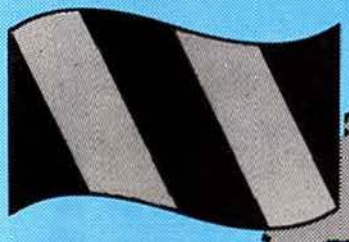
RADio COMmunication

April 1984



RSGB National Convention
NEC, Birmingham
Saturday 28 April
Sunday 29 April

IARU Region 1
Conference
8-13 April,
hosted by ARI

CEFALU

WORLD AMATEUR RADIO DAY
18 APRIL 1984

Journal of the Radio Society of Great Britain

RSGB

Amcomm of London

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01-422 9585 FOR FAST DELIVERY

2 YEAR GUARANTEE on YAESU + ICOM

ICOM IR70 GENERAL COVERAGE RECEIVER

If you are one of the many hunting for a second hand ICOM R70 . . . PLEASE! SAVE YOUR MONEY . . . DON'T CALL AMCOMM . . . WE'VE NEVER HAD ONE!
This says it all for the high performance and classy appearance of the R70. "YOU BUY IT TO KEEP IT". We keep repeating it . . . PEFORMANCE SILKY SMOOTH, APPEARANCE SILKY SMOOTH, OPERATION SILKY SMOOTH . . . PRICE? we think also SILKY SMOOTH, certainly smooth enough for you to call us on 01-422 9585 and become one of the "YOU BUY IT TO KEEP IT" R70 owners.

THE KEY ELEMENT

Are you REALLY SATISFIED with the performance of your station? Getting OPTIMUM PERFORMANCE? Or is that microphone not quite doing what you expected? It's not surprising, most of the microp. „nes used in communication today were designed for use with paging systems. Listen to the MARVELLOUS AUDIO from the other side of the Atlantic, that's not surprising either for a large number of the American operators are using the HEIL MICROPHONE CAPSULE, THE KEY ELEMENT in reproducing communication sound as it should be. Not for them the "this is mic one, this is mic two, this is mic three etc." syndrome, all you get from that test is three different opinions from three different stations. We know you are looking for INTELLIGIBILITY from first class ARTICULATION. It's now available in the UK. The HC 3 is a tiny capsule which rolls off sharply under 350Hz and above 3100Hz and virtually flat in between. If you care about PERFORMANCE, INTELLIGIBILITY and BEING LISTENED TO RATHER THAN JUST HEARD, then the HEIL HC3 capsule is for you. Easily fitted in a matter of minutes to almost any microphone case and available at £17.99 including VAT and post.

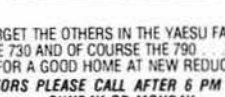
AMTECH 300B ANTENNA COUPLER

BRITISH MADE and MADE TO LAST and PRICED TO SUIT YOUR POCKET, thousands already in use throughout the world. Rated at 300W pep the 300B is suitable for all coaxial fed or random wire antennas. Whats more it comes with a twin meter (3.5 to 170Mhz) S.W.R. bridge ABSOLUTELY FREE. Compare the price with anything else available and you'll see why it has become our STAR BUY.
CALL AMCOMM 01-422 9585 . . . FAST DELIVERY.

£49.95 inc carr. & V.A.T.

YAESU FT290RB MULTI MODE TRANSCEIVER

Looking back a year or so we're extremely surprised that the 290 has not had to face up to any competition. TRYING to see the other manufacturers attitude to it isn't easy, could they better it? or did Yaesu **GET IT RIGHT FIRST TIME.** We know they did, why else has it become the world's Biggest and fastest selling rig of all time? CAN IT BE IMPROVED? functionally we can add a few refinements, you might like to add the MUTEK board if you feel you need it, we'd be happy to do anything like that for you but it still adds up to Yaesu's team doing the big bit **GETTING IT RIGHT FIRST TIME** and leaving the opposition **STRANDED. AND YOU'LL GET IT RIGHT FIRST TIME.** The **FT290R** fitted with **MUTEK BOARD** and complete with **Ni-CAD CHARGER** and carrying case **£299** V.A.T. and carriage paid. CALL AMCOMM 01-422 9585. FAST DELIVERY.



DON'T FORGET THE OTHERS IN THE YAESU FAMILY . . . THE FT230, THE 730 AND OF COURSE THE 790 . . . ALL IN STOCK LOOKING FOR A GOOD HOME AT NEW REDUCED PRICES.
COMPETITORS PLEASE CALL AFTER 6 PM OR ANYTIME SUNDAY OR MONDAY.

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. We're always helping where it hurts – Try us on 01-422 9585 Now. We'll ease the pain.

WHAT INFLATION

Cast your mind back seven or eight years to the introduction of the Yaesu FT 101E, it proved A WINNER FOR YAESU and a DELIGHT TO OWNERS. At £579 it was considered to be GOOD VALUE THEN. Reflect on this! and ask these questions: Did it have GENERAL COVERAGE . . . IF SHIFT/WIDTH CONTROL . . . TWO VFO'S . . . MEMORIES . . . A KEYER . . . FM . . . UNRESTRICTED RIT . . . AN RF PREAMP . . . FULL BREAK IN . . . SWITCHABLE AGC . . . SCAN FACILITY? Both you and we know it didn't. Yet despite the passing of the years, and MASSIVE INFLATION affecting other markets Yaesu can still offer you a transceiver with all these facilities AT VIRTUALLY THE SAME PRICE AS THE FT 101E WAS ALL THAT TIME AGO. Amateur radio expensive? Answer that one yourself. Oh! By the way the transceiver we are talking about is the FT 757GX.

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.

SKYKING 2000 . . . A super little rotor ideal for the smaller VHF array, already in use at G5VS and doing a grand job, he is delighted and so will you be at the performance and PRICE £39.95 . . . CAN YOU BELIEVE IT? Add £1.25 carriage and you will, we'll have it off to you at once.

ANTENNA PARTS AND KITS

Includes the world's finest traps – REYCO, which are guaranteed for five years no condenser used – no blow up possible. Precision moulded coil forms with stainless hardware – aluminium irridite finish – fully waterproofed and suitable for wire, vertical and beam antennas, rated at 2.5Kw and weigh only 4oz per trap – available for 7Mhz (KW40), 14Mhz (KW20), 21Mhz (KW15) and 28Mhz (KW10). £16.99 including VAT and carriage.
The BALUN – The Unadilla W2AU is famous because it's the best, same rating as the traps and has a built-in lightning arrestor – available 1:1 and 4:1 – get it right first time with W2AU Balun – guaranteed for five years. £16.99 including VAT and carriage.
THE KITS – AMCOMM 40 – 1 pair KW40 traps, 1 PL259, 1 W2AU Balun, 1 pair insulators and of course 120ft soft drawn copper wire – coverage 80-10 metres (including 10Mhz). Full instructions included. £43.50 including VAT and carriage.
AMCOMM 20 – 1 pair KW20 Traps, 1 W2AU Balun, 1 PL259, 1 pair insulators and 65ft soft drawn copper wire – coverage 40-10 metres, full instructions included. £41.50 including VAT and carriage.
AMCOMM 3B – 1 pair KW10 traps, 1 pair KW15 traps, 1 PL259, 1 W2AU Balun, 1 pair insulators and 30ft soft drawn copper wire – coverage 20m, 15m and 10m. Full instructions included. £47.50 including VAT and carriage.
NEW WARC TRAPS – KW12, KW17 and KW30 now available from stock. £16.99 including VAT and carriage.

YAESU FT726R 2m/70cms/SAT

If you've been enjoying your annual winter break in ULAN BATOR you've probably missed the VOLUMES OF SUPERLATIVES being liberally dispersed about the YAESU 726R . . . They're coming from all sources . . . THE REVIEWERS . . . LUCKY OWNERS . . . FRIENDS OF LUCKY OWNERS . . . even from the VERY UNLUCKY DREAMERS . . . LITTLE WONDER! . . . ALL OF 2 MTS . . . ALL OF 70cms . . . and a large portion of the HF SPECTRUM . . . MORE . . . if rumours coming from JA prove correct it won't be too long before we have a 1296 FACILITY . . . add the SATELLITE DUPLEXER to that lot and you really have yourself a DREAM OF A RIG . . . Performance figures? Like the rest of it TOP NOTCH . . . but don't take our word for it, call AMCOMM ON 01-422 9585

CALL 01-422 9585 FOR PRICE

THE HANDHELDS

As we said last month "It's been a great year for the handhelds, especially the Yaesu FT208R, they are all extremely versatile BUT THE 208 HAS THE EDGE. Did you see the reviews? They certainly told you a lot . . . WHAT THEY DID'NT TELL YOU WAS HOW TO OPERATE YOUR HF RIG FROM THE 208, from the garden, from the car, even the bath if your are willing to chance it. Whichever handheld you're interested in – Marine P.M.R. or Amateur: call us and we'll tell you, we'll even send you the information. Call 01-422 9585.

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.

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 . . . a beautiful and practical addition to the shack at any time . . . £39.95 post paid. . . . Call now 01-422 9585 FOR FAST DELIVERY.

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, TASCO, 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. All the year round call 01-422 9585 for fast quotes and fast delivery BACKED UP BY FIRST RATE AFTER SALES SERVICE.

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CONTENTS

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

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

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

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

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

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

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

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

Glasgow Lowe Electronics Ltd.
4/8 Queen Margarets Rd, off Queen Margarets Drive, Glasgow.
Tel: 041-945 2626

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

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

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

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

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

TM401A 70 cm FM TRANSCEIVER £299 inc VAT (carr £6.00)

TM201A 2 mtr FM TRANSCEIVER £269 inc VAT (carr £6.00)

Although transceivers intended for mobile operation have kept pace with electronic technology and have incorporated the latest in operating facilities, there has always been the problem of where to install them in today's compact cars. With this difficulty in mind TRIO have concentrated on the size of the mobile transceiver and its relationship to performance. Certain brand new concepts in mobile transceiver design have been the result. These fresh ideas have been applied by TRIO to not one new transceiver but two; the TM201A for two metres and the TM401A for the seventy centimetre enthusiast – two new rigs for the mobile operator.

* By removing the internal speaker, TRIO have gained in two important ways, the overall size of the new rig is reduced to the minimum, 5½W x 1¾H x 7½D (inches approx.) and the quality of receiver audio produced by the now separate speaker (77mm diameter) is extremely high. (The separate speaker is not an optional accessory but is included in the purchase price of the rig).
* The TM201A two metre transceiver produces 25 watts, the TM401A seventy centimetre version 12 watts, in the low power position the rigs give 5 and 1 watt respectively.
* Dual digital VFO's covering the full two metre band for the TM201A and the entire 10 MHz of the seventy centimetre band for the TM401A are provided, selection of the required VFO being by a front panel switch. On the TM201A VFO A tunes in 25KHz steps, VFO B in 5KHz steps and on the TM401A both A and B VFO's tune in 25KHz steps. Control of the VFO's is either by the front panel knob of the up/down microphone switch.
* Five memories are available, memory 1 holds the priority frequency, memories 2 and 3 are standard memories and memories 4 and 5 hold receive and transmit frequencies independently. An internal lithium battery backs up memory data (estimated 5 year life).
* With the priority alert switch on, once every 6 seconds, whether receiving or scanning the rig checks the frequency in memory channel 1. A dual 'beep' will sound if a signal is present.
* The MS switch initiates memory scan. Memories which hold no frequency data are skipped. Depressing the up/down microphone switch begins band scan, programmable scan is available, the upper and lower frequency limits being those as set in memory 5. In both memory and band scan, scanning stops on a busy channel and automatically resumes after approximately 6 seconds.
* A four digit yellow LED display giving improved visibility under mobile conditions indicates the operating frequency. The MHz decimal blinks whilst scanning and the KHz decimal lights to show that VFO B is being used. A S/RF LED bar meter with separate occupied channel, memory recall, priority alert and 'on air' indicators are also provided.
* The use of a GaAs FET RF amplifier plus an improved antenna switching circuit provides high sensitivity and wide dynamic range.

TM201A..... two metre transceiver .....£269.00 inc. VAT
TM401A..... seventy centimetre transceiver.....£299.00 inc. VAT

TRIO

TRIO-KENWOOD CORPORATION

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

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

TR9130 TWO METRE ALL MODE TRANSCEIVER

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

TR9130 . . . **£442.52** inc VAT.

TS780 DUAL BAND BASE STATION TRANSCEIVER

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

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

TR7930 TWO METRE FM MOBILE TRANSCEIVER

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

TR7930 . . . **£312.11** inc VAT.

R2000 GENERAL COVERAGE RECEIVER

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

R2000 . . . **£421.36** inc VAT.

TS930S HF TRANSCEIVER WITH GENERAL COVERAGE RECEIVE FACILITIES

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

TS930S . . . **£1150.00** inc VAT.

TR2500/TR3500
HANDHELD TRANSCEIVERS

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

TR2500 . . . **£237.82** inc VAT.
TR3500 . . . **£256.45** inc VAT.

TS530SP HF AMATEUR BAND TRANSCEIVER

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

TS530SP . . . **£638.00** inc VAT.

TW4000A DUAL BAND FM TRANSCEIVER

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

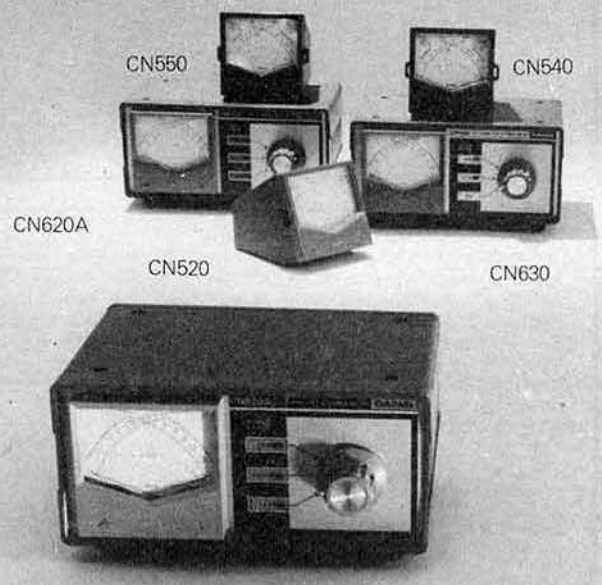
TW4000A . . . **£469.00** inc VAT.

just a part of the range

LOWE ELECTRONICS Ltd

CHESTERFIELD ROAD MATLOCK DE4 5LE TEL 0629 2430/2817

for "cross needle" metering, DAIWA



What's so special about "cross needle" metering? Well, it's typically Daiwa to go direct to the heart of the matter and develop a system which will give you the true value of forward power, reflected power, and SWR all at a single glance. The elegant simplicity of the idea hides a great deal of thought, which of course is the hallmark of Daiwa products.

You will see from the photograph that the meter displays have two scales, one reading forward power, the other reflected power. Since SWR is calculated using these two values, Daiwa have arranged the meter pointers so that SWR is shown at the crossing point of the two meter needles.

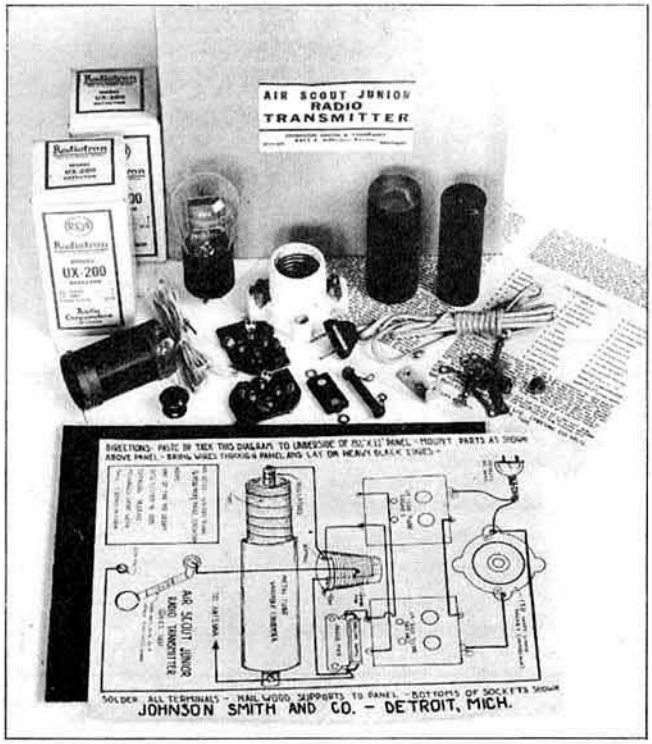
Why don't other makers use the idea? Basically it's a question of power meter accuracy. The usual type of single or twin meter "SWR/power meter" uses a simple strip line to measure the VSWR on the transmission line. You will note that I have said "VSWR", and this is important. These so-called power meters are in fact only measuring the voltage standing wave and in order to display power, you need to monitor both voltage and current in the line. Daiwa meters of course, do just that, and consequently are very accurate indeed. The cheaper so-called power meters depend for their accuracy in being terminated in a load, and exhibit wild inaccuracy when terminated in a reactive load. In other words, when the indicated VSWR on the meter is other than 1:1, their accuracy is quite badly affected.

To summarise; the Daiwa cross needle power meters give you easy, unambiguous readings at a glance, and what's more those readings are accurate even in lines displaying high SWR, and since Daiwa meters measure true power, they are accurate at any point in the feedline from transmitter to aerial.

As with all Daiwa products, their meters show the Daiwa approach design, combining accuracy, ease of use and interpretation, and that indefinable feel of quality which is the sure sign of a good product. Once owned, never discarded.

CN520	1·8-60MHz	**£41.71** inc VAT
CN540	50-150MHz	**£45.00** inc VAT
A500	mounting bracket for above meters	**£2.30** inc VAT
CN620A	1·8-150MHz up 1kW	**£65.40** inc VAT
CN630	140-450MHz up to 200W	**£99.00** inc VAT
CN650	1·2-2·5GHz up to 20W	**£128.00** inc VAT

Carriage on "5" series meters £1.50, on "6" series £2.50.



the superb "Air Scout Junior" radio transmitter.

There seems little doubt that many radio amateurs are daunted by the complexity of modern equipment, and at the same time wish to re-establish the traditional approach to the hobby, by building some equipment for themselves.

We are particularly pleased, therefore, to announce that we have been appointed sole distributors for a range of amateur radio kits, manufactured in America. These kits really do represent a return to sanity and simplicity, but at the same time have some interesting features.

We show here the first model of the new range; the Air Scout Junior transmitter. As you can see, the kit is simplicity itself, but for the readers of "Technical Topics", a few details may be in order. The circuit employs two tubes type UX200 (not supplied), in a high power self excited oscillator circuit. The designer has cleverly eliminated the use of a heavy and expensive mains transformer, by feeding the tube heaters in series via a 150W lamp, the socket for which is provided in the kit. The HT supply is taken directly from the mains input, and this gives the "Air Scout Junior" its distinctive and instantly recognisable note on the air.

Another unique feature is the use of the circuit drawing as an actual parts layout, and this can be said to be a true printed circuit in every sense of the term.

Keying is accomplished by interrupting the HT supply, and since this is the mains input, it is necessary to state when ordering, whether the insulated key knob is to be used on 110 or 240V mains.

Full assembly instructions are provided and the complete kit is available for inspection here at Matlock. A list of approved stockists will be prepared and made available soon. For further details, please ask for a copy of the descriptive leaflet.

see the AIR SCOUT and ourselves at the N.E.C.

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

EMPORIUM NEWS

Good morning,

Another Emporium News on the train to London. A much-travelled man I am becoming, a real railway buff, I have been for a long time, but I never dreamed that I would be able to travel the country by train and it be classed as work. Seriously, I find it difficult to believe that the Directors of the company have not realised that at the end of **each classic stretch of railway** is a Lowe Shop. **Darlington**, a grand ride up the East Coast line. **Cardiff**, HST to the West country with an ear popping trip through the Severn Tunnel. **Glasgow**, high speed 100 mph electric haulage over Shap Fell with the driver "notching down" as we whistle through Tebay and under the M6—and, finally, **the Master Cutler** south to London. I am not suggesting you travel by train to our shops but please note that you can now **visit a Lowe Shop**, see a comprehensive range of equipment and receive courteous service and advice without being pressured into buying— **that is unless Cyril in Darlington catches a glimpse of your wallet or cheque book**! Remember that a purchase from a Lowe Shop, wherever it is, is as if you had bought it from Matlock.

Our Service Department, staffed by **six** of the most capable chaps in amateur radio and led by **John, G3PCY**, is on hand to assist and give you the peace of mind that comes to those who buy their equipment from **Lowe Electronics**. If you've ever thought, 'I hope it never goes wrong because I wouldn't like to bring it back to this shop', then talk to someone who has dealt with us. I once said that the best advert for a piece of TRIO equipment was an owner. I stick by that statement and add, **the best advertisement** we have is **a person** who has already **dealt with us**. If you require confirmation of Lowe service then ask around, find a Lowe customer and talk to him or her.

An LS202E has arrived and I have used it. **The Belcom LS202E SSB** and **FM** hand-held. Giving up to **3 watts** and covering the entire 2 metre band 144 to 146, the rig has some nice touches. An **illuminated** top panel to simplify frequency setting whilst out portable when there is no moonlight, a belt clip and all found in a rig the size of which is 165 × 62 × 40 mm and weighing approximately 500grm. **SSB and FM from a hand portable—amazing!!**

A new product from TRIO: **the MA4000 dual band antenna**, complete with **Duplexer**, priced at £33.80, inc. VAT, carriage £2.00. The MA4000 is finally here. Why have we been so long getting a suitable aerial from TRIO for the dual band TW4000A which we have had for some time? Because it had been produced with the incorrect thread and to use the Japanese home market metric thread, **as supplied by the grey importers**, results in disaster. You screw on the aerial to a standard imperial thread base (the standard supplied by most amateur radio companies) and in getting it tight, overtighten it and **destroy the electrical continuity of the base**. I am not joking, if your MA4000 aerial feels tight then you have not bought a compatible system. As you know, I have had a TW4000A in my car for quite a while. I have been using a **Revco base plus quarter wave aerial** (cut at 19½ inches—don't know the metric equivalent), the informed amongst you will recognise the ¼ wave on 2 metres as a ¾ wave on 70 centimeters. However, over the months I had a feeling I could do better. So, I have a **MA4000 plus Duplexer** (70 cm connector N type 2, meter connector SO239. That's attention to detail) Mounted on the **high quality Revco magnetic base** £18.50, inc. VAT (carriage £1.75), **The results are devastating**. I regret those months spent with the ¼ wave; all those DX contacts lost. **All those lost opportunities** for people to drool over the high quality audio to be heard from a TRIO transceiver. Back to mundane items.

Of course our standard guttermount and cable assembly or wing mount will also take the aerial. The items are **guttermount GSS** @ £4.25 inc. VAT, carriage 75p, **cable assembly RG4M** @ £4.25 inc. VAT plus 75p carriage and the **wing mount** without coax **12B** @ £4.60 inc. VAT, carriage 50p.

Andy, our Shop Manager in London, has fitted in his car the **MC55 mobile goose neck microphone and control box.** Superb audio quality, microphone preamplifier with adjustable gain control built into a gear lever switch which has also up/down shift, a send/receive switch **and a 5 min. timer to ensure that you don't bore all listeners to death**. Even high quality Trio audio can become a trifle wearing after an over in excess of five minutes.

Popped into the **Darlington shop** recently and was told by an amateur that some lads from the North East had chartered a super de-luxe coach to transport them to the **RSGB at the NEC** in style. Not a normal coach this but one complete with **toilet, washroom, young attractive hostess serving coffee**, seats with tables and table lamps and also—wait for it—"**video**". The lads seemed reluctant to name the films they were showing but I understand that the more sensitive travellers are up front with the driver. I can heartily recommend some of the RSGB videos which I am sure would be ideal for such a trip as this, to **the second Amateur Radio Exhibition at the NEC**. Don't forget we will be there and, as an added treat for her admirers, Beryl **will be with us on the Sunday**. I am trying, on your behalf, to persuade her to wear **those pale blue shorts** I have told you about but we must wait and see. In addition, if Beryl was not enough, **Anne** will also be with us on both days, looking after your bits and pieces and generally keeping we sales chaps in order. Last year, thanks to **Norman Miller** and his small, hard working committee, the Exhibition was a great success. This year I am sure it will be even better. We look forward to meeting you.

LS202E

Last month I mentioned the **Colour Genie and the RadSoft package.** Although, as I write this, you have not yet seen the March RadCom (work that one out) sales of the Colour Genie to radio amateurs have increased. **Keith**, our resident computer man, also a radio amateur, is preparing an **amateur radio set of programmes** to be supplied FOC to anyone buying a Colour Genie for shack use.

Sunday, 15th April, 1984 is a date for your diary. Starting prompt at 2.00 pm John, G3PCY will be giving a technical lecture to the combined amateur radio clubs of Verulam, Southgate and Harrow. The instigator of this feast of information was Frank, G3JKS of the Verulam Club. **John's subjects will be the TRIO TS930S transceiver and the AOR AR2001 receiver** which, as you all know, covers 25 to 550 MHz continuously. You will see that the equipment has been carefully chosen **to cater for both HF and VHF/UHF devotees** who want to know more about the design and construction of today's sophisticated equipment. The Venue for this discourse is the well-appointed **CREST HOTEL, South Mimms, Potters Bar** where I have booked for the afternoon the Alban Suite.

Although the event has been organised by the above societies, **this invitation is open to all**—those who arrive first will get the best seats, those who arrive late may not get in at all. I have arranged for tea/coffee and biscuits to be available for purchase at a nominal amount at the half-way point in the lecture and to help find the CREST hotel **there will be a "talk-in" station on S22.** At this moment I do not know its callsign but transmissions will commence at 1.00 pm.

I hope you will be able to attend. John, David G4KFN, Andy G4DHQ and I look forward to meeting you and together having an interesting, entertaining and enjoyable afternoon.

Anyway, that's about it for now. I must go and discuss with **Beryl** her apparel for the NEC so I am sure you will excuse me.

Gud DXes 73es FBYLS, XYLS, esFBOM, etc. David G8GIY

sell any ets until...

IC-745, Latest HF Transceiver

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

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

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

IC-27E, Latest and smallest FM Mobile

Interest-free credit available
Securikor or post despatch free,
same day if possible.

Our local RETAIL premises have now moved to 95 Mortimer St. Herne Bay Kent.

And we thought that the IC25E was small! ICOM have now produced a new and even smaller 25W FM 2 meter mobile – the IC27E.

We have little information on the IC27E at the moment, but by the time you read this they should be available.

Briefly, the IC27E offers two VFO's, 9 memories, priority channel and scanning. The easy to read LCD displays frequency, memory channel, power, S-meter and functions. All this is packed into a case W140 × H38 × D177mm. and weighing only 1.2 Kgs.

The price has not yet been announced but give us a call for this and other information.

Agent Please telephone first, anytime between 0900 – 2200 hrs
Gordon G3LEO Tel: Knutsford (0565) 4040

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IC-R70, HF Receiver

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

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

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

IC-751, HF Transceiver

The IC-751 supercedes the already popular IC-740. Improvements such as the addition of 32 memory channels, doing away with mechanical bandswitching and adding full HF receive capability (0.1-30 MHz), which is even better than the IC-R70, gives you some idea just how sophisticated the IC-751 is. The IC-751 is fully compatible with ICOM auto-units such as the AT-500 and IC-2KL. A computer control option can be added. There is also a digital speech synthesizer option which is ideal for blind operators. Power supply options are the IC-PS35 internal, or the PS-15/PS20 range for external use.

As you would expect, the IC-751 has a built-in speech processor, switchable choice of a J-FET pre-amp, straight through, or a 20dB pin diode attenuator and two VFOs allowing split frequency operation. More information on request.

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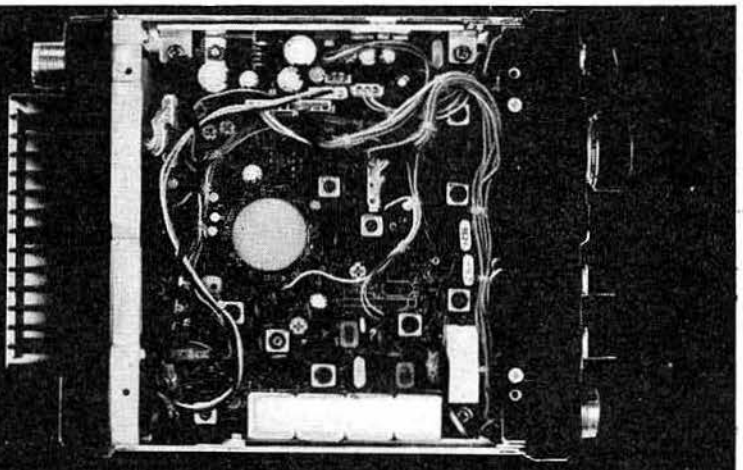
them e-out.



IC-271E/471E, VHF Multimode Base Stations

The IC-271E (2 meter VHF) and IC-471E, 430-450 MHz are the 'terrific twins' in Base multimodes at the moment. The design is based upon a new CPU chip that is easy to operate and offers the maximum number of functions available. Power can be adjusted up to 25W on all modes, squelch works on all modes and a listen-input facility has been added for repeater work. RIT shift is shown on the multicolour fluorescent display. 10Hz tuning facilities are included on both machines. Options for the 271E and 471E include – switchable front-end pre-amp, SM5 desk microphone, speech synthesizer announcing displayed frequency, 22 channel memory extension with scan facilities and an internal chopper PSU. If you would like to learn more specific details for the 271E or 471E, don't hesitate to ask for a brochure.

IC-290D/490E, VHF Multimode Mobiles

The IC-290D is proving to be an extremely popular 25 watt 2 meter mobile. It boasts a bright green display, 5 memories, scan facilities on either memory or across the whole band, an instant input for repeaters, there is also a tone-call button on the microphone. The IC-490E is the 70CM version and has similar features, but only a 10 watt voice in this case.

Interest-free credit available Securikor or post despatch free, same day if possible.

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LATEST!

COMING SOON – FT-203R
NEW COMPACT 2m FM HAND-HELD

FT-726R VHF/UHF multi-mode

Fitted 2 metres with 70cm, 6 metres or HF options. Satellite unit available provides complete satellite operation with full Duplex.

FT-480R 2 metre multi-mode

Now the finest value on the market back in town by popular demand!

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FT-230R 2 metre 25 watt FM mobile

- Two independent VFO's
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- Large LCD readout.

FT-290R 2 metre multi-mode portable

10 memories,
2 VFO's, LCD display,
C size battery, easy car mounting tray,
FT-290R 0.5 low/2.5 high watts out

XIV Olympic Winter Games Sarajevo 1984

YAESU

FT-208R 2 metre FM hand-held

The finest hand-held bar none

ACCESSORIES:
- NC-7 - Standard charger
- NC-8 - Standard/quick charger/DC Power supply
- NC-9C - Compact charger (220-234V)
- PA-3 - Car adapter
- YM-24A - Speaker/microphone
- FL-2010 - 10 watt power amplifier for FT-208R
- FL-7010 - 10 watt power amplifier for FT-708R

BRANCHES

For your convenience we now have fully stocked branches at the following locations where you will be assured of prompt and personal service.

NORTHERN
Amateur Electronics UK/ Holdings,
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Contact Harry G3LLL for all your requirements and specialised advice.
Open: 9.15 am - 5.15 pm
closed Thurs.

SOUTH-WEST
Amateur Electronics UK/ Uppington,
12–14 Pennywell Rd.,
Bristol. Tel: 0272 557732
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Open: 9 am - 6 pm.
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YORKSHIRE
Amateur Electronics UK/ Hooker, 42 Nether Hall Rd.,
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ICOM IC271E
2m base station for the eighties, 25w O/P, 32 memories, scanning, 10/100Hz auto shift tuning rates + (as options) voice frequency synthesiser, internal 12V psu, GaAS FET preamp.

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

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

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EXTRA-SPECIAL OFFER YAESU FT790R PLUS 30W 70CM AMPLIFIER ELH 730 G WORTH £114.95 ALL FOR ONLY £299

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

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FREE

YAESU FT 726R
Multiband base station transceiver. Just compare the following features:

NEC PRICE £739

PLUS MD IB8 MIC

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

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

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

FREE!

FROM A.R.E. AT NEC

Yes, of course there are! You look after the coffee, Brenda- and I'll look after the Special Offers!

WORLD BEATER

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

NEC PRICE £269 WITH MUTEK BOARD (LIST PRICE £296)

MORE FOR LESS

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

NEC PRICE £179 WITH NC9C CHARGER!!

SAVE £30 ON OLD PRICE

Invitation

FROM BRENDA G4VXL and BERNIE G4AOG

We've more at NEC than we can show you here.
Make sure you visit us on STAND B35/36.
Compare prices–see us last–then buy!
Your entrance fee refunded with all purchases over £100.

R.U. SERIOUS?

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

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

THE ULTIMATE

NEC OFFER + OSKERBLOCK SWR300 POWER/VSWR BRIDGE OR NODA TUSHIN 427H P.E.P./RMS POWER METER

YAESU FT757GX
Compact–dual VFO's–general coverage–100W O/P. What more can we say, except... If you haven't already heard or seen one, then you also probably think that Bobby Charlton still plays football for England!

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TIRED OF THE QRM AND LACK OF OPERATING SPACE ON 2M?

Then Q.S.Y. to 70cm and begin to enjoy your hobby again. After all, 70cm is 10MHz wide in most areas of the UK. That's plenty of room for all to enjoy their favourite mode.

In order to help promote further activity on 70cm we have been able to reduce prices of many of Yaesu's UHF transceivers. This has been possible due to S.M.C.'s bulk purchasing from Yaesu together with reduced production costs at the factory due to increasing demand on the Japanese home market since the introduction of UHF repeaters in Japan.

Check out the prices of Yaesu's UHF Transceivers against other manufacturers' models and you will probably agree Yaesu leads the way to 70cm.

Just consider with lower equipment costs than equivalent 2M transceivers, a large number of UHF repeaters in the UK per amateur population than anywhere else worldwide and remember 70cm antennas because of their smaller size and similarity to TV antennas make them far more environmentally acceptable than 2M long Yagis.
'Need we say more except see you on 70 cms'

FT708R
Now only
£179 inc

FT790R

shown with FL7010 optional amplifier

Now only
£249 inc

FT730R

Now only
£229 inc

COAXIAL FEEDERS

Don't throw away those valuable watts by using a poor quality feeder. Remember approximately 20M of UR67 will have an approximate attenuation of 3dB at 432MHz. This means if you invest around £250 for a 100W PA you will only end up with about 50W at the antenna.

UR67	att 3.9dB per 25M approx	£0.69 p/m
Pope H100	att 2.25dB per 25M approx	£0.79 p/m
*Eupen 5121	att 1.4dB per 25M approx	£2.93 p/m NEW
*Andrews LDF2.50	att 1.9dB per 25M approx	£3.00 p/m
*Andrews LDF4.50	att 1.3dB per 25M approx	£3.58 p/m

*Helical Foam-Dielectric cables
Carriage on cables £2.40 up to 20M over 20M £3.20

70cm ANTENNAS

D8/70	8 over 8 Yagi	£25.87
PBM18/70	18 ele Parabeam	£32.20
PBM24/70	24 ele Parabeam	£44.55
LW24/70	24 ele Yagi	£27.02
MBM28/70	28 ele Multibeam	£21.27
MDB48/70	48 ele Multibeam	£35.65
MBM88/70	88 ele Multibeam	£48.87
8XY/70	8 ele crossed Yagi	£42.55
12XY/70	12 ele crossed Yagi	£52.90
SMCGP432X	3 × ⅝ wave colinear	£32,20
SMCGP714	14 step coaxial colinear 10DBI	£78.60NEW
SMC70 N2V	2/70cm Colinear	£32.20

Carriage on antennas £2.65

LOOKING FOR A SATELLITE TRANSCEIVER SYSTEM?

Those clever little men at Yaesu have put together your total satellite transceiver requirements in one package. If you are interested in the RS satellites with 2M to 10M transponders, the answer is FT726R + HF module and satellite unit, or if you want to use Oscar 10 with 70 cms to 2M transponder, the answer is FT726R + 70 cms module and satellite unit. You can even use the FT726R with the mode L transponder on Oscar 10. *However in this case the FT726R does require a little help from Microwave Modules and their MMX1268/144.* For mode L the answer is FT726R + 70cms module, satellite unit and MMX1268/144 on all the above combinations, full duplex is possible when the satellite unit is fitted to the FT726R. *So look no further, Yaesu have the answer, the FT726R!!*

FT726R(2)	Transceiver c/w 2M	£739.00
FT726R	Transceiver Main frame	£585.00
21/24/28	HF module	£200.00
50/726	6M module	£185.00
144/726	2M module	£155.00
430/726	70cms module	£250.00
SAT726	Full duplex module	£95.00
XF455MC	600Hz CW filter	£39.85
MMX1268/144	Satellite transmit transverter	£149.00

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FT203R Yaesu's New Compact 2m Handie

The ultra compactness of the FT203R is due mainly to Yaesu's chip component circuit board assembly, the chip components being installed automatically by robots. The 203's features include thumbwheel frequency selection, built in S/PO meter, 2·5W RF O/P at 10·8V, (3·5W O/P with FNB4). Vox activated switching is possible when used in conjunction with YH-2. Accessories supplied include FNB3, FTE-2 tone unit, CSC6 case and YHA-14A antenna.

FT203R	2·5W transceiver	£169.00 inc
FBA5	Case for 6AA cells	£6.50 inc
FNB4	12V Nicad pack	£36.40 inc
CSC7	Soft case (when FNB4 is used)	£6.50 inc
YH-2	Headset/Mic	£13.80 inc
MH-12A2b	Speaker Mic	£16.85 inc
SMC8.9AA	Charger (13A style)	£8.05 inc
MMB21	Mobile mounting bracket	£7.65 inc

THE BUY OF THE YEAR
FT707 8 BAND HF TRANSCEIVER

~~£499.00~~ now only £425 inc

FP707 matching AC PSU	£125.00 inc
FV707DM digital VFO	£149.00 inc

FT-980

FT980	Transceiver with general coverage RX	£1265.00 inc
SP980	External L/S with audio filter	£58.65 inc
SP980P	External L/S with phone patch	£74.85 inc
FIF80	Computer interface for NEC PC8001	£99.65 inc
FIF65	Computer interface for Apple II	£51.35 inc
FIF232C	Computer interface (RS232)	£58.40 inc

FT77

FT77	8 Band RX/TX 100W output	£459.00 inc
FT77S	8 Band RX/TX 10W output	£425.00 inc
FP700	MATCHING AC PSU	£135.00 inc
FC700	MATCHING ANTENNA TUNER	£98.90 inc
FV700DM	DIGITAL VFO Unit	£200.00 inc
MKT77	Marker unit	£10.35 inc
FMUT77	F unit	£27.20 inc

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THE FT757 SYSTEM

FT757GX	ALL MODES AND FILTERS FITTED	£685.00 inc
FP757GX	SWITCHED MODE PSU (50% duty)	£149.50 inc
FP757HD	HEAVY DUTY PSU (100% duty)	£162.50 inc
FC757AT	AUTOMATIC ANTENNA TUNER	£231.50 inc

* Frequency range 160-10M Tx, general coverage Rx. 10Hz VFO steps and 500kHz band steps. * Modes, USB, LSB, CW, AM, FM all as standard. * Power output 100W SSB, CW, FM 25W carrier AM, 3rd order products −40dB at 100W on 14MHz. * Dynamic range better than 100dB CW(N) at 14MHz. * Frequency stability better than ± 10ppm after warm up. * Dual VFO's and 8 memories with VFO/memory transfer feature allowing more flexible split frequency operation. * Programmable memory scanning with scanstop threshold adjustable with the RF Gain control. * All accessories installed including AM, FM, marker, speech processor, shift filters, 600Hz CW filter and keyer. * New heatsink design and ducted cooling system allows 100W o/p at 100% transmitter duty cycle. * Selectable semi break-in or full break-in and built-in iambic keyer with dot-dash memory. * Three micro processors control most of the switching and adjusting functions normally done by hand and an optional CAT interface unit allows further operating flexibility with an external computer.
* 100% duty with FP757HD only.

REMEMBER

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

BARCLAYCARD VISA

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

GRIMSBY
SMC (Humberside)
247A Freeman Steet,
Grimsby, Lincolnshire
Grimsby (0742) 59388
9.30-5.30 Mon-Sat

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

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

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

BUCKLEY
SMC (T.M.P.)
Unit 27 Pinfold Workshops
Pinfold Lane, Buckley
Buckley (0244) 549563
9.30-5.00 (Lunch 1-1.45) Tue-Sat

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

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

KDK KYOKUTO DENSHI CO. LTD.

FM2033

144 MHz, 12VDC Transceiver. 25W/5W Hi/Lo (both adjustable). Compact 2 13/16" × 6 3/8" × 7 3/16". 12½ KHz steps (100 KHz fast QSY). Amber LCD 'Sunlight View', Side Lit. Display; 100's of Hz or channel number. Sensitivity <0.2μV for 12dB SINAD. Single knob frequency control "Dial". Endless or non-endless dial options. RIT; 1 KHz steps, V.F.O. + memory. Two 5 slot memories A, B, A+B, A×B. 11th memory instant "call" channel. Memories simplex or duplex channels. Band scanning, programmable limits. Scan halts squelch + centre zero. Pause on scan halt for 3 seconds. Scan/tune/RIT from microphone ±600 KHz split, plus cross memory. Repeater input listen by pressing "dial". Setable; steps, tone, splits. limits. Simple controls for safe mobile operation. C/W mobile mount, mic and handbook.

NEW **£239 inc** NEW

SCANNING RECEIVER

MS-8400

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

SPECIFICATIONS

Frequency Range:	Low VHF 68,000 MHz – 88,000 MHz Mid VHF 108,000 MHz – 136,000 MHz High VHF 136,005 MHz – 174,000 MHz UHF 360,000 MHz – 512,000 MHz
Scanning steps:	5, 10, 12.5 and 25 KHz VHF (10, 12.5 and 25 KHz UHF)
Channels:	40 programmable memories
Modes:	AM or FM selectable
Scan rate:	Approximately 18 channels per second
Scan delay:	2 seconds **Priority sampling:** 4 seconds
Audio output:	1.2 Watts
Selectivity:	Better than –60 dB @ ± 25KHz
Power supply:	DC 12V – 16V 0.6A max
Memory backup:	9 volt, battery (PP3)
Antenna:	Telescopic antenna or External
Loudspeaker:	2.5" × 4" oval speaker
Size:	190(W) × 250(D) × 85(H) mm
Weight:	1.7kg

£249.00 inc.

Price includes free carriage

JAY BEAM

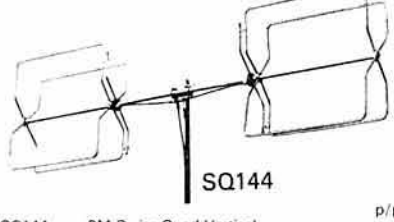
				p/p
4 METRES				
4Y/4M	Yagi 4 element	7dBd	£29.90	£2.65
PMH2/4M	Phasing harness 2 way		£16.10	£1.65
2 METRES				
H0/2M	Halo head only	0dBd	£5.98	£1.50
HM/2M	Halo with 24" mast	0dBd	£6.55	£1.65
C5/2M	Colinear omni vert	4·8dBd	£54.62	£2.65
LW5/2M	Yagi 5 element	7·8dBd	£14.37	£2.65
LW8/2M	Yagi 8 element	9·5dBd	£17.82	£2.65
LW10/2M	Yagi 10 element	10·5dBd	£24.15	£2.65
LW16/2M	Yagi 16 element	13·4dBd	£35.07	£3.65
14Y/2M	Yagi 14 element	12·8dBd	£36.23	£3.65
PBM10/2M	10 ele Parabeam	11·7dBd	£44.85	£3.65
PBM14/2M	14 ele Parabeam	13·7dBd	£55.77	£3.65
Q4/2M	Quad 4 element	9·4dBd	£29.32	£2.65
Q6/2M	Quad 6 element	10·9dBd	£39.10	£2.65
Q8/2M	Quad 8 element	11·9dBd	£44.85	£2.65
D5/2M	Yagi 5 over 5 slot	10dBd	£25.30	£2.65
D8/2M	Yagi 8 over 8 slot	11·1dBd	£34.50	£2.65
5XY/2M	Yagi 5 ele crossed	7·8dBd	£28.17	£2.65
8XY/2M	Yagi 8 ele crossed	9·5dBd	£35.65	£2.65
10XY/2M	Yagi 10 ele crossed	10·8dBd	£46.00	£2.65
PMH2/C	Harness cir polarisation		£9.77	£1.65
PMH2/2M	Harness 2 way 144MHz		£12.65	£1.65
PMH4/2M	Harness 4 way 144MHz		£28.75	£1.65
SEVENTY CM				
C8/70	Colinear Omni Vertical	6·1dBd	£62.10	£2.65
D8/70	Yagi 8 over 8 slot	12·3dBd	£25.87	£2.65
PBM18/70	18 ele Parabeam	13·5dBd	£32.20	£2.65
PBM24/70	24 ele Parabeam	15·1dBd	£42.55	£2.65
LW24/70	Yagi 24 element	14·8dBd	£27.02	£2.65
MBM28/70	28 ele Multibeam	11·5dBd	£21.27	£2.65
MBM48/70	48 ele Multibeam	14·0dBd	£35.65	£2.65
MBM88/70	88 ele Multibeam	16·3dBd	£48.87	£2.65
8XY/70	Yagi 8 ele crossed	10dBd	£42.55	£2.65
12XY/70	Yagi 12 ele crossed	12dBd	£52.90	£2.65
PMH2/70	Harness 2 way		£10.35	£1.85
PMH4/70	Harness 4 way		£22.42	£1.85
1296 MHz				
CR2/23CM	Corner reflector	13·5dBd	£40.25	£2.65
PMH2/23CM	Harness 2 way		£31.05	£1.85

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

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.

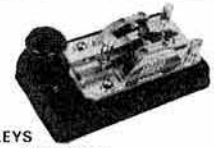


SQ144

			p/p
SQ144	2M Swiss Quad Vertical Mounting	£63.25	£2.65
GP2M	2M ¼ c/w ground plane 3·4dB ↓	£20.70	£2.65
GP144W	2M 2 × ¼ colinear 6·5dB ↓	£29.90	£2.65
GP23	2M 3 × ¼ colinear 7·8dB ↓	£43.70	£2.65
GP432	70cm 3 × ¼ colinear 6·8dB ↓	£32.20	£2.65
70N2V	2M/70cm colinear 2·8dB ↓/5·7dB ↓	£32.20	£2.65
HS770	2M/70cm Duplexer 50W 30dB isolation	£15.35	£1.85
VHFL	65-520MHz Discone Rx only	£16.95	£2.65
GDX1	80-480MHz Discone 3dB ↓	£43.65	£2.65
GDX2	50-480MHz Discone 3dB ↓	£55.20	£2.65
GDXA	100-480MHz Discone 3dB ↓	£36.80	£2.65
LT606	50-500MHz Log Periodic 7·8dB	£115.00	£2.65
HF5V	Trapped Vertical 10-80M 5 bands	£59.00	£2.65
HF5R	Loaded Radial Kit	£38.35	£2.65
3Y1015D20	3 ele 10, 15M Dipole 20M	£158.70	£5.95

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

MORSE EQUIPMENT



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

PRICES INCLUDE VAT at 15%
Carriage as shown

ROTATORS

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

KR600RC 95026

FU200	through	3 Core	Light Duty	£49.95
KP250	Bell	6 Core	Lighter Duty	£54.91
9502B	Offset	3 Core	Lighter Duty	£57.50
AR40	Bell	5 Core	Medium Duty	£98.90
KR400	Bell	6 Core	Matches KR500	£99.95
KR500	Thro	6 Core	Elevation	£126.50
AR50	Bell	5 Core	5 Position Medium	£113.85
KR400RC	Bell	6 Core	Medium Duty	£118.45
CD45	Bell	8 Core	Heavy Duty	£149.50
KR600RC	Bell	8 Core	Heavy Duty	£167.90
HAM IV	Bell	8 Core	Heavier Duty	£264.50
KR2000RC	Bell	8 Core	Heavier Duty	£333.50
T2X	Bell	8 Core	Very Heavy Duty	£332.35
H300	Bell	8 Core	Digital Readout	£546.25

Control Cable

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

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

STOCK-CARRYING AGENTS WITH DEMONSTRATION FACILITIES

Stourbridge Andrew G4BJY (0384) 390916

Bangor John GI3KDR (0247) 55162
Tandragee Mervyn GI3WWY (0762) 840656

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

POWER METERS

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

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

FS-500H

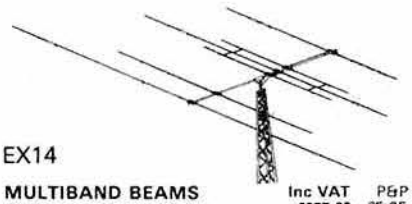
				£
HANSEN				
FS710H	1.8-60 MHz	15/150/1500W	Pep	97.75
FS710V	50-150 MHz	15/150W	Pep	97.75
FS50HP	1.8-60 MHz	20/200/2000W	Pep	96.60
FS50VP	50-150 MHz	20/200W	Pep	96.60
FS500H	1.8-60 MHz	20/200/2000V	Pep	77.80
FS500V	50-150 MHz	20/200W	Pep	77.80
FS300H	1.8-60 MHz	20/200/1000		50.60
FS300V	50-150 MHz	20/200		50.60
FS200	1.8-150 MHz	20/200	Pep	55.95
FS601M	1.8-30 MHz	20/200W	Pep	57.50
FS601MH	1.8-30 MHz	200/2000W	Pep	57.50
FS602M	50-150 MHz	20/200W	Pep	57.50
FS603M	430-440 MHz	5/20W	Pep	56.75
FS210	1.8-150 MHz	20/200W	Auto SWR	59.80
FS301M	2-30 MHz	20/200W		39.50
FS301MH	2-30 MHz	200/2000W		39.50
FS302M	50-150 MHz	20/200W		39.50
FS711H	2-30 MHz	20/200W	Head	41.00
FS711V	50-150 MHz	20/200W	Head	41.00
FS711U	430-440 MHz	5/20W	Head	41.00
HB1	FS711H Coupler			23.00
VB1	FS711V Coupler			23.00
UB1	FS711U Coupler			23.00
FS5E	3.5-150 MHz	20/200/1000W	HF	41.00
FS5S	1.8-150 MHz	20/200/1000W	HF	41.00
FS7	145 & (432 MHz)	5/20/200	144	44.85
SWR3E	3.5-150 MHz	20/200/1000W	HF	26.85
SWR3S	3.5-150 MHz	F/S Meter ant.		28.35
SWR50B	3.5-150 MHz	Twin Meter		26.85
FS20D	3-150 MHz	5/20W		39.85
FS-800	1.8-150 MHz	6/30/150W		115.00
JD				
JD110	1.5-150 MHz	10/100W		13.80
WELZ				
SP600	1·8-500MHz	20/200/2kW		97.00
S.M.C.				
S3-30L	Mini			8.80
T3-170L	3.5-170 MHz	Relative		16.50

T3-170L

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

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.

