, 7.30pm, West End Hotel, Fort William. Further information from Norman Baird, GM4JNB, PO Box 6, Fort William, or try a call on S20.

Perth (P&DARG)—Tuesdays, 8pm. Perth City Sports & Social Club, Leonard Street, Perth. Further details from new sec Mike Clark, GM6OFO, tel 0738 28621.

At the recent ORM in Inverness the possibility of a tour by a member of HQ staff in the spring was discussed. Clubs who are interested in being included on the itinerary should contact RR12 as soon as possible giving any dates which may be preferable/not convenient.

It is by no means certain that the visit will take place, it will depend on interest.

REGION 13—RR A. Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife KY1 2LH. Tel 0592 200335.

Berwick-upon-Tweed (Borders ARS)—First and third Friday in each month, 7.30pm. Tweedview Hotel, Tweed Street, Berwick-upon-Tweed. Details from GM8YPI, tel Eyemouth 50492.

Dunfermline (DARS)—8 December (Club junk sale), 12 January (Illustrated talk "Microcircuitry"), 7.30pm. Room 7, Old High School, Priory Lane, Dunfermline. Details from GM8IID, tel 728778.

Edinburgh (Lothians RS)—Second and fourth Thursday in each month, 8 December ("Getting started on 23cm", by GM8BJF), 12 January ("Use of radio in Scotland by British Telecom", by GM4MVT), 7.30pm. Horwell House Hotel, 13 Ettrick Road, Edinburgh EH10 5TJ. Details from GM4HWO not QTHR, tel 031-332 5502.

Glenrothes (G&DARC)—Wednesdays and third Sunday in each month, 18 December ("Antarctica, VP8AQA, Faraday Base", by GM4TNP), 7.30pm. Provosts Land, Leslie, Fife. Details from GM4LYQ.

Kelso (KARS)—Mondays, 7.30pm. Abbey Row Community Centre, Kelso. Details from GM3VLB, tel 24664.

Borders area

A nomination has been received for an area representative for the area and his appointment should take place soon.

I am led to believe that there has been talk of the



The JOTA station operators of Crawfordsburn, Co Down. L to r: David, GI8FLQ; Roger Moore; Gordon, GI8SKR; Ian, GI4MDD; Keith, GI4IYO; Peter Burnside; Ian McAleer; Bill, GI3MMF; Stephen, GI4OVW; and Roy, GI4CBG

formation of three new clubs in the Borders Area, namely at Galashiels, Alnwick and Peebles. Any information from these clubs would be appreciated for inclusion in this column. *RR13.*

REGION 15—RR J. T. Barnes, GI3USS, Whitegables, 95 Crawfordsburn Road, Bangor, Co Down BT19 1BJ. Tel 0247 3948.

Bangor (B&DARS) (GI3XRQ)—2 December ("Power supplies and how they work", by GI4UUC), 8pm. Sands Hotel, Bangor. Sec GI4OCK. **Belfast (COBYMCAARC) (GI6YM)**—3 December (Christmas party and video show), 10am. YMCA Building (Youth Club), Wellington Place, Belfast. Sec GI6BJO.

Larne (L&DARS) (GI4PHA)—First and third Wednesday in each month. Room 270, Larne Technical College. Visitors welcome. The club's 144MHz summer contest was won by GI4MVQ. Sec GI4CPP, tel 0574 5407.

Magherafelt (MARS) (GI4MFT)—First Tuesday in each month, 8pm. 12 Garden Street, Magherafelt. RAE classes at Magherafelt Technical College, Mondays. Morse classes at club QTH, Tuesdays. Committee—chairman, GI4ZTL; sec, GI4LVC; ass sec, GI6JRY; treasurer, GI3SOO; and committee—GI8JRE; GI6DNI; GI4LDO, and GI6AMB. Details from J. Chapman, GI4LVC, tel 0648 32096. **Moy (Armagh, Dungannon & DRC)**—Second Tuesday in each month, 8pm. Pony Club, Moy. Details from Kevin Boyd, GI4SLQ, tel Moy 84597.

REGION 16—RR T. D. Howe, G3PLF, 18 Vange Hill Drive, Basildon, Essex SS16 4DD. Tel 0268 24453.

Braintree (B&DARS)—5 December ("Swept frequency testing" by G3OLU), 19 December (Christmas party evening), 7.45pm. Braintree Community Centre, Victoria Street. Details from Jeff Roberts, G6OIX, tel Braintree 44857.

Colchester (CRA)—1 December ("A micro-processor project", by G6IAW), 10 December (Annual dinner Wivenhoe House), 15 December ("St John Ambulance Brigade", by members of the brigade), 7.30pm. Colchester Institute, Sheepen Road. Details from Frank Howe, G3FLJ, tel Colchester 851189.

Ipswich (IRC)—14 December (Films), 28 December (Closed), 8pm. Club Room, Rose & Crown, Norwich Road. Details from Jack Tootill, G4IFF, tel Ipswich 44047.

Loughton (L&DARS)—9 December (CW practice), 23 December (Informal at the Wheatsheaf), 8pm. Details from C. Knowles, G6FWT.

Lowestoft (LD&Pye ARC)—9 December (Christmas bring & buy social). Details from Alan Seago, G4KDL, tel Lowestoft 66289.

Norwich (Norfolk ARC)—7 December (Short meeting), 14 December (Visit to headquarters of

Anglia Television), 21 December (Short meeting), 28 December (New Year get together), 7.45pm. Crome Centre, Telegraph Lane East. Details from Peter Forster, G3VWQ, tel Norwich 37709.

Stowmarket (S&DARS)—5 December (Film show), 7.30pm. Red Cross Hut, Station Yard. Details from Jim Lowe, G8SCB, tel Needham Market 721296.

Vange (VARS)—1 December (Junk sale), 8 December (Christmas party), 15 December (Club project), 22 December ("Tobacco tins", by G8GRL), 29 December (No meeting), 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 H. G. Cunningham, G8FG, 235 Station Road, West Moors, Wimborne, Dorset BH22 0HZ. Tel Ferndown (0202) 876018.

Andover (ARAC)—6 December (AGM). First Tuesday and second Wednesday in each month, 8pm. Contact sec G4OZL for venue and details.

Basingstoke (BARC)—Second Tuesday in each month, 7.30pm. The Swan, Sherbourne St John, nr Basingstoke. Sec G4SQZ.

Basingstoke (UK FM Group Southern)—7 December ("AMSAT", by G3RWL), 7.30pm. Chineham House, Shakespeare Road, Basingstoke. Sec G3KWU, tel (0703) 812435.

Bournemouth (BRS)—Following the AGM held in October the following are now officers of the club: president, G3CPN; chairman, G3VPC; sec G4EKE; treasurer, G4FPF. 2 December ("Digital and computers", by Ted Eaton), 16 December (History of amateur radio with demonstration of ancient equipment, by G3SSJ), 7.30pm. Kinson Community Centre, Kinson, Bournemouth. Sec, tel Ferndown (0202) 877945.

Fareham (F&DRS)—7 December ("Tests on your radio", by G8GNB), 14 December (Natter night), 21 and 28 December (No meeting), 7.30pm. Portchester Community Centre, Portchester. Sec G4ITG, tel Fareham (0329) 234904.

Farnborough (F&DRS)—14 December (Christmas social), 28 December (No meeting), 7.30pm. Railway Enthusiasts Club, Access Road, off Hawley Lane, Farnborough. Sec G4BJQ, tel Farnborough (0252) 543036.

Horndean (H&DRC)—Second Thursday in each month, 7.30pm. Merchiston Hall, Horndean. Sec now G6IOV.

Jersey (JAEC)—14 December ("Aurora—what causes it?", by G2FKZ). A Christmas social and disco will be held in December, contact sec for details. 8pm. The Communication Centre, St Brelade. Sec Mrs M Smith, tel (0534) 23248.

Weymouth (SDRS)—6 December (Quiz), 2 January (Film), 7.30pm. Army Bridging Camp, Wyke Regis, Weymouth. Sec G3ZGP, tel (0305) 812893.

Wimborne (FRARS)—4 December ("Nick's Rambles", by G8MCQ), 11 December ("Another use for r!", by G3MDH), 18 December ("CW worldwide", by G4LFM), 25 December (No meeting), 7.30pm. Flight Refuelling Social Club, Merley, Wimborne. Sec G8VFF, tel Wimborne (0202) 882271.

Winchester (WARC)—17 December (Christmas social evening), 8pm. The Scout Log Cabin, Stockbridge Road, Winchester. Sec G3SHQ, tel (0962) 713003.

REGION 19—RR R. J. C. Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ. Tel 01-989 6741.

Cheshunt (C&DARC)—7 December (Junk sale), 14 December (Natter night), 16 December (Christmas dinner, details from Stuart, G8YGP), 21 December (Video show, by Nick, G8NDR), 28 December (No meeting), 8.15pm. The Church Room, Church Lane, Wormley, nr Cheshunt, Herts. Details from Roger Frisby, G4OAA, tel 09924 64795.

Chiswick (ABCARC)—20 December (Antennas—a discussion), Committee Room, Chiswick Town Hall, High Road, London W4. Sec W. G. Dyer, G3GEH, tel 01-992 3778.

Ealing (E&DARC)—Tuesdays, 8pm. This club has now moved back into its old HQ, now redecorated after the fire. All are welcome to attend at Northfields Community Centre, 71a Northcote Road, Ealing W13. Details from G3THQ, tel 01-450 8259.

Harrow (RSH)—2 December (Informal and practical evening), 8 December (Junk sale in the Belmont Room), 8pm. The Harrow Arts Centre, High Road, Harrow Weald. All are welcome to attend this club which is 100 per cent RSGB membership (I think). Further details from Chris Friel, G4AUF, tel 01-868 5002.

Havering (H&DARC)—7 December (Informal), 14 December (A film or video tape lecture), 21 December (Club Christmas party), 28 December (No meeting), 8pm. Listen on GB2RS. Fairkytes Art Centre, Billet Lane, Hornchurch, Essex. Details from A. Negus, G8DQJ, tel Upminster 24059.

London (Civil Service ARS)—5 December (Christmas festivities, 1230-1400, White Horse & Bower, Horseferry Road, Westminster, SW1. Good food and beer at a reasonable price), 19 December (No meeting), CSARS hold meetings mainly during the lunch hour at The Civil Service Rec Centre, Monck Street, Millbank SW1 on first and third Mondays of the month. Details from G. Costin, G4GFU, tel 01-632 6444, day time.

Stevenage (S&DARS)—6 December (Social evening), 13 December (Construction), 20 December (Natter night), 8pm. TS Andromeda, Fairlands Valley Park, Shephall View, Stevenage, Herts. Morse classes at 7.15pm. Pro Trevor Tugwell, G8KMY. Sec G4BGP, tel Baldock 893736.

Wanstead (ELGRSGB)—18 December (Social afternoon and video film show), 3pm. This group appears to still be in existence but so far have not been able to come up with a regular programme of events for the members. It is understood that the meetings are still held on Sundays at the Wanstead House Community Centre, The Green, Wanstead, London E11. Details from Julian, tel 01-550 7013.

REGION 20—RR B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, Bristol BS20 8NQ. Tel 0272 848140.

Bristol (BRSGBG)—19 December (Christmas party), 7.30pm. Queens Building, Bristol University. Details from Chris Short, G8GLQ, tel 0272 621253.

Bristol (NBARC)—December meetings will be concerned with the programme for next year, 7-9pm. SHE, 7 Braemar Crescent, Northville, Bristol. Details from Ted Bidmead, G4EUV.