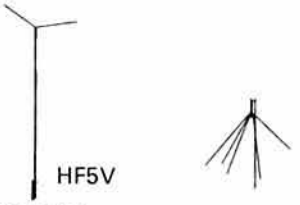


EX14

		Inc VAT	P&P
MULTIBAND BEAMS			
EX14	Explorer 10-20m	£325.00	£5.95
TH3JN	3 Ele 10-20m	£199.00	£3.50
TH2MK3	2 Ele 10-20m	£169.00	£3.50
TH3MK3	3 Ele 10-20m	£199.00	£5.30
TH5DXX	5 Ele 10-20m	£419.00	£6.70
TH7DXX	7 Ele 10-20m	£520.00	£8.75
TB3	3 Ele 10-20 Jaybeam	£189.75	£5.90
HQ1	Mini Quad 10-20	£169.00	£4.00
G4MH	Mini Beam 1-20	£88.50	£4.50
TA33JNR	3 Ele 10-20 Moseley	£177.10	£6.00
Mustang 2	2 Ele 10-20 Moseley	£177.10	£6.90
Mustang 3	3 Ele 10-20 Moseley	£220.80	£6.90
GQ2E	2 Ele 10-20 Quad	£270.25	£5.40
GQ3E	3 Ele 10-20 Quad	£435.00	£9.20
GQ4E	4 Ele 10-20 Quad	£599.00	£10.00
Hyquad	2 Ele 10-15M dipole 20M	£325.00	£6.00
LP1007	Log Periodic 13-20 MHz	£707.75	DIST
3Y1015D20	3 Ele 10/15M Dipole 20M	£158.70	£5.95
DB10/15A	3 Ele 10-15m	£199.00	£4.80

TB3

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



HF5V HF5R

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

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

SMC-HS

HF, VHF, UHF ANTENNAS MOBILE VERTICALS

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

SMC 78F

GCD

SMC258

GCD

		£	P&P
SMC-HS MOBILE ANTENNAS			
SMC6P2T/PL	Telescopic 2M PL259 fitting 0dB	5.75	0.85
SMCT144h	Telescopic 2M ½ wave BNC	£9.20	0.85
SMC6P2T/BNC	Telescopic 2M BNC fitting 0dB¼	5.75	0.85
SMC2H/PL	Helical 2M PL259 fitting	5.75	0.85
SMC2H/BNC	Helical 2M BNC fitting	5.75	0.85
SMCHS430	70cm ½ wave BNC fitting 2.5dB¼	7.30	0.65
SMC2QW	2M wave 0dB¼ 1.6'	2.53	1.85
SMC2NE	2M wave fold 3.0dB¼ 4.3'	7.30	2.00
SMC2VF	2M wave fold 3.0dB¼ 3.5'	12.65	2.00
SMC78F	2M ¼ wave fold 4.5dB¼ 5.7'	14.95	2.50
SMC78B	2M ¼ wave ball 4.5dB¼ 5.6'	14.95	2.59
SMC78SF	2M ¼ wave short 4.7'	14.95	2.50
SMC88F	2M 5/8 wave 5.2dB¼ 6.5'	20.70	2.50
SMC118M	Colinear 2M 11/8 wave fold 7dB¼ 9.7'	33.35	2.65
SMC25B	70cm 2 × ¼ fold 5.5dB¼ 3.1'	13.80	2.00
SMC358	70cm 3 × ¼ 6.3dB¼ 4.7'	18.40	2.00
SMC70N2M	Dual band 2M 2.7dB¼ 70cm 5.1dB¼	18.40	2.00
SMCHS770	144/432 Duplexer 50W	16.50	1.85
SMC20SE	20M 1.72M 'fold over' 100W PEP	19.15	2.50
SMC15SE	15M 1.72M 'fold over' 130W PEP	15.70	2.50
SMC10SE	10M 1.72M 'fold over' 200W PEP	14.95	2.50
SMC17SE	17M 1.915M 'fold over' 200W PEP	17.25	2.50
SMC12SE	12M 1.915M 'fold over' 200W PEP	15.35	2.50
RSL-28b	Yaesu 10M mobile whip	10.65	2.00
SMCGCCA	Gutter clip 4 mtrs cable	10.35	2.00
SMCSOCA	Cable assembly 4M	5.35	1.50
SMCSOCAL	Cable assembly 6M	5.75	1.50
SMCTMCAS	Trunk mount c/w 6M cable	9.20	2.00
SMCSOMM	Magnetic base c/w 4M cable	10.75	2.00
SMCSOWM	Adjustable wing mount base	4.60	0.90
SMCGCD	Gutter clip deluxe	5.00	1.50
SMCBSD	Bumper strap deluxe	9.60	1.50
HS88BK	Bumper mounted extension for 144 MHz ant.	20.30	2.00

SOMM

HS770

NB: PRICES INCLUDE VAT AT 15%

Head office
Mail orders
Service & Spares

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

WATERS & STANTON ELECTRONICS

TRIO YAESU ICOM
FDK JAYBEAM
WELZ DATONG
AZDEN MICROWAVE
BNOS MUTEK

Pictured above is a corner of our Hockley shop.

YAESU 757G

COMPLETE HF STATION

No hidden extras!

CW FILTER IAMBIC KEYER
BREAK-IN NOISE BLANKER
GEN. COVERAGE AM-FM-SSB-CW 1
Accessories:– FC757AT £231.50
FP757GX £149.50 FP757HD £162.50

£675

NEW

ICOM IC02

This is the latest handheld to come from the ICOM stable. Following close in the footsteps of the IC2E the IC02E now includes LCD display and keypad operation. Frequency steps are 12½ kHz or 25 kHz programmable. Comprehensive scanning of the 10 memories or band segments is possible. Price includes ni-cads and charger, etc.

£229

SONY ICS7600

A HANDFUL OF FUN

£179

Small Size – Big Performance
150kHz-30MHz + FM 76-108MHz
AM-SSB-CW – LCD Display
10Memories – Scanning
Mains Power Pack Included

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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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RSGB QSL BUREAU

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

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

RSGB NEWS SERVICES

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

GB2RS Broadcasts
Sunday news broadcasts from stations throughout the UK using the callsign GB2RS on frequencies in the 3·5, 7 and 144MHz bands.

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

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

EDITORIAL

RSGB COMMITTEES AND . . .

How many times have you heard the cliché about committees producing camels? Well, here are two examples of RSGB committees in action, producing results which can be seen to be important to the future of amateur radio.

The IARU Region 1 Conference. This conference will be held in Sicily from 8 to 13 April. By any standards, it is a major conference, with 140 delegates from 35 countries likely to attend. Countries represented will include virtually all those from Western Europe, those from the eastern bloc including Russia, Poland, Czechoslovakia and Hungary, and countries from the Middle East and Africa. Here again is an example of amateur radio bringing together amicably (or at least fairly amicably) people of a very wide range of political and cultural philosophies.

The main purpose of the conference is to agree common policies on matters that have to be decided on an international basis. With so many countries involved, each with varying degrees of development and priorities, this can never be easy, and there has to be much give and take. The starting point for discussion will be nearly 200 papers submitted by individual national societies. This number of papers represents a major task in both typing and circulation by the IARU secretariat to each delegate.

The RSGB will submit about 50 papers, a significant fraction of the total. Most of these will have been generated by the appropriate RSGB committees, with some from outside bodies such as BARTG. About half of the RSGB's 16 committees will have been directly involved in this task, reflecting the views and aspirations of UK amateurs. In addition to preparing papers, the Society's committees will also be considering the papers produced by other societies and formulating RSGB policy within a rather short timescale, again with the interests of UK amateurs in mind.

The co-ordination of all this activity within the RSGB is the responsibility of its IARU Committee, which has among its members the seven delegates who will present the UK position. These delegates obviously have to ensure that they are sufficiently well briefed on all the topics to be covered, so as to be able to cope with the surprises that often occur under the heavy pressures of conferences of this type. Most delegates end up working a 14h day at the conference itself, which includes evening working groups, and sheer lobbying—with all the problems of language barriers.

Finally RSGB committees have to deal with the implementation of conference decisions, which may be the appropriate ones from an IARU point of view but not necessarily popular within the UK.

The RSGB Convention. Concurrently, there has been the preparation for the Society's 1984 convention at the NEC in Birmingham. In 1982 the Society adopted the policy of building up its annual exhibition to be the biggest event in the RSGB calendar. For many months —virtually since the last one finished—considerable effort has gone into its organization, taking advantage of the lessons learned from last year's event. This has placed a large administrative load on both HQ and the Society's Exhibition & Rally Committee, with 10 other RSGB committees being involved in the preparation of stands, demonstrations and lectures. This year we expect to break all records.

At present, the work of the Society's committees is reviewed very briefly in each annual review, and even more briefly in "Council Proceedings". Perhaps greater publicity should be given to their efforts.

David Evans, G3OUF

Amateur Radio News

World Amateur Radio Day

A date for your diary this year is 18 April 1984, which has been designated by the IARU as World Amateur Radio Day. There are no guidelines or rules for this event, but it has been suggested that every amateur should try out something new on this day—perhaps operate on a new mode or band, listen to a satellite, build a new piece of equipment, or even just exchange a greeting with someone new. There will be no prizes, awards or certificates, but perhaps a few moments could be taken to reflect on the nature of our hobby and to realize that IARU staff and volunteers—together with all their counterparts in all the national societies which make up IARU—are working very hard behind the scenes to make sure that facilities available to the radio amateur are maintained and expanded.

The RSGB will be operating its headquarters station for most of the day, certainly between 10am and 4pm, under the callsign GB2HQ. It will concentrate on the 3·5, 7 and 144MHz bands, although it is hoped to contact other national society stations on other bands. The media have shown considerable interest, and some good publicity for amateur radio may well result. Material for use by clubs will have been sent out from headquarters by the time that this is read. As part of this special day, why not resolve to work the headquarters station? We guarantee to QSL . . . !

Other news from IARU

The IARU had a number of its officers in Geneva during January and early February in order to observe the 1984 World Administrative Radio Conference for the HF Broadcasting Service; Richard Baldwin, W1RU, heading a small team which included G5CO and SP5FM. Some 615 delegates from 90 countries were in attendance, and it appears that the conference proceeded relatively smoothly considering the controversial nature of the service being discussed. As is now traditional, the IARU gave an evening reception, which is an excellent platform for discussions of amateur radio matters with senior government officials from many nations.

The Belize Amateur Radio Club has been admitted to membership of the IARU on a unanimous vote, and the IARU takes pleasure in admitting the BARC as its 119th member.

Cefalu Region 1 Conference

The next triennial IARU Region 1 Conference takes place in Cefalu, Sicily, between 8 and 13 April. A total of 148 conference papers has been submitted, of which no less than 45 have been produced by the RSGB on a multitude of topics ranging from polarization standards for 2·3GHz eme working to speeds for rtty operation. The RSGB team is led by Tim Hughes, G3GVV, and comprises six members from the HF, VHF, VHF Contests and Microwave committees. Dr E J Allaway, G3FKM, attends on behalf of the IARU. Somewhere in the region of 150 delegates from the national societies are expected to attend, and the work of the conference is carried out in three committees. Committee A handles administrative and operational matters, Committee B deals with vhf and microwave matters, and Committee C examines credentials and finance.

Ms Heather Norman, assistant to the RSGB general manager, will attend the conference, while on leave, to assist with administrative matters and to take committee minutes, thus maintaining a tradition by which RSGB staff have been on hand to assist the IARU organizational team. A full report on the proceedings of the conference will appear in *Radio Communication*.

A special station signing IP9IARU will be operational from Cefalu during the period of the conference. Amateurs in Sicily may also use the prefix IT84 during April.

See you at the NEC?

Members will have seen the insert in this issue giving full details of the forthcoming RSGB National Convention taking place in Hall 3a of the National Exhibition Centre in Birmingham. The exhibition opens at 1000, and this year there will be no less than four ticket booths which will be open from 0930, so that tickets may be purchased early—since Hall 3a is off the main concourse, the long open-air queues of last year should not recur! There will be a shuttle bus from the car park to Hall 3a. It is hoped that catering and seating will both be improved compared with last year's event—there will be mobile catering kiosks, with adequate seating available, in the hall itself.

Advance bookings for coach parties can be made via Martin Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ, and a 10 per cent discount on the normal admission charge of £2 for parties numbering in excess of 20 will be given. Cheques should be made payable to the RSGB, and the closing date for the arrival of bookings is 16 April.

Repeater news

The Department of Trade & Industry has cleared some repeaters in the latest batch of new applications. In vhf Phase 6, GB3OC on Orkney on R2, GB3BB at Brecon on R4, GB3BI near Inverness on R5, GB3LU in the Shetland Islands on R3, and GB3PA at Paisley on R1 have all been cleared to become operational although, except in the case of GB3OC, formal site clearance procedures have not yet been completed. In uhf Phase 7, GB3BE at Bury St Edmunds on RB6, GB3HK at Hawick on RB14, GB3KR at Kidderminster on RB4 and GB3WI at Wisbech on RB15 have received full clearance to become operational; in addition, GB3CA in Carlisle on RB13, GB3GU on Guernsey, GB3OM in Omagh, Northern Ireland, and GB3PP at Preston—all of which are on RB15—have also been given permission to become operational although formal site clearance procedures are not yet complete. GB3CY, GB3KB, GB3LA and GB3SZ are still awaiting local clearance, and some minor problems remain to be resolved in the case of GB3AM, GB3GD, GB3DS and GB3YS.

As we went to press, it was understood that GB3PA, GB3OC, GB3LU, GB3HK and GB3KR had become operational as of 20/21 February 1984. Further information will be given via the *RSGB News Bulletin*, GB2RS and the Headline News service.

Some television repeaters have also been given clearance to become operational, although here again formal site clearance procedure is not yet complete. GB3GV near Leicester on RMT1, GB3VR in Worthing, Sussex on RMT2, and GB3TV at Dunstable on RMT2 have been given approval, and GB3UD near Stoke-on-Trent on RMT2 will be approved subject to some further tests in conjunction with the Radio Interference Service. GB3GV, which is the UK's first amateur tv repeater, became operational on 19 February. The input frequency of RMT1 is 1,276·5MHz, and its output is 1,311·5MHz, with the sound channel 6MHz higher. It runs a.m. video. The first fm tv repeater, GB3VR, was scheduled to become operational on 3 March 1984: the input frequency of RMT2 is 1,249MHz, and its output 1,318·5MHz, again with the sound 6MHz higher.

Three new repeater proposals have now gone to the DTI: GB3GJ at St Helier on Jersey on R2, GB3BF at Carlton, Bedfordshire on RB15, and GB3HT at Hinckley, Leicestershire on RB11. GB3PD at Peterhead in Grampian, which was not one of the recently licensed batch, was due to become operational on RB10 on 25 February 1984.

The Repeater Management Group, which is responsible for the administration of the repeater network, has a very high workload. In order that the work can be spread more evenly among its members, it would be appreciated if correspondence concerning repeaters could be sent to the relevant regional RMG member for the geographical area concerned. These are as follows: London, SE England and northern Home Counties—Mike Senior, G4EFO, 19 Abbots Leigh, Southwater, Horsham, W Sussex; SW England, central southern England and South Wales—Chris Young, G4CCC, 18 Wincroft Road, Caversham, Berks RG4 7HH; E Midlands, Norfolk, Lincolnshire, Yorkshire, Humberside and NE England—Geoff Dover, G4AFJ, 21 Greenwood Avenue, Bakersfield, Nottingham NG3 7FX; W Midlands, NW England and North Wales—Gordon Adams, G3LEQ, 2 Ash Grove, Knutsford, Cheshire WA16 8BB; Scotland, Northern Ireland and Isle of Man—Colin Dalziel, GM8LBC, 12 Dunure Drive, Earnock, Hamilton ML3 9EY.

Specialist queries should be sent as follows: tv repeaters—Graham Shirville, G3VZV, 18 Church Road, Milton Bryan, Milton Keynes MK17 9HR; rtty/data repeaters—J. Perkins, G4IVV, 5 Ash Keys, Southgate, Crawley, W Sussex RH10 6TJ; microwave repeaters—Steve Davies, G4KNZ, 2 Beaconsfield Road, Aylesbury, Bucks HP21 7SA; general technical queries—Chris Goadby, G8HVV, 4 Rowan Close, Bottisham, Cambridge CB5 9BN.

The chairman of the Repeater Management Group is Mike Dennison, G3XDV, 5 Lambs Walk, Whitstable, Kent CT5 4PJ.

Regions 2 and 14 election results

The result of the ballot for a representative for Region 2 was as follows:

P. N. Butterfield, G4AAQ.....44 votes
B. Crisp, G5PW.....21 votes
(no invalid votes were received)

Mr P. N. Butterfield, G4AAQ, was therefore elected regional representative for Region 2.

The result of the ballot for a representative for Region 14 was as follows:

R. M. Cowan, GM4SRL.....11 votes
G. L. Leishman, GM4MCB.....42 votes
T. G. Wylie, GM4FDM.....77 votes
Invalid votes received: 4

Mr T. G. Wylie, GM4FDM, was therefore elected regional representative for Region 14.

BARTG silver jubilee

The British Amateur Radio Teleprinter Group, BARTG, celebrates its silver jubilee this year: it has come a long way from its foundation in 1959 when a few pioneers got together to exchange ideas on the then-new techniques of amateur rtty. The group nowadays caters for most forms of data transmission, ranging from rtty, Amtor and fax to the more advanced techniques of digital repeaters and packet radio, although the latter is not yet legal in the UK.

The BARTG newsletter is published quarterly and contains about 60 pages of technical and theoretical features, together with news and items of general interest. Other publications include the popular *RTTY the Easy Way*, which is available from RSGB Publications (Sales).

Current BARTG membership is around 1,300, and membership costs £5 per year. For details of membership, please send a stamped addressed envelope to Mr John Beedie, G6MOK, 161 Tudor Road, Hayes, Middlesex UB3 2QG, or telephone 01-561 0010.

Final reminder for 50MHz

The deadline for the receipt of completed application forms for permits to operate on 50MHz has been extended to 31 April 1984.

Who's on top band?

The Society is often asked which countries have allocations in the 1·8MHz band and on which frequencies they are permitted. As at January 1984, the best information available was as follows. In Region 1, and as a result of the 1979 WARC, the table of frequency allocations now allocates the segment 1,810-1,850kHz to the amateur service, with the exception of countries mentioned in Footnotes 490, 491 and 493. However, the following countries allocate the whole band, ie 1,800-2,000kHz, to the amateur service: Bahrain; Cyprus, which permits phone operation only between 1,900 and 2,000kHz; Gibraltar; Lesotho, up to 10W; Nigeria, up to 10W; and Oman, up to 10W, cw only. It is likely, of course, that some or all of the band is shared with other services.

Amateurs in the following countries also have access to more than 40kHz: Andorra 1810-1,875kHz, phone permitted in the upper 50kHz only; Finland, up to 10W in 1,820-1,845kHz, and 1,915-1,955kHz; German Democratic Republic, up to 10W in 1,810-1,950 with phone in the upper 50kHz only; Federal Republic of Germany, 1,815-1,835 and 1,850-1,890kHz, cw, with ssb permitted only between 1,832 and 1,835kHz); Malta, up to 10W in 1,810-2,000kHz; Norway, cw up to 15W in 1,802-1,850kHz; Poland, 1,750-1,800 and 1,810-1,930kHz, up to 10W input except between 1,830-1,850kHz; USSR, low power in 1,850-1,950kHz, phone permitted only in the upper 75kHz; and the UK up to 10W in 1,810-2,000kHz.

In Austria, Djibouti, Senegal, South Africa and Switzerland, 1,810-1,850kHz may be used. In Austria, ssb is only permitted in the segment 1,832-1,835kHz.

The segment 1,830-1,850kHz is available to amateurs in Denmark, cw up to 10W only; France; Luxembourg; Portugal, cw and rtty up to 60W only; San Marino; Spain; and Syria.

Amateurs in the Netherlands may use ssb and cw with a maximum power of 10W in 1,825-1,835kHz, and those in Sweden may use only 10W cw between 1,830 and 1,845kHz.

There is no allocation in Belgium, Hungary, Italy, Lebanon, Liberia, Monaco, Morocco, Romania, Sierra Leone and Turkey.

In IARU Region 2 the segment 1,800-1,850kHz is allocated exclusively to the amateur service, while the segment 1,850-2,000kHz is shared by the amateur, fixed, mobile, radiolocation and radionavigation services. In Argentina, Bolivia, Chile, Mexico, Paraguay, Peru, Uruguay and Venezuela, the segment 1,850-2,000kHz is allocated to those services on a primary basis.

Amateurs in the following countries have access to the entire band, 1,800-2,000kHz: Antigua Barbuda; Canada; Colombia; Costa Rica; El Salvador; Grenada; Guatemala; Honduras; Mexico; Montserrat, cw and ssb only; Netherlands Antilles; Nicaragua; Panama; Peru; Surinam; Trinidad & Tobago; and the USA.

Amateurs in the Bahamas may use the segments 1,800-1,825 and 1,975-2,000kHz, and those in Bermuda may use cw and phone in 1,800-1,825 and 1,875-1,900kHz. The administrations of Argentina, Bolivia and Brazil allocate only the first segment, 1,800-1,850kHz, and in Argentina 1,800-1,810kHz is for cw only and 1,810-1,850kHz for cw and phone.

There is no allocation in Belize or Chile.

In IARU Region 3 the band 1,800-2,000kHz is shared by amateur, fixed, mobile, radiolocation and radionavigation services. Amateurs in the following countries have access to the whole band; French Polynesia; Hong Kong, cw only; Indonesia, phone permitted in 1,800-1,900kHz, cw only in 1,900-2,000kHz; Malaysia; Pakistan; Singapore, up to 10W input; Solomon Islands; and Western Samoa, phone permitted only in 1,850-2,000kHz.

In Australia the segment 1,800-1,866kHz is available, with phone permitted only in 1,825-1,866kHz. In New Zealand the allocations are 1,803-1,857 and 1,863-1,950kHz. In Papua New Guinea the allocation is 1,800-1,866kHz and 1,874-2,000kHz. In Japan the allocation is 1,907·5-1,912·5kHz, for cw only.

There is no allocation in Bangladesh, Fiji or the Philippines.

After all that, we expect a dramatic increase in the number of top band DXCC awards . . . . !

New bands update

As at 1 January 1984, it is understood that countries with allocations in the post-WARC new hf bands are as follows.

10,100-10,150kHz: Algeria; Andorra; Antigua Barbuda; Argentina, 10,100·5-10,103, 10,119-10,121·5 and 10,143·5-10,146·5kHz; Australia not 10,126-10,134kHz and 10,137·5-10,145·5kHz; Austria; Bermuda; Botswana; Canada; Cayman Islands; Colombia; Costa Rica; Cyprus; Denmark; Djibouti; Commonwealth of Dominica; El Salvador; Faeroe Islands; France; German Democratic Republic; Federal German Republic; Gibraltar; Greece; Grenada; Honduras; Indonesia; Israel; Japan; Luxembourg; Malaysia; Malta; Monaco; Montserrat; Netherlands; Netherlands Antilles; New Zealand, 10,100-10,127 and 10,133-10,150kHz; Nicaragua; Nigeria; Norway; Panama; Papua New Guinea; Portugal; San Marino; Senegal; Solomon Islands; South Africa;

RAYNET SYMPOSIUM

Freedom Inn, Aviemore

5 May 1984

PROGRAMME

1000	Coffee.
1030	"Peacetime emergencies", F. Armstrong, voluntary services co-ordinator.
1130	"Police involvement in emergencies", by a chief inspector of communications, Northern Constabulary.
1230	Lunch
1330	"Red Cross role in emergencies", by a Red Cross training officer and mountain rescue member.
1430	Open forum, Raynet and user services.
1530	Coffee and informal session.

Admission free. Tea/coffee and biscuits 50p, if required.

Discounts available for accommodation and for visits to the Highland Wild Life Park, Kincraig.

Further details from GM3RFA, tel Fort William (0397) 3833.

Spain, 10,107·5-10,113·5kHz; Surinam; Switzerland; Syria; Tonga; Trinidad & Tobago; the UK; the USA, 10,100-10,109 and 10,115-10,150kHz; Western Samoa; and Yugoslavia.

18,068-18,168kHz: Algeria; Andorra; Antigua Barbuda; Argentina, 18,073-18,076·5, 18,083·5-18,089·5, 18,096·5-18,108·5, 18,121·5-18,149 and 18,151·5-18,167·5kHz; Australia, not 18,071-18,079, 18,101-18,109, 18,121-18,134, 18,141-18,149 and 18,156-18,164kHz: Austria; Botswana; Cayman Islands; Colombia; Costa Rica; Cyprus; Denmark; Djibouti; El Salvador; Faeroe Islands; France; Federal Republic of Germany; Gibraltar; Grenada; Honduras; India; Monaco, not 18,103-18,116, 18,129, 18,135 and 18,165kHz; Netherlands; Netherlands Antilles; Nicaragua; Nigeria; Norway; Oman; Panama; Portugal; San Marino; Senegal; South Africa; Switzerland; Syria; Tonga; Trinidad & Tobago; the UK; and Yugoslavia.

24,890-24,990kHz: Algeria, Andorra; Antigua Barbuda; Argentina; Australia, not 24,896-24,904kHz; Austria; Botswana; Cayman Islands; Colombia; Costa Rica; Cyprus; Denmark; Djibouti; El Salvador; Faeroe Islands; France; Federal Republic of Germany; Gibraltar; Grenada; Honduras; India; Monaco; Netherlands; Netherlands Antilles; Nicaragua; Nigeria; Norway; Oman; Panama; Papua New Guinea; Portugal; San Marino; Senegal; South Africa; Switzerland; Syria; Tonga; Trinidad & Tobago; the UK; Yugoslavia.

RSGB at the rallies

The Society intends to be at the following amateur radio rallies during 1984. At least one member of headquarters staff will be present to answer your questions, assist with any problems, and to give you the opportunity to purchase books at "over-the-counter" prices.

1 April—White Rose Rally
7 April—Northern Amateur Radio Societies Association Rally
8 April—Buxton Amateur Radio Rally
28-29 April—RSGB National Convention
13 May—27th Northern Mobile Rally
3 June—Spalding & District ARS Mobile Rally
17 June—Denby Dale Mobile Rally
17 June—RNARS Mobile Rally
8 July—Red Rose Rally
22 July—Anglian Mobile Rally
29 July—Scarborough ARS Mobile Rally
5 August—RSGB Mobile Rally, Woborn
12 August—Derby Mobile Rally
19 August—Flight Refuelling ARS/RAIBC Hamfest
9 September—Scottish Convention
23 September—Lincoln Hamfest '84
30 September—Welsh Convention

Some other dates and rallies awaited confirmation as we went to press.

Cable fights back

During February the Society contacted all its members in Milton Keynes in order to survey the extent to which radiation from the cable tv system was affecting the 144MHz band and to establish the scale of the problem. The Society has also written to the local MP and had meetings with the DTI in an effort to resolve the problem—we hope to have some news of progress in this area soon. Meanwhile, in the USA the national lobbying group for the cable tv industry, the National Cable TV Association, has asked the Federal Communications Commission to dismiss the ARRL petition to ban cable companies from using frequencies which are within the amateur bands. An NTVCA representative has said that the claims that the industry has failed to take proper action to eliminate leakage are "...uninformed and unfounded". However, ARRL has said that it intends to pursue the matter; it notes that many cases of leakage from cable tv systems remain unresolved.

More on polychlorinated biphenyls

Polychlorinated biphenyls have received some previous attention *(Technical Topics, Rad Com* July 1982) because of the health hazard which they present. A guidance note from the Health & Safety Commission (note LAAIC/C/3/9) gives some further information; and the following edited extracts are given by permission of the commission.

Polychlorinated biphenyls are a range of substances consisting of a biphenyl molecule (or alkyl or aryl derivative) with more than one chlorine substituent. These compounds are very resistant to degradation and, if released, persist in the environment and accumulate in the food chain. They, and formulations containing them, have been available for some 50 years: Polychlorinated biphenyls are sometimes known as askarels, and some typical trade names include Apirolio, Aroclor, Asbestol, Bakola 131, Chlorextol, Clophen, Interteen , Kanechlor, No-Flamol, Pyralene, Pyranol, Pyrochlor, Saf-T-kuhl and Solvol. Because of their stability, non-flammability, high boiling points and dielectric characteristics, they have been used in transformers and large and small capacitors. However, very little new equipment is being filled with these substances—the sole UK manufacturer ceased to supply them for this type of application in 1972, and ceased production altogether in 1977. In Europe, an EEC directive of 1976 permits the use of polychlorinated biphenyls only in certain kinds of mining, heating and electrical equipment. This directive was implemented in the UK by SI 1980 No 638, the Control of Pollution (Supply and Use of Injurious Substances) Regulations.

Polychlorinated biphenyls are organic oil-soluble materials of moderate toxicity; and vapour is unlikely to be present in significant concentrations unless they are heated or used in a confined space. Exposure by skin or eye contact is the primary risk from these substances although vapour inhalation may be of significance where work takes place in an ill-ventilated space or where a large quantity of the substance has been released or spilled. This applies particularly if the spilled material is warm. The effects of exposure to polychlorinated biphenyls may include an acneiform rash known as chloracne, an increase in skin pigmentation which may be associated with an increased incidence of melanomas, a raised blood fat content and liver damage.

Where a choke or capacitor is found to be leaking, the wearing of gloves, together with strict cleanliness and the careful disposal of the item and wiping materials will usually be sufficient precaution. Local authorities should be able to offer advice and assistance with disposal. For work on larger equipment or for cleaning up spills, specialist assistance should be sought. A high standard of skin, eye and respiratory protection should be worn by persons likely to be exposed to polychlorinated biphenyls. Permeable clothing is not suitable: robust polythene or similar gloves and overshoes are advised, not rubber or neoprene. For work with only minor risks of contact hazard, terylene is acceptable.

The guidance note goes on to give some further information, the gist of which is that polychlorinated biphenyls should be treated with considerable care.

The chances of finding equipment containing these substances are difficult to assess. A high-voltage transformer on sale in a London shop recently was found to contain them, and it appears that many older fluorescent light fittings incorporate chokes and capacitors which utilise them. A faint smell akin to that of napthalene (mothballs) has been said to be associated with their presence, although deliberately sniffing the contents of a large transformer or dummy load would not appear to be advisable! The best recommendation would appear to be that, if it is suspected that a piece of equipment may contain polychlorinated biphenyls, the advice of the chief environmental health officer or director of environmental health services of the local authority should be sought: also the local fire brigade may be able to assist.

Safety in the shack

The Society has heard recently of several cases in which imported equipment has had unsatisfactory fusing and switching arrangements. Some low-voltage power supplies have been fused in the neutral side of the mains input instead of the line side, and two cases in which the mains on-off switch was single-pole and wired in the neutral instead of the line side have been encountered. Both of these are potentially lethal, since failure of the fuse or of the switch leaves some parts of the equipment at line potential—the dangers of shock or fire are obvious. The mains on-off switch in electrical equipment should always be of the double-pole variety which breaks both the line and neutral sides of the circuit. Its ratings should also be adequate for the prospective current being switched, taking account of inrush currents in large transformers and in some types of switched-mode supply without soft-starting arrangements. Mains fuses should always be placed in the line side of the mains input, after the switch, and the continuity of the neutral should only ever be broken by the double-pole mains switch which breaks the line side at the same time. Power supplies originally intended for the cb market are very prone to inadequate arrangements of this kind, and some rotator control units have also been found to be unsatisfactory.

If in doubt, check. It is also good practice to use a mains neon in conjunction with the on-off switch to show that the equipment is live.

On a related subject, the three-pin IEC connector is becoming more frequently encountered on various equipments, and it is possible to purchase mains leads in which this connector is moulded on to one end. Some cases have been encountered whereby the polarity of line and neutral have been reversed within the moulding, which could lead to potentially dangerous

situations. If your shack uses this type of connector it would be worth checking that the line and neutral cables at the free end correspond to the correct polarity of the outlets as marked on the connector.

News from New Zealand

The New Zealand Association of Radio Transmitters, the national society, has obtained some new privileges for radio amateurs after many years of negotiations. Among other things, amateurs are now responsible for their own band planning (as has always been the case in the UK); the need for rtty stations to identify in morse or speech has been removed; and the 1·8MHz band is restored to 1·8–1·95MHz with some minor omissions. The 28MHz band is now open to Grade 2 licensees, and a new novice band at 28,100–28,600kHz is now available. A new band for general amateur use is now available at 610–620MHz, and nine new bands above 47GHz have also been opened to the amateur service. All bands available to the amateur satellite service are now open to New Zealand amateurs. Finally, amateurs of all grades except novice may use 27,120kHz for telecontrol and telemetry. It is understood that the release of the 18 and 24MHz bands may be possible during 1984.

NZART has also announced that, as of 1 January 1984, the callsign prefixes for amateur stations in New Zealand and its territories are as follows: ZK1, Cook Islands; ZK2, Niue; ZK3, Tokelau; ZL1–4, mainland New Zealand; ZL5, Antarctica; ZL6IW, Intruder Watch station; ZL7, Chatham Islands; ZL8, Kermadec Islands; ZL9, Auckland and Campbell Islands; ZL0, visitors to mainland New Zealand. The numeral in ZL1–4 series no longer indicates a district. The ZM1–0 series continues to be held in reserve and is used on special occasions at the discretion of the New Zealand Post Office.

Call areas in Senegal

With effect from 1 January 1984 the Senegalese administration has allocated the following callsign prefixes to the eight regions of the country: 6W1, Cap Vert; 6W2, Casamance; 6W3, Diourbel; 6W4, Fleuve; 6W5, Senegal Oriental; 6W6, Sine-Saloum; 6W7, Thies; 6W8, Louga. Current suffixes remain unchanged.

All SP stations back

In *Radio Communication* October 1983 it was reported that all Polish amateur radio activity has been restored. A letter from the Polish national society, PZK, confirms that the Ministry of Post & Telecommunications returned licences and transmitting equipment to their owners on 1 October 1983—this ended the period of suspension of amateur radio activities in Poland which commenced with the introduction of martial law on 13 December 1981.

Syledis emigrates

It appears that amateurs on the west coast of the USA are having problems with equipment similar to Syledis and manufactured by the same company. The FCC and the equipment owners are currently attempting to find a technical solution which is acceptable to both users of the 430MHz band. Other services can be licensed to use portions of the spectrum allocated to the amateur service in the USA on a case-by-case non-interfering basis.

EMC and amateurs

The 7th International Wroclaw Symposium & Exhibition on Electromagnetic Compatibility, which is organized under the auspices of the Polish Academy of Science and supported by the Polish Ministry of Posts & Telecommunications, takes place between 18 and 20 June 1984 at Wroclaw. It will include a special session devoted to emc problems related to amateur radio. Further informaton on the conference can be obtained from Mr Henryk Cichon, SP9ZD, Szczyglow 1, 40-533 Katowice 2, Poland.

QSL W5LFL?

Owen Garriott, W5LFL, has now chosen the final design of QSL card for his operation during the STS-9 mission last year, and has passed it to ARRL for printing. Some 8,000 QSL cards have already been received, and those who managed a two-way contact will have the W5LFL card individually signed byDr Garriott; however, his signature will be printed on those carrying reports from listeners!

"Computing the beam patterns from phased vertical antennas"

The author of this article (*Rad Com* February 1984, pp123–5) apologises for several errors in the program which he supplied, and thanks G3VZP, G3VI and G3RND for pointing them out. The following corrections should be made: Line 130. . .GOTO 600; line 500. . ."; N ; . . .; line 1040. . .T = 0. . .(*zero*); line 1070. . .IFX < 0 (*zero*) OR X > 63. . .; line 1120. . .NEXT M. Note that in line 1050, PI is a keyboard function, not two letters.

Morse courses

Members in the Birmingham area who want to brush up their morse should contact Roy Williams, G4IUX, QTHR, tel 021-475 8403 in connection with a morse course commencing in April at the Selly Park School, Pershore Road, Birmingham.

An all-day morse course will be held at the Amersham College of Further Education, Art & Design, Amersham-on-the-Hill, Bucks, on Thursday 19 April commencing at 9am and finishing at 4pm, with a lunch break. Further information from the college, tel 21121, or G4HES and G3NCL, QTHR.

Stolen equipment

On 16 January from a car in Bishops Cleeve, near Cheltenham: Yaesu FT290R, serial No 1HO31528. Information to Bishops Cleeve police or G3XGW, QTHR, tel 0386 881373.

On 22 January from a car in Bebington, Wirral: Icom IC240, serial No 17540; Trio TS130S, serial No 1585603. Information to Merseyside police, tel 051 709 6010.

On 23 February from a car in Canterbury: Icom IC-2E, serial No 11918314; JWR Mk2 cb converted for 28MHz. Information to G4SOT, tel Canterbury 64902, or Canterbury police.

Erratum

In "Council Proceedings", *Rad Com* March 1984, p204, under the heading "1984 Council election ballot", the last line should read:
T. Winchcombe, G6ZH, Wallingford.

Collins Owners Club

This club has been in existence for a year and is now well established with a number of enthusiastic and dedicated owners of Collins (pre-380) equipment. Bob Ralph, G4KSG, QTHR, who runs the club, invites anyone who owns Collins equipment and who would like to be a member to send him details of their equipment and an sae. By return they will receive a copy of the latest newsletter and a list of Collins owners.

Sidebands

ZB2MD has received a QSL card for an alleged sstv contact with F6HAZ on 19 February 1983: the difficulty is that there is no sstv activity from Gibraltar and the real ZB2MD was not in Gibraltar at the time . . . .

Rumour has it that Drake are withdrawing from the amateur market. However, although they have discontinued one or two models, they deny any intentions of complete withdrawal.

Two large dishes currently lurk at the back of headquarters. There are plans afoot to use them for GB3RS, although getting them on to the roof looks a little daunting . . . . . look out for us on 47GHz!

It looks as though LORAN may have disappeared from the Canadian 1·8MHz band—its signals have been conspicuous by their absence recently.

Grampian Raynet Group and Moray Raynet Group are conducting two large-scale exercises on 14 April and 27 May 1984. Additional members for both groups are needed, and anyone interested should contact GM8GDN (of the Grampian group) on Aberdeen 702228, or GM4IZN (of the Moray group) on Clochan 384. Newly-licensed amateurs or listeners are welcome.

Tony Wilson, G3MAE, tel Great Smeaton 530, would like to hear from anyone interested in forming an amateur radio club in the Northallerton area.

Peter Prosser, GJ4TVZ, tel 0534 336 48, would like to hear from any reader who has successfully written rtty coding and decoding routines for the Epson HX20 portable computer.

Mr John Hern, G3NAC, was recently installed as worshipful master of the Radio Fraternity Lodge of Freemasons for 1984–5. The secretary of the lodge is Mr G. Wakefield, G3WG.

Election of RSGB regional and area representatives for the period July 1984 to June 1987

Regional representatives

Not later than first post on Thursday 19 April 1984 any five corporate members resident in a particular RSGB region may nominate any other qualified corporate member resident in the region for the office of regional representative by delivering their nomination in writing, together with the written consent of such person to accept the office if elected, to: The Secretary, RSGB, Alma House, Cranborne Road, Potters Bar, Herts EN6 3JW. Each such nominator shall be debarred from nominating any other person for this election of regional representatives.

The names of the present regional representatives are given on page 292 of this issue, and the composition of each region is given below.

The composition of each region in which an election will be held, subject to any minor border adjustments, is:

Region 1	Cheshire, Cumbria, Greater Manchester, Isle of Man, Lancashire, Merseyside.
Region 3	Hereford and Worcester, Salop, Staffordshire, Warwickshire, West Midlands.
Region 4	Derbyshire, all that part of Humberside south of the River Humber, Leicestershire, Lincolnshire, Nottinghamshire.
Region 5	Bedfordshire, Cambridgeshire, Northamptonshire.
Region 6	Berkshire, Buckinghamshire, Oxfordshire.
Region 7	Greater London south of the River Thames, Surrey including part of London north of the River Thames administered by Surrey.
Region 9	Cornwall, Devon.
Region 11	Clwyd, Gwynedd.
Region 12	Grampian, Highlands, Orkneys, Shetlands, Tayside, Western Isles.
Region 13	Borders, Fife, Lothian.
Region 15	Northern Ireland.
Region 16	Essex, Norfolk, Suffolk.
Region 17	Isle of Wight, Channel Islands, Dorset, Hampshire, Wiltshire.
Region 18	Cleveland, Durham, Northumberland, Tyne & Wear.
Region 19	Greater London north of the River Thames, Hertfordshire.
Region 20	Avon, Gloucestershire, Somerset.

In the event of no nomination being received from the corporate members in any region by 19 April 1984, the Council reserves the right to make an appointment.

Elections will **not** take place in Regions 2, 8, 10 and 14, as the current regional representative has served for less than 12 months.

Note. The regions in England and Wales are based on the counties as set out in the schedules to the Local Government Act 1972.

The Channel Islands and the Isle of Man are not dealt with by that Act.

The RSGB regions in Scotland are based on the Scottish regional boundaries which became effective on 1 April 1975.

Area representatives

Not later than first post on Thursday 19 April 1984 any five corporate members resident in an area may nominate any qualified corporate member resident in that area for the office of area representative, by delivering their nomination in writing together with the written consent of such person to accept office if elected, to: The Secretary, RSGB, Alma House, Cranborne Road, Potters Bar, Herts EN6 3JW.

Any representatives who on 30 June 1984 will have held office for only 12 months or less may continue in office for a further period of three years. Area representatives concerned are asked to inform the secretary if they wish to take advantage of this extension by 19 April 1984.

An area is a conveniently-sized geographical district or town which has at least 10 members.

In the case of London, area representatives may be nominated for groups of postal districts. In the case of other large conurbations, area representatives may be nominated on a geographical basis such as North Birmingham, South East Manchester etc.

Ballots

In the event of more than one person being nominated for a particular office a ballot will be conducted, details of which will be published in the June 1984 issue of *Radio Communication*.

Resignations

If, at any time and for any reason, an elected representative wishes to resign his office, he should notify headquarters, who will advertise the vacancy. Local members cannot automatically appoint another member to undertake the duties of a representative who has resigned.

The Council reserves the right to call upon any representative to resign office if, in their opinion, he is considered to be unsuitable or unsatisfactory.

Mobile Rallies Calendar

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

1 April—White Rose ARS Rally, The University of Leeds. Opens 11am. About 50 trade stands. Bring & buy. RSGB stand, bookstall, full catering and bar. Ample free parking. Talk-in on S22 and SU8. Admission 50p, oaps and children free. Details from A. N. Bramley, G4NDU, QTHR.

8 April—Buxton Mobile Rally, Pavilion Gardens, Buxton; Derbyshire. 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.

8 April—Swansea ARS Rally. Patti Pavilion, Swansea (next to St Helens Cricket Ground on A4067). Open 10.30am to 5pm. Trade stands, RSGB books, local repeater groups, bring & buy, licensed bar, refreshments. Talk-in on S22. Good car parking. Details from GW4HSH, QTHR. Tel 0792 404422.

15 April—East Cleveland ARC. Mammoth bring & buy. Leisure Centre, Marske by the Sea. Open 1100. Talk-in S22. Traders, bring & buy. For details send an sae to sec Ken Turner, G8JLA, QTHR.

15 April—Lough Erne ARC Mobile Rally, Killyhevlin Hotel, Enniskillen. Open 12 noon. Trade stands, bring & buy, and auction. The hotel is offering a "mini-weekend" from £30 per person. Admission £1. Details from Joe Maguire, GI4JHA, 124 Hillview Road, Enniskillen.

6 May—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—Swindon Radio & Electronics Rally. Oakfield School, Marlowe Avenue, Swindon, 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—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—Drayton Manor Mobile Rally. Drayton Manor Park, nr Tamworth, Staffs. Organizer N. Gutteridge, G8BHE, QTHR, tel 021-422 9787.

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

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

3 June—Welsh Mobile Rally, organized by Barry College of Further Education RS. New venue: Barry Leisure Centre, Holton Road, Barry, near Cardiff. Well signposted. Open 11am-5pm (disabled from 10am). Trade stands, bring & buy, refreshments, swimming pool in leisure centre, etc. Free car parking, 5 min from the famous Barry Island Pleasure Park and beach. Enquiries to Reg Rowles, GW4FOM, tel 0222 565656 or 563123, evenings.

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

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

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

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

24 June—Longleat Amateur Radio Mobile Rally. Longleat Park, Warminster. 10am to 5pm. Trade stands in five 110 by 40ft marquees. The very successful bring & buy now extended to 110ft in separate marquee. Other attractions include the mast assembly contest for RSGB affiliated clubs; the Bristol Unicorns Marching Band; and the Longleat raffle, plus all the usual Longleat Park attractions for the family. Camping and caravanning facilities available on Friday and Saturday night. Details from B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, Bristol BS20 8NQ, tel 0272 848140.

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

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

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

21 July—West Kent ARS Radio & Electronics Fair. Royal Victoria Hall, Southborough. Open 9.30am-5pm. Car parking nearby. It is hoped to attract many suppliers and traders and there will be a special event station. Details from Dave Green, G4OTV, 13 Culverden Down, Tunbridge Wells, Kent, tel Tunbridge Wells (0892) 28275.

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

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

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

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

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

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

19 August—Hamfest '84, Wimborne, Dorset. Organized by Flight Refuelling RS and Bournemouth & D RAIBC. More details to follow. Further information and booking forms from sec M. J. Owen, G8VFY, QTHR. Tel 0202 882271.
26 August—BARTG Rally, Sandown Park Racecourse, Esher, Surrey. Details from Edward Batts, G8LWY, 27 Cranmer Court, Richmond Road, Kingston-upon-Thames, Surrey KT2 5PY.
26 August—Preston ARS 17th Annual Mobile Rally. Lancaster University. Easy access, ample free parking. Leave M6 at junction 33 and proceed north on A6 for 2 miles. Opens 11am. Early admission for the disabled. Talk-in on 144MHz fm, S22. Cafeteria, licensed bar, bring & buy. All enquiries to G3DWQ, QTHR, tel Preston (0772) 53810.
9 September—Telford Radio Rally & Exhibition. Telford Town Centre Shopping Malls, Telford, Shropshire. All usual attractions, plus some unique to this venue. Over 80 trade stands and giant flea market. Further details from G8DIR, tel Shrewsbury 64273, G8UGL, tel Telford 584173, or G3UKV, tel Telford 55416, all QTHR.
16 September—Peterborough R&ES Mobile Rally. Wirrina Sports Stadium, Bishops Road, Peterborough. Open 10.30am until 5pm. Situated on the river embankment, good car parking, free on Sundays, caravans by arrangement. Food and bar meals in adjacent Gildenburgh Rooms, bar until 3pm. Details from D. T. Wilson, 4 Conway Avenue, Peterborough, tel Peterborough 76238.
23 September—Lincoln Hamfest, organized by the Lincoln Shortwave Club, on the Lincolnshire Showground (4 miles north of Lincoln City on the A15). Opens 11am-5.30pm. Talk-in on 144MHz (S22) and 432MHz (SU8). Ample car parking, caravan and camping facilities, refreshments, licensed bar. More trade stands than in previous years, many attractions for junior ops. Facilities for the disabled. Further details from G8VGF, c/o City Engineers Club, Central Depot, Waterside South, Lincoln.
30 September—Harlow & DARS Annual Mobile Rally. Harlow Sports Centre, Hammarskjold Road. Open 10am. Talk-in on 144MHz (S22). Ample car parking. Refeshments and licensed bar. Bring & buy and usual features. Details from G4TLU and G6STB, c/o Harlow & DARS, The Barn, First Avenue, Harlow, Essex.

Special Event Stations

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

15-23 April, GB4GWR
The Vale of White Horse ARS will operate the station from Didcot Railway Centre, in a former Great Western Railway carriage. Activity will concentrate on 144-3·5MHz, and attempts will be made to contact amateurs worldwide who are interested in steam railways. Details from John O'Hagan, G4PFY, tel Didcot (0235) 812565.

6-7 May, GB4LMF
Southend & District ARS will operate this station for the Rayleigh Lions Club. Phone contacts on hf, 3·5, 7, 14, 21 and 144MHz. For details contact Brian, G4RDS, tel South Benfleet (03745) 50494.

26-28 May, GB2CC
Congleton ARS will operate this station at the Congleton Carnival and Tattoo. Operation will be on hf/vhf bands using mostly phone, but rtty contacts will be made. A special QSL card will be sent via the bureau for all contacts. Details from G4DWW, tel (02602) 6634.

June, GB0GMT and GB1GMT
The station will operate during June to celebrate the centenary of gmt. Operation will be on vhf and hf. Special QSL cards will be available. Details from G4SDC, QTHR.

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

Other Events

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

7-8 April—Northern Amateur Radio Societies Associations' Exhibition, Pontins Holiday Village, Ainsdale, Southport (see page 261 for details).
28-29 April—RSGB National Amateur Radio Exhibition, National Exhibition Centre, Birmingham.
8-11 June—European DX Council Annual Conference, Stockholm. Details from M. Murray, PO Box 4, St Ives, Huntingdon, Cambs PE17 4FE.
8 September—Scottish Amateur Radio Convention, organized by West of Scotland ARS, Cardonald College, Glasgow. Details to follow.
30 September—Welsh Amateur Radio Convention, Oakdale Community College, Blackwood, Gwent. Details from R. B. Davies, GW3KYA, QTHR.
13 October—Midlands VHF Convention. British Telecom Training School, Stone, Staffs.
20-21 October—27th Jamboree on the Air.

OBITUARIES

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

Mr R. Alexander, G3ATC
Reg Alexander died on 21 January, aged 69. He was a member of the RAF Civilian Wireless Reserve, and during the war served as an instructor at Cranwell. He continued as a civilian instructor until his retirement in 1975, and was planning to renew his licence and get back on the air.

Mr A. Dalziel, GM4DDO
Allan Dalziel died on 31 January, aged 71. Although licensed comparatively recently, he had always been interested in radio, and had been an ardent home constructor since boyhood. During the second world war he had been a radar instructor with the RAF, serving in Egypt, India and Britain.
He had been principal teacher of physics at the Aberdeen Academy from 1961 to 1970, and from then until his retirement in 1977 was Advisor of Science to Aberdeen Corporation. He operated mostly on the hf bands, but also on 144MHz.

Mr J. Derbyshire, AMIRE, G3SSD
John Derbyshire died on 12 January, aged 67. "Big John", as he was known in the Blackburn area, was a member of both the local club and repeater group. He was active daily on 144MHz and on 3·5MHz in the early morning. He was also a member of the Caravan Net, and was interested in 1·8MHz operating. His interest in radio began when he was 12 years old, and he had always been keen on homebrew equipment.

Mr W. E. Forster, G2FZK
Ernie Forster, who died on 20 December 1983, was active on most bands from top band to 144MHz. He had made many contacts over the years, especially in Canada and the UK, and was a member of both the RSGB and RAFARS.

Mr A. H. Gay, G3KLG
Arthur Gay died on 23 November 1983. He had been a radio amateur since 1958.

Mr R. G. Godfrey, G4LGJ
Ron Godfrey died on 25 November 1983, aged 69. He had been a member of the Lunchtime Net since 1981, and worked on the Cheshire Foundation Net on 7 and 3·5MHz. He was an active member of the RAIBC, and until his death had been involved in the construction of a revised "Carl Conway" audio tuning device to aid blind operators.

Mr A. Harper, G3WFX
Alan Harper, who died on 1 November 1983, had been an honorary life-member of Wrekin ARS since the 'sixties. He worked on all bands from 1·8 to 144MHz, and will be remembered for his hard work for the club (now Telford & DARS).

Mr L. F. Ivin, G5IC
Lawrence Ivin, who died recently, aged 81, had been a pioneer of the British Broadcasting Company.

Mr J. P. Lose, G3LWZ
Mr Lose, who died on 1 February, had been a keen radio amateur for 25 years.

Mr J. McNae, GM6RDF
Jim McNae died on 17 January. He had been an swl since the late 'forties and had joined the RSGB in the early 'fifties. He was a founder member of Dumfries Radio Club, but did not take the RAE until two years ago. Although by then blind and disabled he passed first time, and became active on 144MHz.

Mr S. A. Morley, G3FWR
Sid Morley, who was president of the Surrey Radio Contact Club, died on 18 January, aged 80. Although not licensed until after the war, his amateur radio interest started in 1923. He was one of the first to join the Voluntary Interceptors organization, and later became a full-time member of RSS serving until the end of the war. He was active on the amateur bands until his death.

Mr N. G. Nolan, G5NL
Neville Nolan died on 3 January, aged 69. He had been a proud member of the RSGB since 1929.

Mr G. Powell, G4TVY
George Powell, who died on 10 December 1983, had only recently become a licensed amateur. He had been an accomplished electronics engineer and computer operator, and was a keen member of the Midland ARS.

Mr W. A. Pyle, GM3HXC
Fred Pyle died on 1 February. He was an active experimenter before acquiring his licence in 1951, and was thereafter very active on the amateur bands, lately on 144MHz. He was a respected member of the Orkney group.

Mr J. G. Taylor, G3SAW
John Taylor died on 21 November 1983, aged 61. He was a keen amateur, a member of Kings Lynn Radio Club, and was involved with Raynet.

Mr P. F. Vella, G3WVP
Peter Vella died on 10 February. He was an active member of the Cray Valley RS and was known for the help he gave to the blind and handicapped.

Mr L. F. Viney, G2VD
Leslie Viney died on 8 December 1983. He had been a member of the RSGB for many years, and although he had not been active recently, he had been a keen dx operator. During the second world war he was a signals officer with Y Group from several overseas stations and from RAF Chicksands.

Mr W. H. Windle, G8VG
Bill Windle died on 7 December 1983. He was licensed in 1937, was a founder member of the First Class CW Operators' Club, and chairman of FOC when he died. He was a wartime VI with RSS, and a signals officer in SCU3.

Also:
Mr S. R. Alderton, G3UXV, in November 1983;
Mr R. Batchelor, GW4NKA, in June 1983;
Mr D. Bell, RS53973, on 20 February;
Mr G. E. Briddon, G8XVN;
Mr C. H. R. Brooke, G3JEC;
Mr A. S. Carpenter, G3TYJ, on 8 January;
Mr A. P. L. Casling, G3MWZ, on 30 December 1983;
Mr A. K. Davey, G2DMN, on 13 May 1983;
Mr J. C. Fry, RS52426, in April 1983;
Mr L. R. German, RS32373, on 24 April 1983;
Mr A. Hales, G6OJS, aged 18;
Mr R. W. Hannay, G3LYR, on 4 September 1983;
Mr F. F. Hartman, RS41870;
Mr E. J. Homersham, RS26489, on 24 November 1982;
Mr W. R. Jones, GW3TFQ;
Mr T. A. Knight, GM4LPI, on 22 January;
Mr J. J. Macpherson, GM4MCP, on 2 December 1983;
Mr W. A. McRobie, G6KNY, on 8 December 1983;
Mr A. L. Milnthorpe, G2FMO, on 5 January;
Mr H. S. Molyneaux, RS46692, in September 1983;
Mr A. Roughley, G4HCP, on 17 November 1983;
Mr J. H. Stock, G3PKS, in March 1983;
Mr C. A. Townsend, RS7772; *and*
Mr J. H. Traill, RS41109, on 29 November 1983.

Members' Mailbag

CONTEST OPERATING

Sir—To indicate to another station in a contest that this is a duplicate contact, I suggest either "QSN" which means, "I did hear you on . . .kHz (or MHz)", or "QUC", which means "The number of the last message I received from you is . . .". These abbreviations are listed in Appendix 2 of the Home Office *Handbook for Radio Operators*.

It would not be necessary to add the frequency or the number to the code. After all, "QRX", strictly speaking, means "I will call you again at . . . hours (on . . . kHz (or MHz))", and "QTH" means "My position is . . . latitude . . .longitude".

Brian Castle, G4DYF

GMs ON 144MHz

Sir—I was amused to read G3JKV's letter concerning the apparent dearth of GMs on 144MHz. Although not quite so favoured as Wally, I do hear GB3ANG quite regularly at my QTH, about six miles west of Dorking. Like Wally, I find the GMs singularly scarce irrespective of conditions, except when I hear the odd aurora. I have concluded that ssb/cw operation must be at very low level up there. It's much easier to work OZ or SM than GM!

I can only hypothesize the following: (i) the Dorking area is a "Bermuda Triangle" for GM signals; (ii) G3KZR and G3JKV are mutually blocking each other's front-ends and so never hear them!

Ian Davies, G3KZR

We'd like to hear what the Scottish 144MHz operators think, but there are several 144MHz dx-chasers north of the border who have been heard to complain that their colleagues in the south never seem to beam north! GB3RS has already worked one GM on 144MHz this year.

REPORTING CODES

Sir—As an old-timer, having been on the air for 58 years, may I please be allowed to express my concern at the apparent lower level of operating practised, when reporting RST.

The code was designed for reports to be made by ear, but of course reports are generally made from the S-meter reading, without, it seems, any regard to the wording of the code. Frequently I hear 519 which translated into plain language could mean your signals are easily readable without any difficulty, your signals are barely perceptible. It does not seem to have been taken into account that not all stations have S-meters, indeed until recent years my receivers had no meter, and even my present one has a meter, but to give a reading it is necessary to turn the rf gain up full, a position which does not give the best *readability*, thus defeating the object of the report.

May I suggest the Q code should be used instead of the RST code. QSA (followed by the figure), and if made from the meter could be QSA3 sm, or if preferred it could be understood to have been by the meter unless otherwise stated thus QSA 3nm (no meter).

Splitting hairs perhaps, but at present there is much confusion apparent. Some stations come back to query my reports as they think I have made it by meter reading, and it seems too flattering for them. Not many do that, but enough to indicate necessary changes.

Norman Richardson, ex-G5HJ, VK4BHJ

The S-unit scale of reporting was originally a subjective one, with an S9 report corresponding to a signal which was loud, clear and noise-free. However, problems of interpretation arose when this subjective reporting system was the subject of attempts to make it correspond to readings on a meter. Different values for the S-unit are assumed by different manufacturers and groups of amateurs, and the last attempt at standardization was made at the 1981 IARU Region 1 Conference: the S-unit was then standardized at 6dB, with a signal level of 50μV corresponding to S9 on the hf bands, and one of 5μV on the vhf bands. A number of papers to be presented at the forthcoming 1984 conference will also address this topic, and we await the result with interest. It should be noted, however, that RST reports still remain essentially subjective, and that each level of readability and signal strength has an explicit meaning which should be assessed by ear.

LIGHTNING

Sir—With reference to A. Martindale's article on "Lightning" (*Rad Com* January 1984) and to the last paragraph of his introduction, I would refer him and any interested readers to the following: (i) *Physics of Lightning*, D. J. Malan. English Universities Press Ltd; (ii) *Atmospheric Electricity*, B. F. J. Schonland. Methuen's Minographs on Physical Subjects—Methuen; (iii) *Atmospheric Electricity*, J. A. Chalmers. Pergamon Press.

If they are not in print, it should be possible to borrow them to order through a public library.

P. L. Stiles

Sir—Congratulations to Alan Martindale for the clarity of his article "Lightning". I endorse his comment upon the ready availability of literature on this subject. Readers may not be aware of the book by J. L. Marshall, *Lightning Protection* (Wiley 1973)—an excellent complement to this article, giving 92 references.

N. F. Hall, RS85680

Sir—In June 1983, during a heavy thunderstorm, a number of houses in my locality were damaged by lightning. I have a metal mast on the gable of the house, and a neighbour informed me that she saw a blue flash of lightning actually travel down it. I had taken the antenna sockets out, and fortunately the only damage sustained was to an ic in the digital frequency meter.

Therefore, I was very interested to read the article on lightning by Alan Martindale, G3MYA, and immediately constructed the spark-discharger described and fitted it in the shack. To be honest, I hadn't a lot of faith in it, but as it was such a simple thing to make and fit, I went ahead. By coincidence, after fitting the unit and switching-on the rig, the first person I heard on the ssb 3·5MHz band was the author himself. I would have liked to have butted in and thanked him for his excellent article, but apparently he had already been bombarded with telephone calls about the article, so I kept quiet.

More recently I was in the shack when I heard a clicking sound. Looking up, I was amazed to see sparks jumping across the home-built discharger, and this went on for almost a minute. I was so pleased that the thing worked —couldn't believe it! At the time there was no audible evidence of a thunderstorm in the locality, but obviously a charge had built up in the antenna system and was being safely discharged.

Jack Martin, G4MYX

WHAT'S IN A NAME?

Sir—To reply to the editorial (*Rad Com* February). Whatever name we choose to describe our hobby, we can be sure that somebody's toes will be trodden on, even if not intentionally. Also we shall be stuck with the word "amateur" as an adjective if not as a noun because the main substance of our hobby is also performed by people who are paid to do it. The general manager implied as much in his analogy with astronomy.

Everybody in amateur radio is involved either in radio operation or in radio engineering. Every licensed member of the hobby has passed an examination in the engineering principles and, even if his interest is confined currently to operation, he is therefore qualified in the engineering aspects of the hobby, as far as qualification is possible.

This leads to a description of our hobby as amateur radio engineering. There is currently in the engineering world, and certainly in the institutions of which I am an associate member or equivalent, a large amount of discussion regarding the status and titles of engineers as against engineering technicians. Some, following this argument, might claim that those in the hobby should be known as amateur radio technicians. This might be a good idea were it not for the confusion that would ensue by there not being a similar word for the hobby ("amateur radio technology" might do—but "technology" does now have a rather dated 'sixties ring about it).

Regarding the name of the international radio service. Most radio services in the ITU list have a name describing the nature of operation in the service: "maritime", "land mobile" and the like. The nature of the *users* in our service which differentiates them from those of other services is that they are not paid; I imagine those in other services are. "Amateur" is therefore a perfect description. However, to avoid the word; leaving aside the unpaid status of its users, the service is essentially experimental and no doubt a great many techniques used in other services were first used in the amateur radio service.

I throw this to the lions: "We are amateur radio engineers and the radio service in which we operate should be called the experimental service."

Peter A. J. Swinbank, G8AHB

Sir—I must congratulate David Evans on his editorial "What's in a name". Yes, the name "amateur" has been a bone of contention for too long, but how does one replace it? We cannot have another problem like this in a few years' time, so the chosen new name, if one there is going to be, must be quite special to the hobby. This of course is not just a problem unique to the British Isles, it could well have worldwide effects. After all, English is an international language. Our hobby is also international.

The idea of having a competition to decide a new name has a great deal of merit, perhaps additionally it would be an idea to poll the public at large by some means. After all, we will be adding to the English language. It would be democratic, I believe, therefore: allow all citizens to involve themselves in some way. If a cost-effective way of implementing this involvement could be found it would be a wonderful public relations exercise.

Let us hope that an action such as this can reinforce the Society's standing in the community and lend to the hobby a standing way above anything we have so far achieved. There are few hobbies which can hope to offer anything like the spread of knowledge and achievement inherent in our involvement in radio communication. Let us hope we can find a name that will adequately represent our hobby and at the same stroke prove we are masters of that other from of communication, advertising!

L. H. Hipkin, G8KMG

Other correspondents suggested "radio sport" or "experimental radio" as replacements for the term "amateur". Either way, the points raised in the editorial were worth making since the retention and expansion of facilities for radio amateurs depends crucially on the hobby possessing credibility at national and international level. The difficulty with the term "amateur" is that it is so easily misinterpreted as meaning "amateurish", which is antithetical to our credibility.

TRY ATV ON 432MHz

Sir—With reference to the letter from G4LMS in *Rad Com* January, I suggest that he might like to try atv on 432MHz. Gear can be made up from inexpensive kits, or "black boxes" purchased from enthusiastic British makers who are most helpful. Indeed the spirit of co-operation and helpfulness has been much appreciated by me since I started on this mode a month or two back. Activity is increasing all the time in this part of the world, and I can usually find someone to work every evening.

C. C. Algar, G6AU

A two-element quad 14, 21 and 28MHz antenna for **RESTRICTED** space

by J. M. HAWKES, 9H1GL*

John Micallef Hawkes, 9H1GL, has been a keen radio enthusiast since his school years. He took up radio and morse lessons at the age of 11. From 1960, at the age of 16, he was employed as a civilian with the British Forces 234 and 235 Signal Squadrons in Malta, and was a telecommunications operator until 1964. Antennas being his favourite subject, John is at present experimenting with another type. He is a member of MARL.

THIS TRIBAND two-element quad antenna for 14, 21 and 28MHz may prove to be a solution for radio amateurs with restricted antenna space, where it is impossible to erect a Yagi antenna or a monster quad. Its advantages are its small turning radius (7ft 6in), and its simplicity of construction, if the instructions given below are followed. As a matter of fact, I constructed, assembled and tuned the whole unit single handed.

I cannot claim particular originality for the whole system, as most of the information was collected from RSGB and ARRL publications. However, certain details which seem to scare the average radio amateur from building a quad antenna, especially the spider system, were easily overcome by using some ingenuity. With an original construction and assembly method of my own design, I managed to build an antenna which is very efficient and gives very good results as regards gain and front-to-back ratio. The main advantages are the small turning radius; reduction in weight; reduced wind resistance; and simplicity of assembly.

This quad antenna functions on the principle of a full-wave loop on 28MHz; full-wave loop on 21MHz; and 2λ/3 loop on 14MHz. The function of the full-wave loops is quite normal, but the critical 2λ/3 loop for 14MHz presented the problem of feed impedance, which was overcome by the method used by E. G. Jolliffe, G3IMX, and patented in his name (see *Amateur Radio Techniques).* In this way the antenna's driven element has only two loops, ie one for 28MHz, and one for both 21 and 14MHz. The technique used by G3IMX using traps for capacitive loading on 14MHz increases the radiation resistance, and thereby increases the feed impedance to the required value of about 75Ω, with no lossy loading coils. This system has been evaluated by G6XN, and found to be quite efficient as a "no compromise" mini-quad.

The antenna has 11ft 10in sides, and is mounted on a metal pipe mast, 1·25in by 20 ft long. This brings the bottom of the loops quite low to the ground, and makes it so much easier to tune and repair in the case of any damage.

* 72 Tal-Borg Street, Paola, Malta.

Construction

The four coaxial cable traps must first be wound on four lengths of pvc plastic pipe, each about 10·5in long (see Fig 1). Wind 8·25 turns of RG58U coaxial cable in the middle of each section of the pvc pipes, and mark the exact points where the cable is to enter the pipe. Drill the pipe right through both sides. Remove the outer cover of the coaxial cable, about 5in from each end of the cable. Separate the braiding from the covered inner core up to a length of about 5in on each side. Solder the braiding of one side of the coiled coaxial cable to the inner core on the other side of the coil; This forms the capacitor, while the braiding forms the coil of the trap. (This information was gathered from *QST* May 1981.)

Now check for resonance of the trap assembly, which should be about 20·200MHz. If resonance is not correct, slight adjustment can be made by moving the coiled coaxial cable tighter or looser. A grid dip oscillator from either side of the trap coil to check resonance would help. If resonance is correct, weather-proof the traps with silicone rubber sealant. See Fig 1 for details and principle of operation. The method of fixing the traps in place is also shown.

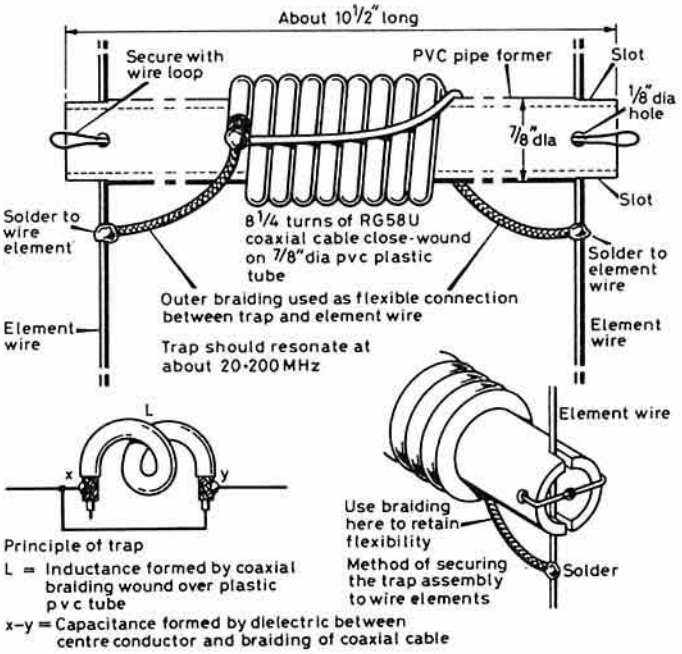


Fig 1. Detailed drawing of the finished trap, and method of securing the trap to the element wires. Also shown is the principle of operation of the trap

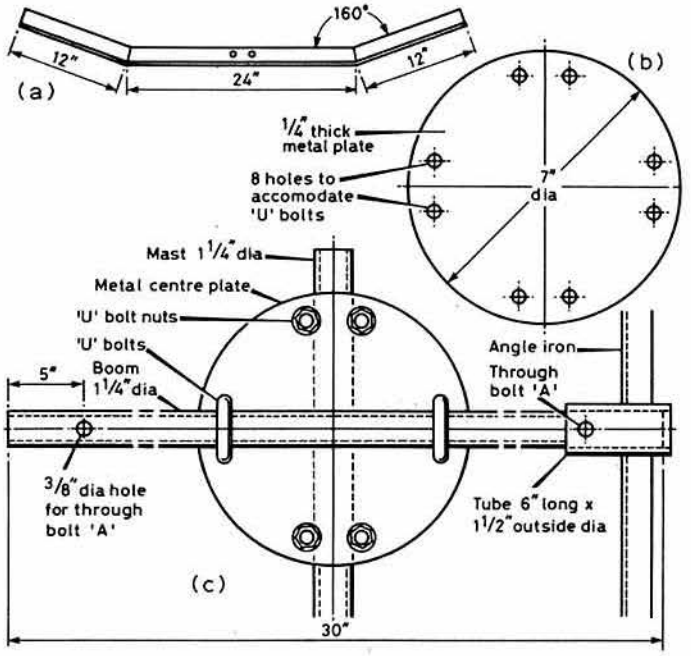


Fig 2.(a) The angle iron stock cut to a length of 4ft, and bent at 1ft from each end to form an angle of 160°. A hardboard or plywood template cut to the correct angle can facilitate the operation of bending the angle iron stock. (b) The centre plate, which can be round or square. The 7in diameter is not critical, but preferably it should not be smaller. (c) The position of the plate on the mast and the boom support. Also shown is the boom with all related drillings. Note how the 6 by 1·5in tubes are located on the boom by means of through bolt "A"

The metal angle iron stock is cut into four 4ft lengths and, by means of an acetylene torch, heated and bent to an angle of 160° at 1ft from each end (Fig 2(a)). The centre point of each length is marked, and holes drilled to accommodate the exhaust-type U-clamps. The metal is then treated for anticorrosion. I painted my angle iron stocks with red oxide, white undercoat, and a couple of coats of light grey finishing gloss. An alternative and even better idea is to have the metal galvanized.

The next step is to manufacture the central metal plate with all the associated holes for the U clamps (Fig 2(b)), and treat it for anti-corrosion. The metal plate is secured to the mast, together with the 2ft 6in length of 1·25in metal pipe boom which forms part of the spider. Note that this boom must be drilled at points 5in from each end (see Fig 2(c)).

When the assembly of the mast, plate and boom is finished, the complete mast with rotator can be raised into position, ready to receive the quad. Note that particular attention should be paid to the angle of the guy wires in relation to the mast. The angle should not exceed 30° and the guys should not be anchored further than 9ft from the bottom of the mast as they may come into contact with the loops when rotated (measurements calculated for a 20ft mast). Fig 3 gives an example of how these should be calculated, depending on the height of the antenna. The higher the point where the guy wires grip the mast the better, as each guy wire will be nearer to the very centre of the quad, so eliminating bending forces on the mast itself.

By calculating the lengths beforehand, plus an extra few inches, the guy wires can be tied to the mast and to the anchor points. This only leaves the final task of raising the mast, with no fear of the mast falling over in any direction. By raising the mast, the guy wires should become taut, and slack can be taken up by turnbuckles to achieve a perfect vertical position.

Assembly of the reflector elements can now be started by clamping the angle stock to the 6in lengths of the 1·5in diameter pipes at 90° to each other, and then tying them together so as to retain their relationship to each other—this becomes handy at a later stage. Next the 1in diameter dowel spreaders, which should already have been treated with suitable waterproofing coats of paint, should be clamped to the angle iron stock by means of hose clips (hc) as shown in Fig 3. When all four spreaders are clamped, the whole assembly can be placed on a suitable rest (such as a round one-gallon can or a metal bucket), so that it may be rotated when rigging the wire elements. I used seven-stranded bare copper earthing wire, but other types of wire such as enamel-covered copper coil wire of 12 or 14swg may be used.

Cut the 28MHz element to size, ie 36ft 4in (plus 2in for joining). Insert four pieces of 4in lengths of plastic pipe and after soldering the ends to form a loop, fold it into four and mark it with a felt pen. These marks are to be positioned on each spreader, thus retaining squareness. Put the first mark in place with the sleeve over it on the first spreader, and then bind it by means of a piece of copper wire around the hose clip on the spreader, for the 28MHz loop (see Fig 4). Continue all the way round the loop until finally ending up on the fourth spreader.

Now cut the 21MHz loop wire to size, ie 48ft 7in, (plus 2in for joining), and assemble in the same way as the 28MHz loop.

If the wire sags it can be made taut by sliding all the spreaders outwards in the angle stock by equal amounts. Finally the clips on the angle stock can then be tightened. Do not overtighten the wire element, as the spreaders may be inclined to bend inwards.

Determine the proper position of the loop, and mark the mid-point on the vertical side. Rig up the capacitive loading elements and tie them in place to the end clip, which is holding the 21MHz loop on the spreader by means of a short nylon string. These loading elements should run parallel to the loop sides of about 10·5in. Then solder the traps in position (see Figs 1 and 4). This completes the reflector element, which can now be raised on to the boom.

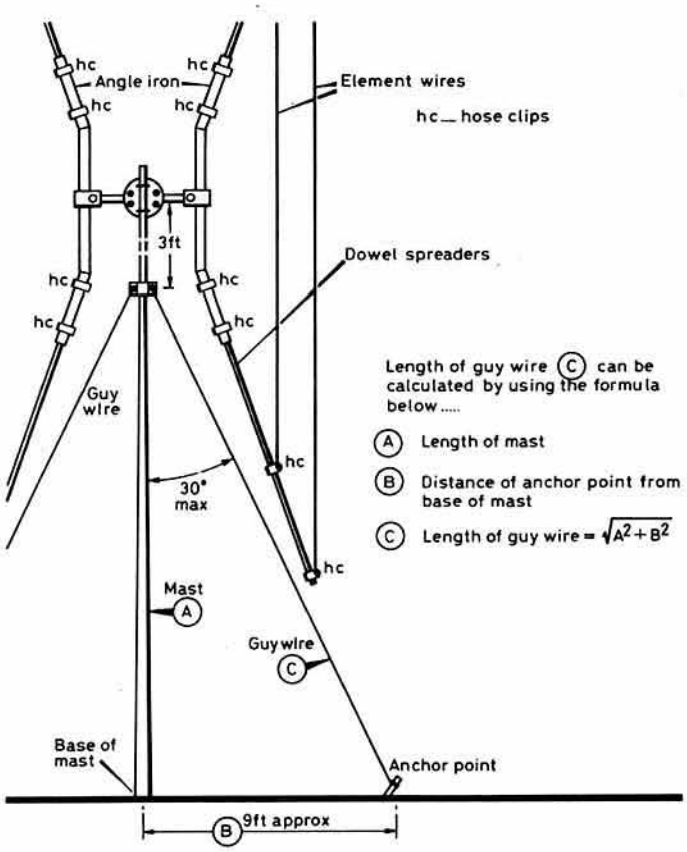


Fig 3. How to calculate the length of the guy wires beforehand, thereby easing the erecting operation, as the guy wires support the mast in an almost vertical position. Note that the 30° angle must not be exceeded as the element wires can come in contact with the guy wires during the assembly process, as shown in Fig 4

The element is not particularly heavy, but wind gusts may prove to be a bit tedious when trying to slide the 1·5in pipe on to the 1·25in boom. Obviously, a ladder of suitable length tied at the top to the mast, or else proper escalating rests bolted temporarily to the mast, are a necessity here! The use of a Gill-Pole with a pulley at the top, through which a long nylon rope has been passed, is an asset at this stage, and by taking the weight of the element on the Gill-Pole rope, it should be a lot easier to control the inward movement on the boom. To support the element on the boom, insert the through-bolt "A" so as to secure it against any wind gust which might blow it off the boom.

The driven element is the next step. Cut the loop wires as follows, but add an extra 3in on each end to go round the insulator; 47ft 6in for the 14/21MHz loop, and 35ft 6in for the 28MHz loop. Follow the instructions as for the assembly of the reflector element, except that instead of soldering them to form a loop, join the ends over the insulator. Rig up the loops as before, with the plastic sleeves on the spreaders, one at each corner, all

Materials required

73yd or 67m element wire (seven-strand bare earth wire, or 12–14swg enamel-covered copper wire).
Four U-bolts for 1·25in diameter pipe.
Four U-bolts for 1·5in diameter pipe.
16ft by 1·25 by 0·125in, or 16ft by 1 by 0·19in angle iron stock.
Two bolts 2·5 or 3in long by 0·37in diameter.
Two lengths pipe 6 by 1·5in diameter.
Thirty-two 1·25in–1·5in hose clips.
Eight 8ft by 1in diameter wooden dowel rods.
Anti-corrosive and weather resistant paint.
Metal plate 7 by 7 by 0·25in thick (can be round shaped).
4yd coaxial cable RG58U for traps.
4ft by 0·88in outside diameter pvc plastic pipe for traps.
6ft by 0·125in inner diameter plastic pipe for sleeves.
20ft by 1·25in diameter metal mast pipe.
2ft 6in by 1·25in diameter metal pipe for boom.
Guy wires as required.
36ft thin nylon rope for tensioners.
Silicone rubber sealer for traps.

marked beforehand to maintain squareness, and then solder the coaxial cable at the insulator end of the loop. Ensure that the insulators are in the exact centre of the bottom part of the loop. Rig up the capacitive loading sections and solder the traps in position. Tie the coaxial cable of the 21MHz loop to the coaxial cable of the 28MHz loop by means of a nylon string, and further up to the U bolt assembly near the centre (see Fig 4). This prevents the weight of the coaxial cable from being taken by the wire elements during the raising operation. Leave some slack in the cable run for the following reasons: first, the rotator needs some slack cable around it, and second,

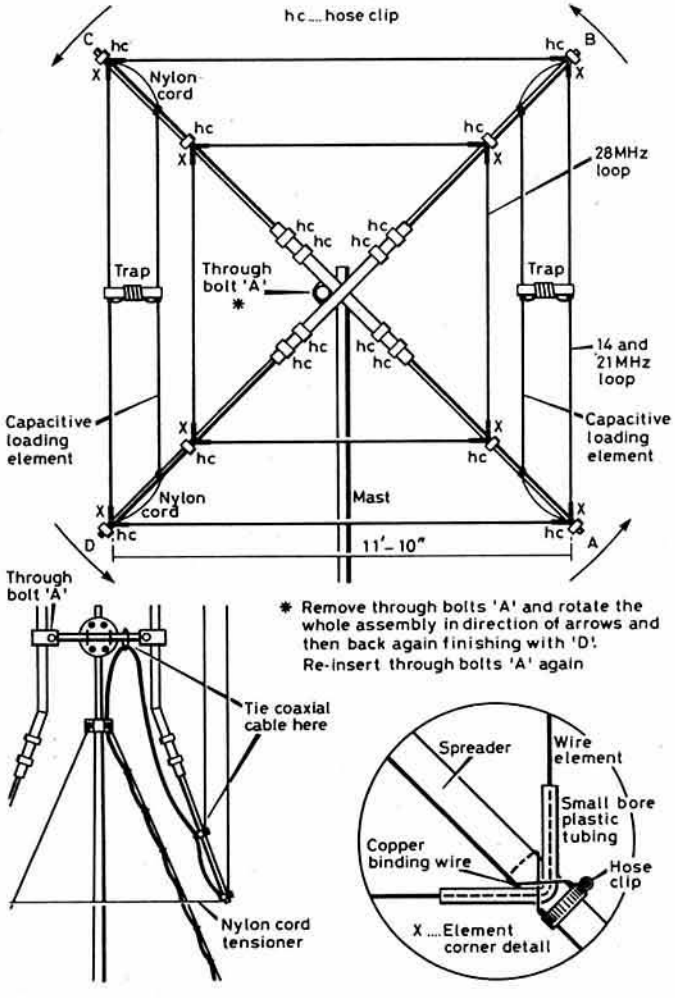
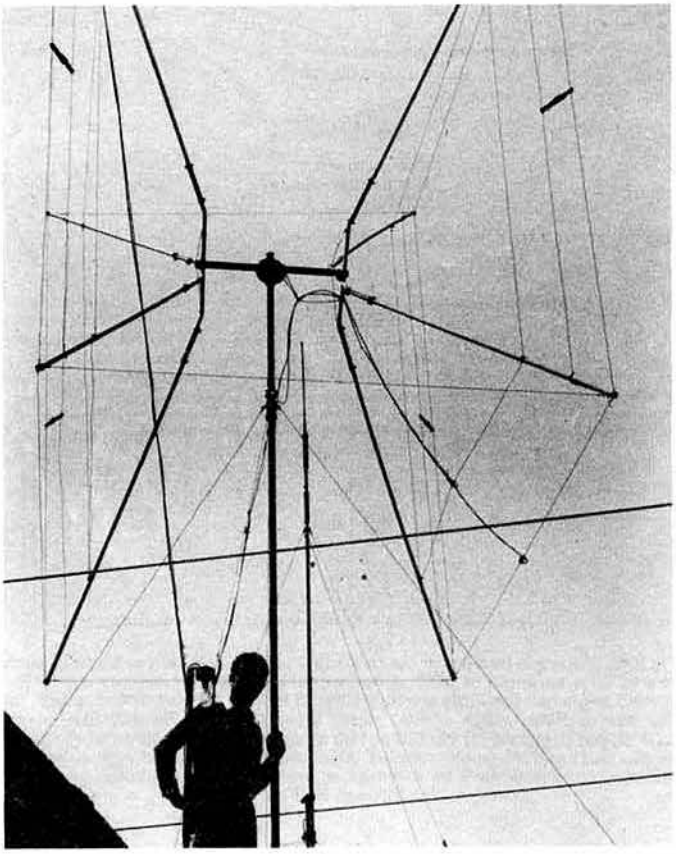


Fig 4. General view of the completed quad (only one element is shown for the sake of clarity). Note how the plastic tubing is inserted into the wire elements. Arrows show how the quad is rotated on its horizontal axis (like a windmill) to gain access to any spreader tip



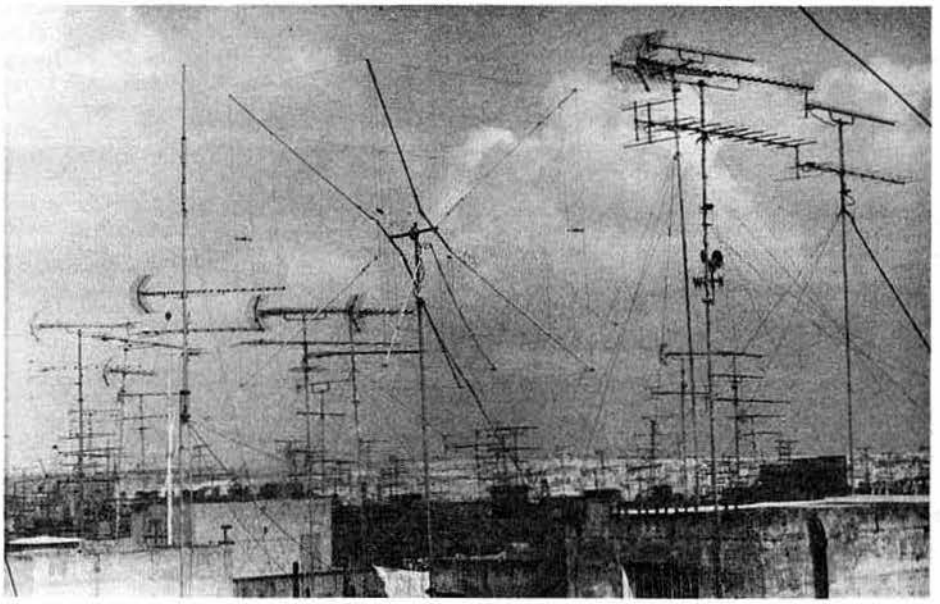
Close-up view of the main assembly parts of the quad antenna. The traps are shown quite clearly and may assist readers to follow the principle of the capacitive loading elements more easily. The author is standing by the antenna to indicate the relation of size

every element can then be turned on its horizontal axis (like a windmill) to allow you to tie the tensioners—or else, if a spreader needed replacing it could then be turned round to the downward position. Once the element is taken up, by means of the Gill-Pole, the through-bolt "A" should be inserted.

Now take a good look at the whole quad from a few feet away, so as to check for symmetry and parallelism between the driven and reflector elements. Correction for alignment can be made at the U-bolts holding the angle stock at the centre to the two 6 by 1·5in pipes. Check that the top and bottom sides of the loops are horizontal. The next step is to tie the tensioners in position. This is easily done by first tying the driven and reflector elements together at the centre, near the U-bolts, with a short length of rope, and then removing the through-bolts "A". The whole quad will now be able to rotate on its horizontal axis like a double-sided windmill. Start first with the further-most downward set of spreaders (marked A on Fig 4), by rotating it over and downward. Tie the tensioners in place, and then proceed to set B, C and D respectively. The tensioners should be 8ft long, and can also be tied in place by some turns of thin wire for added security. Go up the mast again and insert the through-bolts "A" on each side of the boom. The quad is now ready, and waiting for the first test.

Tuning-up

Tune up the transmitter and check for swr on 28MHz. The size of the element is cut for resonance at 28,400kHz. Tune for a 1:1 swr by increasing or decreasing the length of the element: decreasing the length is easily done by "pinching" an "e" in the wire, and then moving one or two clips further up the spreader; and the loop length is increased by loosening some of the wire element at the insulator, and then moving one or two clips down the spreader. Then tune up on 21MHz, and check for any swr on this band. Cut the element to resonate on 21,200kHz. The same method of increasing or decreasing the size of the loop should be used as before. In the case of the 14MHz band the loop is cut to resonate on 14,135kHz. On my antenna 1:1 swr occurs on 14,215kHz, while at both ends of the 14MHz band the swr is 1·4:1 and 1·8:1.



The antenna as seen from a nearby roof. Note the crowded location and the low height of the antenna on its 20ft mast, which is the same height as that used by the tv antennas

The measurements given here were those used on my antenna. The swr may vary from one antenna to another, depending on factors such as height, surrounding metal objects and the amount of metalwork used. For the 14MHz band, swr can be adjusted by either pruning the capacitive loading elements, or by moving them nearer-to or further-from the loop. If you move the loading elements for swr adjustment on 14MHz, check again on 21MHz. Though I used 50Ω coaxial cable on my antenna I recommend the use of 75Ω cable coaxial, as it should prove to be easier to tune out the swr for a unity match of 1:1.

Conclusion

I have used this antenna for quite some time now, and I am extremely pleased with its performance. I use a low power rig, (KW2000, first model, about 18 years old), and have obtained very good reports from many dx stations.

As can be seen from the photographs, my QTH is very heavily crowded with tv antennas, and I am pleased to say that this antenna has caused no tvi whatsoever, despite the close proximity. As one can also notice, my quad has no rotator, as I rotate it mechanically from my shack by means of sprockets and a chain arrangement from the bottom end of the mast. □

BOOK REVIEWS

The Sun, Our Star, R. W. Noyes. Harvard University Press, 1982, 263pp. £17.

HF and, to a lesser extent, vhf operators are always at the mercy of the sun. Small changes in its photosphere, chromosphere or corona can dramatically affect radio communications. The sun's importance cannot be over-estimated, and it is surprising that most texts on radio propagation give it only cursory treatment. Professor Noyes' book, which scarcely mentions radio at all, redresses the balance.

Chapter 1 sets the sun in its cosmological context by comparing it with other stars on which data is available, and Chapter 2 describes how astronomers are able to gather information on surface characteristics: magnetic fields, chemical composition, temperature, convective motion etc, by spectroscopic analysis of emitted electromagnetic radiation. Chapter 3 examines the internal processes of fusion and convection, and discusses the by now well-known neutrino detector, in a South Dakota gold mine, which supplies clues to the core temperature of the sun.

Chapter 4 is of crucial importance to hf operators as it summarises the state of knowledge about sunspots. Their observed optical, thermal and magnetic properties are described, and Noyes goes on to discuss the processes of spot formation and decay, the basic 11-year cycle, the 22-year magnetic cycle, Hale's Magnetic Polarity Laws, "butterfly diagrams" and the variation of latitude of appearance with phase of the cycle, the associated areas of hot gas responsible for enhanced ultra-violet radiation, the controversial "Maunder Minimum" between 1645 and 1715 when very few sunspots were observed, and Babcock's "magnetic dynamo" theory which accounts for many of the observed characteristics of the sunspot cycle.

Other chapters of interest to radio amateurs deal with solar flares and their various particulate and electromagnetic outpourings, the coronal holes so often referred to on GB2RS propagation forecasts, and the solar wind. More general topics covered include: solar influences on terrestrial weather, the life cycle of the sun, and solar energy projects.

The book is entirely non-mathematical and is copiously illustrated with graphs and black and white photographs. At a UK price of £17 it is a little costly for home bookshelves, but anyone interested in solar-driven propagation phenomena would be well advised to borrow a copy from their local library.

As a postscript, the reviewer was particularly intrigued to learn that other stars of similar age and size to the sun have been observed to exhibit "starspot" cycles close to 11 years. Are there any dxers out there?

G3ZAY

The Upper Atmosphere and Solar-Terrestrial Relations, J. K. Hargreaves. Van Nostrand Reinhold 1979, 298pp. £18.50 hard covers, £9.50 soft covers.

Although this excellent book has been available since 1979, it does not seem to have come significantly to the attention of the amateur radio community. It is hoped that this review will remedy the situation.

The rather general title of the work conceals a superb coverage of ionospheric and magnetospheric physics aimed both at second-year university students and at less mathematically-minded readers with practical rather than theoretical interests. Physical mechanisms are explained in simple descriptive prose supported by moderately complex mathematical analyses. Although the maths can be ignored, it is carefully presented and the deeper insight it generates more than compensates for the effort needed to master it. Graphs and diagrams are plentiful, as are references for further reading.

Starting with basic atmospheric physics, electromagnetic wave propagation, and the physics of ionised media, Hargreaves leads the reader through techniques for probing the upper atmosphere, and describes the mechanisms leading to the formation of the D, E, F1, and F2 ionospheric layers, taking into account atmospheric chemistry, neutral winds, diffusion, and the characteristics of the incoming solar radiation. He then discusses geographical, seasonal, diurnal, and sunspot related variations in these layers, giving mechanisms where they are known and indicating areas where research is continuing.

Three chapters devoted to the magnetosphere are of particular interest to vhf operators because of their coverage of auroral phenomena, as well as to vlf listeners seeking to understand "whistlers". A number of solar driven perturbations of hf interest are analysed in later chapters, including: proton events, polar cap absorption, solar flares and magnetic storms. The coverage of storm effects in the F-region is particularly good. The final chapter tackles propagation predictions, forecasting of solar activity, and the possible relationships between solar phenomena and tropospheric weather.

Hargreaves' coverage of sporadic-E leaves a little to be desired, perhaps inevitably given the state of knowledge in 1978, and the book would have benefited from a little more attention to the solar side of the solar-terrestrial relationship. Nevertheless, it is essential reading for any hf operator with a serious interest in propagation, and has much to offer the vhf auroral dxer. At £9.50 the paperback edition is a good buy.

G3ZAY

Gallium arsenide fets for 144 and 432MHz

by John Regnault, G4SWX*

John Regnault is now in his fourth decade, married, and living in Ipswich. First licensed in 1972 as G8FQO after several years' active interest in the amateur bands. The morse test and Class A licence came only recently after many years of laziness, and when 180+ squares left little to be worked on 144MHz phone. Educated at Wimbledon College, and at UMIST in Manchester where he studied electrical engineering with alternative radio as a popular extra-curricular subject. Employed at British Telecom Research Laboratories at Martlesham on semiconductor device research, he has been working with GaAs and related semiconductors for over 10 years. With a keen interest in home construction, dx and contests, John has been a member of the Society's Technical & Publications Committee for the last year. Ambitions: 144MHz DXCC, full planning permission and no tvi.

Introduction

In the past few years some specialized amateur equipment has seen the introduction of gallium arsenide devices. Their use has been mainly restricted to the microwave buffs, and to the average amateur they are something of a black art. It is hoped that this article will open the "Pandora's Box" and provide a good general background in addition to constructional information for cheap GaAsfet amplifiers for the 144 and 432MHz bands.

The GaAsfets used on microwave frequencies and those used in preamplifiers for eme work were designed and manufactured for microwave use and are somewhat expensive. A new type of GaAsfet which has appeared on the market, is a dual-gate device designed for uhf use, and is being mass-produced for use in television tuners. These devices are being produced by many of the major semiconductor manufacturers, notably in Japan, and include the 3SK97, 3SK112 and S3000. Unlike the microwave fets these devices are rugged, have gate protection diodes, and cost very little more than silicon devices. When used properly dual-gate GaAsfets can provide excellent performance on 144 and 432MHz both as preamplifiers or as a replacement for an existing front-end device [1, 2].

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The GaAs device

The specific device chosen for this design is the 3SK97, which is a dual-gate depletion-mode Schottky gate fet. The Schottky gate relies on a metal semiconductor contact which behaves electrically in a similar fashion to a p-n junction, in fact the device symbol is the same as a junction field effect transistor (jfet). Inside the plastic there is a small gallium arsenide chip which will be less than 0.25mm².

The construction and geometry of the device is relatively simple, and a schematic cross-sectional diagram is shown in Fig 1.