Cheltenham (Smiths Industries RS)—8 December (Talk on "Antennas"), the club will also be operating with the club's call G4MEN from about 9pm local time on 3-735MHz + or - QRM, and will be hoping to contact other clubs and societies to exchange views and activities. SIRS hope to make this function a regular monthly event. c/o Sports and Social Club Office, Smiths Industries ADS Co, Evesham Road, Bishops Cleeve, Cheltenham GL52 4SF. Details from Roger Hawkins, G8UJG, c/o Smiths Industries Sports & Social Club.

Gloucester (GARS)—7 December (Talk and slides on "rock climbing", by Paul Sheridan), 21

December (No meeting), 7.30pm. St Barnabus Hall, Stroud Road, Gloucester. Details from Tony Martin, G4HBV.

Portishead (Gordano ARG)—28 December (Social evening), 7.30pm. Ship Hotel, Down Road, Portishead. 4 December (The club is organizing a medieval banquet at the Cadbury Country Club). Details from Robin Coles, G8ROC, tel 0272 691685.

Thornbury (T&DARC)—First Wednesday in each month, 7.30pm. White Horse Inn, Groves End (A38), 7 December (Start of "14s" contest, construction of tx and/or rx for the 14MHz band, using maximum of 14 transistors, and working, or hearing, 14 countries on 14m of wire antenna in 14

days). The actual "on air" contest is from 7 to 21 December. Details from Alan Jones, G8AZT.

Yeovil (Y&DARC)—1 December ("The radar 'moon bounce' equation", by G3MYM), 8 December ("The effect of non-linearity on sine waves", by G3MYM), 15 December ("Using fets", by G3MYM), 22 December ("Skin effect", by G3MYM), 29 December ("Natter night"), 7.30pm. Recreation Centre, Chilton Grove, Yeovil. Details from Eric Godfrey, G3GC, Dorset Reach, 60 Chilton Grove, Yeovil, tel 0935 75533.

Wishing all clubs, societies and members in Region 20, a very happy Christmas and a prosperous New Year. RR20.

Members' Ads

CONDITIONS OF ACCEPTANCE

These subsidized flat-rate advertisements are accepted as a service to members of the RSGB only. They must be submitted on the Members' Ad form printed on the back of a recent address label carrier used to mail *Rad Com* to the advertiser: this will automatically provide proof of membership and should not be more than two months old. No acknowledgement of receipt will be sent, and advertisements not clearly worded or punctuated, or which do not comply with the conditions of acceptance, will be returned. No correspondence concerning this service will be entered into.

Trade or business advertisements, even from members, will not be accepted for "Members' Ads" but should be submitted as classified or display advertisements in the usual way. Traders who are members must enclose a signed declaration that the items for sale or wanted are part of, or intended for, their own personal amateur station.

The RSGB reserves the right to refuse advertise-

ments, and accepts no responsibility for errors or omissions, or for the quality of goods offered for sale. Advertisements for citizens band equipment will not be accepted.

Warning. Members are advised that they should, as far as possible, ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The "purchase" of goods legally owned by a finance company could result in the "purchaser" losing both the goods and the cash paid.

The current rate is £1 for 40 words or less: advertisements containing more than 40 words will cost an additional £1 for every additional 40 or less words. Each advertisement must be accompanied by the correct remittance, either as a cheque or postal order made payable to Radio Society of Great Britain.

The closing date for the February 1984 issue is 15 December.

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS
Do not post to RSGB HQ or Advertising officer.

FOR SALE

Pye PF5 uhf single channel handheld, £35. **Pye Olympic 12ch** a.m., hb, £30. **Pye F30FM** lb base, £75. **PF1 rx**, £4. **PF1 9V** nicad, £1.50. **Pye uhf 12ch Olympic**, £100. **G8EPR**, QTHR. Tel Bewdley 403773.

Yaesu FT707 100W, fm, Yaesu FP707 power pack, Yaesu FV707 digital vfo, Yaesu FC707 atu, three-el beam, telemast, rotator, £600 ono. Tel Crawley (Sussex) 884941.

Photosensitive pcb material, copperclad glass fibre with positive photoresist (suitable developer caustic soda), lightproof coating protects before use, for sheet size 8 by 6in, single-sided, £2.70, double-sided, £2.95. Have also some larger sheets if needed. **G8THS**, 79 Coles Road, Cambridge CB4 4BL.

Jaybeam 10XY/2m, 10-8dB gain; two years old, cost new about £45, vgc, only £25. **Jaybeam MBM88/70** 16-3dB gain, 18 months old, cost new, £48, vgc, only £30. **G4MYQ** NOT QTHR. Tel Clacton-on-Sea (0255) 432586, after 7pm.

2m preamp MMA144, £18. Trio fast charger TR2400 in car, £15. **1/4 whip**, £3. **Chinon 35mm** reflex camera, automatic/manual, £50. **Realistic TRC2000**, new, £99, £35. **Nizo Super 8** cine camera, 8:1 zoom, new £225, £70. **G6ASA**. Tel Oxford 863333.

HW8 psu, atu, phones, swr meter, key, comp QRP station, £95 ono. **G4MPK**, QTHR. Tel Leatherhead (0372) 375514.

Trio 7010 2m ssb tx/rx, 144-175 to 144-395, 10W, mobile mount, preamp, beacon, xtal, mic, £100 ono. Labgear Tele-Verta, CM6022/RA, £7.50 incl postage. **G4TVN** (ex-G6BCO, QTHR). Tel Garstang (Lancs) 2687.

Yaesu FT902DM hf rig, mint cond, nine-band 160-10 tx/rx, YD148 base mic, £600. Can deliver within reason. Tel Andy, 0375 891552.

Yaesu FRG7700M communications rx, immac cond, memory unit, £270. **G3YWS**. Tel Newark 702413.

Personalized computer dx list, comprehensive printout giving prefix, country, zone, continent, bearing and distance from your QTH. Send name, callsign, location, longitude and latitude, £5. VHF contest program for BBC micro, checks for duplicates, calculates score, prints in RSGB type format, totals each page, £4. Checklog program for BBC micro, stores all callsigns, other facilities include contact number search, sorted page display on last letter of callsigns, £4. All incl p&p. **G4IAU**, QTHR. Tel Dave, 0924 270707.

Maximum ig, minimum ic, when they coincide cag is minimum! **Emsac 2m** tx, a.m., fm, cw, vfo or x18 xtals, two units, cct, spares, xtal for 144, 155MHz, super value and cond, £85. **G8EZZ**, QTHR. Tel 0584 3440.

Admiralty Handbook of Wireless Telegraphy Vols 1 and 2, good cond, offers. **G8PGV**, QTHR. Tel 0432 272201.

FT2772D fm, nine bands, dc-dc converter, fan, cw filter, £470. **FT707S**, 10W, cw filter, £280. **FC902**, atu, £80. **FF501DX** lp filter, £12. **Benchcr ZA1A**, 1:1 balun, £7. **Revco 15m** 20m traps, as new, £16. **G-whip** tribander, 10, 15, 20, 40m coil whip, base mount, gutter mount, unused, £25. **MM1000KB** ASCII morse converter, keyboard, £35. Buyers collect or postage extra. **G4BGE**, QTHR. Tel Bracknell (0344) 21502.

Hygain 18AVT/WB 10-80m vertical, with instructions, £40, carriage extra. **ZX81**, 32k rampack, absolutely mint cond, hardly used, incl several interesting books (approx value £15) and mcode compiler tape, £45 ovno. **G4GCL**, QTHR. Tel 0924 402257 (West Yorks).

Trap wire antenna, four aluminium poles, pulleys, ropes, stays, one of G2DYM from Tiverton, offers. Tel Honiton (Devon) (0404) 850501.

TS770 2m and 70cm multimode with matching speaker, exc cond, £425. Tel Emsworth (Nr Portsmouth) 71074.

Tono 9000E, hardly used, orig packing, manual,

£500. NRD515 rx, spkr, immac, £700. G4CEQ, QTHR. Tel Downland 55908.

Western dx 5V five-band portable vertical antenna, £25. G4GJB, QTHR. Tel Geoff, 0226 382411 (West Yorkshire).

Trio 7930 fm mobile, 21 memories, perfect cond, boxed, going for TR4000 dual-bander is reason for sale, £195, no offers. Purchased Feb 1983. G6CZX, QTHR. Tel 0326 318802.

Pye Pocketphones, two pairs xtalled SU8 (one pair needs tweaking), night call, new, charger, good batteries, £50 ono. *Wanted:* a.m. vhf high band equipment, wkg order. G6HEP, QTHR. Tel Lincoln (0522) 30867.

Yaesu and **VIC20** owners: make your own pcbs. Double-sided glass fibre pc boards, 160 by 100mm with 22 double-sided gold-plated connector fingers at 3.96mm pitch, £2.50 each or £20 for ten incl p&p. G4FZZ, QTHR. Tel 0473 622445.

FT290R, nicads, charger, case, plus FL2010, both virtually unused, in orig packing, lot incl mag mount and 7/8, £320 ono. Scooper MR110 10ch xtal scanning rx, xtals, £45 ono. G6TJE. Tel Robert, 0604 714218, evenings only.

Kenwood TS830S, instruction, service manuals, exc cond, £575. New DFC230 available extra. Yaesu FT200, mic, valves, incl 6JS6s, BM7360 spare, fine cond, £200. G-whip, incl 80m coil, £20. Can deliver along line Scarborough/Bristol.

G4HHH, QTHR. Tel 0947-880 245.

TS120V tx/rx, mobile mount, £275. TL120 linear, £80. Both mint cond. G-whip 80-10, £15. G3MKU, QTHR. Tel 0509 502611, after 6pm.

Trio 7010, mobile bracket, £100 ono. G6NFR, QTHR. Tel 051-523 7576, after 6pm, evenings only.

Eddystone professional communications rx, 10kHz-30MHz, continuous, ssb/cw/a.m., usb, lsb, pll tuning, in 100kHz steps plus general coverage, hi-stab oven controlled tuning, etc, mains in, relatively small size, full works manual, £295. Marconi Atalanta gen cov, 15kHz-29MHz continuous, in 10 bands, bandspread, calibrator, dual conversion, mains input, works manual, £110. Ex-USA APR13 tuners, four covering 50-600MHz, digital counter readout, £40. Ex-UK military TR1392D vhf rx, 150-600MHz, miniature valves, £50. Sailor type 76D marine band yacht a.m. tx, solidstate, 6146 pa, built-in psu for 24V, control box, handset, £35. Rhode & Schwartz gen cov vhf rx, 30-180MHz wb fm/nb fm/a.m., mains input, turret tuner, miniature valves, six bands etc, £100. G3OJR. Tel Hull (0482) 43343.

Sommerkamp TS788DX 10m multimode tx/rx, scan spkr, mic etc, £275. FDK ATC720 synthesized airband rx, case, £100. Linear amp, 10m, 20W, variable input, £70. G6YOG. Tel 01-668 8459.

Communications rx, Realistic DX300 10kHz-30MHz, quartz synthesized digital readout, triple conversion, operators manual, service manual, exc cond, orig packing, hardly used, £135. G4IBG, QTHR. Tel 0273 731391 (Hove).

BBC model B computer, 1.2 os, two months old, programs, £325. Sony ICF2001 rx, £85. Large Sword 3 eprom programmer, £50. Atari 400 computer, eight cartridges, comp, £100. Printer interface also available. Tel Hastings 444415.

Trio TS120V, used little, as new, manual, boxed, £265 ono. GM4UKG. Tel Inverkeithing (0383) 416688.

Acorn Atom micro, 12V power supply, leads, books, £90 ono. Standard C78 nicads, case, charger, all in vgc, £165. These items must go. G6IJY, QTHR. Tel Mike or Derek on Wakefield 374568 or 897257.

DX32 2-el 3-band beam, unused, orig packing, £80. 4 x 150A, pair, unused, £7 each. G8PB, QTHR. Tel West Wittering 3584.

TA33JR 3-el 20-15-10m beam, £50. BC221 wavemeter, mains psu, orig calibration book, £25. G3SCD, QTHR. Tel 0507 84283 (Lincolnshire), evenings.

Swan 350D, digital readout, 80-10 hf tx-rx, 125W p.e.p., good cond, manual, mic, two spare pa tubes. Prefer buyer inspects, collects, £250. G4SHD. Tel Dudley (0384) 235931, evenings and weekends.

Trio TR7800 25/5W 2m fm mobile, used very little, immac, mounting bracket, orig box, £180. GW3NSP, QTHR. Tel 0222 753622.

Double extended Eurocard boards, 64 rams, in wirewrap sockets, other sockets, either 64 Fujitsu MB8216E (equiv TMS4116-15NL) 16k x 1 D rams or 64 Intel D2125A-2, 1k x 1 Tristate 75ns, five rams, boards wired but circuitry unknown, offers. G4PUU. Tel 0865 725421.

FRG7 communications rx, manual, £150. RS84672. Henry Elliott, 16 Briscoe Crescent, Whitehaven, Cumbria CA28 6NQ. Tel Whitehaven 5212, after 6pm please.

Rad Coms 1974-83, 10 copies missing, offers. G4EHI, QTHR. Tel 030384 629 (nr Dover).

Morse tutor for BBC micro, morse key, keyboard recognition, over 1,000 words in memory for testing, variable morse speed available, much more, good value for money at £6.50. G6WORB or GW6UOL. Tel Bishopston (044 128) 3496.

FT101E, mic, leads, manual, spare pas, £300. Exchange for TS120S or TS130S. YO901P multiscope with leads, £200. Standard 828 ext vfo, £10. Standard 828, leather case, nicads, charger, rubber duck, £25. G3VYP, QTHR. Tel Yarpole 296.

Hygain TH6 beam, exc cond, Sommerkamp 788 dx all-mode 26,000-3,000kHz, Fantastic! Three-band beam antenna, 10/15/20, Collins KWM380, like new, save pounds. Tel Derby 557705.

Pye uhf-fm Westminster W15U, fully modded for 70cm, comp with six channels, fitted RB2, RB4, SU8, RB10, RB13, RB14, high spec xtals, high spec front end, control box, mic, colinear antenna, £60 ono. G3BYB, 1 Ashlands Close, Crewkerne. Tel 0460 75606.

Yaesu FT221R, fitted Mutek front end, can be seen working, £270. Datong rf speech clipper, suits FT221R, £25. Hansen FS710V power meter, £50. G4OQG, QTHR. Tel 0249 658336, after 7pm.

Books for sale: *RSGB Teleprinter Handbook*, 2nd edition, unwanted gift, £10. *Spotless Micro computers in amateur radio* by Joe Kasser, G3CZC, £4. *Spotless CBM64 games book*, £4. ICL X81 training course incl workbook, manual, cassette, all clean, £10 ono. Collins *Encyclopaedia of Fishing in the British Isles*, unwanted gift, immac, £8. Evans *The Mighty Micro*, £3. Heathkit continuing education course AC Electronics: DC Electronics: Semi-conductor Devices; Design Experimenter Model 3100, comp with all components, records, etc, cost nearly £200, offers around £75. *Wanted:* Heathkit rx model SW717G, working or repair. All includes postage except Heathkit at cost. G4HBU, QTHR. Tel Les, Bristol 611093.

Scanning rx, Fairmate AS32320, six months old, as new, vhf 110-167MHz, unusual uhf coverage, 296-367MHz, £100 ono, or would part exch for SX200N. G4OKC, QTHR. Tel Tony, Brixham (Devon) (08045) 4248.

FRG7, mint cond, fine tune, handbook, £115. FF5 If filter for FRG7700, new, boxed, £5. V4 four-way ant switch, new SO239 sockets, £6. G3ISP, QTHR. Tel 0632 837401, after 6pm.

Mosley Elan three-el, £35. G-whip 10/15/20/80, £10. 2m N8 whip, £3. 3BP1 cw base screen holder, new, £4. Large (7x4x4) 2x250pF, 3kV split stator capacitor, £4. 2x QVQ026, new, £5 pair. Collect antennas. G8FR, QTHR. Tel Emsworth 6177.

Trio TR7010 2m ssb, £100. Pye Lynx camera with lens, £25. 70cm 48-el multibeam, £10. 2m 5-el Yagi, £5. Oscar 10m mobile whip, £10. G4GUN, QTHR. Tel Taunton 79169.

Yaesu FT200/FP200 hf tx/rx, exc cond, mic, xtals for 10m, £220. Buyer inspects and collects. Will consider part exch with 2m base/portable rig. G4GRY, QTHR. Tel 01-226 1286.

FRDX400, exc cond, hardly used, 2-160m, spkr, vertical antenna, rotator, etc, books, offers for the lot! Kirkby, RS33101. Tel Romsey (Hants) 513145.

Yaesu 7700M, atu, SP820 spkr, boxed, new, £300. BC221 psu, £5. Grundig TK35 recorder, £10. QST 1953-4, *Electronic Engineering*, 1940, 50 copies, offers. Vintage radios, spkrs, etc. G8XCQ, QTHR. Tel 01-720 5839, evenings.

Kenwood TS520SE 160-10m, cw filter, MC355 mic, vgc, £350. Daiwa AF606K, all mode active filter, £35. G4KLT, QTHR. Tel 0706 46428, evenings only.

FT200, psu, exc cond, 10m, 28-29MHz, two new matched pairs 6JS6C, £165 the lot. Tel Guy, 061-432 2465, day, 061-798 0061, night and weekends.

30ft two sections, heavy duty, lattice tower, no winches, £85. Buyer collects. G6MBW. Tel Paul, Bath 66835, after 6pm.

North Downs QTH: 25 miles London, nr A20, West Kingsdown between Wrotham and Swanley, three-bed semi with 40ft Versatower, large corner plot at end of cul-de-sac, private garden, ch, double glazing, cav ins, shack in loft with windows, £36,000. Tel 047485 2577.

BRT400 gen cov communications rx, handbook, spare valves, £50. Eddystone 770R, 19-165MHz, £50. Lowe 2m monitor rx, fitted S20-23, R6-7, mains or 12V, £25. Pye Westminster W15AM high band 6 ch, £20. Comp set PET 2001 circuits, £3. Nelson Jones fm tuner, £15. Pair RCA813 valves, bases, filament transformer, £18. G3SNO NOT QTHR. Tel Amersham (02403) 7781.

Buffered ZX81 keyboard program 50chr buffer (type while it sends! Impossible with BASIC programs), fixed messages, user programmable

variable length gaps for contests etc, 2-180wpm, uses G4CIZ port, Sept 1982 *Rad Com* instructions for other ports incl, needs 2k min memory—simplified 1k version without messages available, state which, £4.40, post free. G4CIZ NOT QTHR, 22 Oakfield Road, Pamber Heath, Basingstoke, Hants.

FT227R tx/rx, 25kHz shift, auto scan, 144-148MHz rev/rep, + 80W lunar linear preamp, ideal high power mobile station, £325 ono. G8TPR, QTHR. Tel 01-864 8261.

Datong D70 morse tutor, mint cond, only used six weeks, orig packing, £48 ono. Tel 04215 3083.

Two AR88s: one working well, £25, one (lf model) us but ok for spares etc, £25 and £5 respectively. Buyer collects/arranges transport. G4LUF, QTHR. Tel Swindon 782787, evenings.

Yaesu FRG7700 with memories, comp with antenna tuner, active antenna, two vhf converters covering 118-170MHz, orig boxes, cost £600 but as replaced by R2000, only £375. Tel 09277 65713 (SW Herts).

Trio TS830S with DS2, boxed, workshop manual, etc, £530 ono. Trio TS120V, TL120, VFO120, SP120, comp with all accessories, boxed, as new cond, price negotiable. G4HSB, QTHR. Tel Peter, 0642 816608 evenings, or 242546, days.

KW Atlanta, ext vfo, one owner, recent KW full service, 500W, superb audio, any test, mint, £250. Moscow Muffler AEA WB1 built-in rf acting relay, really works well, reason for sale not required on new rig, boxed, £75. G3RHM, QTHR. Tel 01-423 0306.

W15AM Westminster single channel on 70MHz, £15. G4AKO. Tel 0954 211189.

TSR80 model 1, level 2, 48k expansion kit, Tandy cassette recorder, monitor, cassette word processor program, all as new, £200. G4GEV NOT QTHR. Tel Combe Down (0225) 832156.

TR2300, case, helical, manual, charger, two sets nicads, reverse repeater, £100 ono or exch IC202, 2m cw/ssb or IC2E. G6CHN, QTHR. Tel 061-480 1549, evenings or weekends.

Yaesu FT290R, comp with 2-2AH nicads, charger, carrying case, mobile mount, helical, Tokyo HL32V 35W linear, all boxed as new, save over £100 on list price, £295 ovno. Could deliver reasonable distance. G3OHC, QTHR. Tel 021-352 0199.

Trio JR310 rx, fitted 160m, vgc, £60 ono. G4CLZ NOT QTHR. Tel Warrington 601236.

Kenwood TS595S ssb tx, immac cond, boxed, manual, £170, buyer collects or can send. BNOS 6A psu, as new, £25. Adonis AM503 desk compressor mic, £18 ono. Drae wavemeter, vhf, £8. Electronic components, various, £5 lot. Tel 0702 618305, anytime.

Kantronics "The Interface" cw/rtty/ASCII link to micro, £115. Apple software, split screen, buffers, £23. Mini-terminal stand-alone tx/rx, in-built display, printer output, £220. Bearcat 220FB true a.m. mod, £175. G8PRR. Tel 01-340 4139.

FT101ZD, FC902 tuner, FLZ100Z linear, Shure 444 mic, fm, cw filter, low pass filter, comp outfit, £900. Might split. G4MWU, QTHR. Tel Chesterfield 810652.

NRD515 rx, NSD515 tx, NRD power supply, control unit, mic, comp set-up cost £2,800, five months old, quick sale, £1,800. New QTH forces sale. G4SFG, QTHR. Tel 021-544 7219.

Hammerlund HQ100A hf gen cov rx, spare valves, £55. G4GCI, QTHR. Tel Wickham (0329) 833488.

Moving to Norfolk? Bungalow, four beds, three rec, (one purpose built shack), utility, kitchen, bathroom, etc, 1 acre—trees/shrubs, permission tower/poles, sympathetic neighbours, convenient all services, £46,000. Ferrograph series 5, table/tapes, £60. Both ono. G3LDI, QTHR. Tel Wymondham 603463.

Vic-20 computer, cassette unit, 8k ram, super expander cartridge, rtty program, cw tutor, loads of software of all types, books, mags, £160 ovno. *Rad Com* vols 1974-82, offers. G3UCQ, QTHR. Tel Hayle (0736) 752982.

FRG7 hf gen cov rx, AT1000 atu, £150. UK101 computer, 8k ram, Mono 2, much software, £100. Both fully wkg, with literature, orig packing, any reasonable offers accepted, genuine reason for sale. G4TGJ NOT QTHR. Tel 0707 51449.

Memories etc, ex-eqpt, tested, 2114, 1k x 4, 50p. 2118 16k x 1 single rail, £1.25. 4116 16k x 1, three rail, 50p. Eproms erased, 2716, £1. 2732, £2. Processors 8085, £2. 6802, £150. Please add 50p p&p. Hemingway, Ivanhoe, Glen Road, Hindhead, Surrey GU26 6QE.

Switch mode power supply ITT DP5/20, 5V 20A, small, light, almost new, £17.50 incl postage. Triple output version, 5V 20A, and ±15V, 2A, £27.50. G3OHV, QTHR. Tel 04626 74011.