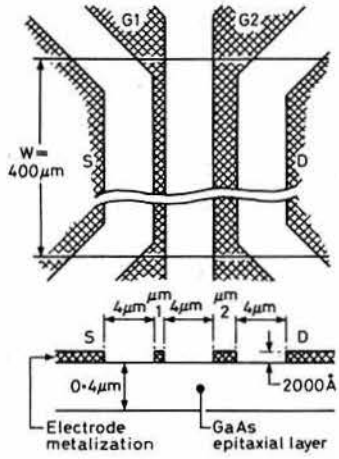


Fig 1. Schematic view of 3SK97 GaAsfet

The gates of GaAsfets, with their very small contact area (1μm × 400μm) with the semiconductor, are prone to damage due to electrostatic discharge. A gate current of 1mA would be equivalent to a current of 10A in 16swg wire! The 3SK97 has protective silicon diodes on each gate to prevent disasters. These protection diodes are mounted together with the GaAsfet chip in a small plastic package, this package is the same as that used in the 3SK88 silicon mosfet. The introduction of these protection diodes unfortunately degrades the noise figure by 0·3dB to give a device noise figure at 900MHz of about 1dB.

Biasing dual-gate GaAsfets is just as simple as for silicon mosfets, the only precaution is to ensure that the gates are never positively biased with respect to the channel. Reference to the data sheet gives the following conditions for best noise figure performance.

Vg1s	−1 to −2V
Vg2s	+2 to +4V
Vds	+5V
Id	15 to 20mA

These conditions are easily achieved in a self-biasing circuit, as shown in Fig 2.

In this circuit, which only requires one supply, gate 1 is grounded, and gate 2 bias is provided by a potential divider from the drain supply which is stabilized by a zener diode. The source bias and drain supply are adjusted by changing the value of the source resistor.

Preamplifiers for 144 and 432MHz

The electrical circuits of the 144 and 432MHz preamplifiers are identical and are shown in Fig 3. This circuit is similar to one using single-gate GaAs devices described by W6PO in an Eimac EME note [3]. The only differences between the 144 and 432MHz preamplifiers are in the input tuned circuit and the output matching transformer. A conventional coil and capacitor arrangement is used on the input of the 144MHz preamplifier, whereas a tuned stripline is used in the 432MHz version.

It is important to obtain good-quality capacitors for C1 and C2 in order to keep losses in the input matching circuit to a minimum. Several prototypes have been constructed using surplus glass piston trimmers purchased at rallies; suitable types are manufactured by JFD and Oxley. Untuned toroid transformers were chosen for the output matching for ease of construction and good stability. As the gain of both preamplifiers using toroidal transformers when noise matched was found to be over 23dB, tuned matching was not attempted. Larger-sized toroids have been tried for T1; however, the stability of the amplifier was not good and oscillation occurred at about 2GHz. As both cores used are readily available in the UK, the author did not experiment further, although other types may be suitable.

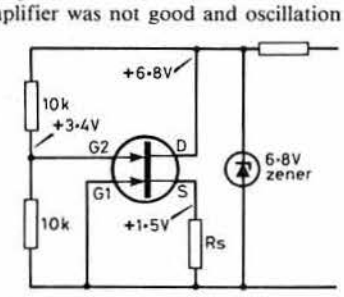


Fig 2. Biasing of 3SK97 dual-gate GaAsfet

Components list

C1, 2	6 or 10pF max glass piston trimmers
C3, 4	1nF leadless disc ceramic
C5	0·1μF disc ceramic
C6	1nF disc ceramic
C7	1nF feedthrough
R1, 2	10kΩ
R3	100Ω
R4	220Ω
TR1	3SK97 GaAsfet
D1	6·8V zener diode 400mW
L1	144MHz 6t 14swg 6mm id, 13mm long; 432MHz Copper line 15mm wide, 57mm long, spaced 4mm above groundplane
T1	144MHz 12t twisted pair of 26swg enamelled copper wire; 432MHz 5t two windings connected in series as 4:1 transformer on Amidon t20-12 toroid core

Note: Ferrite beads are fitted to R1 and D1 as in the circuit.

Construction

Both preamplifiers were built in small diecast boxes 3·5 by 1·5 by 1·25in, RS part No 509-923. BNC connectors were used on the 144MHz version, and SMC connectors on the 432MHz version because of their small size.

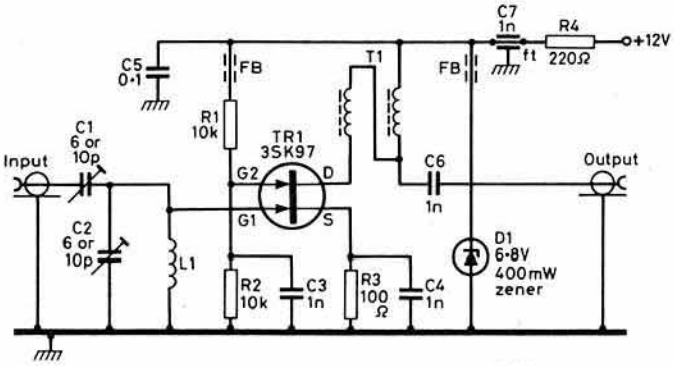
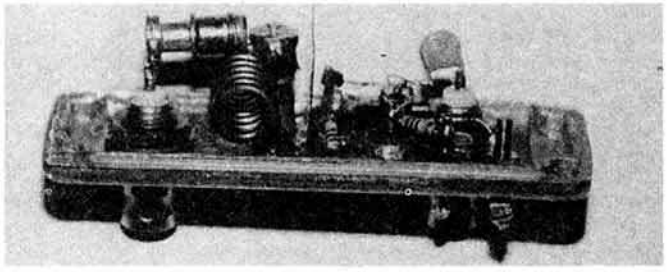


Fig 3. GaAsfet preamplifier for 144 or 432MHz

The layout is shown in Figs 4 and 5. A piece of double-sided pcb was cut to fit the lid of the box, and this acts as a groundplane for mounting most of the components. A vertical screen of pcb or tinplate separates the input and output. The leadless disc ceramic capacitors C3 and C4 are soldered on either side of a hole drilled in the screen for the gate 1 lead. It is important to mount the larger components (C1, C2, L1) first, as these require the most soldering. The fet is the last component to be soldered. Leave only the shortest possible lead length between the drain of TR1 and the output transformer. Fig 6 shows the base connections of the 3SK97, the drain lead being the longest. When soldering the fet into circuit observe the normal precautions used when handling static sensitive devices. A well-earthed soldering iron is essential, and the fet should be soldered using the minimum of heat necessary.



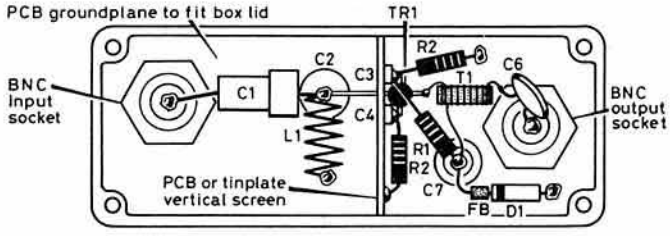
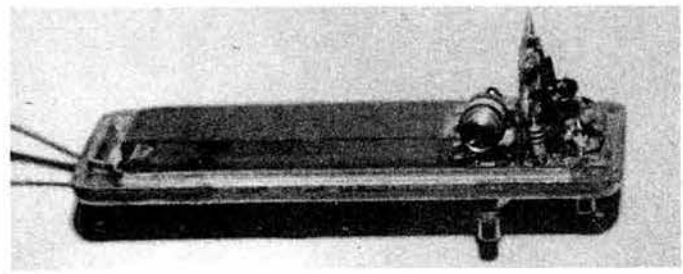


Fig. 4. Photograph and layout of 144MHz preamplifier. The resistor connecting the screen and C4 is R3, not R2. R4, not shown, is on the outer side of the box



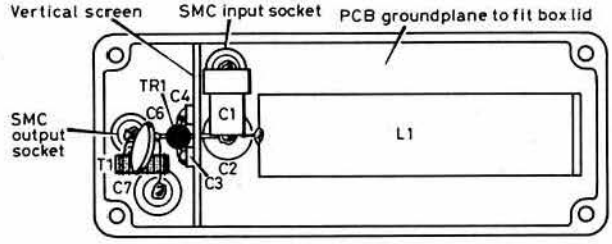


Fig 5. Photograph and layout of 432MHz preamplifier. Resistors have been omitted for the sake of clarity

Testing and alignment

To check for major mistakes in construction, the wary may choose to check the circuit before soldering the GaAsfet into position. The current drawn should be 25-30mA, and this should not change much when the device is in place. Alignment of the rf circuitry should ideally be done using some form of automatic noise figure optimization system; the alignment aid described by G4COM [4] is ideal.

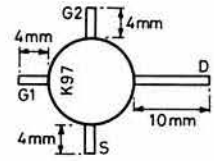


Fig 6. Base connections of 3SK97

For those without such luxuries, alignment on the air using a weak signal has to suffice. One method used by the author with great success is to use a variable attenuator between the preamplifier and the receiver, and using a weak fm signal to tune up the preamplifier. Tune the preamplifier initially for maximum signal, then slowly decrease C1, re-adjusting C2 for best signal-to-noise until an optimum is found.

Conclusions

Several preamplifiers have been built for each band, and noise figures of less than 1dB were measured on all of them. Power gains of 26dB for the 144MHz version, and 23dB for the 432MHz version were typical; one amplifier, however, did show signs of instability. If instability does occur, or is suspected, it can usually be cured by fitting a ferrite bead over the drain lead close to the fet. This reduces the gain of the 432MHz preamplifier to 20dB but has negligible effect on the 144MHz one.

If the preamplifier is to be used in front of an existing receiver, an attenuator should be inserted between them so that the dynamic range of the receiver is not seriously degraded. The method to calculate the required value of this attenuator was described by G3YGF [5]. A suitable value of attenuator to match a typical transceiver with a noise figure of 6dB would be 13dB. The author has constructed a 432MHz transverter using a 3SK97 front-end and a diode ring mixer; the transverter noise figure was measured at less than 2dB, which represents "state-of-the-art" performance.

References

[1] "Technical Topics", Pat Hawker, G3VA. *Rad Com* February 1982, pp 141-2.

[2] "Technical Topics", Pat Hawker, G3VA. *Rad Com* December 1983 pp 1083-4.

[3] "Some GaAsfet preamplifiers", R. Sutherland, W6PO. EIMAC EME Note.

[4] "An alignment aid for vhf receivers", J. R. Compton, G4COM. *Rad Com* January 1976, pp 36-8.

[5] "The effects of preamplifiers on receiver performance, and a review of some currently available 144MHz preamplifiers", J. N. Gannaway, DPhil, G3YGF, *Rad Com* November 1981, pp 1026-31. □

CIRCUIT PROTECTORS

by
Fred Brown,
W6HPH*

Fred Brown was licensed at the age of 16 in 1949 as W6HPH, upgrading to Extra Class in 1967. Electronics has been Fred's career as well as his hobby. He holds degrees from two USA universities, has worked as an electronics engineer, has taught electronics at college level, and has had more than 50 technical articles published in amateur and professional technical journals. During the summer he frequently operates as G5AWI.

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SOONER OR LATER every experimenter learns that solidstate devices are very unforgiving about mistakes. In the days of thermionic valves accidents were seldom disastrous. Even when grids or anodes were visibly red-hot from excessive dissipation the valve would usually return to full health after a few minutes of cooling off. Tubes were tough.

Transistors and ics, on the other hand, often have a life expectancy measured in milliseconds when accidentally subjected to excessive current. The prudent experimenter will protect expensive or hard-to-obtain devices with some kind of current-limiting circuit.

The traditional current limiter is the commonplace fuse (Fig 1(a)). Fuses come in ratings as low as 5mA, but even the quick-blow types are often too slow-acting to protect solidstate devices. However, they are usually fast enough to protect power supplies. Fuses, of course, work only once and then must be replaced.

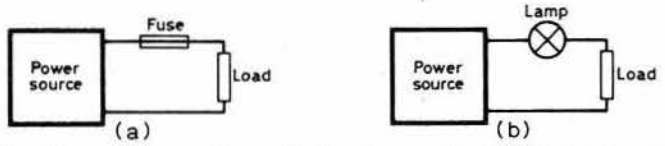

Fig 1. If a response time of several tenths of a second is tolerable, circuits can be protected with a fuse as at (a), or with an incandescent lamp as at (b). These protectors will work on either ac or dc

Incandescent lamps (Fig 1(b)) also are sometimes used as excess current protectors. An increase in current through the tungsten filament causes an increase in resistance and thereby provides some protection to the load and power source. At full brilliance the resistance of a tungsten lamp is typically 10 times the cold resistance. When current is increased beyond full brilliance the lamp ultimately acts as a fuse, by burning out. Also like the fuse, lamps are slow acting because of the filament's thermal lag. Response time from minimum to near maximum resistance is typically 0·25s. Lamps come in a wide variety of voltage and current ratings, but few are available below 50mA. They do have the advantage of giving a visual indication of excess current.

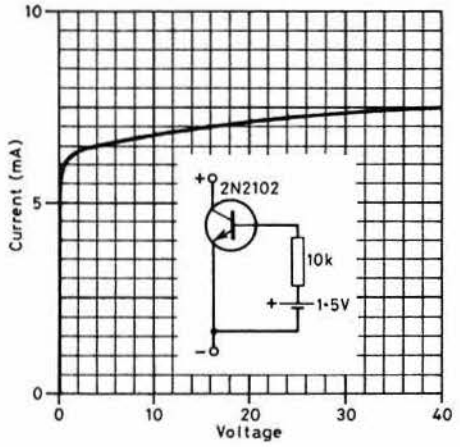

Fig 2. A temporary current limiter can be made from a bipolar transistor, a resistor and a penlight cell, connected as shown. The current limit is determined by the resistance and the transistor current gain. For the circuit shown, voltage drop is only 0·2V at 6mA, and at 7·5mA rises to 40V

A current limiter without the shortcomings of lamps or fuses can be made from a bipolar transistor, as in Fig 2. Constant base current is established by the 1·5V cell and resistor combination. Collector current is the product of base current and the current amplification factor of the transistor (beta or H_{FE}), and is usually fairly independent of collector voltage. For a silicon transistor the value of the resistor R will be

$$R = \frac{0{\cdot}9\beta}{I_c}$$

If collector current I_c is in milliamperes in the above formula, R will be in thousands of ohms.

Since base current is typically only a few microamperes, the 1·5V cell will last nearly as long as its shelf life. However, the circuit of Fig 2 would not be suitable for incorporating into permanent equipment because of the

finite life expectancy of the cell. Nevertheless, it is useful as a temporary means of protecting solidstate devices. It also can be used as a meter protector as described in [1].

A battery-free limiter suitable for permanent equipment is shown in Fig 3; this circuit is described in [2]. Normally the pnp transistor is biased into saturation by the constant voltage drop across the two silicon diodes. But since load current must flow through the emitter resistor, *excessive* load current will cause the transistor to be biased to cut-off and thereby protect the load. The current limit is determined by the value of the emitter resistor, a larger limit will require a lower value. Current limits beyond 50mA will need a larger pass transistor and/or a heatsink. The 10kΩ base resistor will also need to be lowered in value.

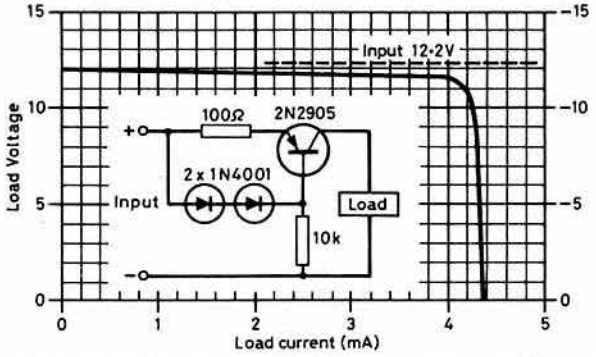

Fig 3. This current limiter results in very little voltage drop until the current limit is exceeded. Load voltage then drops off rapidly

If an initial voltage drop of a few volts is acceptable, the fet circuit of Fig 4 can also be used as a current limiter. The value of the source resistor will determine the current limit, but since fet characteristics of a given type number vary over such a wide range (as much as 10 to 1), the correct value should be determined by trial. Fig 4 can be combined with a power transistor as in Fig 5 to handle heavy currents.

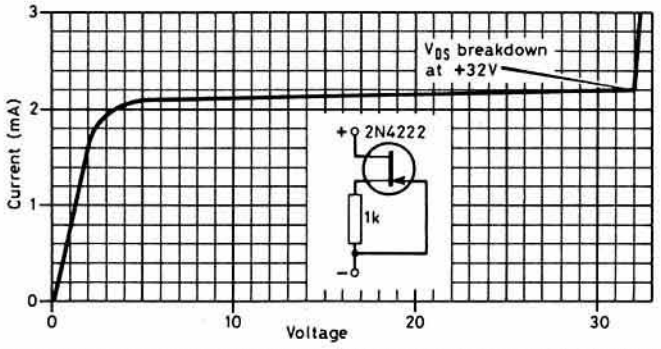

Fig 4. A fet makes an almost ideal current limiter but has more initial voltage drop than shown in Fig 2 or Fig 3. Current limit is determined by the fet characteristics and the source resistance value

Of course, none of these circuits will limit beyond the V_{CE} (or V_{DS} in the case of a fet) breakdown voltage of the transistor. The choice of a protective transistor will depend on the supply voltage with which it is to be used. Consideration must also be given to maximum current capacity and power dissipation of the protective device under worst-case conditions, ie with the load short-circuited. In some cases a heatsink may be needed.

It should be mentioned that adjustable current-limiting power supplies are commercially available, although seldom inexpensive. Some integrated-circuit voltage regulators such as the LM723 provide for adjustable current limiting also. However, a very cheap and simple current-limiting power supply can be contrived by connecting a high-voltage dc supply in series with a current-limiting resistor.

The ht supply salvaged from obsolete valve-era equipment is quite satisfactory for this purpose. Retired valve equipment (radios, amplifiers, test instruments etc) have become increasingly abundant in recent years and can often be had for the asking. The ht supply will usually be in the 200 to 400V region. When combined with a few inexpensive parts this supply can be made into a variable-voltage, variable-current-limit bench supply suitable for solidstate experimenting.

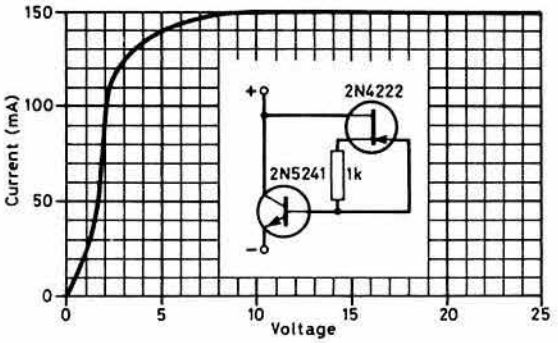

Fig 5. Heavy currents can be accommodated by combining Fig 4 with a power transistor

Fig 6 shows a typical circuit, and it should be borne in mind that this is only one example. Other current limit values and output voltages can be chosen to suit the builder's fancy. A limiting resistor for any combination of current and ht supply voltage can be worked out by application of Ohm's Law. Alternatively, the current limit could be made continuously adjustable if a wirewound potentiometer of suitable power rating is available.

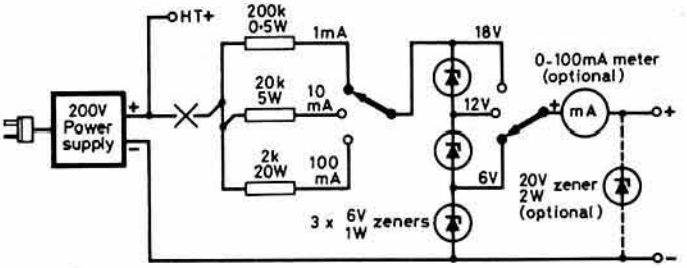

Fig 6. An inexpensive variable current-limiting power supply can be made from a discarded valve ht supply as shown above. Current-limit values are for short-circuit loads. The limit over which full voltage regulation is maintained will be slightly less. A 20kΩ, 5W potentiometer inserted at point X will permit a continuously variable current limit over the range of 5 to 100mA. The milliammeter can be used to set the potentiometer to the desired current limit by simply shorting the Iv terminals. The optional 20V 2W zener across the output terminals is back-up protection to insure that full ht voltage does not appear across the output in the event that one of the 6V zeners should open-circuit fail

The zener diodes will maintain a constant output voltage for any load current from zero up to more than 90 per cent of the current limit setting.

Full ht voltage is brought out to a separate terminal for general purpose high-voltage work, but this terminal should be well marked so that it will never be accidentally confused with the low-voltage terminal.

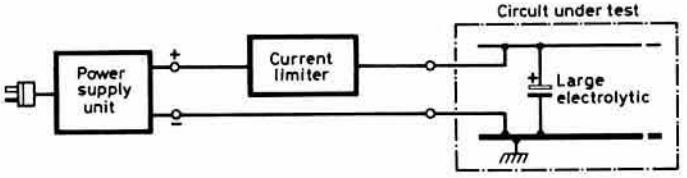

Fig 7. Sometimes a large capacitor can store enough energy to destroy devices even though average current is limited by a circuit protector

In conclusion it should be pointed out that any of these current limiting circuits may fail to protect a solidstate device where the circuit includes a large capacitor across the supply voltage, as shown in Fig 7. Often it is possible for such a bypass capacitor to store enough energy to destroy a device before the current limiter can come into play. Normally this is not a problem with rf circuits where only small bypass capacitors are used.

References

[1] *Amateur Radio Techniques*, Pat Hawker, G3VA. Seventh edn, p356. Fig 45.

[2] *Amateur Radio Techniques* Fifth edition. Page 217, Fig 38. □

Equipment Review

The Yaesu Musen FT726R vhf multiband transceiver

by Peter Hart, G3SJX*

Front view of the FT726R

Introduction

Until recently there were two approaches which could be followed to obtain multiband multimode operation on vhf. The first and traditional approach is to use an hf transceiver in conjunction with transverters for each band required. This results in a number of interconnected boxes, and care is needed to avoid signal-handling problems and i.f. breakthrough. Channelized fm operation is also inconvenient. The second but rather more expensive approach is to use separate dedicated transceivers for each band. The introduction of the FT726R represents an alternative solution encompassing the advantages of both approaches together with additional features and a degree of flexibility not previously seen in a vhf transceiver.

The FT726R provides, in one box, multimode operation on up to three bands, from mains or 13·8V supply, repeater shifts and crossband full duplex for satellite working, together with extensive memory and scanning facilities. Modules are available for 50, 144 and 432MHz, and hf (21, 24 and 28MHz).

Principal features

The FT726R comprises a mainframe i.f. and control unit into which may be simply fitted up to three front-end rf modules. Each module has a nominal output power of 10W and provides switching for controlling an external linear. USB, lsb, cw and fm modes are incorporated, and a flexible frequency synthesizer system provides the following facilities:

(1) Tuning on all modes in either 20 or 200Hz steps, giving tuning rates of 10 or 100kHz/revolution of the tuning knob.

(2) Tuning from the microphone or separate click ident rotary control for channelized fm operation in steps of 12·5 or 25kHz.

(3) Twin vfos for split frequency, split-band or even split-mode operation.

(4) Ten memories each storing band, frequency and mode data.

(5) Standard or programmable repeater offset with normal or reverse operation.

(6) Scanning from the front panel or the microphone across the whole band, or a limited portion of the band, in 20Hz, 200Hz, 12·5kHz or 25kHz steps, or scanning of the memory channels and modes. Stop or pause on busy or clear.

(7) Priority channel checking every 5s for 0·5s.

(8) Clarifier (irt) operating on receive only over the range ±9·9kHz.

A seven-digit blue fluorescent display giving 100Hz resolution is provided, and is easy to read in bright ambient light levels. A separate two-digit clarifier offset display is incorporated.

Other facilities include i.f. shift and variable width, fast/slow agc, noise blanker, all-mode squelch, transmit speech processor, toneburst generator, and provision for a narrow bandwidth i.f. cw filter. Two meters are incorporated for S-meter, discriminator tuning, alc and power output. A mains psu is built-in, or alternatively the transceiver will operate from 13·8V dc. Memory backup is provided by a lithium battery which should last several years. The manual does not mention how to change this battery or where it is located. After much detective work it was found on the control board deep inside the set behind the front panel. No mox or vox is provided, but the ptt is routed to a socket on the rear panel. Semi-break-in cw is provided with sidetone. There is no external transmitter af input, useful for connecting rtty afsk tone generators.

A total of nine 144MHz and five 430MHz modules are available, differing in band coverage, preset repeater shift and fm channel spacing to suit various countries around the world. The correct modules for the UK are 144MHz unit B and 430MHz unit C.

An optional "satellite-unit" may be fitted which enables any two different bands to be used simultaneously for transmit and receive.

Description

The overall size of the FT726R is 33·4 (w) by 12·9 (h) by 31·5cm (d). The front panel is attractively styled, and the controls are sufficiently large to be easy to use and are generally well laid out. The circuit boards are mounted on a steel frame, screened where necessary and interconnected with multiway plug-and-socket flying leads. The rf units are solidly constructed, well screened, and are simple to mount internally. The front panel is "mock diecast" plastic. The scan CLEAR/BUSY, STOP/PAUSE and TONEBURST switches are located in a recess in the top of the case adjacent to the 7·5cm diameter speaker.

A simplified block diagram of the main unit is shown in Fig 1, and the 144 and 432MHz rf units in Figs 2 and 3. The 50MHz unit has a similar architecture to the 144MHz unit. Each rf unit converts to an i.f. of 10·81MHz for both transmit and receive, and receives band and frequency data from the control unit together with the synthesized vfo drive tuning 7·785–7·885MHz.

On receive, the main unit filters the 10·81MHz i.f. and then mixes down to 455kHz where the main selectivity is incorporated. On fm this signal is amplified and limited before passing to the discriminator and the audio amplifier. On ssb the 455kHz signal is mixed up to 10·75MHz, through a

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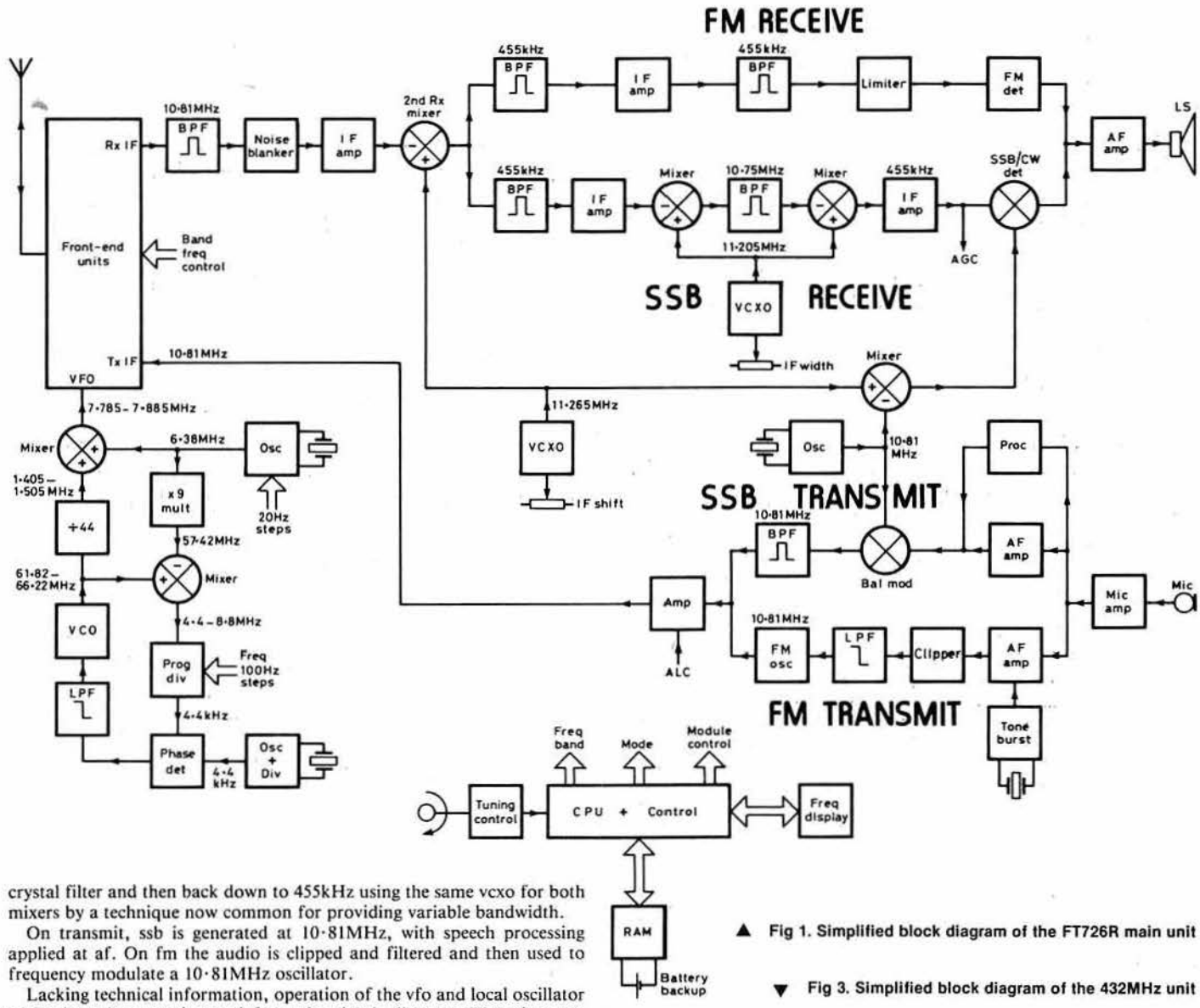


crystal filter and then back down to 455kHz using the same vcxo for both mixers by a technique now common for providing variable bandwidth.

On transmit, ssb is generated at 10·81MHz, with speech processing applied at af. On fm the audio is clipped and filtered and then used to frequency modulate a 10·81MHz oscillator.

Lacking technical information, operation of the vfo and local oscillator stages have been conjectured from the circuit diagram. The vfo tunes 7·785–7·885MHz in 20Hz steps from the dial encoder. A single-loop mixer synthesizer is used with 100Hz steps derived within the main loop, and 20Hz steps (approximately) by incremental shifting of the conversion oscillator.

▲ Fig 1. Simplified block diagram of the FT726R main unit

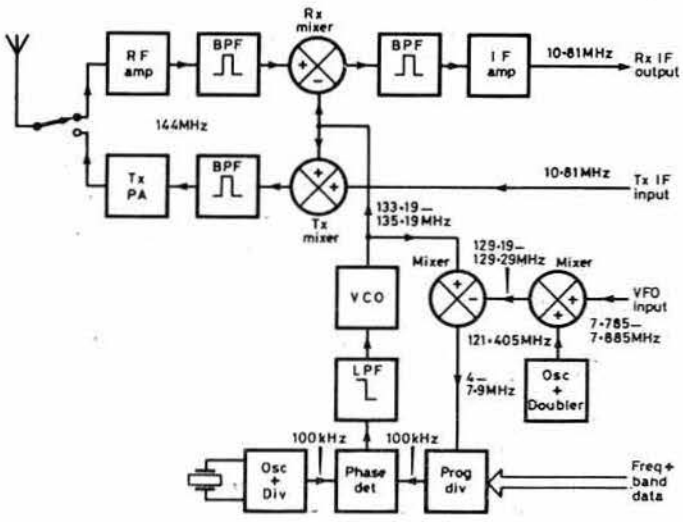


Fig 2. Simplified block diagram of the 144MHz unit

▼ Fig 3. Simplified block diagram of the 432MHz unit

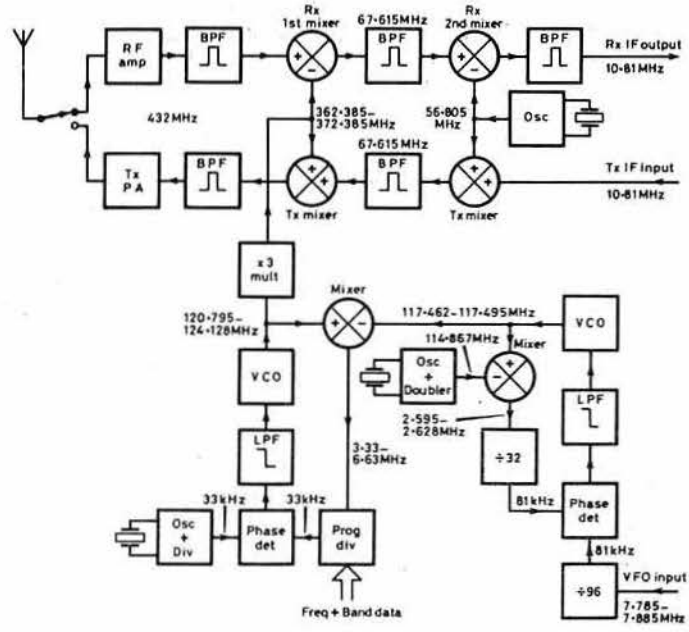


Table 1. Performance measurements

Measurement	50MHz	144MHz	432MHz
Sensitivity on ssb for 10dB s + n:n ratio	0·09μV (−128dBm)	0·11μV (−126dBm)	0·09μV (−128dBm)
Sensitivity on fm for 12dB s + n:n ratio	0·14μV (−124dBm)	0·2μV (−121dBm)	0·16μV (−123dBm)
Noise figure on ssb	4·7dB	6·2dB	4·0dB
S9 level on ssb	10μV	8·0μV	5·0μV
S9 level on fm	4μV	3·5μV	1·1μV
Image response	80dB	73dB	86dB
10·81MHz i.f. rejection	99dB	91dB	—
Blocking level (>30kHz offset)	16mV (−23dBm)	16mV (−23dBm)	18mV (−22dBm)
Third order intercept	−18·5dBm	−12dBm	−9·5dBm
Two tone spurious free dynamic range	80dB	83dB	86dB
Maximum fm power output	13W	13W	10–12W
Maximum harmonic output (second)	−52dB	−45dB	−35dB
Maximum spurious output	−76dB	−65dB	−76dB
SSB p.e.p. output at maximum alc	13·5W	13·8W	10–12W
Third-, fifth-order intermod products at maximum p.e.p.	−22, −40dB	−24, −38dB	−27, −32dB
Intermodulation products at ±10kHz at maximum p.e.p.	−63dB	−60dB	−62dB
Intermodulation products at ±20kHz at maximum p.e.p.	−72dB	−80dB	−75dB

The 50 and 144MHz front-end units are single-conversion, mixing down to 10·81MHz on receive or up from 10·81MHz on transmit. The 432MHz unit is double-conversion mixing via an intermediate i.f. at 67·615MHz. The transmitter stages incorporate hybrid power amplifier modules. The local oscillator drive is derived from a second single-loop mixer synthesizer which combines the vfo tuning range of 100kHz with band and frequency data from the control unit. The heart of the control unit is a custom-designed eight bit nmos microprocessor.

The optional satellite unit provides a separate transmitter i.f. at 10·7MHz together with a separate vfo tuning 7·895–7·995MHz. Both transmit and receive i.fs may be used simultaneously to provide full duplex crossband operation.

Measurements

Table 1 summarizes the measurements made on the FT726R. Other measurements and explanations are given in the sections to follow. The measurement technique was similar to that used in previous reviews [1]. All signal input voltages are given as pd across the antenna terminal. The amplitude of transmitter intermodulation products is quoted with respect to either tone of the test signal.

Unless stated otherwise, all measurements were made on ssb with the audio gain set to give about 100mW af output and shift/width and tone controls central.

Receiver measurements

Sensitivity

The sensitivity figures on ssb are good on 50 and 432MHz, and reasonable on 144MHz. They are consistent with the measured noise figures for a bandwidth of about 2kHz.

S-meter calibration

The input signal level required to give an S9 meter reading is shown in Table 1. On 144MHz the calibration was as follows:

S-reading	SSB Input signal	SSB Relative increase	FM Input signal	FM Relative increase
S1	0·7μV		0·35μV	
		6dB		14dB
S3	1·4μV		1·8μV	
		6dB		3dB
S5	2·8μV		2·5μV	
		5dB		2dB
S7	5·0μV		3·2μV	
		4dB		1dB
S9	8·0μV		3·5μV	
		18dB		4dB
S9 + 20	63μV		5·6μV	
		19dB		3dB
S9 + 40	560μV		8·0μV	
		21dB		3dB
S9 + 60	6·3mV		11μV	

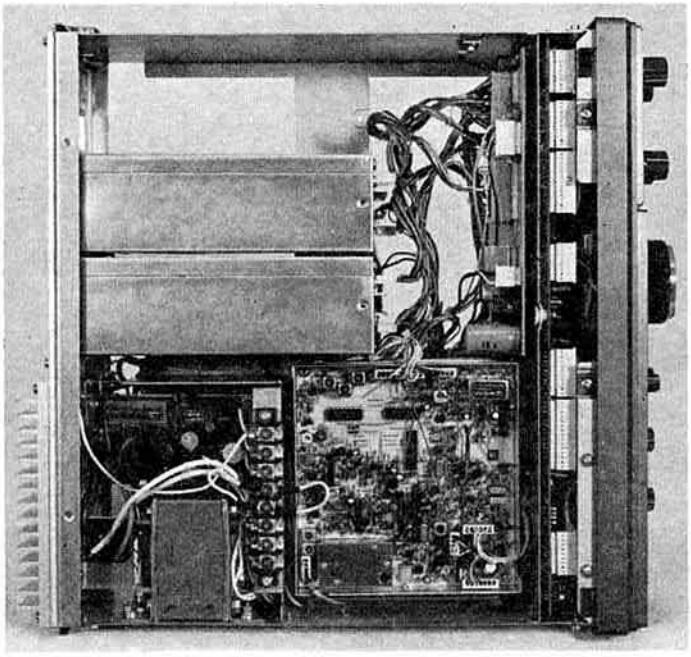
On ssb, the S-meter on 50MHz is about 2dB less sensitive, and on 432MHz about 5dB more sensitive, although these ratios differ at the higher meter readings due to the differing effects of front-end agc. On fm the S-meter becomes grossly non-linear.

Spurious responses

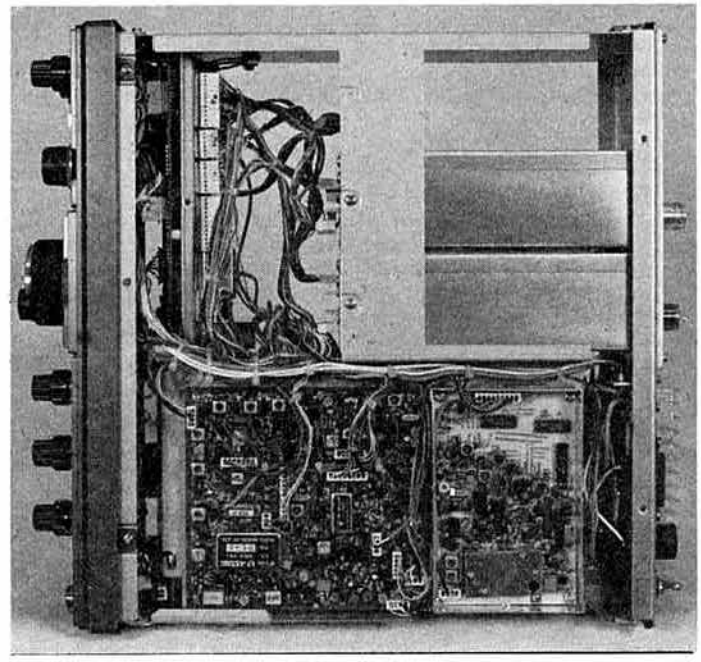
The image rejection and 10·81MHz i.f. rejection figures are shown in Table 1. There was no detectable response at the 10·75MHz and 455kHz i.fs, and on 432MHz the rejection of the 67·615MHz i.f. was 118dB.

With the antenna socket terminated in 50Ω, only two spurii were found, one on 51·2MHz and the other on 435·2MHz, both equivalent to about 0·1μV input signal.

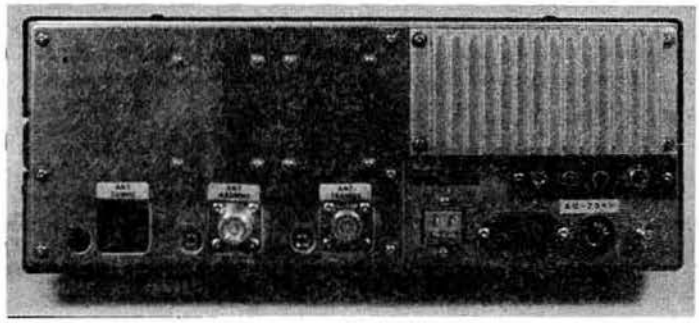
Other spurious responses were checked by setting the signal generator on



Top view of the FT726R with two modules installed



FT726R bottom view with two modules installed



Rear view of the FT726R

either side of the on-tune frequency, at least 100kHz away, and noting the amplitude for any responses obtained corresponding to an S1 meter reading. The results were:

Frequency	Worst response	Other responses
50MHz	70mV	Several around 80mV up to ±3MHz
144MHz	22mV	Several around 80mV up to ±2MHz
432MHz	13mV	Several around 40mV up to ±10MHz

AGC performance

On 144MHz the agc threshold was about 1μV. A 120dB increase in signal above this level resulted in a 1dB increase in audio output. For a 40dB change in signal level, the attack time was 5–10ms (fast) or 30–50ms (slow) and the decay time 30–70ms (fast) or 3–5s (slow). This is quite a reasonable characteristic.

Selectivity

The response of the ssb and cw i.f. filters was measured on 144MHz as follows:

Response	Bandwidth (usb)	Bandwidth (cw)
−3dB	1·45kHz	0·46kHz
−6dB	2·02kHz	0·54kHz
−10dB	2·57kHz	0·69kHz
−60dB	4·58kHz	1·09kHz

Below 60dB on ssb, and below 70dB on cw, reciprocal mixing prevented measurement. The cw filter response was symmetrical, but the ssb filter was steeper on the hf side.

Adjacent channel selectivity measurements on fm indicated that the i.f. filter was too wide for effective use of 12·5kHz channel spacing (only 27dB down in the adjacent channel) but 25kHz figures were very good. At this spacing, 83dB was measured, being limited by reciprocal mixing.

Oscillator sideband noise

Reciprocal mixing measurements were made on 144MHz using a low-noise crystal oscillator source instead of the signal generator/crystal filter arrangement described in [2]. In other respects the measurement procedure was similar. Measurements on ssb (approximately 2kHz bandwidth) were:

Frequency offset	Input level	Level with respect to noise floor
3kHz	−64dBm	72dB
(5–15kHz limited by blocking of the second mixer)		
20kHz	−33dBm	103dB
30kHz	−31dBm	105dB
50kHz	−26dBm	110dB

At spacings of 100kHz and beyond, blocking of the front-end (first mixer) was the limiting factor.

Blocking

The receiver suffers from two distinct causes of blocking. With frequency offsets greater than 30kHz, blocking occurred in the front-end, probably the mixer, at levels given in Table 1. Closer to the on-tune frequency the blocking performance deteriorated due to the unwanted signal passing through the relatively wide 10·81MHz i.f. filter and blocking the second mixer (see Fig 4). The results were:

Frequency offset	Blocking level
5kHz	350μV
10kHz	450μV
15kHz	1·4mV
20kHz	5·6mV
25kHz	11mV

Both 144 and 432MHz gave similar results.

Third-order intermodulation

The results of measurements of third-order intercept and two-tone spurious-free dynamic range are given in Table 1. Tone spacings of 40kHz

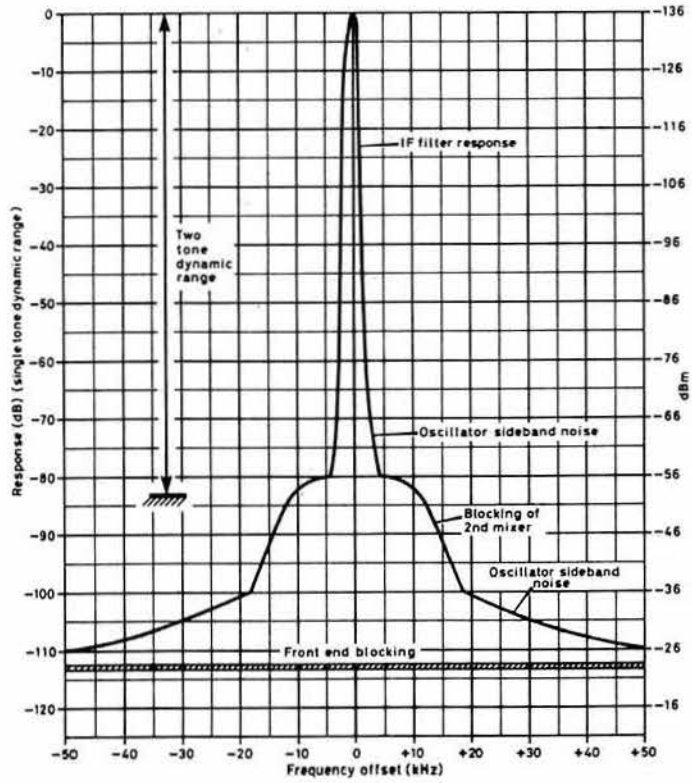


Fig 4. FT726R effective selectivity curve on 144MHz usb

were used (not critical). These results and the blocking figures are poor when compared to a modern hf transceiver, and are also inferior to the FT221R and FT225R when fitted with a Mutek front-end. However, the intermodulation figures are better than those measured for the FT480R and IC290E in [3], although the blocking figure is worse.

Audio

The maximum audio power output into an 8Ω load was measured as 1·5W before the onset of clipping. Up to this level the distortion was constant at about three per cent.

Transmitter measurements

FM power output

The fm power output at maximum drive is given in Table 1. At this level the FT726R power output meter indicated 8W on all bands. The drive control had a range of 25–30dB depending on band.

The peak deviation was measured as about ±5kHz.

Harmonics and spurii

The maximum levels of harmonics and spurious outputs are given in Table 1. The harmonic levels are undesirably high, and are surprising considering the degree of filtering incorporated.

SSB power output and distortion

The p.e.p. output using two audio tones separated by 1kHz is shown in Table 1 for the maximum recommended drive level together with the corresponding levels of third- and fifth-order intermodulation products.

The carrier suppression was 43dB, and the sideband suppression with a 1kHz audio tone was 60dB.

Audio

The audio bandwidth was measured as 250Hz–2·7kHz at the −6dB points, and full output could be achieved with 0·2mV audio input. The second harmonic of a 1kHz tone driving the transmitter to full output was −45dB (0·6 per cent distortion).

Other measurements

Frequency indication and stability

The frequency drift at 144MHz at a constant ambient temperature amounted to 200Hz in the first 15min from switch-on, and 800Hz after 2h.

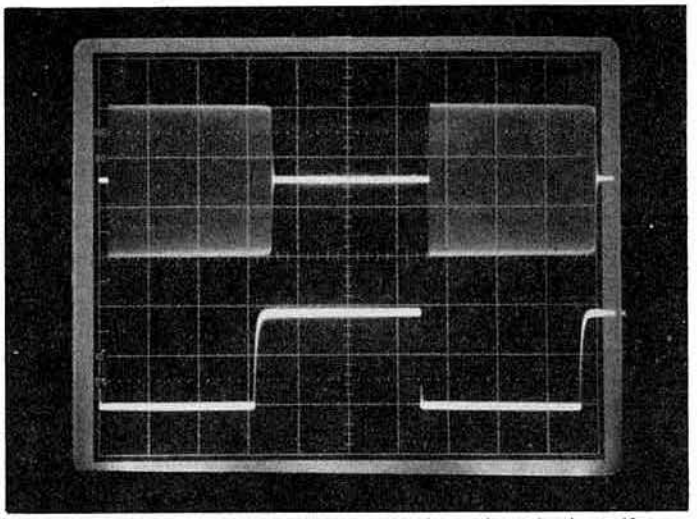


Fig 5. CW keying waveform (bottom) and rf envelope (top) at 40wpm. Horizontal scale 10ms/div

The frequency readout was accurate to within these limits. On cw the frequency readout was approximately correct for a beat note of 700Hz.

Battery operation

At the nominal supply voltage of 13·8V, the current consumption was about 1A on receive and 3·6A maximum on transmit. Satisfactory operation was obtained down to a supply voltage of 10V. Below this level the display was blanked, the transmitter muted, all l.e.ds came on, and most front panel controls were disabled—quite dramatic.

On-the-air performance

The FT726R was used principally on 144MHz over a period of several months, and the overall impression gained was that the transceiver is easy to use, very versatile and a good performer. The controls are well placed, and both vfo and channelized operation simple to select. The main tuning knob has a very nice action.