Standard C58 2m mobile/portable multimode with CPB58 linear, mobile mount, rubber duck, carrying case, nicads, £235 ono. G4MVE, QTHR. Tel Dave, 0783 848091 (Sunderland).

Versatower P30, ideal for small garden, £215. KR400 rotator with lower clamps, £55. AR30 rotator, £22. HQ1 mini quad, £42. QM70 2m high power transverter, £49. G4FXT. Tel Little Chalfont (Bucks) 2315.

Datong audio filter FL1, £30. AVO model 7, £25. Model 40, £25. KW pepmeter, £25. G4CJY, QTHR. Tel 0494 30018.

Sony C9 video machine, mint cond, used about six times, present retail price about £850, would accept £650. Passed RAE last May, require ham equipment. G1AIW. Tel 0841 520000.

Trio TS500 ssb/cw tx/rx, mint cond, full demo available, 3-5-30MHz, 180W p.e.p., xtal calibrator, mic, handbook, matching PS500 power unit, loudspeaker, ideal first hf rig, £160. Marconi HA4000 ssb/cw, 100W xtal tx/rx, 1-6-15MHz, £95. G3MCD, QTHR. Tel 01455 7093.

Yaesu FT290R, 25W linear, psu, nicads, charger, case, helical, swr meter, wavemeter, dummy load, 5A/8, gutter mount, HB9CV, various coaxial, package deal, £275. GW8YYZ, QTHR. Tel Conwy (049 263) 6474.

Trio 9R59D gen cov rx, £40 ono. B40 rx, £25 ono. G6YYU, QTHR. Tel Alex, Wymondham (0953) 604626.

Telephone tx inserts, STC 4050E, suitable for telephone handsets, £2 each, please include 30 pence for post and packing. G3ZQF, QTHR. Tel Medway 723694, evenings or weekends.

Imhof equipment cabinet, four panel chassis, handles, lockable rear door, new, bargain £30. Magnetic devices, 12V coaxial relays, unused, £4. Heathkit sig gen, mint, £30. 2m 6/6 with pole and remote control turning gear, £35. G8BJP, QTHR. Tel 0843 31069, evenings.

Robot 800, monitor, speed range is 4-99wpm, can be used as morse trainer also, used little, only six months old, £475. No offers. G4IQL, QTHR. Tel 01-653 3456.

Yaesu FT200, psu, £200. Yaesu mobile psu, £45. MM 2m converter, £17. Burndept 70cm mobile, £15. *Wanted:* hf tx/rx, Trio, Yaesu or similar. G4GBW, Tel Romford (Essex) 45733.

Codecall Datong switched selective call, three for sale, £20 each, or all for £50. Jaybeam 8-el crossed Yagi, 2m, £24. G6PUS. Tel Bournemouth (0202) 420909.

FT708R due to time wasters is still for sale, inc charger, mobile mount, £175. IC25E, £160, comp with orig packing. Peter Crosland, tel 0905 620041, home, or 021-454 8585, business.

Box odds incl Vernier slow motion drive, power indicator (new), lengths guy wires, toggle switch, dx-for list callback, variable double bank condenser, one toggle switch comp 1982 RSGB set magazines, £15 lot. Japanese BM3 desk mic, immac, £15. G3XWV, 13 Grimpts Lane, Birmingham 38. Tel 0564 822280.

Newbrain QRA program, gives bearings, distance and displays path on map of Europe, converts lat/long to locator, logbook keeps details of stations worked, microwave converts ngr to path details and draws path contours, £6 each. G8MWR, QTHR. Tel 0203 616941.

Comp cw station, six bands, Hammarlund HQ110 rx, Johnson Viking Ranger 50W tx, Dentsu el-bug, c/o box, suit new operator, £80 ono. Buyer collects. G3USE, QTHR. Tel Luton 20312.

Trio TS700 multimode, £275. 100W valve linear, vhf, £130 ono. IC255E, 1/25W, £130. MM144/100LS, £135. FDK Multi, 10W out, £45. FT221R, exc cond, £320. Magnetic mount antenna, 2m Bantex, £15. All ono or swaps w.h.y.? *Wanted:* 10in, 100+ out, linear, transistorized. Dennis, G6HKD. Tel Weymouth (0305) 787747, 834322.

KW202 rx, spkr, KW204 tx, QM70 50W 2m cw/ssb transverter, manuals, spares (36) for all valves, £325, if collected. AR240 synth, handheld, comp, £95. G3JMO. Tel Redcar (N E coast) (0642) 486155, anytime.

Daiwa Search SR11 vhf fm 2m rx, vfo, 6ch scan, xtal, x/4 antenna, exc cond, boxed, £40. Sale due to licence G6XHS. Tel Marlow (06284) 4677.

MBA-R0 morse/rtty/ASCII reader, perfect cond, hardly used, £125. Tel 0463 241211.

Icom IC24G 2m, 10W, fm, £100. DX4OU, external vfo, £35. KW Atlanta hf tx/rx, needs psu rebuild, £90 ono. TenTec PM3A 20/40m ORP tx/rx, £35. WS19 set and rotary power supply, £60. Tel Dursley 811454, after 6pm.

Rad Com pre-1980 being cleared out, offers? Teletype 15 etc, and unfinished rx with Eddystone 898 dial. D. G. Edwards, RS53928, 89 Merton Hall Road, London SW19 3PX.

HQ1 mini beam, in use two months, £50. Hallicrafter Sky Champion, rebuilt, rewired, £20. Marconi Mariner X, ac 240V, similar to Eddystone, £30. 4-30MHz, 150-1,400kHz. Buyer collects. G4NQ, QTHR. Tel Havant 486735.

Yaesu FRDX400 rx, as new, £100. 70cm converter tv camera, spare tube, 2m monitor, rx, lots of junk, shack clearance. Ian Bush. Tel West Wickham 01-777 5072.

AR22R rotator, boxed, 25ft cable, used little, £30. Mains transformer for AR22R, £3. 2m class "C" amplifier, 10W in, 35W out, preamp, in/out switching, £30. Copal 24h digital mains clock, £5. Carriage extra. G3YJI, QTHR. Tel Walton-on-Thames 223228.

SB101 Heathkit tx/rx, comp with HP23A Heathkit power unit 80-10m, cw/ssb 100 p.e.p., nice economic rig to start you on hf bands, still working in my shack, £130 ono. Make a sked? G3KCC, QTHR.

FTDX560, spare set of valves, mic, handbook, £200 ono. G3DOR, QTHR. Tel Staines 54236.

Morse tuition program tapes for Commodore 64, VIC20, Dragon, Spectrum, ZX81-16k (specify), no hardware required, comp with full operating and learning instructions, checks and scores your copy, characters are introduced in stages for easy, fast learning from complete beginner to GPO test standard and beyond. You control this, the speed and amount sent. Sends random character groups or a typed-in text for plain language practice. The best program to get you that A licence, £5. GW3RRI, QTHR. Tel 0286 881886.

TS120V, manual, service manual, MC35 mic, £250, no offers. Jaybeam 10XY, £15. Datong 144/28 converter, £20. All letters answered. A. J. Davidson, G4PSU, c/o Northumbria Hotel, Osborne Road, Newcastle NE2 2AT enclosing telephone number.

PET Commodore 4016k, tool kit, software incl morse rty station log, locator, games, manuals, PET bible, etc, £350 or consider exchange hf 2m base equip. Cash adjustment ok. G4MYU, QTHR. Tel 0282 697405.

TR2200 fm portable, fitted S20-22, S13, R6, R2, nicads, charger, toneburst, case, £65. G6MPH. Tel Bedford (0234) 46788.

TL922 hf 2kW linear amp, Trio, £450 ono. TS120S hf ssb tx/rx, £295 ono. TR2400 2m fm, syn, handheld, base charger, £115 ono. All in exc cond, orig packing. G6HBJ, QTHR. Tel 0844 237093.

Akai portable vtr outfit VTS110 monochrome reel-to-reel, fitted nicads, monitor camera, power unit, tapes, cases, manual, uhf adapter, £140. Icom 1050 10m fm, £30. G4ULR. Tel Norwich (0603) 51656.

SX200N, used little, exchange for FRG7700 unmodified, 26-88MHz, 108-180MHz, 380-514MHz a.m./fm scanning rx, 16 memory channels. Not interested in sale/purchase. G4DBA. Tel Carlisle (0228) 24027, evenings.

Icom 740, mint, virtually unused, fm board, internal ac psu, desk mic, genuine reason reluctant sale, £750. G3ONU. Tel Garston (Herts) (09273) 76344, after 7pm.

Atlas 210X with noise blanker, £220. Atlas 210/212X base station, console, power supply, £75. FT101B, £260. FV101B, £55. G3LLL rf clipper for FT101B, £25. FL2100B linear amplifier, £320. Swann 500, ac, dc power supplies, console, £175. FT221R, £270. Prefer seen tried, collected. G3IPZ, QTHR. Tel 0625 874779.

2m linear amplifier, 10W in, up to 80W out, ARRL QST design, £50. Digital lcd 24h battery alarm clock, £5. 1947-77 *Short Wave Magazines*, 1954-66 bound, offers. All carriage at cost. G3YJI, QTHR. Tel Walton-on-Thames 223228.

Yaesu and VIC20 owners: make your own pcbs. Double-sided glass fibre pc boards, 160 by 100mm, 22 double-sided gold-plated connector fingers at 3-96mm pitch, £2.50 each or £240 for 10 incl p&p. G4FZZ, QTHR. Tel 0473 622445.

FT290R, nicads, carrying case, vgc, £210. Pair PF1s on RB2, spare xtals on SU8, RB4, RB11, £20. MM432/144 converter, MM432 varactor tripler, in one unit, inbuilt changeover switching, £20. G6BBS, QTHR. Tel Cosham (0705) 388488, evenings.

Belcom LS102L, 10m all mode mobile tx/rx, 28-30MHz, 26-30 possible continuous coverage in 1k, 100Hz steps, three digit l.e.d., 10W output, as new, orig packing, Colt 100W linear with preamp, 1-8-30MHz, £250 pair, will split. G4TKP. Tel Derby 383442.

Bird 43-element 100D, 100W, 200-500MHz, £30. Mutek 1,296MHz preamp board using NE64535, £12. *Wanted:* Yaesu transverter boards for 70MHz and 432MHz. Bird 43 vhf/uhf elements, w.h.y?

Coaxial relays type CX600N. G8KAX, QTHR. Tel John, Hornchurch 57782, early evenings.

TS700G multimode tx/rx, £260. Acorn Atom, fully expanded, £100. Monochrome display £40. MML432/50 70cm, 50W, pa, £80. Phillips FM321 70cm, 40 channel tx/rx, working but battered, £50. G6JIT. Tel Bedford 751397, evenings/weekends.

Datong FL1, £35. Himound HH710 key, marble base, £20. ETM2B keyer, £25. Trio HS6 headphones, as new, £10. Eagle stereo preamp model 402, £6. *Wanted:* quad aluminium spider and glass fibre arms. G3POX, QTHR. Tel 0480 811549.

FT101 MK2 with G3LLL clipper, fan, mic, spare pa valves. FC301 tuner. Both mint cond, any trial, will split, £375. Deliver 50 miles or carriage extra. G3GRX, 16 Monnington Way, Penrith, Cumbria. Tel 0768 64890.

TR2400 143-148MHz touch tone system, plus and minus shift, 10 memories, memory scan facility, ST1 base stand, MC30S mic, belt clip, spkr/mic, charger, manual, orig packing, vgc, £170. Genuine reason for sale. Tel 0509 504163, after 6pm.