The synthesizer tuning rate and step size seem about right, but for serious cw and ssb operation the reviewer still prefers a good analogue vfo. However, a synthesizer does open up the possibility for multi-vfos, memories, scanning etc, and these are generally well implemented on the FT726R. The ability to store band, frequency and mode in the memories, together with battery back-up, is very useful. To make full use of the frequency selection modes, it is necessary to spend some time studying the manual and becoming fully acquainted with the set. As with all current synthesized sets, clicks were obtained when tuning close to a strong carrier —an effect due to "dynamic" reciprocal mixing where the synthesizer produces an increase in oscillator sideband noise while the frequency is changing. This is distinct from "static" reciprocal mixing where the frequency is not changing which gives rise to a "hiss" near a strong carrier or "splatter" from a modulated transmission. The FT726R is generally worse than most hf transceivers in the "dynamic" reciprocal mixing performance.

When changing bands the kilohertz frequency is reset to 000·0, which is annoying. It would be preferable to leave the kilohertz unchanged. This does not happen when changing frequency in 1MHz increments within any one band. Slight microphony could be obtained at high listening levels on the internal speaker. Scanning on ssb or from the microphone is of little practical use.

The receiver appeared adequately sensitive for a London location, and no spurious signals or signal-handling problems were encountered, but the reviewer is lucky in not having any really strong local stations. Dynamic range problems may very well be experienced with mountain-top contest operation. The narrow cw filter was excellent. The headphone jack will accept stereo headphones.

On transmit, excellent quality reports were received on both ssb and fm, and the ssb transmission was reasonably narrow. However, on cw, key clicks were reported up to 15kHz off frequency, and for serious cw operation something would need to be done to cure this. Fig 5 shows the cw keying waveform at 40wpm. The attack time in particular is far too sharp. The speech processor seemed to do very little, and this was confirmed in laboratory measurements. It is an audio processor, and not the customary rf processor as used on most hf transceivers.

The satellite unit was used to work through Oscar 10 on QRP days, and worked very well. When the technique had been mastered, the controls were easy to use, although the ability to track the two vfos would have added considerably to the operating convenience. With digital synthesizers this is a fairly simple matter and could even track the vfos tuning in opposite directions, as is required for Oscar 10. The ability to switch out the sidetone oscillator on cw would also help in netting and antenna peaking. This can be achieved by switching the receive mode to usb or lsb, but the narrow cw filter is then inoperative.

When first received, the 432MHz unit had a transmitter fault resulting in slight instability. This unit was replaced by the suppliers. No other problems were encountered.

This transceiver already appears to be popular, judging by the number of stations heard or worked who were using them. In all cases the owners were satisfied with the performance.

To sum up, the FT726R is an excellent performer but, in the reviewer's opinion, for top-grade contest operation the FT225RD/Mutek front-end combination must still reign supreme.

Manual

A 40-page instruction manual is provided which covers full operation and installation of the equipment and options. Circuit diagrams are included, but no servicing or alignment information.

Conclusion

The FT726R is a versatile three-band multimode transceiver offering a host of facilities. The performance is generally good and, while not state-of-the-art in terms of sensitivity or signal handling, is nevertheless better than most other vhf transceivers. The price is relatively high but this does not seem to have deterred many potential buyers—judging by its popularity.

The price with 144MHz unit is £739, and optional units are as follows: 432MHz unit, £250; 50MHz unit, £185; hf unit (21, 24, 28MHz), £200; 144MHz unit, £155; full duplex satellite unit, £95; 600Hz cw filter, £39·85; the main frame is available without band units at £589. All prices include VAT.

Acknowledgements

The reviewer would like to thank all stations worked for their comments, in particular G3RQZ and G3UFY, and South Midlands Communications Ltd for the loan of the equipment.

References

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

[2] "The Yaesu Musen FT102 hf transceiver", P. J. Hart, G3SJX. *Rad Com* January 1983, pp32-6.

[3] "The Yaesu Musen FT480R and the Icom IC290E 144MHz multimode transceivers", J. C. Worsnop, G4BAO, and J. F. Wilson, G3UUT. *Rad Com* November 1982, pp950-5.

Technical Topics

by Pat Hawker, G3VA

THERE IS NOTHING NEW about the basic difficulty of operating a transmitter in a residential environment where your neighbours, or your family, do not share your interest in amateur radio—or at least not to the extent where they are prepared to tolerate, without protest, interference with their own pursuits or domestic appliances.

The late Gerry Jeapes, G2XV, once put into doggerel verse a plaint that must still be echoed by 50MHz experimenters as they wait for television programmes to end:

Up on aloft the antenna hangs high
Catching the signals from out of the sky
At the other end sits a ham with a smile
Who takes out his key points and cleans with a file.

He watches his clock like a cat does a mouse
To be clear of the concert which fills every house
He daren't touch his key till that concert is o'er
Else soon he would hear from the person next door.

Not many people these days file their key points, but otherwise such thoughts could have been penned yesterday rather than when they actually first appeared almost 60 years ago in the RSGB's *T & R Bulletin* of December 1925. Broadcast interference (bci) was then every bit as much of a problem as rfi is today: most broadcast receivers were "wide-open" straight receivers as vulnerable as a modern cmos device. Even when a dozen years later I first ventured on 1·7MHz telephony (yes, the band did extend down to 1,720kHz!) I soon discovered that numbers of radio listeners in the town were still using straight receivers and had no wish to listen to my dulcet tones!

Television interference in the London area, due primarily to third-harmonic radiation of 14MHz transmitters, began to make an impact within weeks of the opening of the Alexandra Palace service in 1936, and has never really gone away since, though no-longer the major preoccupation of British amateurs since broadcasters moved up to uhf.

But now, in the 'eighties, we face a host of new rfi/emc problems as a result of the dramatic increase in the use of electronics in the home. *TT* has repeatedly drawn attention to the vcr problem, the cable tv problem, the home-computer problem, the microprocessor-control problem, the car-electronics problem, the smoke-detector problem . . . and so on and on. Many devices, of course, are two-way menaces, sensitive to rf fields yet gushing out their own pollution.

Fortunately, it is recognized in the UK that, provided the amateur transmitting equipment is "clean" of spurii, no legal blame attaches to the radio amateur and, at least in theory, the onus is not upon him to solve the problem. But in the real world in which we live the neighbours are unlikely to be swayed by legal niceties: if an amateur transmitter interferes with their equipment then, *ipso facto,* the amateur is to blame and some will do their utmost to close him down. These "social pressures" cannot be ignored: the important thing is to get somebody working on the problem before relations with the neighbour have deteriorated too far. Though I am not one of those who believe that you should go out of your way to tell neighbours that you are operating a transmitter and actually *ask* if you are causing interference!

ETI—electronic telephone interference

The trend of semiconductor development seems inevitably to result in ever more vulnerable devices and equipment: very-large-scale integration is being accompanied by lower operating voltages and higher-speed operation: 1V cmos-type devices containing hundreds of thousands of fets are on the horizon. More and more lsi devices are finding their way into consumer appliances of all types.

A few years ago I noted (*TT* January 1981, p46) the work aimed at the development of telephone microphones that would give better quality than the traditional carbon-granule inserts as used for so many years in telephone handsets. Unfortunately the electret and plastic-film transducers that have emerged from this work provide much less output than the carbon units and need preamplifiers to bring the output to a level where the new style of unit can replace directly the carbon inserts.

Electronic inserts are now gradually coming into use, although so far on a relatively limited scale. The telephone service is being improved by them, but consider the results on amateur radio, as recently reported by Mike Grierson, G3TSO. He writes:

"Following a QTH move early last summer yet another source of annoyance came to light: rf breakthrough on the neighbour's telephone! While this problem had been encountered to a lesser degree before, it was then usually associated only with the earpiece and thus objectionable only close to the transmitter end. This time Donald Duck was heard at both ends of the line. Listening on 3·5MHz suggests that other amateurs are running into this problem and may be interested to learn how a cure was effected here.

"Tests with my own telephone, one of the recently-introduced 'Statesman' units, revealed audible pick-up on all amateur hf bands from 1·8 to 28MHz. After several telephone calls to British Telecom, including the Interference Department, an engineer arrived with a handful of capacitors, none of which was suitable for rf suppression.

"However, the telephone engineer proved very helpful, although clearly he had had little previous experience of rf-suppression work. Attempts were made to suppress the interference using various forms of decoupling. The new-style telephone uses an electret microphone and has a small ic preamplifier inside the handset. There is, needless to say, no screening anywhere. Several different models of this type were tried; all suffered from rfi, whereas a traditional carbon-granule insert was free of problems.

"As an experiment an electronic telephone was connected to a dc psu, with no telephone line attached, yet rf still got in—the microphone lead seemingly the most likely cause of pick-up.

"By accident or serendipity, a cure was found suddenly. Across the microphone input to the body of the phone is a series resistor and capacitor. Simply short-circuiting the resistor resulted in immediate disappearance of the rfi with no apparent adverse effect on the operation of the telephone. While this may not appear a highly scientific solution, it does work—and a similar cure has been effective on the neighbour's telephone: Fig 1.

"There are an increasing number of electronic telephones, both proprietrary and supplied by BT. It is also becoming common practice for BT engineers to replace carbon inserts in older installations with the electret microphone/amplifier type of insert, each of which could spell trouble for local radio amateurs. While the BT Interference Department assured me that there were effective rfi suppression kits available, the local telephone

THIS MONTH

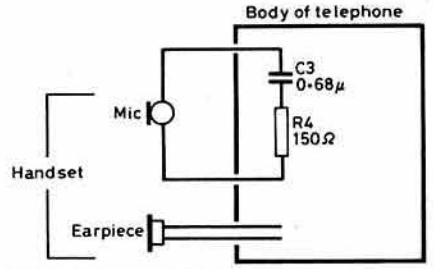


Fig 1. G3TSO's remedy for rfi on the new electronic telephone inserts is simply to short-circuit R4 (150Ω) though there appear to be many variations in the new designs

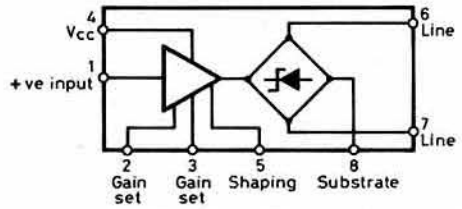


Fig 2. One of the Ferranti eight-pin ic amplifiers used for telephones. Other devices in this range include 14-pin devices and low- as well as high-impedance inputs, see text

engineers had not heard of them, nor did they even have a circuit diagram of the new-style telephones".

Typical of the miniature amplifiers now being put into telephone inserts for use with electret transducers is a Ferranti range ZN470E, ZN472E etc. Some devices feature an on-chip diode bridge that, when powered from the telephone line, operate from a dual-polarity source, although alternative devices, ZN475E and ZN478E, operate from a single-polarity supply. With the ZN478E particular care has to be taken in observing the correct line connections. The amplifiers derive their power from the line, drawing currents from 1 to 100mA. The 470 and 472 are 14-pin packages with a programmable gain of 20 to 26dB selectable in four steps. They have a high input impedance that matches directly with electret transducers without the need for a fet buffer (but presumably making them more vulnerable to rfi). Four of the other devices are in eight-pin dip packages and have 50dB maximum gain, which can be adjusted with an external resistor to suit the sensitivity of a variety of transducers; Fig 2 shows a typical arrangement. The 477 and 478 are designed for use with low-impedance transducers, such as electret microphones with built-in impedance-matching fet buffers, intended directly to replace carbon-granule transducers in telephone handsets. The 476 is for use with moving-coil microphones or other low-impedance transducers.

So it would seem that radio amateurs are faced with yet another rfi problem and are liable to encounter a wide variety of different telephone handsets, virtually all vulnerable to strong rf fields.

Not so passive diodes

The "rusty-bolt" effect, where a poor metallic connection acts as a diode and, when subjected to rf fields, becomes a prolific source of harmonics, has long been recognized as a potential source of harmonic-type tvi. Fortunately for British amateurs, the uhf tv system tends to be less susceptible to harmonics, at least from hf transmitters.

It is, however, not always recognized that diodes in *unpowered* equipment, for example those used in antenna changeover switching, can similarly generate harmonics when the rig concerned is not even switched on. In *QST* (December 1983, pp49-50) Robert Findlay, W6NZX, describes how he found that tvi on vhf channels, when using his 14MHz transmitter, was originating from his solidstate 144MHz transceiver which had its antenna about 3ft above his 14MHz array. Once he had located the source of the harmonics, he tried several different 144MHz transceivers. There was tvi no matter which of them was connected to the vhf antenna. On the other hand there was no tvi when he connected a commercial vhf equipment which had a relay-switched antenna changeover system. Clearly, the prime generator of the harmonics was the diode-type transmit-receive switching in the amateur transceivers.

He was able to cure the tvi by fitting a circulator on his vhf rig, though he notes that for most amateurs a cheaper solution would be simply to move the hf and vhf antennas farther apart.

It should be remembered that an unpowered transistor is, in effect, two diodes formed by the junctions. Virtually any semiconductor device in dead equipment can generate harmonics if subjected to a strong rf field. This can be made use of to detect the presence of those micro-miniature eavesdropping "bugs" so often featured by the media. A little "clean" rf is "swept" across likely hiding places, and the presence of the bug detected by the appearance of harmonic signals—or so I read.

Simple speech decompressor

Many years ago the buzz-phrase in audio was "volume expansion" as a means of reproducing the old 78rpm discs with a rather more impressive dynamic range. It is still not uncommon to find hi-fi audio systems using expansion techniques to compensate for lack of "head room", even on modern recordings. But nowadays one hears far more about speech-compression and audio-processing than expansion, as a means of providing greater intelligibility in noisy communications channels. Medium-wave a.m., and even vhf/fm broadcast signals, are now compressed to varying degrees—anything up to about 19dB in the case of over-the-frontier a.m. external services. Other forms of processing, such as pre-emphasis on a.m., are also finding increased application to counter the very restricted bandwidth of most 455kHz i.f. amplifiers.

Yet very-heavily-compressed speech is far from pleasant to listen to for any length of time. Many radio amateurs use heavy compression and seldom attempt to vary this to suit circuit conditions; some seem surprised if ever they are asked to turn off their processor, or at least to reduce the degree of compression.

In *QST* (December 1983, pp24-5) Eric Nichols, KL7AJ, provides details of a simple add-on decompressor which he claims can restore effectively much of the original quality even on a highly "squashed" signal. In effect, non-linear amplification is used to provide the inverse of that in the distant compressor. In the unit shown in Fig 3, D1 and D2 cause the op-amp to act non-linearly in the opposite sense to normal agc: as the input level increases, amplification increases immediately, so that speech peaks rise further from average levels. The value of the resistors in series with diodes D1 and D2 determine the degree of expansion, and can be any suitable value between 0 and 10kΩ. With the 100Ω resistors shown, the unit provides about 20dB of expansion, roughly the inverse of the degree of compression frequently used in amateur radio practice.

KL7AJ claims that the unit will make compressed speech signals sound more natural and more pleasant to listen to, provided that the frequency channel is reasonably clear and signals are comfortably strong. The lesson to be learned perhaps is that we should think more of tailoring compression and expansion to suit prevailing band conditions.

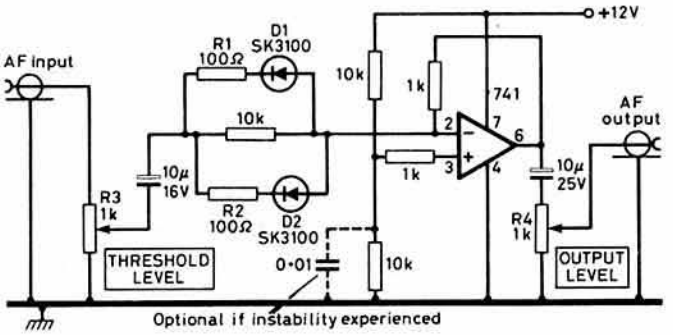


Fig 3. KL7AJ's speech decompressor. Resistors can be 0·25 or 0·5W carbon composition types, and the supply voltage can be from 9 to 13·5V. R3 and R4 are linear-taper carbon controls. D1 and D2 small-signal silicon diodes (1N914 etc)

An operational disadvantage of an add-on unit of this type is that it will usually require an additional outboard audio power amplifier for loudspeaker reception. To overcome this problem, KL7AJ also outlines what he calls a "Mickey Mouse" form of decompression that can be applied to solidstate rigs having a typical complementary-symmetry audio output stage, without requiring any form of external unit. In this approach, crossover distortion is deliberately introduced by modifying the bias arrangements on the output stage. However, I cannot help feeling that such distortion, even if it provides decompression on heavily compressed signals, must greatly impair the quality of non-compressed signals, and I would hesitate to modify an audio amplifier in this way. Perhaps I am taking a too-cautionary stance, but in my experience severe crossover distortion is one of the most unpleasant forms of audio imaginable!

The great GaAs debate

In *TT* December 1983, pp1083–4, I drew attention to the continued advocacy, particularly in French journals but also by K8UR in *Ham Radio*, of rf amplifiers for 144MHz using relatively low-cost gallium-arsenide devices (low-cost, that is, compared with some of the more exotic GaAs fets) such as the Mitsubishi 3SK97, Alpha ALF1023 etc. I made it clear that the use of these uhf devices at *vhf* is highly debatable on cost-effective grounds, justified by the writers on the basis of good dynamic range, since at 144MHz comparable noise and gain performance can be achieved with good silicon devices.

We all tend to hope that new devices and new technology will overcome our problems, even though experience shows that this leads often to disappointment. It is thus rather important that before rushing into GaAs *for 144MHz* we try to find out whether the GaAs fets do all that is claimed for them. This is in no way to question the enormous value of GaAs semiconductors for microwave applications where silicon simply cannot provide the same noise performance.

Chris Bartram, G4GDU, of MuTek, has investigated in depth the use of gallium-arsenide versus silicon at vhf in connection with the firm's interest in high-performance vhf receiving equipment for both amateur and professional applications, noting wryly that radio amateurs often demand performance specifications *at consumer prices* considerably better than those expected by his professional customers!

G4GDU writes: "My experience of low-noise amplifier design has led to the formulation of 'Bartram's Law'. This states that 'if an amplifier is designed for minimum noise figure, using a low-noise device, the input third-order intercept point will not exceed +6dBm, and is most likely to be of the order of 0dBm'. This is true of all the devices that I have come into contact with, and the only way in which I have been able to bypass this law is by the use of non-dissipative negative feedback. This is a very powerful technique, and we have been able to produce amplifiers for professional use with input intercepts approaching +40dBm in the vhf region!

"As far as GaAs devices are concerned, I have evaluated most of the devices currently available. Consumer dual-gate fet devices such as the 3SK97 and 3SK112 have not been unduly impressive: it was possible to obtain noise figures of the order of 1dB (measured with an HP346B source) but the reproducibility with different samples was not good, and the strong signal performance no better than with modern silicon mosfets with third-order intercept points (IPI3) of the order of 0dBm. It is interesting to note that Motorola indicate the same sort of figures in their data sheet for the MRF966 (the 500MHz figures given by them will probably be slightly worse than at 144MHz). The Motorola figures will also assume a conjugate output match: it is usually possible to win a couple of extra decibels of IPI3 by critically mismatching the output (incidentally do not attempt to extrapolate their data sheet graphs to the intercept points using the data sheet graph—the axes used in their sheet give the impression that the IPI3 is higher than it really is! Fig 4 shows the IPI3 intercept point with a corrected X axis.

"The data also confirm my comments about noise performance: it is important to remember that some of these devices are optimized for cellular radio system applications at 900MHz. GaAs devices tend to have a bathtub noise characteristic which results in 0·2 to 0·3dB higher noise figure at 144MHz than at 430MHz! It is also worth remembering that device manufacturers invariably quote the device noise figure; to arrive at a realistic operational low-noise-amplifier figure the losses inherent in any matching network have to be taken into account.

"Microwave fets such as the NEC720, MGF1402 etc do work quite well at 144MHz, and I would almost agree with K8UR, although his 'intercept' figures are better than I've seen. However, I believe that in his *Ham Radio* article the intercept figures quoted are the *output* intercept point—it is meaningless to quote intercepts without referring them to a port! If my assumption is correct then the +9dBm quoted is close to the +5dBm which is the best that I have measured without the use of negative feedback (it would require only just over a 1dB error in absolute power measurement to account for the difference).

"The earlier GaAsfets with one micron gate-width, such as the MGF1400/1200 (now obsolete) seem to have been slightly more linear than the current 0·7mu devices. With the MGF1202 (which we use extensively) I can get around +4dBm IPI3 with around 0·6 to 0·7dB nf without feedback. This is roughly the same as for a good silicon BF981. The large-quantity manufacturers' cost of the BF981 is only about one-twentieth of the MGF1202! My feeling is that the use of GaAs devices on 144MHz cannot be justified in any engineering sense, unless negative feedback is used. However, experience has shown how difficult it is to ignore the psychological aspects of how customers react to new devices etc, and how difficult it is to separate facts from fiction.

"I am not sure where the myth of exceptionally good dynamic performance with GaAs devices came from. The classic G3WDG/G3YGF article in *Radio Communication* did suggest that the strong signal performance of GaAs could be good; however, I believe that the only measurements of dynamic performance actually quoted concerned the ability of a 432MHz amplifier to reject 144MHz signals. I suspect that this had more to do with the loaded Q of their input matching circuit than amplifier linearity. I have also seen +7dBm quoted for the 3SK97 from more than one source. I wonder if this reflects a myth emerging.

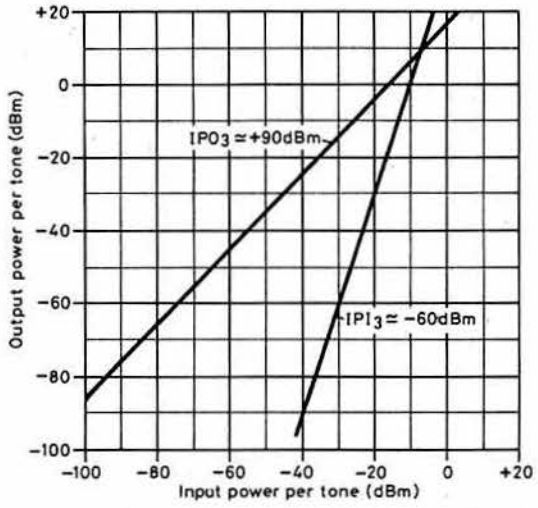


Fig 4. The third-order intercept point of the MRF966 at 500MHz without the change of scale of the X-axis in the manufacturer's data sheets (G4GDU)

"It may be pertinent also to comment on the measurement of input (or output) intercept points. I have never been fond of this parameter, and I still feel that it is a powerful way of confusing people. A point that never seems to have been made properly in the amateur-radio literature is that intercept points have nothing to do with intermodulation: they are a means of characterizing the *linearity* of systems. For this reason it is desirable to perform the measurements in a consistent manner. Measurements of gross intermodulation effects are not terribly helpful, except perhaps for transmitters. The normal method of making intercept measurements on amplifiers is to extrapolate from a 60dB intermodulation ratio. This ensures that the measurement is not likely to be distorted by higher-order products and saturation effects. Also it is comfortably within the on-screen dynamic range of most spectrum analysers, which means that signal/noise corrections do not have to be applied at the bottom end. The use of the 60dB ratio also has one important advantage from the viewpoint of calculating the results. Add 30dB to the power of one of the two tones and you have the intercept point!"

Chordal hop and ionospheric focussing

As long ago as 1966, the CCIR Report 250-1 formally recognized that the long-established idea that the maximum distance that could be covered by an hf signal in a single-hop transmission reflected from the F2 layer of the ionosphere was limited to under 4,000km was demonstrably wrong.

The work that led to this important change of previously accepted theories of hf propagation was largely sparked off by the brilliant work of Hans Albrecht, VK3AHH/DL3EC, in 1947 when he showed convincingly that the strength and consistency of European amateur signals on the 3·5, 7 and 14MHz band, received in Australia, could be accounted for only by disregarding the supposed ground-reflection losses of multi-hop signals following the "long path". He later termed hf propagation that did not return to earth at intermediate points "chordal hop", an extended range signal trapped for most of the path between layers of the ionosphere, such as F and E layers or possibly some other form of "whispering gallery" mode.

Albrecht's work was soon followed by evidence on "round the world echoes" and similar effects by Villard, Stein, Fenwick, Muldrew, Maliphant etc. Les Moxon, G6XN, was one of the first British amateurs fully to recognize the significance of chordal hop and its direct relation to very many amateur dx contacts. In *TT* I repeatedly drew attention to this form of propagation in the late 'sixties and 'seventies, including the clear-cut operational findings of the German Deutsche Welle hf broadcasting service (*TT* September 1979, *ART7* etc) that revealed the superiority of the

long-path, *lower-frequency* "darkness" path when compared with the shorter, higher-frequency direct path to Australia in daylight.

At first some professional communications people tended to play down chordal hop as a rare and infrequent phenomenon, suggesting that even if an hf signal was launched as a trapped wave between the layers then it was most unlikely that the signal could be relied upon to come back to earth at the required part of the world. This argument overlooked the regular tilting of ionospheric layers around dawn and dusk, when the F1 and F2 layers separate or combine; a happy accident that can be exploited virtually every day on the G-VK path and along the so-called "grey-line" paths. At about 0800gmt, almost as regularly as clockwork, the 14MHz band opens to VK, regardless of the level of sunspot activity. Remember that the main cause of "poor conditions" is attenuation in the low D-layer that fades away during the hours of darkness. These points are illustrated in Fig 5.

There is a further factor that helps G-VK and G-ZL contacts, although we are not geographically situated to exploit this fully, the so-called ionospheric focussing of signals at the antipodal location. What this means is that no matter in which direction signals leave your antenna in the UK then by following great circle paths they will all come together again at precisely the opposite side of the globe—which is why New Zealand appears as such a long, stretched-out shape on any great circle map centred on the UK. If New Zealand was at the exact antipodal point the map would show that country as stretched right round the outer diameter of the map.

In practice, the degree of antipodal focussing is limited, since not all paths in all directions are likely to be open at the same time. Nevertheless (as noted in *TT* January 1973) Gary Bold of the Radio Research Centre, University of Auckland, New Zealand, found that the "Voice of America" relay station near Tangiers, as received at its antipode in New Zealand, exhibited a striking increase in signal strength each morning (around 2000gmt) of up to 30dB, building up very rapidly even at times when the critical frequencies were too low to support multi-hop propagation at 15MHz, and explicable only by chordal hop/ionospheric focussing.

Similarly H. A. Whale in New Zealand (*TT* July 1974) noted that very often hf signals from Europe arrived from directions well "off beam", as a result apparently of irregularities in the structure of the ionosphere. The concept of regular, flat "layers" is useful as an introductory aid, but is far from an accurate description of the turbulent, slow and fast moving clouds of ionization that exist in the ionosphere.

Brian Austin, ZS6BKW, last year mentioned that in 1969 American publishers Plenum Press published a book by H. A. Whale *Effects of ionospheric scattering on very long distance radio communication* describing the work in New Zealand on antipodal/chordal-hop type propagation mechanisms between the UK and New Zealand.

ZS6BKW, himself, has over many years listened on and off to WWVH, Hawaii, mostly on 15MHz. Hawaii is roughly the antipode of Johannesburg. He writes: "What has struck me lately is that the Fort Collins, Colorado, station WWV runs the same power, 10kW, to what I would assume to be similar antennas, and yet WWVH is by far the stronger signal of the two in this country. Could it be because of antipodal focussing, or would the fact that Hawaii is a relatively small land with signals launched more effectively over the salt water "groundplane' be the reason? Maybe the subject of ionospheric propagation is not old hat after all, as some of my microprocessor-orientated colleagues would have me believe!"

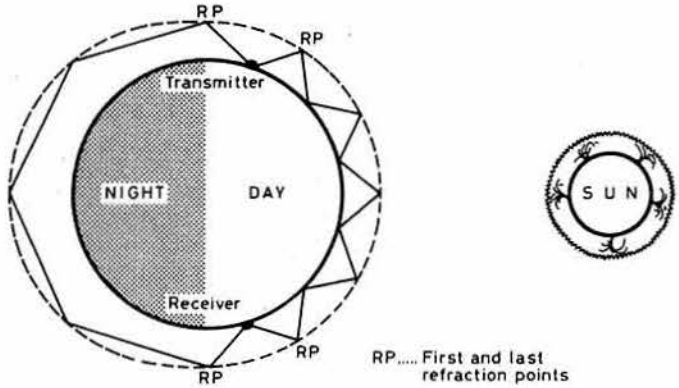


Fig 5. The change of height of the F-layer of the ionosphere around dawn and dusk produces "tilts" that result in chordal-hop propagation during those periods of time when the first and last refraction points of the signal path coincide with the tilts. The absence of intermediate ground reflections and repeated crossings of the attenuating D-layer (which exists mainly in daylight) means that chordal hop is a much superior mode than multi-hop for long-distance contacts at the power levels used by radio amateurs. As noted in *TT* (September 1979): (a) The long path may be louder; (b) going up in frequency may put your signals down (what one needs is the *muf for the optimum path*; (c) the traditional dawn/dusk (grey-line) periods stem from the *regular appearance* of the ionospheric tilts at these times; (d) when tilts are roughly overhead, even an antenna with a high-angle of radiation will launch chordal hop signals, and the main advantage of low angles of radiation is that such paths are open for longer periods

Similarly, R. W. Micklewright, G3MYM, with the help of members of the Yeovil Amateur Radio Club, carried out a lengthy investigation during 1983 into the nature and likelihood of chordal hop propagation. His conclusions would appear to support fully the suggestion made previously both by G6XN and in *TT* that hf chordal hop propagation should not be regarded as a rare occurence but as the normal mode of propagation for most amateur radio contacts over distances of about 5,000 miles.

To quote G3MYM's tentative conclusions:

(1) There are two requirements for chordal hop to take place. These are that the frequency of the radio wave be near muf at the point of refraction, and that the rate of change of the electron density with height in the ionosphere be decreasing rapidly in the direction of propagation.

(2) Two types of chordal hop result from (1) and the topography of the ionosphere. These are an hf type and an lf type. The hf type was the main subject of our investigation being studied on 14MHz. HF chordal hop takes place in the F-layer and occurs in the evening at mid and lower latitudes and in the morning at around 0800 local sun time. LF choral hop, not studied in detail, takes place in the E-layer at sunrise and sunset, and is likely to be effective on 1·8MHz and possibly 3·5MHz.

(3) Chordal hop propagation is a daily occurence, and is probably the main night-time mode of hf dx propagation in winter.

Antennas that slow the wave

Last summer, Les Moxon, G6XN, outlined a series of antenna experiments based on the use of triangular loop elements for multiband arrays (*TT* August 1983, pp705-7). At that time a very brief mention was made of some investigations he was also making into "flat" reversible beams based on folded dipole elements, utilizing some of the same principles as the loop elements.

This further project subsequently developed into an interesting exercise in the use of slow-wave structures, a topic which he believes has come to the fore quite suddenly. W6QYT, for example, has drawn G6XN's attention to an mf broadcast antenna only 35ft high, though details of this interesting structure have not been fully disclosed. In the UK some limited use has been made of mf "umbrella" antennas about 90ft high, but most mf broadcast antennas, even for local radio, use mast-radiators or T-antennas at least 150ft high. G6XN also noted the short helix antenna described in *TT* October 1983, p890, Fig 6. He considers the simple helical-wound-element approach is much inferior to end-loading or its equivalent, although admitting that it is vastly better than the more common centre-loaded short antenna. He writes:

"If we compare centre loading, a resonant helix and end-loading, the current distributions are respectively triangular, sine-wave and square-wave. The sine-wave doubles the radiation resistance compared with triangular; the square-wave more than doubles it again. But it must be recognized that there are also major repercussions on loss resistance which will always tend to be rather large in the case of a small diameter helix because of the need to use relatively thin wire.

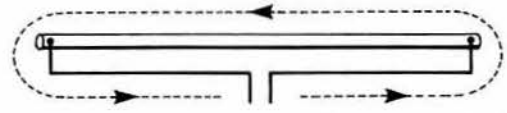


Fig 6. Basic form of G6XN's multiband folded dipole showing current distribution when the element is short

"To arrive at my form of short, multiband folded dipole one starts from the arrangement of Fig 6. From basic principles this element, with unequal diameter conductors, provides a large and useful impedance step-up, but such an element deteriorates in performance very rapidly if the physical length is reduced below the λ/2 electrically resonant length. The current flowing in the wrong direction brings the radiation resistance down with a bump. Also, as the current starting from the centre turns the corners at the end, it encounters a change in impedance. By reference to a Smith Chart it can be seen that since this change is occurring too soon, the step-up vanishes very quickly as overall length of the element is reduced.

"My first objective was to try to keep the impedance constant as the corner is turned, but without having to support a lot of additional metal. This can be done by *capacitive* loading, using only thin wire. L is large because the wire is thin, C is made large by attaching a lot of 'whiskers'. Zo = $\sqrt{(L/C)}$ and therefore Zo *tends* to stay constant; on the other hand

the velocity of the wave, which is given by $\sqrt{[1/(LC)]}$ is greatly reduced. Thus one arrives fairly quickly at the point of minimum current. Provided that this point is substantially less than about half-way in to the centre, the radiation resistance, referred to the centre of the thick part of the element, is at least equal to that of the thick element, considering it to be end-loaded; ie to have a rectangular current distribution. By changing from capacitive to inductive loading at the point of zero current, Zo is increased but the velocity (measured axially) stays low. This transforms the radiation resistance to a relatively high value at the feedpoint. Note that one must allow for a corresponding drop in current as the current zeros must be pushed outwards towards the ends, hence the word 'substantially' above.

"What the element now looks like (electrically) is shown in Fig 7. Radiation resistance, as actually measured at the feedpoint, is 200Ω at

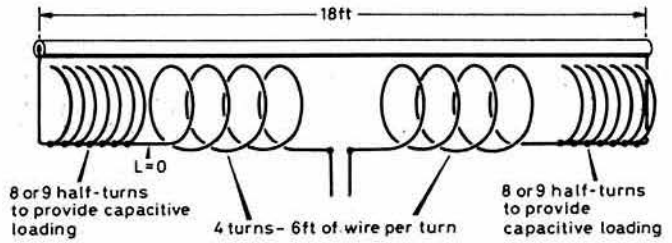


Fig 7. Electrical form of the loaded folded dipole element, including inductive and capacitive loading. Note that physically the loading is supported on nylon fishing line that runs outside of the tubular element (see text)

14MHz, 70Ω at 21MHz and 200Ω at 28MHz. The loading looks like a helix surrounding the 18ft tubular sections, although only the inner half is a true helix. I used 21swg wire, the supporting 'former' consisting of four lengths of nylon fishing line stretched between the tips of vertical T-pieces attached to the ends of the central tubular elements, and the line is routed via anchoring points on the boom, together with a boom extension; in cross-section this resembles a sort of twisted rectangular 'former' virtually impossible to illustrate clearly.

"Thinking it was going to be difficult to obtain enough loading, I overdid this originally to the extent of having just over one inductive turn too many, but this proved all to the good, the two elements worked on 10MHz with about 9dB front-to-back ratio, calculated losses roughly equal to the forward gain and, at 30ft, the array put a good signal into Australia although this was not part of the original plan!

"The design, looked at from a 'sales appeal' angle, is rather mind-boggling, and I am not expecting that anyone else will rush to copy it, despite its interesting exploitation of slow-wave techniques. Incredibly, however, the second element took only one day to construct. Compared with the first it was electrically spot on, and both elements seemed well balanced (I abandoned my original idea of a three-element array). On-the-air performance was at least as good as the beam it replaced (Fig 3 of *TT* August 1983) at the same height. There were also a number of surprises:

(a) Nothing had been done to increase coupling between the elements, and I had therefore expected unequal currents and poor nulls as normally experienced with conventional two-element arrays. In practice the nulls off the back were the most impressive I have ever had!

(b) Disappointingly, there was *no* improvement in effective bandwidth, which proved to be *identical* on 14 and 21MHz with the modified VK2ABQ array shown in Fig 2 of *TT* August 1983, the smaller of the triangular arrays.

(c) Unlike the triangular arrays, it was found possible to feed the flat array with some 24ft of open-wire line without degrading the bandwidth on 14MHz, a completely unforeseen and very valuable practical advantage, since it allowed all tuning and matching adjustments to be carried out at ground level. The low value of radiation resistance on 21MHz was tiresome,

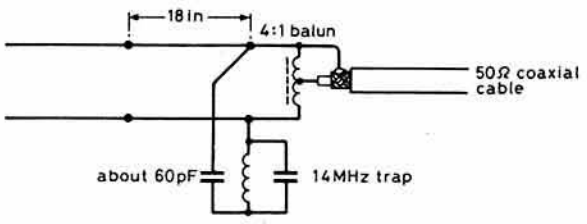


Fig 8. G6XN's feed arrangements with open-wire line transformed to 50Ω coaxial cable and designed for element feed impedances of about 200Ω on 14 and 28MHz, and about 70Ω on 21MHz. The 50Ω cable goes to an atu or to a series-tuned circuit to permit reflector tuning from the shack

but tuning on 14MHz provided about 18in of excess length at 21MHz, and this was used as a transformer to bring the impedance up to 200Ω with the help of a capacitor which then had to be removed at 14MHz by means of a trap: Fig 8.

"After taking a lot of measurements and giving the design a good try-out on the air, I finally decided that it must be regarded as one eyesore too many. I replaced it by an 'invisible array'."

It is hoped to include details of this later work in a future *TT*. G6XN has also been tackling the problem of building the "smallest possible" efficient dipole, starting out from the folded-dipole elements discussed above and using as a basis for comparison the helix design of ZL4DP (*TT* October 1983, p890).

Sleeping and other crystals

In the January *TT* attention was drawn to an annoying, but fortunately fairly rare, problem with quartz crystals. This problem is often known as "sleeping sickness", but more precisely as dld or "drive level dependence" since it occurs only when drive levels are low.

As part of a very interesting package of information on the manufacture and use of quartz crystals, W. S. ("Bill") Metcalfe, G8XLE, managing director of Cathodeon Crystals Ltd, explained that, like crystal ageing ("hysteresis"), dld is related to contamination of the quartz plate at atomic levels. A single monolayer of contamination can be equated to a frequency change of 0·3ppm. Thus an ageing of only 0·5ppm per year, achieved in glass-encapsulated crystals such as those supplied by Cathodeon for UOSAT and for professional satellite navigational equipment, implies a differential change of contamination of only 0·2 monolayers per year.

While this may seem rather like blinding us with science, it does have a practical consequence. The extremely high standard of cleanliness involved during the manufacture of these crystals calls for such techniques as liquid helium cryogenic pumping for the vacuum plating systems, turbo-molecular pumps for vacuum baking, and rf induction (under vacuum) for crystal encapsulation. All a far cry from the days when one did a spot of crystal grinding with a flat piece of glass and some toothpaste!

But apart from reducing the ageing rate, such ultra-clean processing, associated with ultra-violet and plasma cleaning, has also been found to eliminate sleeping sickness. G8XLE draws attention to the fact that Dave Gordon-Smith, G3UUR, in his doctorate thesis, demonstrated clearly that sleeping sickness or dld is associated with residual oil contamination on the surface of crystals, usually from an oil-based vacuum diffusion pump. An emotive analogue has been applied to dld involving such terms as "corrugated iron roofs", "lead tennis balls" and "treacle", though I am not sure if any of these are used for waking up dozy crystals.

G8XLE also issues a plea (one that I have heard before from crystal manufacturers) that customers, whether amateur or professional, should show more understanding of the load capacitance problem when specifying the crystal characteristics they require. Over-specification by customers leads in the end to everyone having to pay more than would otherwise be the case for good-quality crystals. As an example, G8XLE relates the following typical situation:

"A 'standard' 10MHz crystal has a pulling sensitivity of typically 18ppm/pF at a load capacitance of around 20pF. Thus a 0·5pF 'error' in the load capacitance seen by the crystal results in a 9ppm (90Hz) error of frequency. The customer typically demands a test tolerance of ±10ppm. Genuinely we then do not sell crystals which violate this figure and simply scrap them. In reality the customer would be satisfied with a tolerance of, say, ±25ppm, but he specifies ±10ppm to cope with the ±1pF tolerance of his circuit. In other words the circuit designer will often try to pass on his design problems to the crystal manufacturer!"

G8XLE raises the question of over-specification also on crystals required for vxo or vcxo applications: "I can only speculate as to why people who buy crystals for these applications demand a good frequency/temperature performance and also close calibration tolerances". He points out that "axiomatically, AT-cut crystals manufactured for very wide operating temperature ranges (eg −55 to +105° C for military purposes) have an awful performance over the actual operating temperatures likely to be encountered by amateurs in practice. 'Worst case tolerancing' may be fine for resistors, capacitors, semi-conductors etc but it guarantees an indifferent performance for frequency control crystals". Finally, G8XLE points out that not all cheap crystals are bad crystals. He says: "Crystals produced in very large quantities for tv and similar requirements can be produced in huge quantities on excellent equipment to good, consistent specifications. On the other hand they can be awful. I have just returned from a tour of South-East Asia: while I have seen some excellent crystal manufacturing facilities, I have also seen some which would disgrace the one-time reputation of Lisle Street. All I can say is *caveat emptor*". □

4-2-70

*by Ken Willis, G8VR**

APART FROM A SMALL tropo opening on both 2m and 70cm over the weekend of 10-13 February, plus some auroral activity which penetrated into the south of the country, conditions have been really quite flat. However, summer is not far off, and soon we shall be watching for some of the spectacular Es openings which cause such excitement on 2m, a band which is becoming very overcrowded. Flat conditions or not, my postbag has not become any less heavy, so my only problem is in trying to include all the fascinating information which you send me, month after month, and which is greatly appreciated.

IARU Sicily conference

The International Amateur Radio Union, the administrative body which governs the conduct of amateur radio throughout the world, is holding a conference of its Region 1 member-countries in Sicily this month. Delegates from most of the Region 1 national societies will attend to discuss wide-ranging aspects of our hobby, and the RSGB will be sending representatives to speak for the UK on matters affecting almost every facet of amateur radio, among them the vhf manager and the chairman of the VHF Committee. Many of the UK papers submitted are devoted to vhf and related topics. The UK has traditionally been among the leaders in establishing and maintaining vhf policies and operating procedures, so it is good to see the high level of participation maintained.

The meeting is conducted mainly through committees, but the ability to meet overseas representatives informally is another valuable feature of these meetings. As mentioned elsewhere in this feature, the QTH locator scheme, which was raised at the last IARU Region 1 conference in Brighton in 1981, is on the agenda, and this time it is likely to result in a decision, one way or the other.

The IARU, with assistance from RSGB headquarters staff, has produced a booklet aimed at the newcomer to amateur radio entitled *Operating Advice for Licensed Radio Amateurs*. The RSGB is planning a UK version for distribution later this year.

QTH locators

Correspondence indicates that some readers are confused by the proposed new QTH locator scheme ("Maidenhead") which is under consideration as a replacement for the current "squares" system. It was described in *Rad Com* November 1980 by its originator, John Morris, G4ANB, but for those whose back-numbers do not extend so far, a more recent and equally-comprehensive article appeared in *Short Wave Magazine* January 1984, written by Norman Fitch, G3FPK.

With the present system, if you say "I have worked ET square", most European operators will know what you mean, although there are two ET squares on European maps, one north, the other south. If one attempts to divide the whole surface of the earth into similar squares, ET and every other square notation will be repeated several times, since there are only 26 letters in the alphabet. The Maidenhead system was conceived to provide a unique QTH identification worldwide, so it would be of interest to hf as well as vhf operators. It makes use of "fields", each containing no less than 100 "squares" of the current size. Since it is the field which is identified by a two-letter pair, this is where the confusion has arisen. Some examples of Maidenhead locators are shown in the list of beacons, where they appear alongside their current identification. The Belgian beacon ON4VHF is shown as being located in JO20FP (current CK square). Also in JO field is SP2VHC (JO94BI), a Polish beacon which is clearly very distant from ON4VHF. It is the pair of numbers following the two letters which is significant, while the final pair of letters provides even finer details of location.

If the Maidenhead system is recommended for adoption by delegates at the April IARU Region 1 meeting, then in future, instead of saying "I have worked ET square", the correct statement would be "I have worked square 49 in field JO", a somewhat larger mouthful!

As would be expected in any changeover of this sort, there would inevitably be a period during which both systems were used to a greater or lesser extent. No awards will be invalidated by the introduction of any new system such as Maidenhead, provided that there is no duplication in the claim (that is, don't claim AY07j *and* JM08PW as separate "squares", because they are one and the same location!). It will still be *squares* to be chased if the new system is adopted, not *fields*, so apart from a change in nomenclature, everything else remains the same, except that the eme operators who work over much greater distances will be able to use the system without ambiguity.

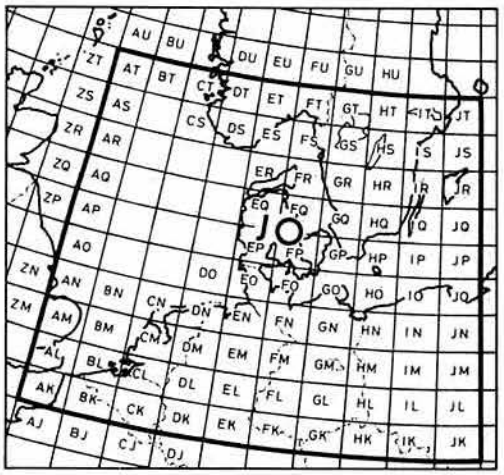


Fig 1. The JO field of the Maidenhead system

No doubt programs for typical micros which would translate locations using the present system into the new terminology would soon follow (some exist already for Maidenhead). Meanwhile, if you do not feel competent to work out your own location as described in the two magazine articles, there will be a chance at the RSGB National Convention in Birmingham on 28/29 April to have it computed for you if you can supply the six-digit national grid reference of your QTH.

American vhf operators are now using the Maidenhead system. Awards similar to those available from RSGB are open to European and indeed all amateurs who can provide proof of having worked the required number of squares.

Repeater news

February was an important month for repeater enthusiasts, for the DTI cleared several new repeaters for operation, details of which are given in the "Amateur Radio News" section. It will be a source of satisfaction to Scottish operators to know that all of their outstanding vhf repeater applications have now been cleared for operation.

One of the first repeaters to get off to a flying start following the new approvals was GB3OC, operated by the Orkney-Caithness Repeater Group. The first contact through this system was made by GM6WPA/P (Anne) and GM4LNN (Kim) at 1600gmt on 17 February. This repeater is located on Wideford Hill, near Kirkwall, and its existence is due to co-operation between two groups of radio amateurs, separated by what Bill Wright, GM3IBU, chairman of the group, describes as "the worst piece of sea in the UK". He also wishes to acknowledge the help of Jaycee Electronics and Heller Electronics, and the many amateurs and professionals who gave their time and substance to the project, "whose names may be forgotten by the passage of time but whose contributions certainly will not".

Hot on the heels of GB3OC was GB3PA (Paisley) which became operational on 18 February at noon from a hill-top site south of Paisley. Tom Wylie, GM4FDM, QTHR, would welcome reception reports for this installation, which can, if preferred, be telephoned after 5pm to 0505 22749. One can now appreciate the impatience of the Scottish groups, since they were clearly ready to go once authorization was received, and we look forward to hearing more of their activities in future.

From Chris Young, G4CCC, vice-chairman of the Repeater Management Group, comes some information on the Berkshire Downs Repeater Group of which he is a member. The group was formed in 1976 with the

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

immediate aim of establishing a 70cm repeater (GB3BK) to serve the Reading area. Subsequently a 2m repeater GB3RD appeared also, with GB3RU on 1·3GHz planned for the future. All repeater sites are at the village of Upper Basildon some 11km WNW of Reading at 435ft asl.

GB3SK (RB11) first became operational on RB6 on 18 October 1977, but changed channel in August 1980 due to co-channel interference with the London repeater GB3LW. During the past six years the repeater has been off the air for only 12 days. It uses two four-dipole stacks arranged so as to provide a gain of about 9dB to the east. One antenna is used for transmit and the other for receive, separated by 100m horizontally. The coverage of the repeater for a mobile with 5W to a 5dB gain antenna is Dorchester (Oxon) to the north, Farnham to the south, junction 13 on the M4 to the west, and junction 3 (M4) to the east. Since the system is operating satisfactorily, no major changes are planned for the future.

GB3RD on 2m (R3) started up in March 1983 after prolonged negotiations with the RWG. It has run low power since that time. The initial antenna (colinear) was unsatisfactory due to its angle of radiation, and was replaced in November 1983 by a pair of folded dipoles each with unity gain. Future plans are to use the higher dipole for receive and the lower one for transmit. The vertical spacing should give good isolation. However, at present only the upper dipole is being used, giving an erp of only 1·5W. An erp of 20W is envisaged for the future, which should give at least 10dB improvement. Original tests from the site using 25W erp showed a coverage much the same as that experienced with GB3BK, but out to the west as far as Membury on the A4, plus the filling of some "holes" such as Henley, Marlow and possibly Newbury. Chris is anxious to state that in saying "holes" he speaks in a radio-frequency sense and in no way denigrates either the architecture or local beauty of the towns mentioned!

Expedition information

A sure sign that summer is coming was provided by a note from David Johnson, G4DHF (Bourne, Lincs), giving advance details of an expedition planned for 25 July to 4 August inclusive by the "Five Bells Contest Group". The group, consisting of G4ODA, G4DHF, G8NWM, G8JNV, plus various members of their families, are arranging a trip to XS square where they will operate GM4DHF/P on 2m and GM4SIV/P on 70cm, using high-power and multiple-antenna arrays. Frequencies proposed are 144·215/432·215MHz for tropo ssb, and 144·028MHz for cw ms.

No schedules will be arranged prior to departure, since priority will be given to tropo, aurora and Es according to daily conditions. Meteor scatter skeds will be arranged daily on the vhf net (14,340kHz) or, especially during the evening, on the proposed new 80m net. GM4ODA/P will be the vhf net station. With 400W to 4 × 9 elements on 2m, and 300W to 4 × 21 elements on 70cm, they should put out a good signal and be much in demand. David does not say if the "Five Bells" title is borrowed from a local hostelry where plans are formulated over a soothing draught or two, but it seems a good idea. Why not get your "local" to sponsor an expedition to a rare country or square this year?

Beacons

The callsign of the 50MHz beacon to be established at RSGB headquarters will be GB3NHQ. Some concern has been expressed by local tv dx groups who keep watch on or near Band 1 frequencies, and it is to be hoped that they will suffer no real problems from the proximity of this proposed 24h/day transmission. As mentioned previously in *4-2-70*, having a beacon too close to one's own location can be a disadvantage. At G8VR the strength of nearby GB3VHF is sufficient to make adjacent beacon frequencies useless for monitoring very-weak signals despite a state-of-the-art front-end.

The 4m beacon at GB3ANG was in the workshop for modification when news was last received. It may be necessary to reduce its power to minimize problems associated with the tv transmitter which provides the mast on which the 4m antenna is mounted. The 2m and 70cm beacons at GB3ANG are still operating, and the 70cm unit has not yet had its frequency changed to reduce repeater interference, though the proposed change is so small that many operators will not notice much difference when it finally takes place.

Claus Neie, DL7QY (Rudolfsberg) who is editor of *DUBUS*, has sent a very comprehensive list of European vhf/uhf and shf beacons corrected at 15 January 1984. It is always difficult to know whether a particular beacon is still active, especially if it has not been audible for some time, so this list is of great interest. (The RSGB is of course mounting its own programme to keep in touch with beacon status throughout the world.) The *DUBUS* list covers bands 50MHz to 10GHz, and in the next few issues, *4-2-70* will publish details of some of the beacons most likely to be within range of the UK during good or exceptional tropo or Es conditions. One other interesting feature of the *DUBUS* listing is that it gives both the current "square" location of beacons as well as the proposed new "Maidenhead" or grid system (see "QTH locators"). This month's selection, courtesy of DL7QY, lists beacons which might be heard in the UK this summer season.

Callsign	QRG (MHz)	Maidenhead QTH	Current squares QTH	Power (W)
DL0PR	144·910	JO44JH	EO54c	150
DB0JT	144·927	JN67JT	GH14c	30 erp
EA3XS	144·152	JN11DP	BB22e	20/250
EA1VHF	144·867	IN53UG	VD59e	25
EA3VHF	144·892	JN11MR	BB26h	1
EA6VHF	144·918	JM8PW	AY07j	25
FX0THF	144·895	JN08ML	AI46h	30
FX3THF	144·905	IN88GS	YI13d	30
FX8THF	144·955	JN05TC	AF79h	20
HB9HB	144·865	JN37NE	DH66c	10
IS0A	144·810	JN40SX	EA08a	25 erp
IT9G	144·840	JM68QE	GY67c	35 erp
LA1VHF	144·860	JO49FS	ET13e	25
OK0EB	144·963	JN78DU	HI12a	1
OK0ET	144·992	KN08SU	KI18a	1
ON4VHF	144·985	JO20FP	CK23e	2·5
OZ7IGY	144·930	JO55VO	FP39b	50 erp
SK4MPI	144·960	JP70NJ	HU46d	100
SP2VHC	144·980	JO94BI	JO51b	28
Y41B	144·985	JO53RP	FN28f	10
DB0AC	432·015	JN39KH	DJ55j	15
DF0AAD	432·990	JO54IF	FO64a	10 erp
FX1UHF	432·830	JN18BR	BI21b	10
FX4UHF	432·870	IN93EH	ZD52c	10
FX3UHF	432·950	IN97EF	ZH62b	10
I0B	432·825	JN61ES	GB12d	40 erp
I2N	432·865	JN45JU	EF14b	50 erp
LA1UHF	432·860	JO59JW	FT05g	12
LA3UHF	432·880	JO48BC	ES71a	50 erp
OK0EA	432·935	JO70SS	HK18d	12
OZ2UHF	432·865	JO46JD	EQ64d	10 erp
OZ7IGY	432·930	JO55VO	FP39b	50 erp
PA0DSW	432·895	JO22JM	CM35f	0·5
PA0QHN	432·903	JO22FH	CM53j	1
SK6UHF	432·925	JO67BF	GR61a	10 erp

Not all of these beacons radiate favourably towards the UK, but under Es conditions several of the more distant 2m beacons could well surface. The 2m beacons may also produce ms pings when conditions are right.

Aurora

The last event recorded in *4-2-70* was the one which occurred on 10 January. Iain McHardy, GM3JFG (XR) is well placed to catch auroras, but he says things have been fairly quiet up north. Nevertheless, he found auroras in progress on 16, 25 and 28 January which were relatively short-lived in late-afternoon sessions. Iain's letter was dated 3 February, and on that very day things started up again, and in a much bigger way.

Nick Peckett, G4KUX, from his new high-up location and 4 × 19-element antenna system, noted an aurora on 3 February around 2330 gmt. It persisted into the small hours, and then on the next day came back in full force for several hours between afternoon and the early hours of 5 February. It was a major event, and Nick worked, in all, 30 stations in prefixes GM (Shetland), OY, SM, OH, LA, UK2, UR2 and DL. He also had a contact with a Swedish station in IX square, the furthest north that Nick has worked via the Au mode.

In the same event, G3NSM (Oxford), worked UR2, UP2 and UQ2 with 56A reports both ways. Bob uses a very large 80-element colinear array, so it is evident that under present conditions these big antenna systems really come into their own for those lucky enough to have the real-estate to erect them. Down in Kent, G3POI has an even larger system, and during auroras can often be heard calling into USSR and working stations there which are quite inaudible on a 16-element Tonna into a quite adequate front-end.

Stuart Mather, GM4OGM (YP05h), is a flat dweller who cannot aspire at the moment to more than a 16-element Tonna. He was active in the 4 February event, and heard stations in F, LA, SM, PA, OZ, OH, OY, EI, DL, UR2 and G, and worked quite a few of them, using only 25W.

The next reported event was on 10 February when between 1845 and 1941gmt, G4KUX worked SM, Y22, OH, UR2 and LA, while in the same period GM4OGM was working into OH, EI, SM and GW.

There was a further event reported by GM4OGM on 12 February during which he worked some locals and heard LA7KK (FU).

A question often asked is "How can I forecast the likelihood of an aurora occurring?". RSGB weekly newscasts give solar data and suggest dates when the sun may be unusually active. These, coupled with the use of 27-day charts, provide a guide to the most likely days when auroras could occur. Several of the "big guns" on vhf monitor broadcast transmissions on frequencies lower than 144MHz, especially those around 50MHz, since auroras tend to start earlier on these lower frequencies, and often are the prelude to an opening later on 2m. Band 1 tv transmitters situated to the north of one's station and which are normally inaudible are favourite sources of signal to monitor. When an aurora starts, a growling tone may be heard as the signal reaches the southern point via the auroral curtain. The Meldrum sound transmitter on 58·215MHz is a favoured signal used by G3LTF and G3NSM, and no doubt many others.

For those with access to back numbers, *Rad Com* March 1977 contains an article by Peter Blair, G3LTF, which not only describes techniques for

auroral detection and forecasting but also includes details of a receiving converter for one of the tv stations. Unfortunately UK Band 1 transmitters are being phased out during 1984. What we need is a 50MHz auroral warning beacon, situated as far north as possible with a beam pointing north or northeast. The locals would not need it—they are near enough to the action to catch those events too weak to penetrate to the southern part of the UK.

Down in Devon, G3BPV, who listens to the 50MHz permit operators, also hears, on the same equipment, Kirk O'Shotts tv on 53·250MHz (sound) and other stations. During the event of 10 February he was hearing it via aurora. (He also gets ms bursts from this and beacon GB3SIX while monitoring.) As mentioned many times previously here, 70MHz is often open to aurora when the event is not strong enough to produce much on 2m.

Meteor scatter

By the time this appears in print the sporadic meteor rate should be on the increase, but during the "flat" months of January and February, ms enthusiasts continued to make good dx contacts through this mode, and it is clear that more and more amateurs are coming to regard ms working as a normal part of their repertoire.

Paul Turner, G4IJE, continues his weekly skeds with I3LGP, and they are almost routine in that they are completed in short time. Both stations have much ms experience, and the value of this is demonstrated by the recent work of Gerald Peck, G4OIG (Northampton), who was of the opinion that his low power (QQVO6/40A linear and nine-element Tonna) was not adequate for sporadic meteor contacts during flat conditions. After being bludgeoned by *4-2-70* to try, he set up a sked with LA6QBA (FT) and worked him with a 27 report, and even though the copy was not dramatic, it was enough to complete. Gerald says that six months ago he could not have done it, but with experience gained from the Geminids and Quadrantids, he succeeded against all the odds. Incidentally, G4OIG comments that the slow-morse transmissions on Mondays from GI3SXG, and on Tuesdays and Fridays from G3AWL on frequencies 144·100 and 144·110MHz cause interference on the random ms cw channel. This is the old story of a very crammed spectrum, of course. Meteor scatter operators are in the minority (at present!), just as those who habitually listen for weak beacon signals tend to be overwhelmed by fm stations who think the channels are clear because their low-gain, vertically-polarized antennas do not produce any signals from remote beacons. Perhaps we could make a plea for slow morse and indeed any other users to avoid the random ms channels, both cw and ssb, at least when major showers occur.

Roger Thomas, G6JBN (Staffs), has heard plenty of good ms reflections but so far has not managed a complete contact. He too comments on the need to gain experience, and once he has "broken his duck", I am sure he will find things come much easier.

Dave, G3BPV (Devon), has been listening to much meteor scatter from tv stations around 50MHz, and also from GB3SIX.

GM4OGM (YP) is another newcomer to the ms mode and is operating from a flat with a nine-element Tonna.

During January, which is reckoned to be very poor for sporadic meteor activity, G4DHF (Lincs) had several complete ms contacts, and received one burst of 35s, and many of 3s duration. Using cw and 600–1,000 lpm, you can copy a lot of information in 3s, while with a 35s burst the repetition of callsigns and report can be positively boring!

Paul Whatton, G4DCV, a member of the British Meteor Society, is interested in collecting from amateurs any information related to their ms activities. In its simplest form this need only be a record of how many reflections are noted on a signal during a listening period in a sked. A standard reporting sheet has been prepared, and supplies are available from: British Meteor Society, 26 Adrian Street, Dover, Kent CT17 9AT. Ask for the "Amateur Radio Reporting Sheet". The BMS also publishes *The Radiant Catalogue*, which is a comprehensive list of all meteor activity. It costs £1.50 post free.

The following minor showers occur in April/May: 22 April Lyrids (12), 5 May Eta Aquarids (25), 7 May Piscids (30), 12 May Nu Piscids (20). Figures in brackets are the "hourly rates" of meteors (the ZHR). Not all these minor showers may be peaking in elevations suitable for the UK, but they represent times when there ought to be meteor activity higher than sporadic.

Some vhf history

With the current interest in 50MHz operation, it might be a good time to look back on what was happening on that band more than 35 years ago. After the war UK amateurs were authorized to operate on 58·5 to 60MHz, this band exhibiting much the same limitations as the current 70MHz band, since few other amateurs were allowed to use it, thus reducing the potential for dx working.

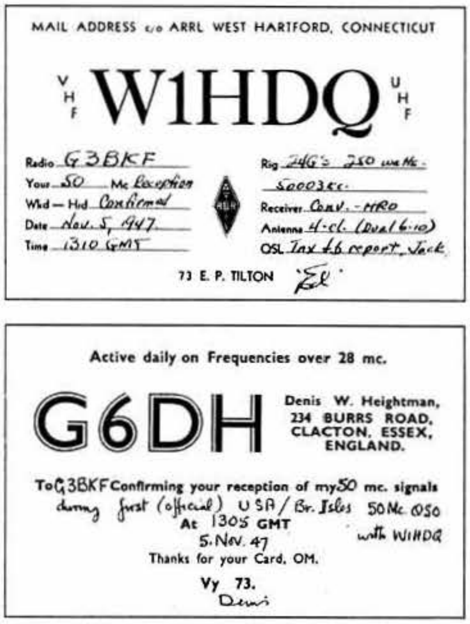


Fig 2. Cards confirming listener report of first UK—USA transatlantic crossing on 50MHz, 5 November 1947

At the peak of the sunspot cycle in 1946–7, Denis Heightman, G6DH (Essex), heard W1HDQ (Connecticut) on 50MHz (24 November 1946) and worked him crossband via 28MHz. The muf was not high enough for Denis to reply on 58MHz at that time, which was the first time that the Atlantic had been bridged on 50MHz. By the following year, G6DH had been granted special facilities to use 50MHz, and on 5 November 1947 he and W1HDQ completed the first UK-USA 50MHz two-way transatlantic contact.

In those days Jack Ivison, G3BKF (Loughborough), had just obtained his licence and was working as an engineer in the Marconi Research Laboratories, Great Baddow, Essex. One of his colleagues in the labs had just completed the development of a vhf receiver covering 50MHz, and had connected it to an antenna, whereupon some signals were heard which G3BKF immediately identified as G6DH and W1HDQ making their memorable contact.

Reports were sent to both stations, and the cards illustrated in Fig 2 were received as a result; a very nice memento of an historic occasion. The transmitter used by W1HDQ can still be seen in the museum of the ARRL in Newington, Connecticut, and it is a fine example of the simple homebrew vhf equipment of the day. It was crystal-controlled and used amplitude modulation, the "final" being a pair of HK24G triodes—some of which used to brighten the shack of G8VR on a winter's night, as their anodes glowed cherry-red under the onslaught of currents never contemplated by their designer!

News from here and there

For a really rare but relatively local square, Manus McClafferty, EI7EQ, offers his own, which is VP70d. He will soon be QRV on ssb from that location, with 100W to a 10XY antenna, especially during contests. He says he is the only ssb operator in the square but there are one or two others using fm. There isn't a great deal of land in VP, so Manus' comment that "maybe *even* some Gs would like to work it" could be the understatement of the year! He is QTHR.

DUBUS subscriptions are now due for 1984. In future, copies will be mailed direct from Germany, but Bob McHenry, G3NSM, QTHR, is still acting as agent and would like to receive subscriptions from those who wish to receive copies for the current year.

G3UFS (W Sussex) says he has a poor location "looking into 400ft of chalk to the north with an antenna height of only 28ft asl". He is, however, in ZK square, which ought to interest a lot of people since he works 4m. On that band he has contacted 230 different stations in six countries using homebrew 80W and a four-element Yagi. His best time is Sunday mornings, so anyone wanting West Sussex or ZK square, please contact him QTHR.

G8VR now has the SM6EOC list of active vhf stations (2m) in most of the squares which can be reached from the UK under all but eme modes. It is much too long to print here; any station wishing to have callsigns of stations active in any square, please send an sae to G8VR who will forward the required information from the list. □

Microwaves

*by Mike Dixon, G3PFR**

INTRODUCING OUR NEW CONTRIBUTOR

Licensed for nearly 23 years and a member of RSGB for the same period, Mike describes himself as an "amateur amateur" since his profession has no connection with electronics or radio. His knowledge is, he says, totally a result of self-training, experimentation and home-construction. With the decline in these aspects of amateur radio at hf and vhf, he has turned his efforts (over the last eight years) to microwaves where, he says: "The field is still wide open, exciting and very stimulating, and has led me to the acquisition of skills never before contemplated". He has a special interest in introducing newcomers to microwaves and believes that co-operation at local club and group level will be a great stimulus to future developments in this field.

Introduction

In opening I can do little better than echo G3WDG's words of February 1978, and say that it is with mixed feelings that the old author of a well established column relinquishes his duties, and with equally mixed feelings that the new writer takes over. Both my predecessors (Dain Evans, G3RPE, 1970–8 and Charles Suckling, G3WDG, 1978–84) have put much effective effort into the promotion of microwave interests and development. It is my earnest hope that, with your help, I can continue to provide a column which is topical, instructive and informative—please keep your information and contributions coming! Finally, all our thanks are due to Charlie for his sterling efforts over the past six years.

Beacons on 2·3GHz

Reviewing the past year's *Microwaves,* it should be apparent that there is strong growth in 2·3GHz band activity. Not only is eme activity increasing, but many of the "tropo dx" results on this band (and on 3·4GHz) are really quite exciting, and it is believed that with increasing use of these "intermediate" bands a few surprises are still in store. For instance, there is gathering evidence that tropo openings (as distinct from the ever-present forward scatter, which demands first-class equipment, high antenna gain and appreciable power) which are usable by the modestly-equipped station may occur much more frequently than at vhf or uhf. By the same token, these openings may also be shorter-lived and less widespread than the openings which occasionally cause such chaos on 144MHz.

The frequent occurrence of "anaprop" (anomalous propagation) at X-band and other radar frequencies, even in the disturbed atmosphere of the South Atlantic winter was noted last year during a brief visit which I made to the Falkland Islands. It is reasonable to assume that such conditions will occur with similar frequency at 54°N as at 53°S.

One of the most effective ways of detecting the presence of "lifts" is to regularly monitor microwave beacons. The UK and nearer Europe are quite well provided with 1·3GHz beacons and repeater/beacons and, while there are some seven 2·3GHz beacons in Germany (for instance), there are only two operative in the UK, *viz* GB3AND and GB3LES.

Thus proposals to establish 2·3GHz beacons would be welcomed by the Microwave Committee, and I or the Microwave Committee chairman/microwave beacon co-ordinator (G4FSG, QTHR) would be pleased to receive letters of intent or formal proposals for such beacons. A *Guide to beacon licensing* which is essential reading for anyone contemplating beacon construction is available from RSGB headquarters.

Many of the difficulties in building, licensing and installing a beacon could be overcome by co-siting with existing beacons or repeaters, since site clearance, maintenance and switch-off procedures will already exist, at least in principle. It occurs to me that building a microwave beacon could be a good way for a repeater group to "wet its feet" in microwave techniques and to construct hardware which might later become part of a more ambitious (repeater) project, for it has been long-established policy that an unaccessed microwave repeater shall function as a beacon.

Microwave beacons tend to be "neighbourhood" devices, but this is strongly site-dependent and frequency/mode dependent: even under flat-band conditions the coverage could be several hundred square kilometres, providing much-needed signals for alignment. Under lift conditions the wider coverage will provide valuable propagation indications.

2·3GHz eme tests

DF0EME will be operative for further eme tests and skeds on the following dates, all times gmt: 7 April, 1900–2300; 5 May, 1800–2130; 2 June, 1700–2030; 30 June, 1600–1930; 29 July, 1600–1930; and 25 August, 1200–1700. The frequencies in use will be 2,320·150 (±) and 2,304·05 (±)MHz, the latter for contacts into the USA.

Stations known to be QRV are DF0EME, LX1DB and OE9XXI, and those hoping to be QRV later in the series of tests include G3WDG/G4KGC, OK1KIR, WB5LUA, WA4HGN and PA0SSB. Some 10 further stations have expressed an interest in these tests, which will take the form of 30min test transmissions from DF0EME, followed by skeds.

Microwave nets and activity groups

Two or three years ago there were a number of regular weekly microwave nets (on 144MHz) in existence. These were useful in that they were forums for discussion of ideas and problems peculiar to a semi-local group of like-minded souls. An important ingredient of amateur radio is communication and an interchange of ideas. This communication can be carried out at the local club, on the air, or by the more formal means of the written word. In my locality an attempt to improve communication on microwave matters is being made via the formation of a microwave activity group which will run a net if there is a demand. It is the group's intention to hold "teach-in" sessions for beginners, arrange constructional projects and generally "stir-up" interest in the use and technique of microwave frequencies. If a reader thinks that these suggestions are worthwhile, why not consider forming a group?

I would be pleased to hear of any efforts made along these lines so that other groups may be made aware of what might be going on, maybe in the next club, town or county. After all, we must start somewhere, and it is often very difficult for the beginner to know where to turn for advice or help or even encouragement! Simple, reliable and easy-to-construct designs are always needed and, again, I would be pleased to receive such information.

VHF Communications

Readers are reminded that the subscriptions and distribution for this publication are now being handled directly by the publishers in Germany. The 1984 subscription rate is DM22, and the address is Verlag UKW-Berichte, Terry D. Bittan, Jahnstrasse 14.D-8523, Baiersdorf, W Germany. The 4/83 issue, incidentally, is something of a "bumper" microwave issue with articles on 1·3, 2·3 and 5·7GHz equipment, converters, transverters and preamps.

Round table

The next round table will be held at Sheffield University, Department of Electrical Engineering, Mappin Street, on Saturday 2 June. Further details will be given next month, or can be obtained from Dr Barry Chambers, G8AGN, at the above address. It is hoped that a comprehensive range of test and calibration equipment will be available, together with the usual informal interchange of ideas and discussion of problems.

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

Component supplies

The ever-vexed question of obtaining specialist microwave components and materials has been partly solved (as mentioned last month) by the Microwave Committee's stock of certain selected components. Further additions to the stock will be announced in coming issues of both the *Microwave Newsletter* and *Microwaves*. Meanwhile Steve Davies, G4KNZ, has assembled a very useful list of component and module suppliers which was published in 01/84 (January) issue of the *Microwave Newsletter*. Like the microwave directory, also published in the newsletter, it is hoped that this list will be expanded over the coming months as more information comes to hand. The success of this venture will depend on information received from you, the reader.

1984 Microwave Cumulatives

Rules for these contests are published in "Contest News" in this issue. The dates for your diary are:

13 May, 10GHz plus 2·3GHz; 17 June, 10GHz plus 3·4GHz; 15 July, 10GHz plus 5·7GHz; 12 August, 10GHz only; and 16 September, 10GHz only.

Apart from differences in their frequency and duration, the main difference this year is to "push" 24GHz activity by nominating two *exclusively* 24GHz periods to be held on 1 July and 26 August. It is hoped that good support for all these events in 1984 will be forthcoming from both operators and the wx! □

EPHEMERIS

Satellite news and views

*by R. O. Phillips, G4IQQ**

Uosat-B

The major news this month revolves around the success or otherwise of the launch of the second satellite from the University of Surrey—Uosat B. As this column is being put together about one week before the planned launch date of 1 March 1984, it is not possible to say how the launch went —hopefully you will find an item of late news at the foot of this column for that information. For the record the spacecraft will continue to be known as Uosat-B until it is launched, when it will change its name to Uosat 2/Oscar 11.

The final pre-launch data indicated that all had progressed very well in the construction and testing of the spacecraft, as well as the integration with the other payload and the launcher itself. The frequencies to be used by the spacecraft will be identical to those on the first model:

General data beacon/digitalker	145·825MHz
Engineering data beacon	435·025MHz
Beacon experiment	2401·5MHz

The projected orbital parameters for the spacecraft were somewhat different to those of the first, with an increased altitude of around 690km and a corresponding period of 98·6min. The team at Surrey has indicated that a period of about one month will be required to carry out in-orbit testing of the satellite, so, all being well, it should be available shortly after you read this report.

Uosat-1

As indicated above, with the imminent launch of a second satellite in the Uosat series it has been necessary to rename the first one in orbit Uosat 1. In fact the health of this satellite continues to be very good, though it was out of action for a few weeks in February, no doubt due to other pressing matters concerning its successor.

RS

As predicted last month the four satellites RS5, RS6, RS7 and RS8 came back into operation around the end of January, and have been carrying considerable traffic throughout the month of February. It is very easy to forget how sensitive these birds are! My own experience, which is typical of many, indicates that only 5–10W of rf into a six-element Yagi is all that is required. The simplest method of tracking these satellites remains the use of the Oscarlator, in spite of the growth in the use of computers. Reference orbits for the series of satellites are given below for 1 April 1984, as well as the period and longitude increment per orbit. To work out appropriate values for subsequent orbits, simply add these two values to the reference data for each orbit.

	RS5	RS6	RS7	RS8	
EQX gmt	01:52	01:46	01:14	01:08	} ref values
Deg W	34	40	28	23	} 1/4/84
Orbit No	10065	10136	10095	10047	
Period (min)	110·55	118·717	119·196	119·765	
Increment (deg)	30	29.8	29.9	30	

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

Oscar 10

Activity on this satellite continues at a high level in spite of the rather unsociable hours of operation that were available during February, and the increasing elevation angles for the majority of the orbit. AMSAT is organizing an international amateur radio satellite competition to commemorate the 25th anniversary of the date in April 1959 when Don Stoner, W6TNS, issued a challenge that if a launcher were made available there was nothing to stop an amateur repeater in space. The competition will run for three months from 0000h on 15 April, and it is open to three categories of entry: AMSAT members, non-AMSAT members, and swls. The points scoring system will be complex and is intended to reward the lower-power stations with good downlink performance to minimize the likelihood of de-sense of the satellite receiver. If both stations use an eirp of 200W or less, the points scored would be five points; with only one station below 200W, three points; and with both stations above 200W, one point. Values of eirp greater than 800W are not permitted. This point score is doubled if the contact is with an AMSAT member. An additional multiplier to the total points scored is applied depending on the number of grid squares worked. The grid system to be used is the so-called Maidenhead system which was described in *Rad Com* November 1980.

A number of queries have been raised recently concerning the best method of netting onto an ssb station that is calling "CQ" via one of the satellites. The first step is to calculate the expected uplink frequency based on the nominal translation frequency, and then to apply a correction for doppler shift according to whether or not the satellite is approaching. These two can be checked periodically through the orbit by making a short test transmission. The last phase is the most critical one and is really where the problem lies. One technique used is to apply a low-level audio tone to the transmitter input and adjust the transmit frequency until the downlink produces an audio output of the same frequency. Alternatively the transmitter may be set for cw operation and the transmit frequency again adjusted, though in this case a very low audio tone should be aimed for. Even having done this it may be necessary to make a final adjustment during the first part of the transmission.

Other news

The annual general meeting of AMSAT-UK will be held at London House, Doughty Street, London WC1 at 1300 on 12 May 1984. All existing or prospective members of the organization are welcome to attend. The agm is usually a very lively affair and provides an opportunity to catch up with the latest available satellite information.

Late news

A near-perfect launch of Uosat 2 took place at 1759gmt on 1 March 1984. Shortly after separation from the launch vehicle, the command station at the University of Surrey switched-on the 145·825MHz telemetry beacon. All appeared in order on the first three orbits, but when the satellite came back into range on 2 March, the beacon was not operating.

A combination of software and hardware problems was suspected, but hopes were high for a quick solution. □

QRP

*by Rev George Dobbs, G3RJV**

A hitch-hiker's guide to radio

Far out in the uncharted backwaters of the unfashionable end of the western spiral arm of the galaxy lies a small unregarded yellow sun. Orbiting this at a distance of roughly 98 million miles is an utterly insignificant blue green planet whose ape-descended life forms are so amazingly primitive that they still think that digital readout is a pretty neat idea . . . . .

I unashamedly plagiarize Douglas Adam's language to introduce what is a common complaint against QRP operators, don't they merely hitch a ride on other people's expensive QRO stations to make contacts? Certainly QRP operators have been grateful for the assistance given by good operators with powerful stations in gaining dx contacts. Many well-known dx operators have been most helpful, and even amazed, during QSOs with low power stations using simple equipment. It might be seen as hitching a ride on someone else's credit card, but amateur radio is a hobby and we are only in it for fun, so we expect to meet and enjoy the contact with operators of every kind of station.

My general experience is that QRP operators have the respect of many QRO and dx operators. There are some QRO operators with the heavy boot "I don't work anyone who isn't S9" outlook, but who is the problem? Many of us have a conviction that if all amateur radio stations, world wide, were restricted to lower power, say 10W, the bands would be much cleaner and we would all still work roughly the same stations as we work at present. The fact that most easily dispels the view that QRP operators are just hitch-hikers is their eagerness to work their fellow QRP operators.

Many QRP nets and activity periods are organized every year, the main UK weekly activity periods for two-way QRP working are on Sundays from 1100 to 1230gmt and 1400 to 1530gmt, on the international QRP frequencies, and on Wednesdays on 3,560kHz from 8pm. Two-way QRP QSOs can often be had on 7,030kHz on weekday lunchtimes from around noon. The G-QRP Club organizes a series of activity periods each year to meet other QRP operators on specified bands at set times. Most of these events are on cw but this spring an ssb activity weekend is planned.

G-QRP Club Spring SSB Activity Weekend

5, 6 May 1984. This is not a scoring contest, just call "CQ QRP" and enjoy the contacts. The accepted power limit is 10W p.e.p. Times and frequencies are: 0900-1000, 14,285; 1000-1100, 21,385/28,885; 1100-1200, 7,090; 1200-1300, 3,690; 1300-1400, 14,285; 1400-1500, 3,690; 1500-1730, 21,385/28,885; 1730-2000, 14,285; 2000-2100, 7,090; 2100-2200, 3,560; and 2200-2300, 14,285.

Other contests and activity periods in the spring and early summer of 1984 include: 15 April, RSGB Low Power Contest (3·5 and 7MHz); 21, 22 April, QRP QRCI Spring QSO Party; 26, 27 May, CQ WPX CW Contest with QRP section; and 15 July, RSGB 3·5MHz Field Day.

Large contests can be a fruitful field for QRP operators seeking new countries, especially in the latter stages when many stations are hungry for new contacts. It also tends to show which large stations are the alligators (all mouth and no ears)!

G-QRP Club home constructors forum

As part of the RSGB National Convention at the National Exhibition Centre, Birmingham, on 28-29 April, the G-QRP Club is to run a forum for home constructors. This two hour event will take place in the afternoon of 28 April as a section of the HF Convention. The forum will be divided into two sections. The first portion will be a series of mini-lectures on practical aspects of building amateur radio equipment with advice and tips for the newcomer and experienced constructor. The second part takes the form of an "any questions" session on radio construction. A panel, chaired by myself and made up from well-known writers in the radio amateur press, will answer questions submitted by the audience. There will be an opportunity to submit written questions in advance, and verbal questions will be taken from the floor. The forum should provide something of interest for anyone who enjoys, or is considering, wielding a soldering iron.

World QRP news

New QRP club in Australia. Last year many of us were disappointed when the VK CW QRP Club disbanded after the resignation of Jack Swiney, its chairman and founder. There is now much better news for Australian QRP operators in the foundation of a new local club. Len O'Donnell, VK5ZF, is acting as the organizer for the new Australian CW Operators QRP Club. The club promises a magazine, club awards and club contests. The membership fee is $4 Australian, and members are being sought world wide. The address for all correspondence is: CW Operators QRP Club, 33 Lucas Street, Richmond, South Australia, 5033.

New American QRP Activity Parties. The QRP ARCI, the national American QRP organization, has announced a monthly activity period for QRP operation. They are to be called the QRP ARCI First Sunday QSO Parties and will be held on the first Sunday of each month, unless there is a major American contest at the same time, from 1500 to 2400gmt. These events are not contests, so operators should simply call "CQ QRP" and attempt to work fellow QRP operators. The recognized QRP calling frequencies will be used: 3,560, 7,040, (7,030 in Europe), 10,106 or 10,120, 14,060, 21,060 and 28,060kHz. Most Sundays the QRP ARCI also runs the Transcontinental Net (TCN) from 0001gmt on 14,060kHz. The QRP ARCI has recently revamped its journal *QRP Quarterly* with a new format and style under the editorship of Fred Bonavita, W5QJM. Details of this club can be had from the secretary, William K. Harding, K4AHR, 10923 Carters Oak Way, Burke, Virginia 22015, USA.

New QRP book. Adrian Weiss, the QRP editor of *CQ Magazine*, has been working on a QRP handbook for some three years, and has now completed it under the title *The QRPer's Guide to Feedlines, Antennas, Propagation and Dxing*. The book not only covers the subjects mentioned in the title but gives a complete guide to low-power operation, including setting up a station and operating low power in all sorts of conditions. I had a taste of some of the content of this book in Adrian's address to the QRP Forum at the ARRL Convention in October, and every indication is that the book will be of considerable interest to any radio amateur, whatever the power of his station. The book is now with the publishers and I hope to be able to announce a publication date in a future *QRP* column.

Adrian is also the provider of the DXCC QRP Trophy (5W output) and the Milliwatt DXCC Trophy (1W output). Applicants should submit a log list in alphabetical prefix order of the 100 qualifying DXCC countries, along with the QSL cards including date, time, band, mode and report, and an application fee of $24. The fee covers the very handsome trophy which requires considerable sideboard space. "List" and "DX net" QSOs must be made entirely with QRP in order to qualify for the country. Applications, or further details of the award, can be had from: Adrian Weiss, W0RSP, 83 Suburban Estates, Vermillion, SD 57069, USA.

More on commercial QRP equipment

The Shimizu SS105S is probably the most easily available QRP transceiver in the UK at the moment. It is sold in semi-kit form, has 10W of rf output with ssb, cw and fm facilities. I have never used one but have heard good reports from those who have the transceiver. The power output is above the limit for many QRP contests and awards but its arrangement of feeding the pa and output filters from links in the back of the case make it possible to use lower power rf amplifiers without internal modifications.

The Trio TS120V just about qualifies as a QRP transceiver but again the power is above the usual limitation for award and contest work.

Low pass filter values

Ed Wetherhold, W3NQN, has pointed out that the values for C2 in *QRP, Rad Com* October 1983, p904, are incorrect. Based upon the information in the circuit diagram, it is obvious that C2 should have twice the value of C1 and C3 because the Xc of C2 is half that of C1 and C3. I have been interested to read W3NQN's data on seven-element harmonic filters using standard capacitance values, and hope to publish this useful information in the next *QRP*. □

*17 Aspen Drive, Chelmsley Wood, Birmingham, B37 7QX.

The Month on The Air

*by John Allaway, G3FKM**

THE INTEREST in awards appears to be increasing, and your scribe has started to receive applications, many of which should have been sent elsewhere. Please do make a note that only applications for the *CQ Magazine* awards, WAZ and CQDX are verified by G3FKM. DXCC correspondence must be sent direct to ARRL—and this also means QSL cards, which cannot be "certified" elsewhere. All other applications should be sent to G3KDB (who is the Society's hf award manager) for checking.

Comment in January *MOTA* that G4JVG/SM0 would answer QSLs for his OJ0 expedition "when the Swedish bureau re-opened" has been taken up by SM0KV, who points out that the SSA QSL bureau is never closed.

G4TOJ reports receipt of QSLs for cw contacts on 3·5 and 21MHz that he has not made—he does not operate on cw or on 3·5MHz.

Philip Bridges, G6DLJ, points out that RCA are supplying a small number of free QSL cards to promote their government communications system. Anyone interested may care to write to Tom Bluetween, RCA Government Communications Systems, Mail Stop 13-4, Camben, NJ, 08102, USA.

Mike Mason, G4OTY, is receiving QSLs for an operator named "Dave" who is located in Bournemouth. He feels that this is an instance where a callsign is being misread as the person concerned seems to be sending out QSLs!

Overseas news

The Bangladesh ARL, in its third *Bulletin,* gives the news that at the agm which took place in December M. Saifud Dahar Shahid was re-elected as president and Mahbubul Huque Khan secretary. Manzoor Mannan is now treasurer and Iqbal Ahmed and Kh. Nazrul Islam are committee members. The writer had the pleasure of meeting Saif Shahid at WARIC, and it is very encouraging to see that BARL is making such good progress. Hopefully amateur licences will be issued to its members in the not too distant future.

The Club Oceanien de Radio et d'Astronomie celebrates its 50th anniversary this year. Special awards will be made to those working FO8 in the week 14 to 21 July, and details will be given later. The club is also organizing the "FO8 mega dxpedition"—by arranging exchange visits between Tahitian amateurs and their families and those in other parts of the world. For more details write to FO8AA, BP 5006, Pirae, Tahiti, French Polynesia.

Paul Kirby, ex-G3XUD/VP8NS, is still in Swaziland and using the callsign 3D6AK. He leaves on 18 May and would like to give a cw QSO to anyone who still requires one with 3D6 before he leaves. He intends to be on the air every Wednesday from about 1530 commencing on 28,032kHz and then moving to 21,032 or 14,032kHz as propagation dictates. Total QSOs since April 1982 have been over 10,000—almost all on cw. QSL cards go to G3WPF (see January *MOTA*).

DX news

AH3AA/KH9 and AH9AB are reported to be active daily in several dx nets and in the areas 14,225-14,275kHz and 21,260-21,335kHz between 2000 and 1330. Dave, AH9AB, keeps a schedule with YU1FW on 14,252kHz at 0630 and with VK9NS and JY3ZH on Sundays. AH3AA/KH9 has favourite frequencies said to be around 3,550, 7,050, 14,050, 21,050, and 28,050kHz on cw, and 7,075-7,100, 14,250 and 21,300kHz on ssb. ZL8AFH, on Kermadec Is, was to be found around 3,795, 7,085, and 14,220kHz almost every day at the time of writing between 0800 and 1000. Signals were not good but a beam was about to be put up.

KX6DS has been on the air since early December 1983, mostly on cw around the low end of each band. He will arrange schedules, but not between 1800 and 0600 on weekdays or 2100 and 0030 on Sundays. His address is PO Box 1179, APO San Francisco, Cal, 96555, USA. Another Marshall Is station, KX6PO, is reported to be found on 21,330kHz after 1900.

YB0BZZ makes frequent business trips to Burma and has applied for a licence. The Director of Telecommunications is said to be favourable but the decision of the military is still awaited. There is an IARU member society in Burma and a recommencement of licensed activity would be most welcome. The equipment at XU1SS has been repaired and the station is on the air again. It is hoped that foreign amateurs will be able to operate in due course with permission from the Khmer Radio Amateur Association—they will use the XU0 prefix followed by a three-letter suffix.

VP8ANT made a total of 40,838 QSOs from Adelaide Is, in addition to a few from S Georgia in October 1981 and 365 on 14MHz ssb from S Shetland between 24 December 1983 and 2 January 1984. Richard's future plans are unclear but he hopes to find a job in another dx location after his vacation which was to be spent cycling from VK6 to VK2 when he would be active /M on vhf.

Expeditions

The Clipperton Is expedition should be over by the time this is being read, and indications at the time of writing were that it would be a great success. Equipment and funds were provided by Henry Radio, Cushcraft, Icom, the N.Californian DX Foundation and the YASME Foundation, but the bulk of the cost was shared by the individual operators. Contributions to help offset their expenses should be sent to Rusty Epps, W6OAT, 948-H Kiely Blvd, Santa Clara, Ca, 95051. They should be made payable to the NCDXF, and please indicate that the contribution is for the "1984 Clipperton Expedition". Those sending US$10 or more will become members of the NCDXF and receive a handsome membership certificate.

K4YT's projected trip to the Middle East has been cancelled as he has changed his job. He hopes to resume his travels in two years or so.

VU2GDG is asking those who felt that the Laccadive Is expedition was a success to write to him and say so—such efforts will be used to support his application for permission to activate the Andaman Is.

10MHz—ssb and competitions?

There is a feeling in some quarters that the new 10MHz band is being underused, and as a result it is being suggested that more activity should be stimulated. In a timely editorial in *QST* IARU President W1RU said "We finally got a 10MHz allocation from the conference, but only by the skin of our teeth. The chairman of the working group tackling that part of the spectrum had to test the water with several proposals—for a 100kHz allocation, for 50kHz, for amateur primary, for amateur secondary—until he found a combination that was voted on favourably by the conference. It was a 50kHz segment, shared with the fixed service, with amateur use to be secondary, that was finally adopted by the conference, and then only by the narrowest of margins. Those of us who were at Geneva in 1979 held our breath as 10·1-10·15MHz made its way from the

Luis, FO8EM, who comes from Spain, was likely to be in the expedition to Clipperton Is last month

*10 Knightlow Road, Birmingham B17 8QB

allocations working group to the full allocations committee at the final plenary session. We were all very much aware of how close defeat was on a number of occasions. After WARC-79, prior to actual implementation of the conference decision, there was considerable IARU debate about the proposed use of that new band at 10MHz. It was indeed a special case. It was only 50kHz wide. It was shared with the fixed service, which includes both civilian and military users in many countries. Amateur use was to be secondary, and on the basis that no interference was to be caused to the primary users. For these reasons, should there be any voluntary restrictions by the amateur service?

"Yes, the members of IARU decided. Because of the limited width of the band, only narrowband modes should be used—ie cw and rtty. No phone. Similarly, because the amateur service was secondary and not to cause interference to the primary user, the members of IARU agreed that they ought not to encourage any type of operation that was competitive in nature. Thus, it was agreed not to sponsor contests on 10MHz or to encourage the crediting of contacts on that band for any form of awards. It was hoped that this restriction would discourage the wild pile-ups that often occur when a rare dxpedition makes its on-the-air appearance.

"Do these voluntary, mutually agreed-on restrictions please everyone? No, of course not. There has been some pressure for ssb operation on the band, and for the crediting of dx contacts on 10MHz for DXCC. But IARU's position is still that the practical realities of our allocation at 10MHz are such that to permit phone operation and/or to permit competitive activities on that band would eventually either jeopardise our existing allocation or make it more difficult to get expanded allocations at a future conference. It is encouraging to note that so far the 120 members of IARU have maintained the integrity of their 10MHz agreements. . ." ". . . Sometime in the next couple of years or so, more amateurs will gain access to the (ultimately) exclusive bands at 18 and 24MHz, and these will provide new opportunities for contests and awards. Sometime in the next decade, there's going to be another WARC and the members of ITU will take another look at the allocation table. Surely, one of the IARU goals for that conference will be for expanded privileges at 10MHz. Maybe a wider slice, maybe an exclusive allocation, maybe both. We think we'll be in a better position to achieve these expanded privileges if in the meantime we have done nothing to violate the terms under which we now occupy the band, terms that clearly specify that we occupy it on a secondary basis and that we are not to cause interference to the primary service."

NEC 1984—HF Convention

Readers' attention is drawn to the fact that on the Saturday of the RSGB National Convention there will be items of special interest for hf enthusiasts in the Pendigo Suite starting from 1200. Members of the HF and HF Contests committees will be in attendance, as well as your scribe. A box will be available to put in your outgoing QSL cards for G3DRN, and there will also be a competition for the best QSL card **received** by the entrant. Come along and ask a few questions at the HF Forum at 1600. See you there!

World Amateur Radio Day

World Amateur Radio Day has been established by IARU as 18 April, but hitherto no plan for its recognition was known. NZART has come forward with a suggestion that we should all try to recognize the founding of the International Amateur Radio Union on 18 April 1925 by doing something we have not done before in the period 1200 17 April to 1200 19 April each year. These times represent the start and finish of 18 April at the International Date Line. This is in no way a contest, and working new stations, trying a new band or mode, listening through a satellite, or building some equipment are all ways in which individuals can make the day special. The reward is the satisfaction that the day has been remembered and our debt to IARU and its achievements acknowledged. 1985 is IARU's diamond jubilee—let this year be an experiment leading up to mass participation then! (There is also a proposal before the Region 1 Conference from Islenzkir Radioamatorar, the Icelandic society, that 18 April should also be designated as International QRP Day.)

United Arab Emirates/Tunisia

The presence on the bands of various stations using A6X prefixes has provoked some reaction from G3LEW, who has recently returned home following a two-year tour of duty in the Air Wing of the Dubai Police, as chief radio officer. He made strenuous attempts while there to get an amateur licence but had no success. He included some original documents from the Director of Telecommunications in Abu Dhabi—the most recent dated 12 February 1983—which said "reference to your letter dated 3 January 1983, we regret to inform you that we do not permit the use of amateur radios at present". The *Gulf News* dated 26 March 1983 also contained an item headed "Ban on use of amateur radio transmitters" and containing the same message.

A similar state of affairs seems to exist in Tunisia. Manuel Calero, I4CMF, has forwarded a copy of a letter, dated 22 November 1983, from the Director General of Telecommunications in Tunis to the Italian society, ARI. It says that amateur radio in Tunisia was suspended in 1958. Several temporary special licences have been issued—mostly to organizations and visitors. 3V8PS is the only station which has been authorized to operate since 1982. TS8 does not exist as an amateur prefix in Tunisia.

Top band

Serious problems have arisen recently as a result of interference being caused to French coastal stations by enthusiastic top-band dxers—apparently unaware that our permission to use the band is still very much on a limited basis. Unfortunately the new schedule for the Class "A" licence as published in *Radio Communication* April 1982 merely says that 1,810–2,000kHz is "shared with other services". Owners of licences issued earlier will note that they say that we may use it on a secondary basis on condition that we do not cause interference to other services.

This confusion arises due to progress made towards implementing the decisions made at WARC 1979. After certain transfer procedures have been completed the segment 1,810–1,850kHz will become amateur primary—but still shared with other services. Hopefully we shall retain 1,850–2,000kHz on a similar basis as now—that is with steps taken to prevent harmful interference to the fixed and mobile services and the limiting of the mean power of amateur stations to a maximum of 10W.

Until further announcement is made by the DTI it will be very important to check and double-check any top-band frequency before transmitting. The list below contains frequencies of some of the stations which have been located between 1,800 and 2,000kHz in the past few years, but is not necessarily complete or accurate as up-to-date data was not available at the time of writing.

1,806kHz—Brest	1,838kHz—Cullercoats	1,869kHz—Humber
1,813kHz—Blavand	1,848kHz—N.Foreland/Oban	1,876kHz—Brest
1,820kHz—Bordeaux	1,855kHz—Ilfracombe	1,883kHz—Portpatrick
1,827kHz—Wick	1,856kHz—Stonehaven	1,890kHz—Scheveningen
1,834kHz—Niton	1,862kHz—Bordeaux/Scheveningen	1,925kHz—Portpatrick

Heard Is DX Association

Due to unfortunate confusion among the group which was organizing the expedition to Kermadec Is, VK9NS found himself unable to accompany the New Zealand operators who should have been on the island recently. Two other projects are currently being worked on. Jim comments on the appalling behaviour of certain Europeans during list operations involving ZL8AFH. The list is being done *at the request of the dx station,* and times of schedules depend on Warwick's own availability—which is not necessarily the best time for propagation into all parts of the world. The association still needs financial support: HIDXA, PO Box 90, Norfolk Is, 2899.

Welcome

The following joined the Society during January: CT4KS, EI3DD, EI4BK, EI5J, K8YAH, LA8PDA, N2FDP, OK1DKW, ON9GA, OZ1JHJ, OZ3OZ, VK2BBT, VK3XBW, W8WG, 5N8ALH, 5N8AMA, M. Fletcher and M. Raino (OH), M. Marhoon (A4), W. Smith (A6), D. Chalkley and M. Morizot (F), and T. Nicholson (OE).

Contests

Helvetia Contest

1300 28 April to 1300 29 April

CW and phone. 1·8 to 28MHz—following IARU band plans. Entrants work Swiss stations and exchange RS/T plus serial QSO number (from

QTH CORNER

ex-A4XYJ	D. Wear, G4DPJ, 6 Holmes Court, Holmes Grove, Bristol, BS9 4EB.
N5RM/C6A	R. H. Mitchell, Route 1, Box 300A, Allen, Tex, 75002, USA.
W6KG/CP6	(see W6QL/ZP5).
FO8s XU, XV, XW, XX, XY, XZ	(via YASME—see W6QL/ZP5).
J37XC	via W2BJI, F. H. Thisse, 164 Washington St, Manlius, NY, 13104, USA.
KX6DS	NAIaDX Club, PO Box 4563 Huntsville, Ala, 35815-4563, USA.
OD5AO	R.Saidah, F0DDA, Residence Vasco de Gama, 84 Rue Desnouettes, 75015 Paris, France.
P29AF	A. Flint, PO Box 94, Mount Hagen, Papua New Guinea.
P29KY	K. Yamagata, JR1EMT, 44 Hayanoshinden, Mobara, Chiba, Japan.
T30AT	(new) via G4GED, 92 Betham Rd, Greenford, Msx, UB6 8SA.
VP8ANT	Box 146, Cambridge, or via RSGB QSL Bureau.
XT 2BJ	via DL6FAL, E. Behrens, An Der Herrenwiese 99, D 6000 Frankfurt 71, FR of Germany.
W6QL/ZP5	YASME Foundation, PO Box 2025, Castro Valley, Cal, 94546, USA.
4M5ARV/6	Churun-Vena Expedition, ARV, PO Box 3636, Caracas 101-A, Venezuela.
5W1DQ	Graham Fuller, 79 Woolley St, Christchurch 7, New Zealand.
G8GRN/5X	via G4CTQ, S. T. May, 77 Chaucer Drive, Lincoln.
8Q7AH	J. Laib, HB9TL, Einfangstr 39, CH-8580 Amriswil, TG, Switzerland.