Collins R278 uhf rx, 220-400MHz, 1,750 channels, 240V ac, good cond, wkg, comp with manual, £45. GRC9 portable ex-NATO hf tx/rx, 1-9-12MHz, vfo or xtal, incl hand generator, 6/12/24V dc psu, mic, cables, as new, £40. Park Air Electronics professional air band rx, type 1700, 118-136MHz, scans eight xtal channels, built-in nicads and charger, 240V ac, 12V, dc, very sensitive, not broadband, technical manual, as new, £60. G4JMF, QTHR. Tel 051-355 3854, home, 051-339 4181, ext 211, office. IC245E 2m multimode mobile tx/rx similar IC260E, just overhauled by Thanet, remote control box, memory back-up, good cond, £190 ono. *Wanted:* McMichael Radios. G8HDF, 55 Hazell Way, Stoke Poges, Bucks, SL2 4DD. Tel Farnham Common (02814) 2396, after 6pm or weekends.

Yaesu FL2010 2m linear amplifier for FT290, 3 to 10W, £39. G4RRG. Tel Worcester 352110.

Yaesu FT101E hf tx/rx, first-class cond, comp with Shure 444 desk mic, new, sold together for a real bargain, £350. G4ITS, QTHR. Tel 0452 67725, evenings or weekends.

TenTec Omni, superb cw/ssb eight-band rig, QSK, 200W, incl mains psu, keyer, £475. Trio TS510, PS510, five-band ssb/cw, £150. Free delivery UK. G3YIQ, QTHR. Tel 0270 841168.

Sharp M280K, comp with Sharp P3 printer, io box, sell or exchange for 70cm equip. W.H.Y? G6MSM. Tel Eastbourne (0323) 840209.

Trio TR9130, exc, £350. Trio R1000, superb rx, £190. Tonna nine-el crossed Yagi, new, £30. VHF atu, works fb, £10. Need cash for hf gear. Will haggle. G4UWW. Tel Tony, Boxted (Essex) (0206 36) 853.

Trio TS530S, AT230, SP230, HS6 phones, MC35S mic, narrow ssb filter, first-class equip, 12 months old, cost £800 today, accept £600. Telescopic 7m galvanized mast, £50 ono. *Rad Com* '68 to date, best offer secures. Tel Andy, 021-451 2571.

FRG7, digital readout, Collins mechanical ssb filter (very selective) fm board, xtal calibrator, xtal controlled bfo injection, ext appearance exc, mod details available, carriage by Securicor at cost if necessary, £125 ono. G4ABF. Tel Malvern 66202, before 7pm.

FT101ZFM nine-band c/w mic, handbook, fan 101Z, cw filter, dummy load, atu, swr meters, comp station for £500 ono, needs only 13A socket, antenna and operator, can you help? G4HNB NOT QTHR. Tel 061-653 7055, weekends, and Fridays after 7pm.

Trio TR7500 2m fm, 144-146, mobile bracket, handbook, boxed, £130. G8HED NOT QTHR. Tel 0782 519439, Fridays evenings or weekends.

Ten fm rigs DNT M40FM or LCL 2740FM, modified and tested 29-310-29-700MHz, unused, perfect for Christmas, £33 each. Kenwood R300 rx, £90. Zetagi 30W linear, ideal for mobile 10 fm, £18. G4SNO. Tel 0562 884824, evenings.

Eddystone 680X rx, £50 ono. Cossor 1045K sb oscilloscope, not used for two years so might need attention, offers. Both comp with handbooks. G3YVK, QTHR. Tel Upminster (Essex) 24265.

HF and 70cm gear: Trio TS120V, PS20 psu, AT120 atu, narrow cw filter, 270kHz, HP5 trap vertical, £430 or split. Transverter, MM432/28S, £120. Freq counter MMD 050/500, £50. G3KHZ keyer (cmos) £20 comp. G4TBF. Tel Ted, Blackpool 700637.

FT790R, nicads, six months old, £275. UK101 disk interface, £45. ROM DO5, £35. Buyer collects/pays carriage. G6DAA NOT QTHR. Tel Ringwood (Hants) 5267.

Yaesu FL2100B linear, £240. Shure 444 mic, £25. Shure 407A mic, £20. G3LGB NOT QTHR. Tel Torquay (0803) 313318.

HW7 QRP tx/rx, good cond, 7, 14, 21MHz, great for

a new G4. 16k ZX81, many tapes and books, all leads, psu, DX100L rx, ssb/a.m., 150kHz-30MHz, bought in October 1983. 12AVQ vertical antenna, 14, 21, 28MHz. Many radio and electronic magazines. Sell or exchange/part exchange for HW101 or similar hf rig. Offers? W.H.Y? G4SYI. Tel 01-958 9868, after 5pm.

Tono 900E, £500. GEC vhf mobile tx/rx, £20. Electron Oric BBC programs morse tutor, £4.50. QTH locator, £4.50. BBC rtty, £5. FT290R, nicads, helical, 25W linear, £255. T. Tugwell, G8KMW, 11 The Dell, Stevenage, Herts. Tel 0438 354689.

KWM2A, ac psu, 30L1 round emblem, late model, handbooks, set spare valves, will split, £1,050. Drake B-line WARC/160, xtals, new pas, handbooks, £450. VFO240, used little, £85. FRG7, £135. Acorn Atom 12k via, books, cassette deck, rtty/ORA progs, £175. All open to offer. Part exchange or buy TL922A, VFO230 diesel generator. G4BWP, QTHR. Tel 0462 812383, anytime before 10pm, December only.

TR2200G 144MHz fm tx/rx, R1-7, S20-23, nicads, case, charger, exc cond, £70 ono. Can deliver Kent, Essex, London, SE, E. G3VTT, QTHR. Tel Maidstone (0622) 39936.

Daiwa SR9 2m rx, full vfo coverage, facility for 11 xtal controlled channels, nine already fitted, £38. Datong morse tutor, £36. *Wanted*: linear amplifier with preamp to suit FT290R. G1ACL. Tel 01-889 3952.

Eddystone gen cov rx, 730/4, cw circuits, hand-book, £75. Trio 7200G 2m fm tx/rx, all repeater channels, 10 simplex channels fitted, 10W, 1W rf output, £85. Russell Barnes, 39 Newlands Lane, Worthington, Cumbria. Tel Worthington 4954, weekends only.

Parabeam vhf 14-el pbm, 14/2m, nearly new, £25. G4RMM. Tel Ruislip 31240.

Creed 444, £45. Buyer collects. RX80 kit, see 1981 *Rad Com*, £100. AF filter kit, *Ham Radio* July 1983, £12. Surplus af filter, £2.50. Ten 2m transverter, QV0640 pa, £50. G3RHI, QTHR. Tel Bratton 830606.

Power supply, 11A continuous, amp meter, fully protected, British made, as new, £29. Drae vhf wavemeter, used three times, £19. Portable cassette recorder, tape counter, used little, £7. Stereo headphones, hardly used, £3. G6MEF, 97 Redland Drive, Northampton.

Racal RA17 rx, good cond, £160. P.A. Curran, Old Ship Inn, Market Place, Worksop, Notts. Tel 0909 476354.

KW2000A, ac psu, vfo stab mod, mic, manual, Q-mult, mobile inverter, £195. Trio TS700 2m multimode base station, cw sidetone, 17W out, £225. Codar AT5 mic, psu, manual, £30. Heathkit OS2 scope, £25. G4MTG, QTHR. Tel 021-430 6764.

Datong FL3, £90. Various valves, state wants. *Wanted*: Shure 444 mic. G2UZ, QTHR. Tel Leeds 784074.

33ft two-piece steel antenna tower, £100 ono, or exchange for Trio 7010 or similar. G6STD NOT QTHR. Tel Burley (042 53) 3559.

KW2000A hf tx/rx, ac psu/spkr, mic. Updating University of Exeter club station. G3PBV. Tel 0392 77911, ext 416, daytime, or G3XEU, QTHR.

FT101, G3LLL mixer, fm converter, £205. Eddystone 730/4, £55. DC psu, 13-5V, 4A reg, £15. 12AVQ, £20. Delivery 30 miles from Chelmsford. G3JUX, QTHR. Tel 0245 71905, after 6pm or weekends.

TS130SE hf tx/rx, power supply, swr meter, G-whip antenna, all in exc cond, £475. Tel 01-399 2502, evenings and weekends. G4RGG, QTHR.

TS520, vgc, £295. Heath HW100, fitted new vfo drive, £120. Marconi HSR21, a.m./ssb, 2x6146, Naval surplus, £30. Collins TCS12 rx, few hours use since new, suit collector, £20. G3ZAC, QTHR. Tel Dover 820626.

Collectors' items: B34 Admiralty receiver, isotope counter, Dekatron scaler, power pack, lead castle, five pH/mV meters, 1930-60, some brass/ebonite types, Ferranti rx type 255, Facit CA1-13 calculator, typewriter, portable, Remington, 1932. Tel Oxford (0865) 247213.

KW2000B tx/rx, ac power unit/spkr, £225. Remote vfo 4B, no mods, owned from new, exc cond, £45. Audio amplifier/PP807S modulator, 500/250V pu, mercury vapour rectifiers, on two chassis, offers? G2FUU, QTHR. Tel Nazeing 2274.

Pye Cambridge dash radio telephone, two glider channels, 130-4, 130-1MHz, vgc, £80. GU3HKV, QTHR. Tel 0481 47278, 6-7pm only, Tuesdays to Fridays.

All new this year: comp fm 2m station, 144-146MHz, exc wkg order, comprising Tonna beam and rotator in loft, all connecting cables to a Western controller, tx/rx FDK700 multi and MM preamp, swr and pwr meter, all plugs attached to

cables, 12V, 10A power supply, £325. First £300 offer can take it away. Reason for sale, ill health. E. Clarke, G8AO, QTHR. Tel South Shields 554818.

KW1000 linear, recently overhauled by KW, new transformer, exc cond, hence £260. Two roller coasters, £5 each. Five wide-spaced tuning capacitors, incl one twin-gang. Carriage paid on all items. G3UCQ, QTHR. Tel Hayle (0736) 25982.

Trio MC60/56 desk mic, £25 ono. Datong anf auto notch filter, £25 ono. G6HCV, QTHR. Tel Codsall (Staffs) 4532.

Two-el quad beam for 10 and 15m, good cond, £45. *Wanted*: TA33JNR or TH3JNR three-el triband or swap for above. Cash adjustment if necessary. G4RPX. Tel Peter, Congleton (02602) 4026 (South Cheshire area).

IC25SE 2m fm 25W twin vfo, five memories, handbooks, circuit diags, packing, mobile mount, £140 or offer. G8UXU, QTHR. Tel 01-467 2600 ext 597, office hours.

VFO 230, exc cond, used very little on TS830S, orig packing, instructions, all leads, need money for vhf rig, can you help, £185 ono. Will send by courier. GM5DUB or GM4/5B4GF. Tel Edinburgh (031-664) 3258.

Robot 400 slow scan television scan converter, perfect cond. Tel Ron, 01-462 2222.

FT290, nicads, charger, Mutek fe, case, charger, 25W linear, 30W mm, not used, 7/8 Oscar, gutter mount, car bracket, £350 ono. Tel 0293 25032, for details.

Trio 9000 multimode, 2m, good cond, mobile bracket, scanning mic, £249. G3KCR NOT QTHR. Tel Seaford (0323) 890726.

Mains transformers, 100-0-100, 250-0-250, 350-0-350, 80mA +, 5V, 3A twice, 6-3V, 3A twice, £5. 475-0-475 250mA, 13V 6A, 4V 2A, 35V 0-2A, 4V 2A, 35V 1A, £6. Gardners 6-3V 5A, 6-3V 1A, £3. G3MBL, QTHR. Tel 01-445 4321 (N London).

70cm fm standard C78, gwb but new nicads required, comp with handbooks, charger, £115 incl post and packaging (less if buyer collects). Graham Carrington, G8WVI, Nurses Home, Lister Hospital, Coreys Mill Lane, Stevenage, Herts.