001). Swiss stations will also give two letters to indicate their canton (AG, AI, AR, BE, BL, BS, FR, GE, GL, GR, JU, LU, NE, NW, OW, SG, SH, SO, SZ, TG, TI, UR, VD, VS, ZG, or ZH). Each Swiss station may be worked once per band—either on cw or phone, and each QSO counts three points. The multiplier is the total of different cantons worked on each band added together. If there is more than one log-sheet the QSOs should be separated by band and a multiplier checklist (written on the back of the summary sheet) would be appreciated. Include callsign, name, address, if single- or multi-operator, number of QSOs, points and multipliers per band and total with final score. A declaration that "rules of the contest and licence regulations have been observed, duplicate QSOs have been eliminated, ham-spirit and sportsmanship were respected and decisions of the contest committee are final" should be followed by date and signature. Mail log within 30 days of the contest to HB9ZY, Gody Stalder, Tellenhof, CH-6045 Meggen, Switzerland.

This contest is an excellent opportunity to make contacts for the Helvetia Award (see "Awards").

International Gagarin Cup Competition
0000 to 2400 15 April
3·5 to 28MHz, cw only. Single-operator single- and multi-band, and multi-operator multi-band. Exchange RST and ITU zone. QSOs with own continent count one point, with other continents three. The multiplier is the total number of ITU zones worked on each band added together. Mail entry by 14 May to Krenkel Central Radio Club, Box 88, Moscow, USSR. (This is a contest which is held once every three years. Unfortunately the 1984 rules have not been received and these are as for the 1981 event—with appropriate date changes.)

AGCW-DL QRP Party
1300-1900 1 May
Copies of rules from G3FKM (sae please).

Awards

Helvetia Award
This most attractive certificate is awarded to those who have confirmed contact with all 26 Swiss cantons on or after 1 January 1979. Send QSL cards, plus a list of contacts, to Kurt Bindschedler, HB9MX, Strahleggweg 28, CH-8400 Winterthur, Switzerland. There is no charge but some ircs for the return postage on the QSL cards and on the very attractive certificate would be appreciated.

Ontario Bicentennial Award
Sponsored by the Radio Society of Ontario Inc. To qualify contact at least 20 different VE3 or /VE3 stations during 1984. Any mode/band endorsement as requested and special seals are available to those who work 200 VE3s. Stations using special prefixes count as double. Send certified log data plus three ircs to VE3LSS, Bicentennial Project, Listowel District Secondary School Geography Dept, Listowel, Ont, Canada, N4W 2M4.

Totem Award
Issued by the Western Washington DX Club to those who work 25 stations in Washington state—at least 10 of whom are members of the club (there are over 750 members so this should not be too difficult). Send certified log data to Morris Shepherd, W7LVI, Box 224, Mercer Is, Wash 98040, USA. No details of charge were given in the information supplied.

Worked All Continents
Issued by IARU for confirmed post-second world war contacts with all six continents (N America, S America, Europe, Asia, Africa, and Oceania). Two-way ssb, 1·8MHz, rtty, OSCAR, and moonbounce endorsements are available—but please note *not* two-way cw. Contacts made on 10MHz do not count, nor those made on 18 or 24MHz prior to the date when these two bands become fully available to the amateur radio service. Send QSL cards and list of contacts, plus proof of RSGB membership (a label from a recent *Radio Communication*) together with sae and return postage to RSGB HF Awards Manager, P. Miles, G3KDB, PO Box 73, Lichfield, Staffs WS13 6UJ. Please note that the certificate is issued from IARU HQ in the USA and that delivery takes six to eight weeks.

WACE Award
By the Radio Club de Chile to those who have confirmed contact with CE stations in each of the 10 Chilean provinces since 1922. Send list of QSO details with a list of the QSL cards certified by a radio club, plus eight ircs, to: Awards Manager, Radio Club de Chile, Casilla 13630, Santiago de Chile, Chile.

1984 28MHz Table

G3XQU—84 (ssb)	G4NXG/M—15 (ssb)	G4OBK—8 (cw)
G4PEL—43	G3SXW—14 (cw)	G4FVK—2
G4SKI—34	G3TXF—10 (cw)	G3XTT—2

1984 Six-band Table

	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total
G3XQU	1	49	64	54	88	58	314
G3SXW	49	42	33	33	21	14	192 (cw)
G4SKI	2	9	2	64	75	34	186
G3TXF	47	41	33	36	14	10	181 (cw)
G3XTT	56	13	26	3	4	2	104

Deadline for next table—15 April. Entries to G3GIQ, QTHR, please.

Around the bands

G8KG decided that enough has happened during February to justify an interim report, and he also wonders if we are about to see a repeat of 1971-2 when the cycle went into reverse for about a year! He says: "Last month's cautious forecast of a recovery in solar activity has proved to be correct, though pessimistic as regards timing. Between 20 and 29 January the daily solar flux values rose steeply from 97 to 180 sfu and activity remained relatively high, with a secondary peak of 147 sfu on 10-11 February, and values again rising to 172 sfu at the time of writing (24 February).

"During this period there have been several major flares, and the 27-day average solar flux moved steadily upwards from 97 to 141 sfu, bringing it back to where it was in mid-1983. It is too soon to be able to say how long this situation is likely to last, but the improvement in conditions on the higher hf bands is evident although rather few stations seem to be taking advantage of it."

Mike, G8FCD, has pointed out the value of Radio Australia on 12,290kHz (which transmits continuously) as a propagation indicator. Apparently it is beamed on the short path and is intended as a back-up for the microwave link between Lyndhurst and W Australia.

The following kindly supplied logs from which the callsigns below were extracted: F6GPA, G2HKU, G3YY, G5JL, G3s BDQ, BDS, GIQ, GVV, LPS, URA, YRM, G4s, EHQ, FVK, GCK, GW4KGR, G4s NXG/M, OBK, OTY, RVV, UOL, and VGK, and RS10906.

Stations listed in italics were using A1A.

1·8MHz. 0000 *CT2DV, EA6ET, JX5DW, UA9CBO, YV1OB, 9H1BB.* **0200** *NP4A, SV9OA.* **0300** *UH8DC, UK2WAM.* **0500** *G6ZY/EA6.* **0600** *AA1K, EA8QU, K2DSV, N4SU, VE1YX, W9UCW.* **0700** *CT2DV, W0FIH* (Tex). **1500** *LA2GV, OE5JDL, OK2BEJ, SP5ING.* **1900** *VK3IM.* **2000** *VK3DGJ, VK5BC, 9M2AX.* **2200** *OY7ML,* T77V. **2300** *JX5DW, ZB2EO, 4U1ITU.*

3·5MHz. 0000 C31LD, C53AL, CE3DPD, HI8IMR, J73AH, V3FB, YS9RVE, 6Y5IC, 8P6s **0100** 5N1ARY. **0600** *VP9BK.* **0700** HC1EA, *PJ7A, PY2BW,* V3FB, VP2KCA, *K5NA/VP2.* **0800** TG9NX, XE1VIC. **1900** 3A2AH. **2000** JY9CL. **2100** JAs. **2200** TL8CK, *UA9LAU,* 7X2HM. **2300** FM7WS, KG4DX, K3WW/VP9.

7MHz. 0000 *9K2BE, 9M2AX.* **0600** *CX5AO, KL7H, N2GC/PJ7, XT2BJ.* **0700** *FM7WD, FO8KP, HK1QQ, W6-W7, ZL.* **0800** *FO8JR, JA1UQP, JH1GEG, N6OC, UK1PGO, VKs.* **0900** JAs, UA0KCT, VK7CM. **1500** *W6s* (LP). **1600** *CR9WW, UH8EAA, W7OF, 4S7WP.* **1700** *9V1VP.* **1800** HV3SJ. **1900** *ZL3GQ.* **2000** *OX3PH, TN8AJ, TR0AB, VK3VJ.* **2100** *HZ1AB, UD6CN, VK6RZ, VU7WCY/TS, ZS4JB, 4K1QAV.* **2300** *HH2VP, J6LJG, UA9PV, W1-W4, W8s.*

10MHz. 0000 *K4LTA/PJ7.* **0800** *JP1BTA, JA6HW.* **0900** *DL7NDI/EA8. JAs 2EPW, 6HW, 8XR. VKs, ZLs.* **1500** *C31NP, W8EGB.* **1700** *JP1BTA.* **1800** *LX2LH, 4X6GP.* **1900** *EA8AFB, SV0AH.* **2000** *VEs, Ws.* **2300** *J37AE, J6LJG, LU1DZ, DL2GG/YV5.*

14MHz. 0700 AH9AB, HL9KN, T2GSH, ZLs. **0800** AH2AA/KH9, H44SA, P29AF, T30AT, VS5IB, VS6CX, ZL8AFH, W6QL/ZP5. **0900** CR9CT, H44IA, JAs, *JT1KAA,* KL7MO, *PYs,* VKs, VK0RC, YI1BGD. **1000** KA4JRY/DV9, FO8DF, *JR6RWX, OX3UD, R0K, XT2BJ,* ZL7PO. **1100** *HL1GC, JT1s BR, KAA.* **1200** *4U1VIC, G3CYC/5B4.* **1500** W6-W7s (to 1800), *4S7VK.* **1600** A6XYB, FB8WJ, FR7CA, OE8HFL/YK, 9V1s VC, VI. **1700** *C31LBB,* VE8RCS. **1800** *SU1AH,* VKs, 9X5WB. **2000** TR8DR, VP8AEN, 3X4EX, G8GRN/5X. **2100** VK3MO, VP8MT. **2200** *W6KG/CP6.*

18MHz. 0900 *DL, HB, OE.* **1200** *OE6FHG, PA3BBH.* **1600** *C31NP, LA9XG.* **1800** *C6ABA.*

21MHz. 0800 C53FG, JAs (to 1200), VKs. **0900** A71BK, H44IA, *J28AS, UA0YT,* VQ9TP, *YC1DVW, 7P8CL.* **1000** CR9CT, HL0U, JD1BBG, XU1SS, G8GRN/5X. **1100** AP2KS, *P29KY,* VP8MT, VS6CT, 4S7PVR. **1200** *A6XYB,* W6QL/ZP5, 5N3HDM. **1300** D68WB, TI9JVA, V3TV. **1400** VE8YQ, K8WW/VP9, OE8HF/YK. **1500** W8MPW/J8, *TI9CF,* W6s, YB3KK, ZD9BV, G8KW/5N, ON6BC/9X. **1600** A4XJQ, CO2HQ, J39BS, VU2GDG. **1700** VP8KF, ZXT2BJ, ZD7BW, ZD9CA, 3D6AN, 9L1SL. **1800** C53BI, TU2NW, VE4, VE5, VE6s, 5R8AL. **1900** PJ8DFS (St Eustacius), K4FW/VP2K. **2000** D44BC, TI9RCM, W6s, ZL4JO.

24MHz. 1500 *VU2LO.*

28MHz. 0900 SV5TS, *ZC4CW,* 3X4EX. **1000** PY4ZO, TU2JB, *VK2BFJ,* 5N9GM. **1200** DF3NZ/ST2, VS5IC, ZD7CW. **1300** A71BJ, OD5SM, *TR8IG,* W1-W4s. **1400** J28DN, *F6KDE/OD5.* **1500** *FM7CT, K4FW/VP2,* W1-W4s, W8s, W9, ZSs. **1600** LUs, PYs. **1700** VP8KF, *XE2FU,* 6W1KP. **1800** A4XYH, *N4BP/C6A,* D44BC, W5s, W0s. **1900** VP8AIB.

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

Closing date for the receipt of items for **June** issue is **26 April**—everything to reach G3FKM no later please. □

HF propagation predictions for April 1984

Using the table

The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band, ie ♀ = 0000, ♀ = 0200, ♀ = 0400 etc.

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

	28MHz				21MHz				14MHz				10MHz				7MHz				3·5MHz			
GMT	000 024	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	...	...	...	...	...	124	444	4..	..2	666	677	872	646	544	445	798	874	211	112	578	†4	...	...	25†
Malta	...	...	...	...	...	134	555	51.	211	777	778	984	877	654	456	799	997	422	223	589	††4	...	...	25†
Gibraltar	...	...	...	...	...	.12	222	31.	...	377	777	883	644	765	556	798	998	642	223	589	†††	3.	...	2††
Iceland	...	...	...	...	...	...	...	1..	...	.25	556	762	311	365	556	787	876	533	223	467	††5	2.	...	235
ASIA																								
Osaka	...	...	...	...	...	.23	31.	...	...	253	334	341	...	.21	..2	573	...	...	...	241	...	...	...	.2.
Hong Kong	...	..1	11.	...	...	244	454	2..	...	133	335	762	1..	...	..2	585	...	...	...	263	...	...	...	.3.
Bangkok	...	.11	111	...	...	345	556	4..	1.1	113	235	773	3..	...	..2	587	1..	...	...	366	...	...	...	.33
Singapore	...	.12	222	...	...	346	566	51.	1.1	123	235	774	3..	...	..2	588	1..	...	...	366	...	...	...	.33
New Delhi	...	.12	221	...	...	345	666	1..	212	112	235	774	63.	...	..2	588	51.	...	...	367	2..	...	...	.35
Teheran	...	123	332	1..	..1	556	667	61.	425	322	235	886	863	...	..2	589	74.	...	...	368	5..	...	...	.35
Colombo	...	123	332	1..	...	456	667	62.	321	112	235	886	72.	...	..2	589	5..	...	...	368	2..	...	...	.35
Bahrain	...	123	333	1..	..1	556	677	62.	535	211	235	887	963	...	..2	589	84.	...	...	368	5..	...	...	.35
Cyprus	...	123	333	2..	...	677	888	841	646	655	567	898	986	322	234	689	873	1..	..1	478	†4.	...	...	4†
Aden	...	134	554	3..	1.1	555	678	841	855	211	235	798	973	...	..2	589	851	...	...	268	†2.	...	...	.35
OCEANIA																								
Suva (S)	...	...	...	...	...	..1	111	1..	...	243	235	63.	..1	421	..2	52.	...	2..	...	2..	...	...	...	...
Suva (L)	...	...	...	.3.	21.	32.	...	.73	123	752	222	652	.2	52.	..2	53.	...	2..	...	2..	...	...	...	...
Wellington (S)	...	...	...	...	...	.11	221	...	..1	443	234	541	.2	421	..2	541	...	2..	...	21.	...	...	...	...
Wellington (L)	...	...	...	...	11.	11.	...	.33	344	641	...	164	113	52.	...	441	..1	2..	...	21.	...	...	...	...
Sydney (S)	...	..1	...	...	...	345	322	1..	..1	553	235	651	...	32.	..2	573	...	...	...	241	...	...	...	...
Sydney (L)	...	...	...	...	...	.3.	...	.13	222	352	1..	.75	..1	331	..1	363	...	1..	...	23.	...	...	...	...
Perth	...	123	2..	...	...	566	62.	...	212	253	234	551	31.	.2.	..2	585	1..	...	...	365	...	...	...	.32
Honolulu	...	...	...	...	...	...	..1	1..	...	.23	114	52.	.2	321	..2	2..	..1	2..	...	...	...	...	...	...
AFRICA																								
Seychelles	...	134	554	3..	1.1	556	778	842	854	211	235	798	963	...	..2	589	84.	...	...	268	†.	...	...	.35
Mauritius	...	135	555	4..	1..	566	778	852	854	212	235	799	973	...	..2	589	84.	...	...	268	†2.	...	...	.35
Nairobi	...	135	666	41.	2..	556	678	863	975	311	135	799	995	1..	..2	589	872	...	...	268	†4.	...	...	.35
Harare	...	135	777	61.	31.	566	678	974	986	521	135	799	996	2..	..2	589	884	...	...	268	††.	...	...	.35
Capetown	...	.34	777	62.	1..	476	778	974	85.	742	235	799	994	41.	..2	589	885	1..	...	268	5†2	...	...	.35
Lagos	...	.34	777	72.	32.	376	668	984	996	741	115	799	998	51.	..2	589	786	2..	...	268	4†3	...	...	.35
Ascension Is	...	.34	346	73.	21.	.76	567	983	986	452	112	699	998	52.	...	489	886	2..	...	157	5†3	...	...	.25
Dakar	...	.23	566	73.	11.	176	667	883	886	652	112	699	998	52.	...	379	886	2..	...	157	5†3	...	...	.25
Las Palmas	...	.12	333	42.	...	167	777	871	664	776	666	798	998	653	333	589	997	421	..1	268	††4	...	...	3†
S AMERICA																								
South Shetland	...	...	566	73.	...	..2	778	983	732	123	225	678	887	42.	..2	457	786	2..	...	125	4†3	...	...	..2
Falkland Is	...	...	466	63.	11.	..4	778	883	886	633	224	578	998	52.	..1	247	886	2..	...	.25	5†3	...	...	..2
Rio de Janeiro	...	..3	444	63.	11.	..7	666	883	886	643	211	479	998	52.	...	159	886	2..	...	.27	†53	...	...	..4
Buenos Aires	...	..2	355	53.	...	..6	676	783	776	533	222	368	998	52.	...	37	886	2..	...	.15	††3	...	...	..2
Lima	...	...	122	32.	...	..1	565	563	653	353	221	136	897	531	...	..4	686	2..	...	..1	3†3	...	...	...
Bogota	...	...	111	22.	...	..1	554	553	642	243	221	126	887	531	...	..4	686	2..	...	..1	3†3	...	...	...
N AMERICA																								
Barbados	...	..1	122	32.	...	..5	555	573	653	343	211	147	997	531	...	.16	886	2..	...	..3	5†3	...	...	...
Jamaica	...	...	.11	11.	...	..1	444	452	531	123	221	126	786	431	...	..3	586	2..	...	..1	2†3	...	...	...
Bermuda	...	...	..1	11.	...	..2	444	562	631	123	221	247	886	431	...	.15	686	2..	...	..2	3†3	...	...	...
New York	...	...	...	...	...	...	233	442	52.	.13	222	246	775	321	...	.14	586	2..	...	..1	253	...	...	...
Mexico	...	...	...	...	...	...	133	331	42.	..1	232	113	465	321	...	...	266	2..	...	...	.33	...	...	...
Montreal	...	...	...	...	...	...	223	341	41.	.13	222	246	774	321	...	.14	476	2..	...	..1	253	...	...	...
Denver	...	...	...	...	...	...	..1	111	21.	...	123	223	354	31.	..1	..1	146	2..	...	...	.23	...	...	...
Los Angeles	...	...	...	...	...	...	..1	12.	2..	...	.24	212	243	31.	..1	...	.35	2..	...	...	..3	...	...	...
Vancouver	...	...	...	...	...	...	...	...	1..	...	.12	222	233	31.	..2	...	.25	2..	...	...	..2	...	...	...
Fairbanks	...	...	...	...	...	...	...	...	...	121	123	221	112	321	..2	211	..2	2..	...	...	...	...	...	...

The provisional mean sunspot number for January 1984 issued by the Sunspot Index Data Centre, Brussels, was 57·6. The maximum daily sunspot number was 118 on 29 January, and the minimum was 10 on 1 January. The predicted smoothed sunspot numbers for April, May, June, and July 1984 are, respectively: (classical method) 51, 49, 48 and 46; (SIDC adjusted values) 43, 40, 37 and 34.

SWL News

*by Bob Treacher, BRS 32525**

Overseas news

We start this month with a question from two overseas members who regularly provide much in the way of topical news from southern Africa —John Lord, ORS46084, and Stan Porter, ORS45992. Stan has often expressed his surprise that more overseas listeners do not write to provide news for this feature. As he rightly pointed out, each month new overseas listeners join the Society, and they must have receiving equipment to enable them to monitor the amateur bands with a view to dxing. It has been suggested that the yearly countries table should be divided into two sections —one for UK-based listeners and one for overseas members. Stan felt that neither he nor John would ever head the table in view of the vastly differing propagation characteristics of 7, 3·5 and 1·8MHz in other parts of the globe. Judging from the number of overseas logs for the lf challenge, I feel that Stan has made a very worthwhile point. As an experiment, therefore, the yearly table will be divided for 1984 to encourage greater dx participation. If by the end of July we have no other takers it will revert to its usual format. It is therefore for our dx listeners to put pen to paper to make this idea work.

Stan reported some good propagation on 3·5MHz during January between 0330 and 0500 (the power is switched off at 0500 until 1600!). He logged C53AL, HH2MC, JY4MB, T77V, AZ5ZA, 5B4LP and 6Y5IC. All good stuff from that location. On 7MHz jealousy prevailed, having read of all the Pacific dx which had been available during the ZL2AAG net. Plans were afoot to perhaps "test" the electricity supply for an hour at that time in the hope of catching some rarities! On the awards front, Stan had claimed the WCY Award and was hoping to obtain one of the first DX-SWL awards.

His partner in 7Q7, John, also wrote. His letter was received well after the copy date for the March issue, so his final table score of 519 for 1983 could not be registered. Golf had kept John away from the amateur radio scene for a long time, but VU7WCY and XU1YL had been heard early in January. Confirmations had been building steadily, and John had 210 from 250 heard. VR6KY and VK9YE were the latest additions, but some other less-rare verifications had been taking 10 or 12 months via the bureau.

Meteor activity

With meteor activity on vhf becoming almost an all-year-round pastime these days, a letter from G4DCV struck me as being of particular interest. The British Meteor Society is interested in receiving information from amateurs and listeners about their meteor scatter activities on the uhf and vhf bands. A standard reporting sheet has been prepared and supplies are available from Mr R. Mackenzie, FRAS, FBIS, 26 Adrian Street, Dover, Kent. The amateur population can contribute a great deal towards the research work currently being undertaken because, unlike optical observation, radio can "see" meteors at any time of the day irrespective of weather conditions. Information, however little, will be gratefully received, and you will be assisting with a very worthwhile project.

Newcomers

G4OQD wrote to admit that he was more of an swl, preferring to monitor the bands rather than to call "CQ". However, he has received a number of swl reports for QSOs he has made and has sent a card in return. What concerns G4OQD is whether the listener finds his card and comments of interest. This is an interesting slant on QSLing, and one which caused me some thought. Many send cards with no comments on at all, but at least the recipient has bothered to reply. That would be the main thought in many listeners' minds, but a comment about himself, his rig, his operating habits would also be of interest. A courteous comment about the usefulness and accuracy of the report would also be well received. Other listeners may well have their own thoughts which I will air in forthcoming columns if they are substantially different from the views expressed here. My xyl, BRS62088, points to several QSL cards which she has received where the station has either returned her irc (yes, that does happen!) or has provided a booklet, map etc on the geographical or historical features of that station's particular location.

Steve Bessent, BRS54203, joined the Society about a year ago and now uses an R1000, a KX3 atu and a dipole. He had also built the "Beermat" direct-conversion receiver which appeared in *Rad Com* July 1983. Shortly to be married, Steve had little time for dxing when he wrote, but had managed to purchase a house with a long back garden! He hoped to sit the May exam but may find himself with other jobs to do rather than studying. Steve, who is keen on contesting, had a go at both the CVRS and WRARS events but was hoping to participate in some Society events during 1984, perhaps on vhf. It *is* possible to enter the various tables which appear in this piece as a Class B licence holder. Perhaps this further mention might prompt some newly-licensed people to have a go at the vhf/uhf table for 1984?

Dave Burt, BRS85613, wrote from Devon with several queries. 4O9WCY was a special call used by some YU operators to celebrate World Communications Year in 1983. QSL via YU7BCD. Dave would also appreciate the QSL details for EC5BLF. Anyone with the address is asked to write to Dave at 11 Stanhope Terrace, Northam Road, Bideford, EX39 3JZ.

DX news

Douglas Johnstone, BRS54163, reported YI1BGD and many VKs on 21MHz. He recently purchased an FRT7700 atu, and this enabled him to tune his antenna to give a better match on all bands. He noticed a tremendous improvement in readability and signal strength, and was able to copy signals solidly from VK and ZL at the interesting time of 1930–2130 on 21MHz during January.

Brad Bradbury, BRS1066, reported much domestic QRM in January which forced him to cut down his listening activities. However, he copied cw from VE1BVL and VE3INQ on 1·8MHz, FR7AI/T and TJ1QS on 21MHz, while 10MHz produced OY1R, 8P6AU and LU8DQ. One oddity was VK0Q at 0115 on 3·5MHz cw, asking for QSL cards via VK2HH. Has anyone any information? VK6HD had confirmed VK on 1·8MHz, and HK0TU was safely received for a new one on 21MHz.

Dave Whitaker, BRS25429, had also been strangely inactive, with only OY8R and T77V logged on 1·8MHz for new ones. He participated in the WRARS contest and managed Ws from 1 to 0 less 6 and 7 and ZL2BT. In the *73 Magazine* 160m Contest he logged 47 different W/VE stations in 25 states/provinces, but a good amount of sleep was lost in the process! On the QSL card front, RG6G and UK9CAE produced needed cards for 1·8MHz, while UJ8JCX gave No 217 confirmed on 3·5MHz. Cards for last summer's exploits on 144MHz were also beginning to filter through— DB4MR (FI14h), Y24QO (GM49f), and OK1JKT/P (GK46c) being the most pleasing.

Together with a substantial increase in logs for the lf challenge came hf news from BRSs 18529, 52543 (who heard ZL8AFH at 3 and 3 on 7MHz), 31879, 50134, 44395, 53844 and 85124. Hopefully, QRM permitting, the challenge results will be in the June issue.

DX stamps service

G3TXF, QTHR, has provided more details of this service. He is slowly increasing the number of countries catered for, but is limiting the service in the main to those countries where QSL managers are regularly to be found, or those where it is usually necessary to send a card direct in order to obtain the desired QSL card. Recent additions include OD, TA and 9M2. For the swl with no regular source of ircs, mint stamps should, in most cases, prove cheaper than buying ircs at the local post office.

Finale

As there were too few table entries for 1984 when compiling this month's piece, the table has been held over until next month. News, views, comments and table scores for inclusion in the June column should reach your scribe by Thursday 12 April, with late news items to arrive by Tuesday 24 April. □

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

RSGB SLOW MORSE PRACTICE TRANSMISSIONS

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

Time	Callsign	MHz	Mode	Town	Notes
Sundays					
1015	G3CGD	1·875	A1A/A3E	Cheltenham, Glos	
1100	G2FXA	1·910	A1A/A3E/J3E	Stockton-on-Tees	
1100	G3BLS	145·250	F2A	Osney, Oxford	[1]
1200	G3PER	145·575	F2A/F3E	Heysham, Lancs	[1]
1200	G3HVI	145·250	F2A/F3E	Stoke-on-Trent, Staffs	[1]
1200	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1830	GM4RZJ	145·475	F2A/F3E	Thurso, Caithness	[1]
1830	G4NHG	145·250	F2A/F3E	Stoke-on-Trent, Staffs	[1]
1830	G3RLO / G4NZU	144·525	F2A/F3E	West Bridgford, Notts	[1]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1845	G4OBK	1·875	A1A/J3E	Chorley, Lancs	
1930	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
1930	G3LDW	144·250	A1A/J3E	Halesowen, W Midlands	[1]
2000	G4TKM	145·425	F2A/F3E	Birmingham	[1]
2005	G3OLU	145·250	F3E	Braintree, Essex	[1]
2100	G3HQH	145·250	F2A/F3E	Stockport, G Manchester	[1]
2100	G4EWK	144·850	F2A	Burton-on-Trent, Staffs	[7]
2130	G3ORP / G4UAO	144·250	A1A/J3E	Maidstone, Kent	[6]
2200	G4OJD	145·250	F2A/F3E	Brixham, Devon	[1]
Mondays					
1400	G4OOC	145·250	F2A/F3E	Leeds, Yorks	[1]
1800	G4FEX	145·250	F2A/F3E	Horsley Woodhouse, Derbys	[1]
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1845	GM4RZJ	145·475	F2A/F3E	Thurso, Caithness	[1]
1900	G3ULY / G4EXD	1·880	A1A	Culgaith, Cumbria	
1900	G3CMH/A	144·250	A1A/J3E	Yeovil, Somerset	[1]
1900	G8QR	145·250	F2A/F3E	Norwich, Norfolk	[1]
1900	G3RLO / G4NZU	144·525	F2A/F3E	West Bridgford, Notts	[1]
1900	G4ILD / G3ZQS	145·250	F2A/F3E	Riston, Lancs / Darwen, Lancs	[1]
1915	GM4RSJ	145·250	A2A/F3E	Prestwick, Strathclyde	[1]
1930	G4VBL	144·625	F2A/F3E	Fulham, SW London	[1]
1930	G4LLU / G4JSQ	144·160	A1A/J3E	Wolverhampton, W Midlands	[1]
1930	G4SXU	145·250	F2A/F3E	Harrogate, N Yorks	[1]
1930	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
2000	G2FXA	145·250	F2A/F3E	Stockton-on-Tees	[1]
2000	G3GMS	145·250	F2A/F3E	Whitley Bay, T & W	[1]
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2000	G4PYR	1·880	A1A/J3E	Solihull, W Midlands	
2030	G3ASR	1·875 / 144·175	A1A/J3E / A1A/J3E (lsb)	Harrow, Middx	[1] [12]
2030	G4ICC	3·535	A1A/J3E	New Duston, Northants	
2030	G4NZA	145·250	A2A/F3E	Wellington, Somerset	[9]
2100	G3AVJ	145·250	F2A/F3E	Huyton, Merseyside	[1]
2100	G3WOR	144·250	A1A/J3E	Lancing, Sussex	[14]
2230	GM4RZJ	145·475	F2A/F3E	Thurso, Caithness	[1]
Tuesdays					
1100	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
1200	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1830	G4ILD / G3ZQS	145·250	F2A/F3E	Rishton, Lancs / Darwen, Lancs	[1]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1900	G3RLO / G4NZU	144·525	F2A/F3E	West Bridgford, Notts	[1]
1900	G3WQK	144·775	F2A	Eastbourne, E Sussex	[1]
1900	G4RS	3·565 / 145·250	A1A/J3E / F2A/F3E	Catterick, N Yorks	[1]
1915	GM4RSJ	145·250	A2A/F3E	Prestwick, Strathclyde	[1]
1930	G4BFJ	1·950 / 144·625	A1A/J3E / F2A/F3E	Banstead, Surrey	[1]
1930	G4DAL	145·250	F2A/F3E	Lancaster, Lancs	[1]
1930	G4TDO	144·160	A1A/J3E	Wolverhampton, W Midlands	[1]
1930	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2030	G4PDP	144·250	A1A/J3E	Biggleswade, Beds	[1]
2030	G3KGU	1·910	A1A/A3E	Theydon Bois, Essex	
2100	G4EWK	144·850	F2A	Burton-on-Trent, Staffs	[7]
2100	G3AVJ	145·250	F2A/F3E	Huyton, Merseyside	[1]
2100	G3HQH	145·250	F2A/F3E	Stockport, G Manchester	[1]
2200	G3AWL	144·250	A1A/J3E	Easington, Co Durham	[8]
2200	G4OJD	145·250	F2A/F3E	Brixham, Devon	[1]
2300	G4PEF	145·250	F2A/F3E	Willesden, London NW	[1]
Wednesdays					
1100	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
1400	G4OOC	145·250	F2A/F3E	Leeds, Yorks	[1]
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1830	G4TYF	145·250	F2A/F3E	Bishop Auckland, Co Durham	[1]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1845	GM4RZJ	145·475	F2A/F3E	Thurso, Caithness	[1]
1900	G4ILD / G3ZQS	145·250	F2A/F3E	Rishton, Lancs / Darwen, Lancs	[1]
1900	G3BLS	145·250	F2A	Osney, Oxford	[1]
1900	G4RS	3·565 / 145·250	A1A/J3E / F2A/F3E	Catterick, N Yorks	[1]
1915	GM4RSJ	145·250	A2A/F3E	Prestwick, Strathclyde	[1]
1930	G4BFJ	1·950 / 144·625	A1A/J3E / F2A/F3E	Banstead, Surrey	[1] [10]
1930	G3ASR	1·875 / 144·175	A1A/J3E / A1A/J3E (lsb)	Harrow, Middx	[1] [11] [12]
1930	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
1930	G4SBH	145·250	F2A/F3E	Torquay, Devon	
2000	G2ACZ	1·819	A1A	Mablethorpe, Lincs	
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2000	G3GMS	145·250	F2A/F3E	Whitley Bay, T&W	[1]
	G4NZA	144·650	A2A/F3E	Wellington, Soms	[9]
2100	G3WOR	144·250	A1A/J3E	Lancing, Sussex	[14]
2100	G4EWK	144·850	F2A	Burton-on-Trent, Staffs	[7]
2100	G3AVJ	145·250	F2A/F3E	Huyton, Merseyside	[1]
2100	G3HQH	145·250	F2A/F3E	Stockport, G Manchester	[1]
2200	GM4HYF	28·350 / 145·250	A1A / F2A	SE Glasgow	[1]
2200	G4OJD	145·250	F2A/F3E	Brixham, Devon	[1]
2230	GM4RZJ	145·475	F2A/F3E	Thurso, Caithness	[1]
Fridays					
1100	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
1830	G4ILD / G3ZQS	145·250	F2A/F3E	Rishton, Lancs / Darwen, Lancs	[1]
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1830	G4TYF	145·250	F2A/F3E	Bishop Auckland, Co Durham	[1]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1900	G3RLO / G4ZNU	144·525	F2A/F3E	West Bridgford, Notts	[1]
1930	G3HVI	145·250	F2A/F3E	Stoke-on-Trent, Staffs	[1]
2000	G3RR	145·550	F2A/F3E	Barnoldswick, Lancs	[1]
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2030	G3CAR	144·625	F2A/F3E	High Wycombe, Bucks	[1]
2100	G3AVJ	145·250	F2A/F3E	Huyton, Merseyside	[1]
2200	G3AWL	144·250	A1A/J3E	Easington, Co Durham	[8]
Saturdays					
1200	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1830	GM4RZJ	144·475	F2A/F3E	Thurso, Caithness	[1]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1900	G3RLO	144·525	F2A/F3E	West Bridgford, Notts	[1]
1930	G4TDO	144·160	A1A/J3E	Wolverhampton, W Mids	[1]
2000	G4TKM	145·250	F2A/F3E	Birmingham	[1]
2030	G4NRO	144·525	F2A/F3E	Atherton, G Manchester	[1]

Notes

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

Contest News

Region Round-up CW Contest rules

TRANSMITTING SECTION

1. The general rules for RSGB hf contests published in the supplement to the January 1984 issue of *Radio Communication* will apply.

2. Eligible entrants. All paid-up members of the RSGB resident in the British Isles (G, GD, GI, GJ, GM, GU and GW) holding a Class A licence. Single-operator entries only.

3. When. 0700-1200 Sunday 20 May 1984.

4. Contacts. CW only in the 3·5 and 7MHz bands. Entrants are requested to confine their 3·5MHz operation to the segment 3·510-3·590MHz. RST and serial number (starting from 001) must be exchanged, followed by R and the number indicating the operator's RSGB region—eg 599001 R03. (The composition of RSGB regions is given on page 292 of this month's magazine.)

5. Sections. a) Up to 150W input. b) QRP—up to 10W input.

6. Scoring. Three points for each contact with a station within the British Isles. Each station may be contacted for points only once on each band. The final score is the total points on each band, added together and then multiplied by the total number of RSGB regions worked on each band added together.

7. Entries. Separate log sheets must be used for each band. It would greatly help the adjudicator if standard log sheets (form HFC1) were used. A cover sheet and signed declaration (form HFC2) must accompany the logs, which must be sent to RSGB HF Contests Committee, c/o John Allaway, G3FKM, 10 Knightlow Road, Birmingham B17 8QB, and postmarked no later than 4 June 1984.

8. Awards. Certificates of merit will be awarded to each of the three leading stations.

RECEIVING SECTION

1. Transmitting section rules 1, 2, 3, 6, and 7 will apply with the addition that holders of British Class B licences may also enter.

2. A station may only appear once in the column headed "station heard". The callsigns of the station being worked may only repeat once in every three contacts logged, except when the station is a new multiplier. Entrants should log the time; callsign of the station heard; RST; serial number and region given by that station; and the callsign of the station being worked.

3. Awards. Certificates of merit will be awarded to the leading three receiving stations.

VHF NFD 1984 rules

Stations wishing to take part in this year's VHF NFD should write to the chairman as detailed below to obtain a site registration form. SWL entries for all or any of the bands will be very welcome, and will count towards the VHF Listeners Championship.

Figures in square brackets refer to the general rules for vhf/uhf contests published in the January 1984 issue of *Radio Communication*.

1. Duration. From 1400gmt 7 July to 1400gmt 8 July 1984.

2. Site notification. Each group intending to compete must send details of the site to be used by completing a site registration form available on receipt of an sae from VHF Contests Committee, c/o J. H. Quarmby, G3XDY, 12 Chestnut Close, Rushmere St Andrew, Ipswich IP5 7ED. Completed forms must arrive at the above address not later than 2 June 1984. Entries will only be accepted from groups who have submitted a correctly completed form. Groups requiring confirmation that their registration has been received should enclose a stamped addressed post card.

3. Bands. Up to four separate stations can be used, operating on the 70, 144, 432 and 1,296MHz bands. Only one station can score or give points on each band. Single-band entries on 144MHz will not be accepted. Stations operating on 70MHz must use cw only during the period 1400-2200gmt, and phone only during the period 0600-1400gmt, and should close down in the period 2200-0600gmt.

4. Operators. Any RSGB member or group of members operating from the British Isles (excluding Eire) may enter. Two groups operating from the same site may combine their scores subject to rules 3 and 5.

5. Stations. All the stations forming one entry must operate from within a circle of 1km radius centered on the operating position of any of the stations. Proof of permission to use a site may be required. All equipment, including antennas, must be installed on the site during the 24h preceding the contest, or during the contest. Only portable accommodation can be used to house the stations. The site may not be used for any transmitting activities by the group or member during the five days before this time. Stations may not use public mains supply. Power for all equipment must be derived from an on-site generator or battery.

6. Scoring. Contacts will be scored by the radial system [7a]. Scores from the two 70MHz sessions will be added to give the final 70MHz score.

7. Contest exchanges.

(a) Contestants must exchange both callsigns, signal reports, serial numbers and QTH locator. On 70MHz the QTH must also be exchanged.

(b) On 70MHz, one scoring contact with a given station can be made in each session. Serial numbers start at 001 in each session.

(c) On 144, 432 and 1,296MHz, only one scoring contact can be made with a given station [11a].

(d) The 1·3GHz station may operate on any other band for the purposes of arranging a contact, but the exchange of contest information must take place on 1·3GHz only, and may not be interrupted by recourse to another band. CQ calls on another band should clearly be "for 1·3GHz only".

(e) Serial numbers start at 001 and advance by one for each contact.

(f) The QTH must be given in a different form in the two sections of the 70MHz event.

(g) No points will be lost if a non-competing station being contacted by an entrant is unable to supply a QTH, QTH locator or serial number, but the receiving operator must obtain enough information to be able to calculate the claimed distance score.

(h) Contacts with stations whose callsigns appear on any of the group's cover sheets will not count for points.

8. Sections. there will be two sections:

(R) Restricted section:

(i) The power output on any band may not exceed 25W p.e.p. at the transmitter.

(ii) The height of any antenna may not exceed 35ft agl.

(iii) Only one antenna per band may be used (eg no stacked, bayed or colinear arrays). A slot-fed Yagi or quad antenna is permitted.

(O) Open section: as per licence.

9. Inspections. All stations are subject to inspection by members of the VHF Contests Committee or nominated representatives. Should the inspector be unable to locate the site due to inadequate or incorrect information being given, the entry will be disallowed. In the event of a last minute change of site, it is the responsibility of the members of the group to make suitable arrangements for the inspector to find the new site. The inspector's brief will be to ensure that the rules and spirit of the contest are being observed.

10. Entries.

(a) All entries must be postmarked not later than 30 July 1984.

(b) Separate sets of log sheets and 427 cover sheets are required for each band.

(c) A summary sheet 4422 must also be completed. Otherwise the scores on each band will be listed, but the total will not appear in the overall results table.

(d) Entries must be addressed to: The Chairman, VHF Contests Committee, 12 Chestnut Close, Rushmere St Andrew, Ipswich IP5 7ED.

11. Other rules. The following general rules will also apply: 5a, 8b, 9, 10a, 12a, 14-26.

12. Awards. The Surrey Trophy will be awarded to the overall winner in the Open section, the Arthur Watts Trophy to the overall winner of the Restricted section, and the Tartan Trophy to the leading Scottish entry. Certificates of merit will be awarded to winners and runners-up in all sections.

10GHz Cumulative Contest rules

1000-1800gmt, 13 May, 17 June, 15 July, 12 August, 16 September

Three activity periods will count towards the final score. Entrants unable to be active for three periods are strongly encouraged to send in logs, as a record of their activity, but will not be eligible for an award. Such logs will be included in the tables of results. All available logs should be sent in, to assist in adjudication.

During each activity period, a station may change location once (see general rule 5b). For the purposes of this contest the "location" is defined as any point within 5km of a fixed point. Contestants may start from a new location for each activity period.

Entries from stations outside the UK will be accepted, whether or not they are RSGB members.

Stations operating from within the UK must state the grid references of all sites used on their cover sheet.

Crossband contacts will count for half-points (see general rule 10b). A full contest exchange (report, serial number, QTH locator and QTH) should be given on both bands.

This year there will be two separate sections, wideband and narrowband. Stations may operate in both sections if they wish, provided that separate equipment is available for both modes (excluding antennas, preamps and power amplifiers). A given station may be contacted twice, once on narrow band and once on wide band to count for both sections. In the case of cross-mode contacts, the points for the contact should be counted towards the section appropriate to the equipment used at *your* end. Serial numbers start at 001 and advance by one for each contact, irrespective of section. Awards will be made to the winner and runner-up in both sections, as well as to the leading foreign station and fixed station in each section. In addition, the leading overall station (combined score from both sections) will receive the Alpha Cup.

Entries should be sent in no later than 1 October. Please do not send in logs until after the last event.

Except where modified above, the following general rules for vhf/uhf/shf contests, published in the January 1984 issue of *Radio Communication*, will apply: 1, 2, 3, 4a, 5b, 6a, 7b, 10b, 11b, 12a 13-24.

All entries and checklogs to: VHF Contests Committee, c/o Dr C. W. Suckling, G3WDG, 46 Windsor Close, Towcester, Northants NN12 7JB.

Microwave Cumulative Contest rules

1000-1800gmt, 13 May, 17 June, 1 July, 15 July, 26 August

The following bands will be active on these dates: 2·3GHz—13 May; 3·4GHz—17 June; 5·7GHz—15 July; 24GHz—1 July and 26 August.

Each band will be scored separately and each band leader will receive a certificate. In the case of 24GHz, only the higher scoring day will count, although logs should be sent in for both days if possible.

During each activity period, a station may change location once (see general rule 5b). For the purposes of this contest the "location" is defined as any point within 5km of a fixed point. Contestants may start from a new location for each activity period.

Stations operating from within the UK must state the grid references of all sites used on their cover sheet(s). A separate cover sheet is required for each band entered.

Crossband contacts will count for half-points (see general rule 10b). A full contest exchange (report, serial number, QTH locator and QTH) should be given on both bands.

Entries should be sent in no later than 1 October. Please do not send in logs until after the last event.

Except where modified above, the following general rules for vhf/uhf/shf contests published in the January 1984 issue of *Radio Communication*, will apply: 1, 2, 3, 4a, 5b, 6a, 7b, 8a, 9, 10b, 11a, 12a, 13-24.

All entries and checklogs to: The VHF Contests Committee, c/o Dr C. W. Suckling, G3WDG, 46 Windsor Close, Towcester, Northants NN12 7JB.

432MHz-24GHz Contest rules

1400-1400gmt, 5/6 May 1984.

Multi-operator stations may operate concurrently using different callsigns. Individual band and overall tables will be published. On 432MHz scoring will be by the radial ring system, and at 1pt/km on the other bands.

The following general rules, published in the January 1984 issue of *Radio Communication*, will apply: 1, 2, 3, 4d, 5a, 6a, 7a, 7b, 8b, 9, 10b, 11a, 12b, 13-26.

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

May 144MHz & SWL Contest rules

1400-1400gmt, 19/20 May 1984.

The following general rules, published in the January 1984 issue of *Radio Communication*, will apply: 1, 2, 3, 4d, 5a, 6a, 7a, 9, 10a, 11a, 12b, 13-26.

All entries and check logs to: VHF Contests Committee, c/o D. A. Yorke, G4JLG, 40 Edge Fold Road, Worsley, Manchester M28 4QF.

1,296MHz Cumulative Contest 1983 results

This year's cumulatives were blessed with variable conditions during the five activity periods. Sessions 1, 3 and 5 appeared to the majority of contestants poor, with session 2 giving medium range dx and session 4 some of the best dx seen on 1,296MHz, with distances of up to 972km being achieved.

The new format of separate nights for 432 and 1,296MHz was welcomed by all contestants, and the VHF Contests Committee will certainly ensure a constant start time for each cumulative. 2030gmt seemed acceptable to all entrants.

Congratulations to GW8TFI/P who from his Welsh mountain top site proved to gain the best of the east-west path conditions. Certificates go to both GW8TFI/P and to runner-up G4APA/P. *G4MWA*

Posn	Callsign	Points	QTH	Power (W)	Ant	Best dx	Km	Session
1	GW8TFI/P	1,866	YL25j	190	4 × 23Y	OZ1AXX	972	2, 3, 4
2	G4APA/P	807	YN79b	175	4 × 23Y	F6DZK	564	2, 3, 4
3	G8FEZ	699	AL56b	50	23Y	PE1CQQ	490	2, 3, 4
4	GW8ACG/P	655	YM05j	40	24QLY	DD1BV	670	2, 3, 4
5	G8GDZ	526	ZM41g	40	4 × 23Y	PE1AKG	555	2, 3, 4
6	G8AYY	429	ZM41b	50	15/15	DD1BV	590	2, 3, 4
7	G3GRO	420	ZL80h	100	4 × 15/15	PA0EZ	388	1, 2, 4
8	G8ZQB	377	ZM35g	150	27QLY	PA0EZ	429	2, 3, 4
9	G3ZQU	368	AM66g	3	2 × 27QLY	DD1BV	411	2, 3, 4
10	G4LNV	356	ZL46g	1	3ft dish	DD1BV	571	2, 4, 5
11	G8FMK	342	ZL26h	40	26Y	PE1CQQ	480	2, 3, 4
12	G8KAX	329	AL32g	70	23Y	F6APE	472	2, 3, 4
13	G6CSY	297	AL51a	2	23Y	PE1CQQ	444	1, 3, 4
14	G8HHI	216	ZL56c	1	15/15	PA0EZ	424	2, 4, 5
15	G8CZZ	203	ZL38e	40	23Y	PA0EZ	397	2, 3, 4
16	G4TAW	126	AL51a	2	23Y	GW8ACG/P	280	1, 2, 3
17	G6GJD	108	YN15h	1	2 × 23Y	G3TDG	358	3, 4, 5
18	G8PSF	106	ZL30e	1·5	15/15	PA0FRE	317	2, 3, 4

21MHz CW Contest 1983 results

The contest this year suffered from rather mediocre conditions, resulting in the bulk of the activity being in the east-west path.

At the start, 9H1EL and a few other European stations, mainly Russia, had the field to themselves. 9H1EL notched up 71 contacts in the first hour, and many Russians exchanged higher serial numbers than the British participants.

After the first hour, the band opened to Japan, where large numbers were looking for UK contacts. Finnish stations reported severe echoes and some turned their beams round to work via the long path.

By 1100 the Japanese stations were fading out and most of the beams turned westwards where North American stations were beginning to appear. This did not help stations situated in Africa who had difficulty throughout the contest in attracting the attention of G stations, being sideways-on to their beams. The path to Australia was very poor throughout the day, with very few VK and ZL callsigns appearing in the logs.