Heath SB401 tx (6146B pas) SB303 rx, solidstate, cw filter fitted, operates transceiver or separate, SB600 matching spkr, manuals, £225 lot ono. Carriage arranged at cost. GD3RFH, QTHR. Tel 0624 843209.

West Wales: spacious three-bedroom bungalow, double glazing, central heating, chalet in grounds, at present used for letting, stable and paddock, on bus route, fishing, golf, half hour coast, good hf position, excellent pull-in offering great potential, £39,950. Tel 057-045 403.

Swan 350, as to cond contact G4JAZ, QTHR, £199. Mosley 2-el Trap-master, TA32JR rotator, 103SAX, control, all good cond, will not split ant or rotator as bargain at £120. Be on hf for £319. G3BWN, QTHR Nottingham.

Europa 2m transverter, £50. Tektronik RM503 scope, £110. Two Lambda regulated power supplies, 125V input, 325/500V 400mA output, for the price of one, £55. G3LXX, QTHR.

NAG 144XL 2m linear, built-in power supply, preamp, 250W out, as new, £325. G27 10m 5/8 vertical groundplane, £7. Jaybeam 6-el 2m quad, £15. G4IOF, QTHR. Tel 01-486 8286, daytime, 01-722 7040, evenings.

2m ssb Liner 2, covers 144-130 to 144-330, worked some good dx, comp with preamp homebrew psu, want about £70. G4KYA, QTHR. Tel 0427 890204, after 4pm.

Feeder coaxial, 75Ω, 0-5in diameter, double screened, 165ft, £8. Mobile power cable, connectors for Drake TR3/TR4, £4. "Advance" voltstabs CV100A, output 252V 100W bulb, 244V 150W bulb, further tap 316V, no load, leaflet, £6. G3MBL, QTHR. Tel 01-445 4321.

RGD radio gramophone auto, 1937, best offer. E.N. Diamond, 11 The Close, Furzeham, Brixham, South Devon TQ5 8RE. Tel Brixham 3772.

Standard C78 70cm fm portable, nicads, mobile bracket, case, £195. Drake 7077 desk mic, £25. Azden MEX55 mobile swan-neck mic, preamp, unused, £19. G4IOF, QTHR. Tel 01-486 8286, daytime, 01-722 7040, evening.

Oric 1 morse decoder and tutor program, practise sending and receiving up to 30wpm with full verification and checking, menu driven, six functions, random letters, numbers, groups, sentences, plot keyed waveforms, cassette and instructions, £4.50. G6IDQ, QTHR.

88mH coils, 3AF type, used, special Christmas offer, £2.25 per pair incl. T. Sherman, G8XAJ, QTHR. Tel Bedford (0234) 766183 for availability.

You need wire? Packs of 100m pvc-covered stranded connecting wire (approximate diameter 1-2mm) containing 10 coils of 10 different

colours. Single 100m lengths—ideal long-wire antenna! £2 each, will include postage. G8THS, 79 Coles Road, Cambridge CB4 4BL.

Morse talker MMS1 Microwave Modules. I can't bear to be parted with oldy G8 call, so no use for this advanced morse tutor, only £75. G8FQT, QTHR. Tel Horsham 56245.

Muirhead fax printer, circuits, data, £45. Superb parallel ASCII keyboard, 24 function keys, eight i.e.ds, £35. Marconi mobile data equipment, write for details, beams, rotators, meters, 2m swr bridge, A43R uhf fm mapack, 200-400MHz, 6ch, antenna, mic/headset, nicad, £35. *Wanted*: small modern receive-only tu, must have range of shifts, speeds, 1in paper tape items, winder, storage boxes, editing block, w.h.y? Castor conversion for ASR33 floor stand. Bob Sayers, G8IYK, 40 Royal Oak Drive, Leegomery, Telford, Shropshire TF1 4SS.

TTL cookbook, £5. CMOS cookbook, £5. Mutek 2m preamp, £10. 19in rack mounting case, cw heatsinking, £10. New 13-8V power supply, £11. Feller Office Master accounting machine, £8. AOI base mic, £10. Orange guitar phaser, £15. Mobile compressor mic, £7. Mobile rig alarm, £5. MoD 2m/70cm tripler, £9. Speech processor, £15. 10m helical mobile whip, £8. Coaxial relays, as new, £5. New 200A meters, £1. New coaxial switch, 3-way, £4.50. Comp set *Radio and Television Servicing*, 19 volumes, pre 1954-1974, £35. BF900 SD306 mosfets, 75p. Tonna 2m phasing harness, £12. New 9-el Tonna, £10. G8MAG. Tel Milton Keynes (0908) 676221.

Sharp MZ80K personal computer, xtal Basic, Sharp Basic with toolkit, assembler and disassembler, large collection of games, information software, manuals included are Sharp Basic and xtal Basic, also some past newsletters, £300 ono. G4NTT, QTHR.

TS830S tx/rx, £525. AT230, £90. SP230, £30. LF30A, £10. TR2500, £185. Mobile mount MS1, £15. SMC25 spkr/mic, £10. All in mint cond, no mods. Data Dynamics ASR33 teleprinter in wkg order, £40 ono. G4JXU NOT QTHR. Tel Reading 698276, evenings/weekends.

Morse tutor, Datong D70, as new, £30 or w.h.y? *Wanted*: YM24A spkr/mic for FT202R. GM6FOJ, QTHR. Tel Kilmarnock (0563) 32561.

Shack sale: FT77 100W /M hf rig, as new, £400. Eddystone 880/2 high stab rx, 0-5-30MHz, 30 bands, £235. 770R rx 19-165MHz, gc, £95. Standard C5800 2m multimode, as new, £300. Hallicrafters SX110 rx, £75. Telford TC7 rx, tunable 28-30MHz, a.m., fm, ssb, £35. 2m converter for TC7, £10. G4AFY, QTHR. Tel Kidderminster (0562) 753358.

Drake T4XC-R4C amateur band tx/rx, AC4 spkr/ps, 0-5kHz rx filter, Addit sw range, connecting leads, manuals, no mods, two spare 6JB6 pa tubes, £370 ono. G3ISG, QTHR. Tel Bristol (0272) 565860.

Standard C8800 10W fm mobile tx/rx, five memories, scanning from mic, 5/25kHz steps, exc cond, orig packaging, £160. G8UZE, QTHR. Tel 01-654 2665.

Transformers, 200-250 in, 350-0-350, 250mA 6-3, 4A x2, 5V 3-5A, £6.50. 6-32A, 6-3 1A x 2, £1.50. Shure mic, 561F 25Ω on Flexiarm, £3. Microammeter, 20fsd dial aperture, 105 by 58mm atu wd type, 2-8MHz, £3. Ceramic insulators for ow feeder 44, £2. Tel 01-654 3434.

Yaesu FT200, Europa transverter, £219. Pye A200 pa, service manual, £30. G4MEO. Tel Sandy 80043, after 6pm.

Yaesu FRG7700 gen cov rx, FRT7700 atu, three months old, vgc, £225 ono, Tel Carlisle (0228) 35177.

Yaesu FT901DM de-luxe model, used little, as new, owner living abroad, £495. Sorno 700 uhf 12V 6ch radio telephone, new, £95. Sorno 600 12V radio telephone, fitted marine xtals, £90. Mains supply for Eddystone EC10, £16. ASCII keyboard, £20. Owner returning to UK for two weeks from 1 December. G4HYQ. Tel Bracknell (Berks) (0344) 3696.

WANTED

Attempting my own "real" radio collection. Good price paid for mint 19 sets, 38 sets, 1154, 1155, BC348, anything of this era accepted. W.H.Y? G3ZYC, QTHR.

For Panda Explorer hf tx, circuit, manual. Manual for Taylor valve tester model 45C, and valve charts for same, photocopies would do. Datong D70 morse tutor for Avevale ARC. Tel P. Peach, Axminster (0297) 34259.

For disabled housebound person, funds limited, Viceroy 3 psu and mic or any parts. PSU urgent for testing. RAIBC member. C.T. Curtis, 554 Middle

Park Avenue, Eltham, London SE9. Tel 01-859 1191.

Yaesu 221 or 225, Icom 211 or 251 with or without Mutek front end board. Letters only please. Peter, G8IQO, QTHR.

Bearcat 220 circuit diagram, buy or borrow for copying. G8OZH, QTHR.

For the wireless museum: old radio books, magazines, catalogues, QSL cards, callbooks, morse keys, valves, components, spkrs, shelving, any old knobs! Collection arranged. Details please to hon curator, G3KPO, QTHR. Tel Ryde (0983) 62513.

Planair type blower motor for use with 4CX250B linear amp project. Please contact Dave Newman, G4GLT, Newhaven, Beveridge Lane, Bardon-Hill, Leics LE6 2TB.

Watkins & Johnson twts, 24GHz bits, MMT1296/144 transverter, VIC20 peripherals, can provide address in England. For sale: worldwide frequency list, 10 to 160kHz, 80 pages, £7. Crispino Messina, 15XWW, Via di Porto 10, 50058 Signa FI, Italy.

FL101 in good cond. Connecting cables for FR101 if possible. G4YK. Tel Micky, 0206 35225.

For Chalk Pits Museum, Amberley: Jones plugs and shells for T1154, R1155. For own use: R1155 meter deflection and aural sense switches, knobs, screw-on legend plates. Acons xtal mic types MIC33, MIC35, MIC36. G3KXF, QTHR. Tel 0903 764599 ah.

KW2000B in A1 cond, squeeze keyer, P1 output coil and switch assembly for LG300. TT11 and 6AG7 valves. Sell Eddystone EA12, handbook, spare valves, £130 ono. Pair new boxed TT21s, £12. G3AIO, QTHR. Tel Pembury (Kent) 2836.

Tektronic 585 'scope manual, circuit or any information to buy or borrow for photocopy. G3VZE, QTHR.

Burndebt uhf 3ch hand portable tx/rx, must be comp with Varta nicads, same used by Home Office, Fire Service, etc. Battery charger must be in mint cond. Good price paid. Tel Burnley (0282) 59320 between 5 and 10pm, please.

Still required, pair of each: 2A3 and 6C5, 6F6, 6L6 metal valves, must be of USA origin and close wartime period. G4IMT, QTHR. Tel Bath 891254.

Manuals, circuits or any info for Inoue IC700T and IC700T, buy or borrow for copying. Info for Marconi scope Q-scan TF966A. All costs paid. G4FQW, QTHR. Tel Accrington 391682.

Info, handbook, advertising literature, service manual etc, originals or photocopies for Trio 2200G (new circa 1975). Spares/accessories, esp xtals. W.H.Y.? All letters answered. G8URI, QTHR. Tel Romford (0708) 751808.

SK800 base and 4CX1000A. G14TAP, ex-G18UPV, QTHR. Tel 0232 620728.

Bases for QY4-400 valves. Glass chimneys. Large ceramic switch for pa network, vacuum sealed relay single or double pole. G3YCP, QTHR, Somerset.

Old airguns, rifles, pistols, air canes, etc. Private collector pays good prices, give me a ring and I'll make an offer, or call if you're near enough. Garrard click filter (audio). G6VAJ, QTHR. Tel Brighton (0273) 550509.

Information on modifying FT200 for fm. Norman, G4RYS, 23 Moor Allerton Avenue, Leeds 17.

Help: conversion details Pye Vanguard AM25B for 4m, any information on 4m activity. Workshop manual for Sommerkamp FTD500/400, all costs gladly paid. G4TVN, ex-G6BCO, QTHR. Tel Garstang (Lancs) 2687.

Hewlett-Packard noise sources 'type 343A, 347A, 349A or w.h.y.? for HP340B noise figure meter? HP340B manual to copy and return. Please contact either G4AEQ or G8AFC, QTHR. Tel 061-865 3183, after 6pm.

TS700S, all mode, 2m tx/rx, first class cond essential. G3WEX, QTHR. Tel 021-354 4265.

Circuit or manual for Star SR600 amateur band rx. Info on Pye F460 base uhf, RTC controller, PF70 handheld. For sale: WS62, WS52, WS38, R1132, R1359, R1155, BC342, BC454 etc. Cain, G3DVF. Tel Alnwick 602487.

Mains power supply for Codar AT5, small, 160 through to 10m cw only transmitter or a.m./cw. Complete and working 62 set. Complete MK123. G4GDR. Tel Swindon 762970.

Amateur Radio Handbook, 3rd edition, May 1965 picture Bromley station inside cover. G6WZF. Tel Ipswich 830147.

Coils for R1082 and accessories, T1154 antenna amp meter, generator, ht plug, type F key, junction 4191, control 4189, TCS12 rx for spares, R1475 chassis, R1116 bits, test set 65, good prices. T1396 TR9, any restorable cond, buy it or swaps in any amount, T1154M, R1155A, R1082, rare Marconi DFP2 rx, sw direction finder, 700 USA second world war, cased, Vols 1-6 **Radio & Television Repair Manuals.** Other interests T1115, T1083, German airborne. Work not objected to. D. Parsonage, 52 Bramble Lane, Mansfield, Notts NG18 3NR.

Sony ICF2001s circuit diagram and any info. Please contact F. Deravi, G6WVDS, Dept Elec Eng, University College, Swansea SA2 8PP.

For FT7 power pack, FL110. 180m adaptor or instructions to build. G4DDN, ex-G8YLF, QTHR.

QTH exchange for month's vacation during 1984. Will exchange modern home in Los Angeles area with ham station, and use of car, for similar facilities anywhere in UK. Monty Bancroft, W6NJW, 9921 Edmore Place, Sun Valley, Calif, 91352 USA. Tel 213-767 3499.

Modification information, circuits, alignment details etc, to successfully convert Fidelity cb 1000 fm legal cb to 10m use. Can photocopy or cover costs involved. Any help most welcome. G3TZV, c/o 3 Geneva Road, Bramhall, Stockport, Cheshire SK7 3HT.

Two or three good TT21s, quote price. G3CIX, QTHR. Tel 041-881 4440, reversed charge accepted after 6pm.

Service manual, Ferguson 3463 music centre, tape section in particular. Richard Bowell, 16 Margaret Way, Wickford, Essex SS12 0ER.

Tx/rx, in working order, very very modestly priced to get GM4UWO on to hf bands. Letters please to G3UWU, QTHR.

Wanted dead or alive: old or unusual radio valves for private collection. Buy or exchange, send list of valve numbers, postage refunded, other collectors please contact. G3LMR, 112 Groby Road, Glenfield, Leicester. Tel John, 0533 871522.

Z-match antenna matching unit for KW2000A tx/rx, KW or SEM Z-match type. What I am after is an antenna tuning unit capable of handling a couple of hundred watts of rf. Tel Wells (0749) 77433, day or night.

Heathkit HM102 swr power meter. 4mF 600V paper cap, 1.75 by 1.75 by 4.5in (2). G3RWH, QTHR. Tel 0983 293323.

Yaesu extras, FC700 atu, FTV700 with 2m module, must be working and at reasonable cost. IC201. Derek Andrews, G4EZZ, 26 Kings Way, Harrow HA1 1XU. Tel 01-863 3978, evenings/weekends.

FL101, manual, ssb side need not be working and slightly scratched cond not objected to, but vfo stability must be to Yaesu spec, also fsk on all bands. Handbooks for Creed 444 and/or 54. G3VRU, QTHR.

Yaesu FR101S fm board and fm filter XF30D. G4HMC, QTHR. Tel 01-878 5303.

Swan 350, any info on modifying rig to 500C specification, sideband selection, sidetone, 6LQ6, or any other mods, rit etc, circuit diagram photocopies of 500C. All costs refunded. G6MVM, 24 Seaview Road, Herne Bay, Kent CT6 6JA. Tel Herne Bay 4318.

Handbook for Yaesu FT200 to purchase, borrow or copy. D. M. Aldridge, G4NQH, 57 Otto Terrace, Sunderland. Tel Sunderland 651786.

100 or 150W 2m linear with preamp. G6NWM NOT QTHR. Tel Jim, Rotherham (0709) 812707.

QM70 28/432 transverter. QM70 Buccaneer 28/144 transverter, good cond externally, but not working ok. G8HNN, QTHR. Tel 0905 22704.

Valves: 1920s, 1930s. 2V triodes, screen grids, six-pin coil formers and bases needed, plus surface-mounting B4/5 valve bases and other components. Cash waiting! Norman Field, G4LQF, 14 Regent Road, Harborne, Birmingham 17. Tel 021-426 3663.

Eddystone short wave manuals, Nos 1, 2 & 3. Short wave components of the 1930s, Eddystone, Formo, Raymart, BTS etc. A. Hennis, 87 Valley Way, Stevenage, Herts SG2 9AG.

HW8 QRP tx/rx, no undocumented mods. All replies answered. G4BLI, QTHR. Tel 051-722 9538 (Liverpool).

KW2000E, must be in vgc. G3TQQ, QTHR. Tel 0422 72036.

Drake SPR4 rx xtals 21-09, 25-09, 32-09, 39-09, 39-59, 40-09 and 40-59MHz. Model 5NB noise blander. Paul Costigan, 10 The Paddock, Clevedon, Avon BS21 6JU. Tel Clevedon (0272) 877873.

RAIBC, RSGB member, invalid, requires KW Viceroy psu, mic, RCA AR88 for spares. Cash limited, wanted urgently, house-bound, for radio checks, testing. Mr A. Curtis, 554 Middle Park Avenue, Eltham, London SE9. Tel 01-859 1191.

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Circuit diagram for Lafayette NA350 communication rx. G4OF, QTHR. Tel 0935 41515, evenings.

101E workshop manual. G4OWV NOT QTHR. Tel 01-883 2182.

Icom IC201 or IC210 2m fm/ssb. Tono cw/rtty terminal model 550. G4AFY, QTHR. Tel Kidderminster (0562) 753358.

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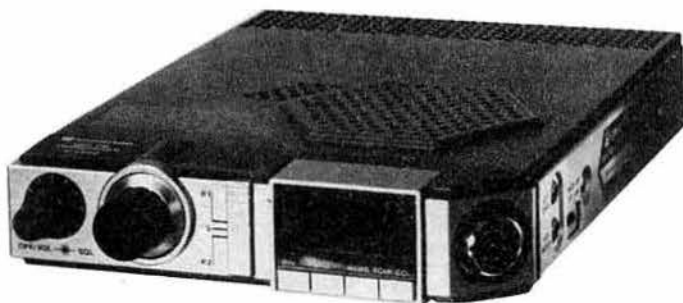
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The alphabetical call sign list covers 3329 call signs, with name of the station, ITU country symbol, and corresponding frequency (-ies). An additional section - arranged in country order - covers 214 stations operating without complete official call sign, and co-channel stations. The formation of call signs is explained in the RRs on the identification of stations. The table of allocations of international call sign series is also included.

- Additional subjects included are:
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The price includes the subscription to the SUPPLEMENT SERVICE, which comprises one supplement to be issued halfway before the publication of the 3rd edition of the guide. The supplement will include a few hundred new frequencies and call signs of stations monitored until that date, in the same pattern as the reference book itself.

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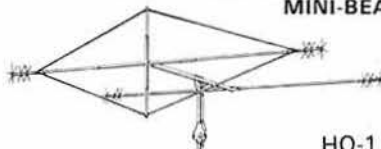


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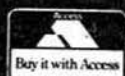


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DIPOLE of DELIGHT

The Dipole of Delight is the familiar name for the Multiband Dipole recently invented by GM3HAT and fully covered by NRDC supported patent applications in major industrial countries since September 1981. The DD created a lot of interest when demonstrated and described to RSGB members at SCOTAM'81 and to audiences at meetings of the IEE N. of Scotland Sub-Centre during that winter.

Practical trials of prototypes by active DX operators have confirmed that this novel design has considerable advantages in radio communications attributable to:—

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2. its built-in lightweight capacitive BALUN system.

Two versions capable of radiating up to 400 W p.e.p. on any one of three bands each, are in production and now available from stock.

DD 7/14/21 operates on the 7, 14, and 21 MHz frequency bands

DD10/18/24 operates on the 10.1, 18.1, and 24.9 MHz bands

Future versions will be made for other band groupings.

ANTICIPATED & REALISED BENEFITS of this ORIGINAL ANTENNA FEED SYSTEM are:—

1. Low SWR across each of the operating bands without an ATU.
2. Efficient radiation and reception behaviour without traps.
3. Ideal unbalanced coax feeder input to balanced dipole without a transformer.
4. Exceptionally good rejection of local machine hash, TV time-base noise, and computer interference.

To get good DX capability in a difficult radio environment, transmitting amateurs and SWL's should seriously consider the purchase of a Dipole of Delight. The requirement for space in either case is a full half wavelength at the lowest frequency, i.e.

DD 7/14/21 needs half of 42 metres = 21 m (about 69 ft)

DD 10/18/24 needs half of 30 metres = 15 m (about 50 ft)

Thanks to the zero voltage on the screen, produced by the excellent BALUN, the DD is ideal for inverted V operation, or support on a chimney over a house roof. Should space be a little short, a method of folding ends back is described in the user instructions. Also given there is a low-cost and inconspicuous method of constructing a 3 el Yagi within a suburban garden and which will provide significant gain on high angle routes.

As there is no ATU required the DD is an economic starting antenna for SWL's and Class B operators working for their Morse test. The DD is superb for amateurs with NO-TUNE PA's and Linear. To change bands, flick the switch, listen on channel and speak. A sheer dream in a contest.

The very low SWR figures which obtain across each amateur band allow a user to make calls well away from the over-crowded central frequencies to which trap and coil resonated antennas are tuned. Details of typical SWR figures, and notes on precautions to be taken to measure low SWR values are given in the DD Data Sheet (Free of Charge for enquirers who let us know band combinations of interest; UK send SAE; DX addresses for Air mail, 2 IRC's)

In regard to TVI the particular circumstances determine the outcome. The DD is so efficient that it will produce amateur band field strengths greater than a traditional antenna. But by virtue of its excellent balance, a horizontally slung DD will produce considerably less vertical induction field than would an old style coax fed dipole with its unbalance current flowing down the outside of the screen.

PRICES:—

Either DD is the same price. No feeder is included but all are fitted with an integral SO 239 UHF socket. Recommended feeders are 50 ohm medium size 5 mm dia such as UR76 or UR43. The large 10 mm cables UR67 or RG8U are much too weighty for these antennas unless a central support scheme is planned.

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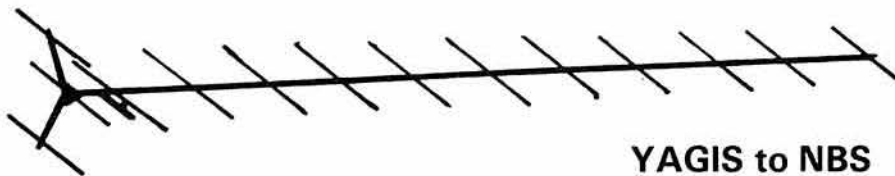
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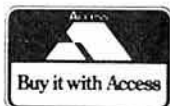
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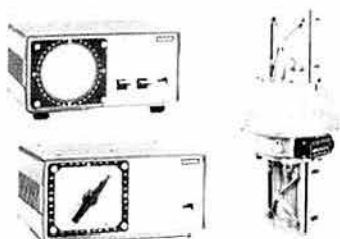
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It's the end of another year. We've found it very successful and we'd like to thank everybody who has taken an interest in (or even bought) our products. The range has expanded yet again and the quality is better than ever! There are more new products on the stocks, and we'll be releasing them over the next few months—keep reading our ads!

To our customers, competitors, distributors, detractors, friends and foes the warmest seasonal greetings from all of us at Bradworthy. May we wish you a peaceful and prosperous New Year.

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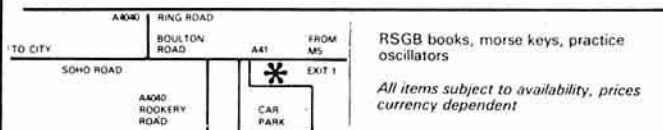
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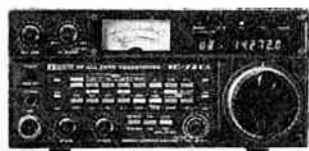


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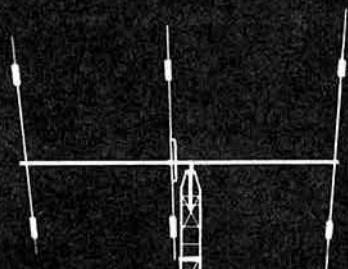
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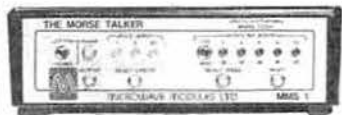
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SD1134	2w	10dB	12.5	470MHz	£7.69
2N5945	4w	8dB	12	470MHz	£10.44
SD1135	5w	7.5dB	12	470MHz	£8.45
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2N5946	10w	6dB	12	470MHz	£12.25
SD1088	25w	6.8dB	12	470MHz	£33.42
SD1089	40w	4.3dB	12	470MHz	£34.75
SD1434	50w	6.0dB	12	470MHz	£38.48
SD1405	75w	13dB	12.5	30MHz	£25.25
SD1451	50w	12dB	12.5	30MHz	£18.65
SD1013	10w	12dB	28	175MHz	£8.45
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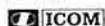


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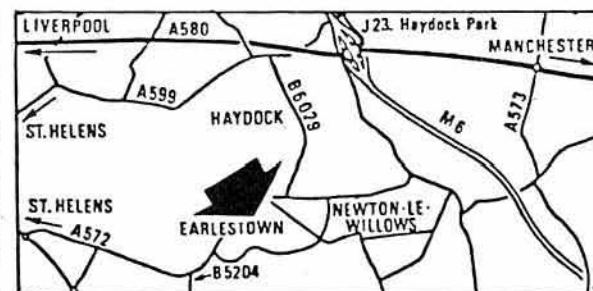
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All classified and semi-display advertisements MUST be prepaid.

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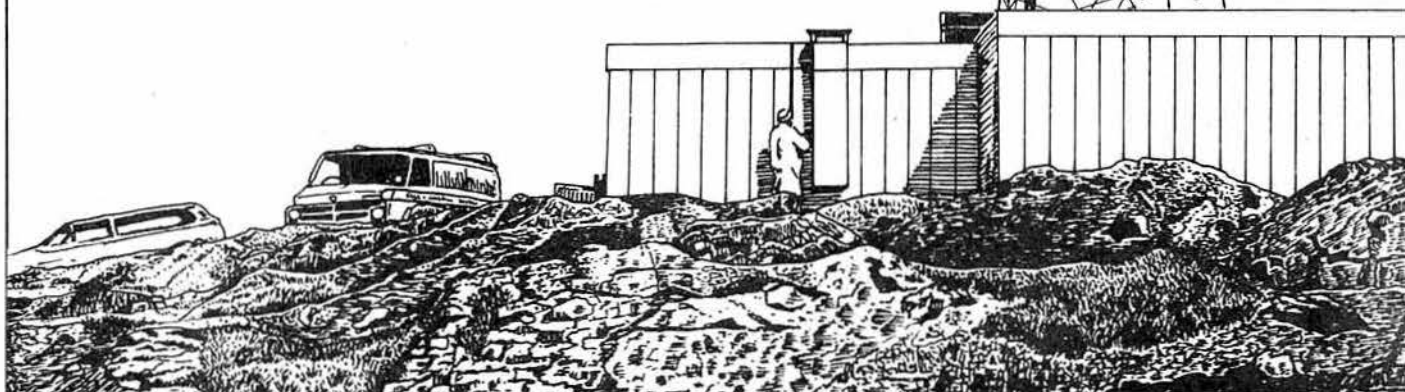
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	Non-members' price	Members' price		Non-members' price	Members' price
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<i>Amateur Radio Awards</i> (2nd edn)	£3.41	£3.07	<i>Active-filter Cookbook</i> (Sams)	£12.71	£11.44
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<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)	£4.18	£3.76
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<i>Teleprinter Handbook</i> (2nd edn)	£13.84	£12.46	<i>Best of Oscar News</i> (AMSAT-UK)	£1.46	£1.31
<i>Television Interference Manual</i> (2nd edn)	£1.85	£1.67	<i>Better Short Wave Reception</i> (RPI)	£3.90	£3.51
<i>Test Equipment for the Radio Amateur</i> (2nd edn)	£6.00	£5.40	<i>Care and Feeding of Power Grid Tubes</i> (Varian)	£3.53	£3.18
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RSGB logbooks			<i>Complete Shortwave Listener's Handbook</i> (Tab)	£11.91	£10.72
<i>Amateur Radio Logbook</i>	£2.71	£2.44	<i>English-French QSO Language Instruction</i> (out of print)	—	—
<i>Mobile Logbook</i>	£1.14	£1.03	<i>FM and Repeaters for the Radio Amateur</i> (ARRL)	£4.30	£3.87
<i>Receiving Station Logbook</i>	£2.72	£2.45	<i>G-QRP Club Circuit Book</i>	£4.19	£3.77
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<i>QTH Locator Map of Europe</i> (card for desk)	76p	68p	<i>Radio Amateur Callbook</i> (1983 USA listings) (ARCI)	£16.93	£15.24
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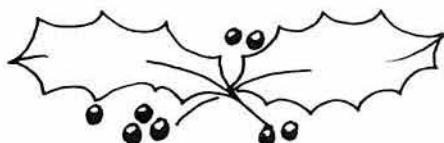
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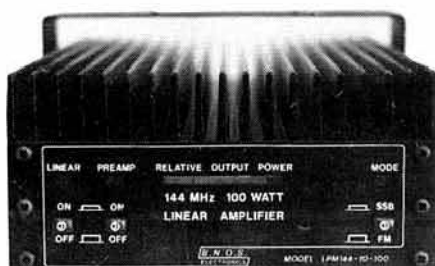
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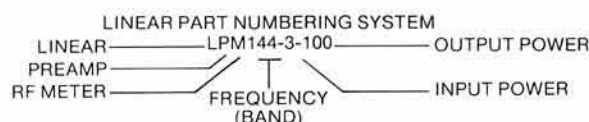
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FT-980

The FT980's innovative design boasts the highest level of microprocessor (80-85) control ever offered as a standard feature in an all mode, all solid state, amateur H.F. transceiver.

Every frequency related function is digitally synthesised permitting local or external control via a personal computer of: Mode, all VFO and memory functions, IF shift and width, clarifier, band limits, FSK shift—and more!

Two independent VFO's—multiple tuning methods including; flywheel knob, two speed scanning in 10Hz (also 5/500 KHz) steps and keyboard entry.

12 totally independent mode/frequency memories (whose contents can be checked even while transmitting) are provided.

Primary digital readout offers resolution to 100 or 10Hz is mode sensitive, displays offsets and even VHF frequencies when used with the matching transverter. A remarkable secondary display indicates frequency change by scrolling sideways, with a scrolling cursor providing resolution to 1 KHz.

Two receiver front ends are provided, one for general coverage—150KHz to 30 MHz, the other for amateur bands only. Seven high IDSS JFETs produce extraordinarily wide dynamic range and the employment of ten V.C.O.'s secures a high carrier to noise ratio—even in the adjacent channel.

The triple conversion design of the FT980 receiver (Ω 47 MHz, Ω 9 MHz, 455 KHz) incorporates four cascaded stages for all modes and can operate as standard on SSB, CW, AM, FSK and FM transceiving.

The transmitter covers all H.F. amateur bands in 500 KHz segments. Convenience features include: simultaneous measurement of forward and reverse S.W.R., or compression (RF processor) or Ic or Vc or output power or ALC (includes "easy adjust" peak hold facility), AMGC (reduces ambient noise on voice transmissions), and a transmission

quality monitor (all mode IF demodulator).

With a P.A. rated for 560W dissipation 100W PEP is produced from a 24V line with 3 order intermodulation at typically -40dB. Full thermal (with blower and VSWR) protection (though power delivery is still 75% of full into a 3:1 VSWR) are of course standard.

For CW, full break-in and calibrating (spotting—zero beating with other station) and choice of sidetones are fitted, and an inbuilt Curtis Keyer is optional.

Other FT980 features include AGC speed, tone, FM, squelch and centre zero meter, additional 'write' button for protected memories, display dim, dial lock, QSK linear provisions—the list is almost endless—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: 50 KHz—30 MHz (continuous)
Tx: 10-160M (9 bands)

Frequency accuracy

Better than ± 3 p.p.m (0-40°C)

Tuning steps

10Hz, 5 KHz & 500 KHz (band)

Direct/Computer keyboard entry

Modes of operation

J3E (LSB/USB), A1A (CW), A3E (AM), J1B (AFSK), G3E (FM); Rx & Tx

Power requirements

100/120-200/234 V 50/60 Hz

72VA Rx, 530VA Tx (100W out)

Dimensions (Ex/Inc projections)

370/380W x 157/165H x 350/465D mm

17Kg, Nett

Options

XF-455 8MCN 300Hz CW Filter

XF8.9HC 600Hz CW Filter

XF8.9GA 5 KHz AM Filter

MH-1-BB Hand Scan Microphone

MD-1-BB Desk Scan Microphone

D3000026 Curtis Keyer Unit

FIF-80 Computer Interface

RECEIVER

Sensitivity (2-30MHz)

J3E/A1A/J1B : 0.25 μ V (2.4 KHz)

(10dB S+N/N) : 0.16 μ V (600 Hz)

A3E : 0.10 μ V (300 Hz)

A3E : 1.40 μ V (6 KHz)

(10dB S+N/N) : 1.25 μ V (5 KHz)

G3E (12dB SINAD) : 1.00 μ V (3 KHz)

Sensitivity (150 KHz-2 MHz) : 0.60 μ V (12 KHz)

J3E/A1A/J1B : 4.0 μ V (2.4 KHz)

(10dB S+N/N) : 2.6 μ V (600 Hz)

A3E : 1.6 μ V (300 Hz)

A3E : 22 μ V (6 KHz)

(10dB S+N/N) : 20 μ V (5 KHz)

Dynamic range : 16 μ V (3KHz)

95dB in 300 Hz (max sensitivity)

Audio peak filter

350 Hz-1400 Hz

IF notch filter

500 Hz-2700 Hz (demodulated)

Audio

4-16 Ohms, 3W in 4 ohms (10% THD)

Image/I.F. rejection

Better than 70dB

TRANSMITTER

Power output

J3E/A1A : 100W(PEP)

A3E : 25W

G3E/J1B : 50W

Intermodulation (3rd Order)

Better than -40dB (14 MHz 100W)

Carrier suppression

Better than -50dB (peak output)

Sideband suppression

Better than -50dB (1 KHz tone)

Spurious radiation

Better than -50dB (peak output)

Audio response

Better than 250 Hz-2750 Hz @ -6dB

FM deviation

± 5 KHz (maximum)

AFSK shift

170, 425, 850 Hz

Microphone impedance

600 Ohms nominal

Output impedance

50 Ohms nominal, unbalance

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