The winner, Neil Graham, G3OAY, operated from the club station GW8GT, making 577 contacts using a TenTec Omni-D to a TH6DXX antenna at 60ft. In second place was G. Beasley, G3LNS, who made 514 contacts with an FT102 and a three-element Yagi at 60ft. Ian Trusson, G3RVM, was third with 483 contacts from his FT101E and two-element quad at 60ft.

IARU Region 1 Field Day 1982 results

The HF Contests Committee apologizes for an error in the results table for this contest which appeared in the December 1983 issue of *Radio Communication*. The callsign of the Windy Yet group should have read "GM3NEQ", and not, as published, "GM3NEO".

Contests Calendar

1 April	ROPOCO 1 *(Rules in March issue)*
8 April	432MHz CW *(Rules in February issue)*
14-15 April	BARTG Spring VHF/UHF RTTY *(Rules in March issue)*
15 April	G T Peck Memorial Trophy DF Event *(Details in April issue)*
15 April	International Gagarin Competition *(Rules in April* MOTA*)*
15 April	Stevenage & DARS 144MHz fm *(Rules in March issue)*
15 April	Low Power *(Rules in February issue)*
28-29 April	Helvetia *(Rules in April* MOTA*)*
29 April	DF Qualifying Event Oxford *(Details in April issue)*
1 May	AGCW-DL QRP Party *(Rules from G3FKM)*
May-September	10GHz Cumulative *(Rules in April issue)*
May-September	Microwave Cumulative *(Rules in April issue)*
5, 6 May	432MHz-24GHz *(Rules in April issue)*
13 May	LF Phone WAB*
19, 20 May	144MHz & SWL *(Rules in April issue)*
20 May	Region Round-up *(Rules in April issue)*
20 May	DF Qualifying Event Coventry
2, 3 June	HF NFD *(Rules in February issue)*
3 June	70MHz & SWL
9 June	1,296MHz Trophy
10 June	432MHz Trophy & SWL
10 June	DF Qualifying Event Dartford Heath
23, 24 June	Summer 1·8MHz
24 June	VHF 144/432MHz Phone WAB*
24 June	DF Qualifying Event Northampton
7, 8 July	VHF NFD & SWL *(Rules in April issue)*
15 July	Low Power Field Day
15 July	DF Qualifying Event Mid-Thames
4 August	432MHz Low Power & SWL
5 August	144MHz Low Power & SWL
5 August	DF Qualifying Event South Manchester
19 August	DF Qualifying Event Salisbury
19 August	1,296/2,320MHz
26 August	ROPOCO 2
1,2 September (prov)	SSB FD
1, 2 September	144MHz Trophy and IARU VHF & SWL
9 September	DF Qualifying Event Chelmsford/Colchester
16 September	70MHz Trophy & SWL
23 September	DF National Final Slade
October-December	432MHz Cumulative
October-December	1,296MHz Cumulative
6 October	DF Double Night Event Slade
6, 7 October	432MHz-24GHz & IARU UHF
7 October	21/28MHz Phone
21 October	21MHz CW
27 October	DF Treble Night Event Mid-Thames
28 October	70MHz Fixed
3, 4 November	144MHz CW & Marconi Memorial
4 November	LF CW WAB*
10, 11 November	2nd 1·8MHz
12, 20, 28 November **6, 14, December**	28MHz Cumulatives
2 December	144MHz Fixed
16 December	70MHz CW

* Rules, logsheets and other information from Steve Lawrence, 7 Ashfield Road, Market Harborough, Leics.

Winner of the British Isles QRP section, J.J. Pascoe, G4ELZ, used a modified FT301D at 10W input to a four-element sloper antenna system 40ft above ground at its highest point.

In the overseas section 9H1EL (G3YDR) was the clear winner with 204 contacts, and UA3DJN was in second place with 169. 4N4DD (YU4VRA) made 114 contacts to gain third place. Winner of the overseas QRP section was YU1OWW, who used a homebrew transmitter at 10W input and a ground plane antenna for his 80 contacts.

This year saw the introduction of a short wave listener section with an encouraging entry from overseas. John Goodrick, BRS44395, logged 186 contacts using an FRG7700M and an active dipole at 20ft to take first place in the British Isles section, while Alexander Zhigachov, UA6-101-62, used a homebrew nine-valve superhet to record 104 contacts.

Many entrants lost points through minor logging errors, including incorrect callsigns. Those who lost a large number of points had unmarked duplicates and/or lost multipliers. A few overseas entrants will find their scores increased, having misunderstood the available multipliers, and one British entrant missed out one complete log sheet when calculating his score.

Comments received indicated that most entrants enjoyed the contest. Several suggested including 28MHz to supplement activity. BRS52868 had a listen on 28MHz during a break and heard many European countries absent on 21MHz. He also commented on overseas stations using break procedure without once sending the call of the G station, making logging difficult. JA multipliers were especially appreciated.

Contest publicity was sent to most overseas societies and obviously proved very effective in Japan and North America, judging by the number of those stations active. Thanks are due to all who sent in entries, check logs

and comments, which will be discussed when the rules of the 1984 event are reviewed.

Subject to the approval of Council, Neil Graham, G3OAY, will be awarded the T.E. Wilson (G6VQ) Cup and will receive RSGB publications to the value of £10. Certificates of merit will be sent to the leading three stations in each section and in each overseas country.

G3KKQ

BRITISH ISLES SECTION

Posn	Callsign	Mult	Points	Posn	Callsign	Mult	Points
1	GW9GT	72	119,880	22	G3SWH	50	27,700
2	G3LNS	72	104,256	23	GW3MPB	51	24,786
3	G4CNY	72	101,304	24	G3APN	45	21,015
4	G3RVM	73	97,601	25	G3KSH	46	18,354
5	G4BUO	72	89,208	26	G4MH	44	15,356
6	G4DRS	68	84,870	27	G3ESF	42	14,742
7	G3FKH	68	76,636	28	G4CCZ	42	12,792
8	G3SJJ/A	65	68,055	29	G4NDL	40	11,760
9	G3PVA	65	67,990	30	G4KDL	34	9,894
10	G3NOM	66	66,066	31	G3VTY	37	9,509
11	G3VJP	62	62,496	32	G6QQ	33	8,415
12	G3UFY	58	61,596	33	G4MVA	35	7,910
13	G2QT	68	55,692	34	G4ANH	31	7,552
14	G3TXF	64	54,208	35	G3AWR	32	7,392
15	G4AMT	65	51,805	36	GW3ZDW	32	7,200
16	GM4EJI	54	50,544	37	G3WRR	27	4,050
17	G3SXW	62	49,228	38	G4IWO	21	3,339
18	G4UPS	77	48,972	39	G3GMM	25	3,150
19	G3IGW	61	47,824	40	G2HDR	22	2,838
20	G5ECD	54	36,126	41	G3OLU	19	2,717
21	G5MY	57	29,013	42	G2AJB	20	2,400

(The Overseas Section table will be published next month.)

OVERSEAS QRP SECTION

Posn	Callsign	Mult	Points	Posn	Callsign	Mult	Points
1	YU1OWW	10	2,360	9	OH6KY	6	378
2	UB5CI	10	2,150	10	OH5AD	7	315
3	UB5QCK	10	1,740	11	JH7XGN	4	144
4	UB5AAL	8	1,160	12	OH7UV/8	4	108
5	N5BA	6	738	13	EA1ASI	3	90
6	N8CQA	7	651	14	JA1OHP	2	54
7	JH3KDZ	6	558	15	JA1JGP	2	18
8	AI2S	6	450				

Entry from EA5RQ disqualified—excessive log errors and irregularities

BRITISH ISLES QRP SECTION

Posn	Callsign	Mult	Points
1	G4ELZ/P	40	13,840
2	G3VMY	30	5,940
3	G3NIJ	25	4,125
4	G4ETJ	23	3,312
5	G3IQF	13	663

BRITISH ISLES SWL SECTION

Posn	Callsign	Mult	Points
1	BRS44395	55	29,975
2	BRS1066	49	20,874
3	BRS52868	31	4,650

OVERSEAS SWL SECTION

Posn	Station	Mult	Points	Posn	Station	Mult	Points
1	UA6-101-62	12	3,348	5	UB5-082-291/U5F	8	1m,056
2	UA6-150-697	11	3,080	6	JA6-9330/JA1	8	720
3	UA3-142-198	9	1,989	7	UA3-123-419	7	651
4	UQ2-037-239	8	1,080		UB5-065-2040	7	651

Check logs received from: G3FXA, G3GSZ, NC5K, W9YDP, UA1WAP, UA3TAM, UA9DC, UA9HCA, UK5DAA, UL7GAA, UY5GG.

DF Qualifying Event Oxford

Date: 29 April 1984.
Map: OS sheet 164, 1:50,000 series, Oxford.
Assembly: 1300bst for start at 1320bst.
Location: Shotover Plain, ngr 565 062. Please approach from the west.

Competitors requiring tea should notify Mr P. Bradley, 60 Weyland Road, Headington, Oxford OX3 8PD, tel 0865 61808, not later than 22 April 1984.

Details of rules etc of RSGB top band df events may be obtained from E. L. Mollart, G6AGE, 17 Spinfield Mount, Marlow, Bucks SL7 2JU.

G T Peck Memorial Trophy DF Event

Date: 15 April 1984.
Map: OS sheet 175, 1:50,000 series, Reading and Windsor.
Assembly: 1300bst for start at 1320bst.
Location: Peppard Common, ngr 709 818.

Competitors requiring tea should notify Mr W. Peachey, Jays Lodge, Crays Pond, Reading RG8 7QG, tel 0491 680552, not later than 8 April 1984.

Verulam ARC Contest results

We apologise for a composition error which occurred with these results, *Rad Com* March, p246. Because of space limitations, it was necessary to shorten the tables to give only the leading stations, but the three lines for positions 13, 14 and 15 in the transmitting section were inadvertently included alongside positions 1, 2 and 3.

Consequent on changes which took place in the layout of *Radio Communication* last year, and for other reasons, our policy regarding the publication of rules and results of club contests was changed.

In any issue, if space remains on the final "Contest News" page after all RSGB contest news has been included, we will fill it with any current club contest news, but with no guarantee that rules and results, in whole or in part, will be published. However, we will endeavour to give at least the address from which contest rules can be obtained.

Club News

The following is the latest information received by RRs from RSGB affiliated societies, clubs and groups in time for inclusion in this issue, plus basic unchanged information on other affiliated organizations which was last published in the January issue.

RSGB affiliated organizations are requested to report all programmes and news items to their regional representatives regularly. Information for inclusion in the **June** issue should reach them by **12 April** and for the **July** issue by **12 May.**

Club programmes are given in order of date, subject time and place of the meeting. All callsigns of club secretaries and other contacts are QTHR (correct in the current *RSGB Call Book*) unless otherwise stated.

All clubs welcome visitors and would be pleased to hear from potential new members.

REGION 1—RR W. R. Parkinson, G3FNM, 141 Norris Road, Sale, Cheshire M33 3JR. Tel 061 973 1472.

Ainsdale (AARC)—3 April (Informal at the Mount Pleasant Hotel, Manchester Road), 24 April (Formal meeting), 10, 17 April, 1 May (DF hunts, 7pm start). Scout HQ, Marine Drive, near the pier, Southport. Sec David Norris, G4TUP, tel 0704 35947.

Barnoldswick (Rolls-Royce ARC)—4 April (Quiz night), 2 May (Fox hunt), 29 April (Visit to NEC, 8am start. Fare £3.50. Non-members £4.50. Details for picking up points etc from sec Leslie Logan, G4ILG, tel 0282 812288). Club meets at 8pm. Rolls-Royce Sports & Social Club, Barnoldswick.

Barrow (South Lakeland ARS)—First Tuesday and third Thursday in each month. NORWEB Social Club, adjacent Ormsgill Hotel, Barrow. Chairman G3IZD, treasurer, G8KPL, secretary, G6LKB.

Bury (BRS)—10 April ("Early radio", by Arnold Moss, G8VF), 8 May ("Confessions II", continuation of the "Confessions of a tv repair man" by Clive Hardesty, G8XUR). 3,17,24 April (Informal meetings), 8pm. Mosses Community Centre, Cecil Street, Bury. Pro Malcolm Pritchard, G3VNQ.

Fylde (FARS)—3 April ("RTTY", by John Ball, G4RSA), 17 April (Informal meeting and morse class), 1 May (Visit to HMS *Inskip*), 7.45pm. Kite Club, Blackpool Airport. Pro Frank, G4CSA, tel 0253 737680.

Manchester (South Manchester RC)—6 April (Spring df contest), 13 April ("Radio signalling—British Rail", by Mrs Christine Barker), 20 April (Club closed), 27 April (Home built equipment contest), 4 May (Discussion evening), 8pm. Sale Moor Community Centre, Norris Road, Sale. Informal meeting Mondays, 8pm, in the club shack. Sec David Holland, G3WFT, tel 061-973 1837.

Stockport (SRS)—11, 18 April (Informal meetings), 25 April (Surplus equipment sale), 8.15pm. Blossoms Hotel, corner of Wellington Road and Bramhall Lane, Stockport. Sec Mel Betts, G4FFW, tel 061-224 7880.

Thornton Cleveleys (TCARS)—9 April (Construction night), 16 April (Film show), 23 April (Natter night), 30 April (Barb-e-que), 7 May ("Aeroplanes", by Jerry Vallely), 7.30pm. Norbreck 1st Scout Hut, Carr Road, Bispham. Sec Mrs Janet Bullock, 26 Lancaster Ave, Thornton Cleveleys, Blackpool FY5 4NN, tel 0253 826451.

Wirral (WARS)—4 April (Sale of surplus equipment), 18 April ("Aerial Circus" video lecture by Dud Charman, G6CJ), 7.45pm. Guide Hut, Westbourne Road, West Kirby. Sec Cedric Cawthorne, G4KPY, tel 051-625 7311.

REGION 2—RR to be appointed

Goole (GR&ES)—3 April (Natter night), 10 April ("Unusual aerials", by Mike Ward, G6IDL), 17 April (Operating evening), 24 April (Visit, details in newsletter). Junior Chamber Buildings, Boothferry Road, Goole. Details from sec Richard Sugden, G8IOH, tel Reedness 462.

Hornsea (HARC)—Wednesdays, 7.30pm. The Mill, Atwick Road, Hornsea. Details of meetings on RSGB Northern News, or from sec Norman Bedford, G4NJP, tel 0262 73635.

Maltby (MARS)—Fridays, 7pm. Methodist Church Hall, Blyth Road, Maltby. The club holds morse and RAE revision classes. Details from Ian, G3ZHI, tel 0709 814911.

Todmorden (T&DARS)—2 April (Homebrew evening). Queen Hotel, Todmorden. Details from sec G6MDB, 283 Halifax Road, Todmorden, Lancs OL14 5SQ.

REGION 3—RR L. W. Craven, G4EQI, Grass Moor, Radford Road, Alvechurch, Birmingham B48 7DT. Tel 021-445 1347.

Atherstone (AARC)—16 April ("VHF/UHF techniques/introduction to awards" by G5UM) 7.30pm. Tudor Centre, Coleshill Road, Atherstone. Sec G6BEO, tel Hinkley (0455) 212051.

Birmingham (Midland ARS)— 17 April ("QRP", by Rev George Dobbs, G3RJV), 7.30pm. 294a Broad Street, Birmingham B1 2DS. Sec G8BHE, tel 021-422 9787.

Birmingham (South Birmingham RS)—11 April ("Microwaves", by Glen Ross, G8MWR), 7.45pm. St Lawrence Pastoral Centre, Church Hill, off Bunbury Road, Northfield. Sec G8RGQ, tel 021-459 8312.

Bromsgrove (BARS)—10 April (Members talks and discussions on computers), 24 April (Informal

meeting), 8pm. New meeting place—British Legion Club, Bromsgrove. Sec Alan, G4LVK, tel 021-445 2088.

Bromsgrove (B&DARS)—13 April (Annual constructors contest), 8pm. Avoncroft Art Centre, Bromsgrove. Asst sec G4NWQ, tel 021-476 6965.

Burton-on-Trent (B-on-T&DARS)—Wednesdays, 8pm. New club sec Mike, G4HBY, tel Burton-on-Trent (0283) 62344.

After 30 years membership and service to Burton-on-Trent RS, Mr Harold Harrison, G3ACR, (right) was presented with a brass key by the chairman of the club, Cyril Hartshorne, on his retirement

Coventry (CARS)—6 April (On the air), 13 April (Visit to sound recording studio), 20 April (No meeting, Easter), 27 April (Club project), 8pm. Baden Powell House, 121 St Nicholas Street, Radford, Coventry. Sec Dave, G8OMB, tel Coventry (0203) 396936.

Coventry (CTARS)—2 April ("50 years of amateur radio", by Tom Douglas, G3BA), 7pm. Winfray Annexe, Coventry Technical College, New sec, Roy Flowers, BRS53677, tel Coventry (0203) 77947.

Dudley (DARC)—10 April (" VHF/UHF operation" by Fred Smith, G6FK), 7.45pm. 24 April (No meeting due to Easter holiday). Central Library, Dudley. Sec G4SQP, tel Codsall (209) 5636.

Halesowen (MEB Sports & Social Club)—10 April (AGM), 8pm. MEBHQ Social Club, Mucklow Hill, Halesowen. Sec Bob, G4RWH, tel 021-747 8784.

Hereford (HARS)—April meeting to be announced on GB2RS, 8pm. Civil Defence HQ, Gaol Street, Hereford. New sec, Eddie, G3WRQ, tel Hereford (0432) 54064.

Malvern Hills (MHRAC)—10 April (Meeting to be announced on GB2RS). 7.30pm. Club coach will run to RSGB Convention, NEC Birmingham on Sunday 29 April. New club sec, Nic, G4TXG, tel Malvern (06845) 65802.

Much Wenlock (Wenlock ARES)—Second and fourth Mondays in each month, 8pm. Raven Hotel, Much Wenlock. New sec, Phil, G6JMG, tel Bridgnorth (0746) 862103.

Redditch (RRC)—26 April (Discussion evening and on the air), 8pm. WRVS Centre, Ludlow Road, Redditch. Sec Ray, G3EVT, tel Alcester (0789) 2041.

Shrewsbury (Salop ARS)—5 and 19 April (Natter nights), 12 April (Construction contest), 26 April (Surplus sale), 29 April (Visit to RSGB Convention, NEC, Birmingham), Meetings 8pm. Albert Hotel, Smithfield Road, Shrewsbury. Sec G6UDB, tel Shrewsbury (0743) 62737.

Solihull (SARS)—17 April ("Amateur tv", by Haden Bate, G8AMD), 7.30pm. Manor House, High Street, Solihull. Sec G6HSZ, tel 021-742 3378.

Stourbridge (STARS)—2 April (Morse code classes begin), 16 April ("Digitally speaking", by G3MRZ and G8JTL), 30 April (Morse class and constructional evening, G6OI and G6SRS transmitting), 8pm. The Robin Woods Centre, School Street, off Enville Street, Stourbridge. Sec G8JTL, tel Lye (593) 4019.

Stourbridge (Wordsley)—5 April (No meeting), 7 April (Skittles evening at Fountain Hotel, Clent, tickets from G4TGM), 19 April (AGM (members only)), 8pm. Vine Inn, Wordsley, West Midlands. Sec Andrew, G4TGM, tel Kingswinford (2) 295082.

Stratford-on-Avon (S-on-A&DARC)—9 April ("Mobile interference suppression", by Dennis Morris, G3AYJ), 23 April (Easter bank holiday), 7.30pm. Old Control Tower, Bearley Radio Station, Bearley, nr Stratford-on-Avon. Contact Ian, G4CWK, tel Stratford-on-Avon (0789) 68863.

Sutton Coldfield (SCARS)—9 April (Two RSGB films: "Aerial Circus", and "Farnborough Radio Society HF Field Day"), 23 April (No meeting, Easter), 7.30pm. Central Library, Sutton Coldfield. Sec G6UFD, tel 021-358 6501.

Telford (T&DARS)—4 April (AGM), 11 April (Committee meeting of new members), 18 April (Construction competition, judge G4LSA), 8pm. Dawley Bank Community Centre, Dawley. Sec G6ECA, tel Telford (0952) 503758.

Tenbury (T&DARS)—Newly affiliated. Thursdays, fortnightly. Construction evenings, alternate Thursdays, 7.30pm. Club House at Broadheath being renovated. Sec Ken, tel Kyre (08854) 274.

Stoke-on-Trent (North Staffs ARS)—Regular monthly lectures Mondays, 7.30pm. Harold Clowes Hall, off Dawlish Road, Bentilee, Stoke-on-Trent. New sec David, G6MLI, tel Newcastle (0782) 332657.

Walsall (WARS)—4 April (G4HLL on the air, hf and vhf), 11 April (CW practice evening, beginners welcome). 18 April (RSGB film show), 25 April, (RAE revision evening), 8pm. Forest Comprehensive School, Bloxwich, Sec G4FAJ, tel Brownhills (05432) 2169.

Warwick (Mid-Warwickshire ARS)—10 April ("Radio in a Japanese PoW camp", by Tom Douglas, G3BA), 24 April (Discussion evening), 8pm. 61 Emscote Road, Warwick. Sec G4TIL, tel Southam (096281) 4765.

West Bromwich (WBCRC)—Sundays, 8pm. Victoria Hotel, Lyng Lane, West Bromwich. Sec G1BGX, tel 021-544 4759.

Willenhall (W&DARS)—4 April (AGM), 11 April (CW class), 28 April (G4ETW on the air and cw class), 8.30pm. Saracens Head, Bloxwich Road South, Willenhall. New sec, John, G4LWI, tel Wolverhampton (0902) 782036.

Wolverhampton (WARS)—3 April ("70cm df hunt equipment and pocketphone modifications", speaker tba), 10 April (Satellites), 15 April (Sun df hunt), 17 April ("RF heating", by Frank Wyer, G8RY), 24 April (Natter night, interference suppression), 8pm. Wolverhampton MEB Club, St Marks Road, off Chapel Ash, Wolverhampton. New sec G6ZHV, tel Wolverhampton (0902) 763387.

Worcester (W&DARC)—2 April (Constructional contest), 8pm. Oddfellows Club, New Street, Worcester. Sec Alasdair, G4NRD, tel Evesham (0386) 41508.

Worcester (Moonbounce Society)—Newly affiliated, callsign G1EME. Red Lion Cottage, Holt Heath, Worcester. Expedition to C3 being planned. Interest in 50MHz-2·3GHz? Contact Peter, C30AKA, tel Worcester (0905) 620041.

Members wishing to purchase reduced price literature at the RSGB NEC Convention, 28/29 April should bring their membership cards with them. Look forward to seeing you there. G4EQI, RR3.

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

Bolsover (BARS)—18 April ("50 years of amateur radio", by G3BA), Wednesdays, 7.30pm. Angel Hotel, Bolsover. Sec Ian Mellows, G4WCX, tel Mansfield 811129.

Buxton (BARS)—10 April ("Amateur radio on a shoestring", by Rev George Dobbs, G3RJV), 24 April (Open forum), 8pm. Egerton Hotel, 36 St Johns Road, Buxton. Sec Dave Cooper, G6MIF, tel Buxton 6174.

Derby (D&DARS)—4 April (Junk sale), 11 April (Night on the air), 18 April (Amtor—what is it?), 25 April (RSGB-Q&As), 7.30pm. 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.

Derby (NHARG)—Fridays, 7.45pm. Nunsfield House, Boulton Lane, Alvaston, Derby. Sec John Robson, G4PZY, tel Derby 767994.

Grantham (GRC)—17 April ("Make the most of your scope", by G6IPW), 8pm. Shirley Croft Hotel, Harrowby Road. Grantham. Sec John Kirton, G8WWJ, tel Grantham 65743.

Hinkley (HARES)—11 April ("RSGB questions and answers" by G3SZJ), 25 April (Top band df), 7.30pm. John Cleveland College, Butts Lane, Hinckley. Sec Norman Geary, G8STX, tel Hinckley 632778.

Lincoln (LSWC)—11 April ("VHF then and now with a look at the RSGB metre awards system" by G5UM), 8pm. City Engineers Club, Waterside South, Lincoln. Sec Pam Rose, G4STO, tel Gainsborough 788536.

Louth (LARC)—First Wednesday in each month, special meetings third Wednesday, 7.30pm. Kings Head Hotel, Louth. Details from Paul Empringham, G6GZS, tel North Somercotes 483.

Melton Mowbray (MMARS)—13 April (Construction contest), 7.30pm. St John Ambulance Hall, Asfordby Hill, Melton Mowbray. Sec Richard Winters, G3NVK, tel Melton Mowbray 63369.

Newark (N&DARS)—5 April (Cambridge evening), 17 April (Natter and noggin, The Rose & Crown, Farndon), 3 May (Junk sale), 7.30pm. Palace Theatre, Appleton Gate, Newark. 20 to 23 April (GB2NAM at Newark Air Museum). Sec Roger Hiscock, G4MDV, tel East Stoke 539.

Nottingham (ARCON)—5 April (AGM), 12 April ("History of Arcon", by G4NZU), 19 April (Activity night), 26 April ("Amateur radio, 1937 until today", by G3BA, Tom Douglas,) 5 May (Forum), 7.30pm.

Following the success of the Beechdale Ambulance Station's open day in September 1983, of which GB2BAS was a part, sufficient funds were raised to buy and train one guide dog for the blind, and nearly enough for a second one. So Alan Marwood, G8SSL, suggested ARCON run a "sponsored CQ" in early December 1983 to try and raise the extra £200 needed. The end result was a cheque to the value of £158.32 being handed over to Mrs Walsh, of the Institute for the Blind, at ARCON's Christmas party held at the Test Match Inn, West Bridgford on 22 December 1983.

Alan Marwood, G8SSL, Mike Shaw, G4EKW (president), and Dave Molyneux, G3YUT, (chairman), are seen addressing the meeting, with Mr and Mrs Walsh and Sheba. *Photo:* Phil Barber, G4OSL

Woodthorpe House, Sherwood Community Centre, Mansfield Road, Nottingham, Sec Phil Barber G4OSL, tel Nottingham 266082.
Ollerton (Dukeries ARC)—Sundays, 1 April ("RSGB—questions and answers", by G3SZJ), 2pm. Labour Hall, New Ollerton. Sec Paul Jackson, G4WBH.
Ollerton (Robin Hood ARS)—Fridays, 8pm. White Hart Inn, Ollerton. Sec P. Buckmaster, G6VGN, PO Box 1, New Ollerton, Newark, Notts NG22 9XL.
Scunthorpe (S&DARC)—Tuesdays, 10 April (RSGB questions and answers, Martin Shardlow, G3SZJ), 8pm. Grange Farm Hobbies Centre, Franklin Crescent, Scunthorpe. Sec Ida Aizlewood, G6ZCA, tel Scunthorpe 732268.
Spalding (S&DARS)—13 April ("Radio controlled models", by G6RNY), 8pm. Maple Room, White Hart, Market Place, Spalding. Sec Betty Whitley, G6YBL, tel Spalding 2781.

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

Bedford (B&DARC)—25 April (Video "The secret listeners"), Ravensden. Sec Les, G4PBE.
Cambridge (C&DARC)—Coleridge Community College closed for Easter. Pub night in lieu. Details from sec Dave, G8JKV.
Cambridge (CUWS)—Closed for the Easter vacation. Details from sec Lawrence Barber, G8NJJ, of Selwyn College.
Dunstable Downs (DDRC)—6 April (Talk by a member of the Leighton Linslade RC), 20 April (No meeting (Good Friday)), 27 April (DF hunt, 160 and 2m), 8pm. Chews House, Dunstable Downs. Sec P. G. Seaford, G8XTW.
Leighton Linslade (LLRC)—2 April (Computer night, a chance to play with some computers, hopefully guided by our own experts), 16 April (Meeting), 7–10pm. Vandyke Community College, Room A64, Vandyke Road, Leighton Buzzard. Sec Peter Brazier, G6JFN.
Milton Keynes (MKARC)—9 April ("Amtor", by Ian Wade, G3NRW). Details from RR5.
Peterborough (GPARC)—12 April (Junk sale/quiz/raffle), 7.30pm. Southfields Junior School, Stanground, Peterborough. Sec Frank Brisley, G4NRJ, tel 0733 231848.
Wellingborough (Nene Valley RC)—4 April (Natter night), 7/8 April (Boys' Brigade Anchor Chain 1984, operating GB4WBB), 11 April (Video evening "World at their fingertips", "World of amateur radio"). Dolben Arms, Finedon. Details from Lionel, G4PLJ.

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HA3 7EA. Tel Penn (049 481) 4240.

Aylesbury (AVARS)—The club now meets fortnightly. 3 April (Junk sale), 17 April (Quiz with Leighton Linslade Radio Club), 1 May (Cheese and wine social), 15 May (Norman Lipman, G6ASA, on "Alternative energy"). Details from Cathy Clark, tel 0844 51461.
Vale of the White Horse (VWHARS)—3 April (Ian White, G3SEK, sec of the club will give the members his own private exposition of the planned lecture to the VHF Convention to be held later in the year. The subject will be "getting the most from your vhf station"). Details from Ian, tel 0235 31559.

REGION 7—RR to be appointed

Biggin Hill (BHARC)—17 April (Dealer demonstration by C. M. Howes), 8.30pm. St Marks Church Hall, Church Road, Biggin Hill. On 28 April a coach to the RSGB National Convention has been arranged, cost £6.50. Details from Ian Daniels, tel 01-656 5285. The total membership of the club has risen to 57. New committee after the agm comprises chairman, Jim Burr, G3CTI; sec Ian Mitchell, G4NSD; treasurer, Colin Peck, G8TBZ, and G. Chamberlain, G4NPD, and I. Daniels, G4VTD. Details from Ian, Greenway Cottage, Tatsfield, Westerham, Kent TN16 2BT, tel 09598 376.
Coulsdon (CATS)—9 April ("Conversion of commercial equipment for amateur use", by Frank G3ZMF), 7.30 for 8pm. St Swithins Church Hall, Grovelands Road, Purley, Surrey. Details from Alan, G6HC, tel 01-684 0610.
Crystal Palace (CP&DRC)—21 April (Informal), 8pm. All Saints Parish Rooms, Upper Norwood, SE19. Sec G.M.C. Stone, 11 Liphook Crescent, SE23, tel 01-699 6940.
Sutton & Cheam (SCRS)—6 April (TBA), 13 April (TBA). Downs Lawn Tennis Club, Holland Avenue, Cheam. 4 May (AGM), Sutton College of Liberal Arts. Acting sec Jack Korndorffer, G2DMR, 19 Park Road, Banstead.
Wimbledon (W&DRS)—13 April (Surplus equipment sale), 27 April (Natter night and cw practice), 8pm. St John Ambulance HQ, 124 Kingston Road, Wimbledon SW20. Sec G. Mellett, G4MVS.

REGION 8—RR M. Elliott, G4VEC, 20 Haysel, Sittingbourne, Kent ME10 4QE. Tel 0795 70132.

Canterbury (East Kent ARS)—5 April (Talk on interference, tvi, and others (to be confirmed)), 19 April (To be announced), 5 August (East Kent RS mobile rally). The Cabin, Kings Road, Herne Bay, Kent. Details from sec Stuart Alexander, G6LZG, tel Canterbury 68913.
Chichester (C&DARC)—3 April (AGM, plus contest for home construction equipment, in the Long Room), 19 April (Club meeting in the Green Room), 7.30pm. Fernleigh Centre, 40 North Street, Chichester. Details from sec Chris Bryan, G4EHG, tel Chichester 789587.
Dover (SEKYMCARC)—4 April (AGM), 11 April ("Up and down—the wonders of lifts", by G4OJG), 18 April (Amateur television), 25 April (2m fox hunt), 2 May (Natter night and film show), 7.30 for 8pm. Dover YMCA, Godwynehurst, Leyburne Road, Dover, Details from Alan Moore, G3VSU, 42 Nursery Lane, Whitfield, Dover, tel Dover 822738.
Maidstone (MYMCAARC)—Fridays, 13 April ("Modern amateur radio", by Peter Clarke, G3LST, of Arrow Electronics), 27 April ("Teleprinter surgery", by Michael Cobb), 8pm. "Y" Sports Centre, Loose Road. Details from G4GKW or G4EMC.
Margate (Thanet RC)—10 April (Video film, "Commercial satellites"), 24 April (To be arranged), 8pm. Grosvenor Club, Grosvenor Place, Margate. Details from sec Ken Lown, G4PTE, tel 0843 32198, or Ian Gane, G4NEF.
Tunbridge Wells (West Kent ARS)—No formal meetings during April as adult education centre will be closed. 10, 24 April (Informal meetings at the Victoria Road Drill Hall, Tunbridge Wells). Details from Brian Guinnessy, G4MXL, tel 0892 32877.

REGION 9—RR W. J. Colclough, G3XC, "Highview", Indian Queens, St Columb, Cornwall TR9 6LL. Tel 0726 860485.

Axe Vale (AVARC)—Club call G8CA. 6 April ("Construction techniques", with a challenge). A new innovation to the club is an excellent newsletter edited by the pro Roger Jones, G3YMK. It contains lots of interesting bits and pieces including the story behind the club call, G8CA. It would appear the club was originally formed as long ago as 1970, and one of the founder members was the now deceased owner of the call G8CA. The club is running a coach to the RSGB Amateur Radio Exhibition at the NEC on 28 April. Non-members are welcome and full details of time, cost etc, can be obtained from the club sec Bob Newland, "Ham House", Lyme Road, Uplyme, Lyme Regis, Dorset DT7 3XA, tel 02974 5282. Chairman, Cliff Toomer, G4RKE; treasurer, Pip Piper, G4LHS; sec Bob Newland, G3VW; equipment officer, George Smith, G8AOJ; pro, Roger Jones G3YMK.
Cornish (CRAC)—5 April (AGM). Computer section: 16 April ("Pascal", introductory talk by Andrew Crook). The general club meetings and also the computer group will, in future, meet at the same venue, the Church Hall, Treleigh, on the Redruth Bypass. Following the recent excellent talk on rtty by G4SDU, G4MSV, and G4EIK, interest in 10m fm has been somewhat reduced in favour of rtty within the county. Sec Simon, G4PEM, tel Penzance 3948.
Camelford (North Cornwall RC)—First Wednesday in each month, 4 April ("DF antennas", by G6LXS), 27 April (Daytime visit to Caradon Hill transmitting site, 2pm. Further details from sec.), 7.30pm. RAOB Club, Fore Street, Camelford, Cornwall. Pro Jack Boundy, G8ZOK, tel Tintagel 770542.
Exeter (EARS)—9 April (Visit to Radio Devon Studios. Meet at studio main entrance at 7.30pm. As there is only limited accommodation book through Simon, G6OGO). Second Monday in each month (Formal), 7.30pm. Community Centre, St Davids Hall, Exeter. Informal meetings other Mondays, Emmanuel Scout Hut, Okehampton Road, Exeter. Pro Roger Tipper, G4KXR, 11 Chancel Court, Chancel Lane, Pinhoe, Exeter, tel 0392 68065.
Exmouth (EARC)—Alternate Mondays, 7.30pm. 6th Exmouth Scout Hut, Marpool Hill, Exmouth, Devon. Chairman, Harry Williams; treasurer, Steve Gurney, G8UXJ; sec, Des Thompson, G8SBU.
Newquay (N&DARS)—Club call G4ADV. 11 April (Visit to Coastguards Station, Falmouth, all meet at Pendennis Castle, 7.30pm), 25 April (Making and testing df (vhf) antennas). Details from sec, 22 Bramble Close, Newquay, tel Newquay 4285.
Plymouth (PARC)—2 April (Fox hunt), 16 April (Spring social), 30 April (AGM), 7.30pm. Information from sec G6XZG, PO Box 46, Plymouth PL1 1SY.
St Austell (English China Clay RC)—23 April (QSL cards). Pentewan Labs. Details from sec Mike Porter, G4OKS, tel 0726 850818. Chairman, Chris Rogers, G4MXB; treasurer, Tony Turner, G6EKX; sec, Mike Porter, G4OKS; vice-chairman, Geoff Tregoning, G4RMO; RSGB and Raynet, Chris Golley, G4JYF.
Saltash (S&DARC)—Club call G4GXK/G8SAL. First and third Fridays in each month, 7,30pm. Burraton Toc H Hall, Saltash. President J. H. Miller, G8NSP; chairman, F. Rattray, G4SPB; sec, B. Pridham, G8YJJ; treasurer, M. R. Huntley, G4CDU; pro, J. Lee, G4TSN.
Tavistock (Kelly College ARS)—Society call G4COF, operational on hf, 144 and 432MHz. Details from G8ONR, tel Tavistock 2881 at the school, or Tavistock 3231. Intending visitors should phone in advance.

May I thank all those clubs who sent representatives to the regional meeting at Plymouth, also to the ARs, news readers, and other RSGB members who supported the gathering. *RR9*

REGION 10—RR E. J. Case, GW4HWR, 2 Abbey Close, Tyrhiw, Taffswell, Mid-Glamorgan CF4 7RS. Tel 0222 810368.

Abergavenny & Nevill Hall (A&NHARC)—Thursdays, 12 April (AGM), 7.30pm. RAE classes in the Seminar Room, Tuesdays, 7.15pm. Pen y Val Hospital, above Male Ward 2, Abergavenny. Sec Dave Jones, GW3SSY, tel 0873 78674.
Aberystwyth (ARSGBG)—10 April (Morse practice and station). Bay Hotel (on the sea front, opposite the bandstand). Sec J. M. Pryse, GW4JXB, tel 0970 828446.
Blackwood (BARS)—Fridays, 13 April (John Case, GW4HWR "Some homebrew hf aerial systems"), 7pm. Oakdale Comprehensive School, Oakdale, Blackwood, Gwent. Sec Wynn Wright, GW8UAM.
Bristol Channel Repeater Group (GB3BC)—Members and intending members please note that the membership secretary has changed his address—it is now Roy Selleck, GW6MBU, 12 Northman Close, Rhoose, tel Barry 711146.
Cardiff (CRSGBG)—9 April ("Underwater photography", Tony Case, GW8UKW. Tony has recently been selected from more than 20,000 divers as "Diver of the year"), 7.30pm. Pantmawr Hotel, Tyla Teg, Pantmawr Estate, Whitchurch, Cardiff. Sec Cyril Laws, GW6ZHP, tel Cowbridge 3212.
Highfields Disabled Centre (HARS)—Thursdays, 7pm. Highfields Centre, Allensbank Road, Cardiff. This club was formed in 1981—the International Year of the Disabled—by the late Wing Commander Cyril Parsons, GW8NP. Under his guidance and with the help of a number of dedicated friends a station was set up, callsign GW4LFO. The club is now very active and the many activities include listening and transmitting to and from stations on vhf and hf; electrical theory for those wishing to sit the RAE and for those who have passed, morse code lessons, practical workshop, computer instruction, film shows and lectures. If you are interested please contact Sid Hudson at the centre, tel Cardiff 750315.
Newport (NARS)—Mondays. 9 April ("Man from the Met Office"), 16 April (Film and video), 23 April (Centre closed), 7pm. Brynglas House, Brynglas Road, Newport. Details from sec Robert Johns, GW4NXD.

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)—12 April (Talk by John Lawrence, GW3JGA, subject to be announced later), 7.45pm. Green Lawns Hotel, Bay View Road. Sec J. N. Wright, GW4KGI, 46 The Dale, Woodlands, Abergele, Clwyd LL28 7DS, tel 0745 823674.

Dolgellau (Meirion ARS) (GW4LZP)—Please note revised information. Meetings held at Dolserau Hall Hotel, one mile east of Dolgellau, on first Thursday of the month. 5 April (AGM). Sec W. H. Judge, GW4KEV, Tyddyn Mawr, Arthog, nr Dolgellau, Gwynedd.
Rhyl (R&DARC) (GW4ARC)—2 April (Activity night), 16 April (DF hunt), 7.30pm. 1st Rhyl Scout HQ, Tynewydd Road, Rhyl. Sec J. McCann, GW4PFC, 67 Ashley Court, St Asaph, Clwyd LL17 0PL, tel 0745 583467.
Wrexham (WARS)—11 April (Technical session —Tune up your rig), 25 April (Film night No 2). Friends Meeting House, Holt Road, Wrexham. Sec Pete Higgs, GW4IGF, tel Rossett 570212.

REGION 12—RR M. R. Hobson, GM8KPH, 17 Well Brae, Pitlochry, Perthshire PH16 5HH. Tel 0796 2140.

Aberdeen (ARS)—Fridays, 6 April (Junk sale), 27 April (Videos—general interest), 7.30pm. Club Rooms, 35 Thistle Lane, Aberdeen. Coffee, tea etc available. Details from Don Travis, GM4GXD, tel 04676 251.
Forfar (F&DARC)—The club is now meeting again and has a full programme. 13 May (The club will be running a demonstration station for the County Scout Association). Details from sec Ken, GM1ABN, tel 0307 63095.
Orkney—The Orkney/Caithness repeater GB3OC came on the air on 17 February from Wideford Hill near Kirkwall, on R2. Details from, and contributions towards its upkeep, to Bill Wright, GM3IBU.
Perth (PRG)—The group maintains two repeaters, GB3PR on R3, and GB3PU on RB0, both located about 1km south of Perth. The repeaters are both financed entirely by donation, and users may care to send a donation towards the upkeep to M. R. Hobson, GM8KPH, 17 Well Brae, Pitlochry, and *not* QTHR.

All members in Region 12 are asked to note that RR12 has moved and is not now QTHR. The correct address is at the start of the column. The telephone number remains unchanged. I hope no correspondence has got lost in the move, however, if I have not replied to your letter please accept my apologies and try again.

REGION 15—RR J. T. Barnes, GI3USS, Whitegables, 95 Crawfordsburn Road, Bangor, Co Down BT19 1BJ. Tel 0247 3948.

Antrim (A&DARC) (GI4SIW)—Second Monday in each month, 8pm. Back Room of the Railway Bar, Railway Street, Antrim. AGM held on 12 March. Details from GI4FUB, tel Antrim 64931.
Ballyclare (EAARC) (GI4KKK)—10 April (AGM), 8 May (Meeting to discuss arrangements for special event station), 12 June (Annual 2m df hunt), 8pm. Fairview Primary School, Hillmount Avenue, Ballyclare. Details from GI4LKA.
Ballymena (BRC) (GI3FFF)—Tuesdays, 8pm, morse tuition, Wednesdays, 8pm, RAE tuition, Thursdays, 8pm, club night, Sundays, 4pm, club activity. Club Rooms, 70 Nursery Road, Grace Hill. Details from GI4HCN.
Banbridge (MUARC)—Second Sunday in month, 3pm. QTH of GI4BAC. Details from GI4BDL. Preliminary notice of mobile rally at Parkanaur, Dungannon, on Sunday 20 May, starting at 1200. Traders, book stall, bring & buy, refreshments, all in beautiful grounds. Talk-in on S22 and main routes signposted.
Bangor (B&DARS) (GI3XRQ)—First Friday in month, 8pm. Sands Hotel, Bangor. A new constitution has been prepared by the committee and was approved by members at an egm on 3 February. Copies will be available for members. 6 April (A video of Yaesu production—courtesy of GI3KDR, followed by a talk on a beginners' guide to atv, by GI3MBB). Details from GI4OCK.
Belfast (BRSGBG)—Meetings third Wednesday in each month, 8pm. 90 Belmont Road, Belfast. Details from GI4RXS, ex-GI6DGP.
Belfast (CoBYMCARC) (GI6YM)—Tuesdays, 7pm, Saturdays, 2pm. Club Rooms, Fourth Floor, YMCA, Wellington Place, Belfast. Details from GI6BJO.
Belfast (College of Technology ARS) (GI2BX)—Active at lunchtimes on 144MHz and hf. For lecture and other details contact J. Barr, GI1CET at college, tel Belfast 227244, ext 243.
Belfast (QUoBRC) (GI3LLQ/GI8FQB)—Tuesdays, 7.30pm. Club Rooms, 37 Fitzwilliam Street. RAE and morse tuition available. Details from Victor Fails, GI6JHF, tel Belfast 703027, evenings, or 661111, ext 4006, daytime.
Larne (L&DARS) (GI4PHA)—First and third Wednesdays in each month, 6.30pm. Room 270, Larne Technical College. A large turnout on 1 February enjoyed "World of amateur radio" on video. More video shortly. RAE and morse tuition available at the club. Details from GI4CPP, tel Larne 5407.
Moy (Armagh, Dungannon and District ARC)—Club held its first agm at the Pony Club, Killyman Street, Moy, on 14 February. A constitution is being prepared and affiliation sought. Details from GI8RNX.

REGION 16—RR T. D. Howe, G3PLF, 18 Vange Hill Drive, Basildon, Essex SS16 4DD. Tel 0268 24453.

Braintree (B&DARS)—2 April (Interference problems), 16 April ("Homebrew pcb" by G6MCB), 7.45pm. Braintree Community Centre, Victoria Road. Details from Pat Penny, G6TAF, tel Braintree 26487.
Chelmsford (CARS)—3 April ("Microcomputers in amateur radio," by G3KPJ), 7.30pm. Marconi College, Arbour Lane. Details from Andrew Mead, G4KQE, tel Silver End 83094.
Colchester (CRA)—5 April (Constructors competition), 7.30pm. Colchester Institute, Sheepen Road. Details from Frank Howe, G3FIJ, tel Colchester 851189.
Ipswich (IRC)—11 April ("Marconi, his middle years", by J. Stanley-Wood, Marconi Co), 25 April (AGM), 8pm. Club Room, Rose & Crown, Norwich Road. Details from Jack Tootill, G4IFF, tel Ipswich 44047.
Loughton (L&DARS)—13 April (AGM), 8pm. Loughton Hall, Rectory Lane. Details from C. Knowles, G6FWT.
Vange (VARS)—5 April (Junk sale), 12 April ("AR 2001 scanner", by G3XPV), 19 April ("World War 2 radio", by G3EUR), 26 April (Railway signalling & electronics), 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)—Until the end of June 1984 meetings held on the first Tuesday and third Wednesday in each month, 8pm. The Wolversdene Club. Sec G8OPR.
Basingstoke (BARC) 10 April (Surplus equipment sale), 7.30pm. The Swan, Sherborne St John, Basingstoke. A club net is held every Monday, 8pm, on 145·475MHz. Chairman G4WIZ, tel 07356 5185.
Basingstoke (UK FM Southern, Repeater Holding Group)—10 April (Surplus equipment sale), 7pm. Chineham House, Shakespeare Road, off Popley Way, Basingstoke. Sec G3KWU, tel 0703 812435.
Bournmouth (BRS)—6 April ("Satellite tv", by G3HQX), 20 April (No meeting), 7.30pm. Kinson Community Centre, Kinson, Bournmouth. Sec G4EKE, tel Ferndown (0202) 877945.
Fareham (F&DARC)—4 and 18 April (OTA natter night), 11 April ("History of Naval communications", by G3YIQ), 25 April (Junk sale), 7.30pm. Porchester Community Centre, Westlands Grove, Portchester. Sec G4ITG, tel Fareham (0329) 234984.
Farnborough (F&DRS)—11 April (Bring & buy sale), 25 April (Brains trust), 9 May ("AMSAT UK", talk on latest developments), 7.30pm. Railway Enthusiasts Club, Access Road, off Hawley Lane, Farnborough. Pro G4MOZ, tel Farnborough (0252) 837581.
Horndean (H&DARC)—2 April ("A year of radio", by G4BEQ), 7.30pm. Merchiston Hall, London Road, Horndean. Sec G6IOV.
Jersey (JAEC)—11 April ("What to do on 70cm, tv, dx, fm, or satellite etc", by local experts), 8pm. The Communicare Centre, St Brelade. Sec GJ8KVV, tel 53333.
Liphook (Three Counties ARC)—11 April (Junk sale), 25 April ("RSGB awards", by G3JFF), 7.30pm. Railway Hotel, Liphook. Sec G6SOQ, tel Bordon 3395.
Weymouth (SDRS)—3 April (AGM), 7.30pm. Army Bridging Camp, Wyke Regis, Weymouth. Sec G3ZGP, tel Weymouth (0305) 912893.
Wimborne (FRARS)—1 April ("First aid", by Mike Pomoroy), 8 April (Spectrum communications), 15 April ("Contests", by G8MCP), 29 April ("Power supplies", by G3MDH), 7.30pm. Flight Refuelling Social Club, Merley, Wimborne. Sec G8VFY, tel Wimborne (0202) 882271.

REGION 18—RR R. A. Ricalton, G4ADD, 4 South Road, Longhorsley, Morpeth, Northumberland NE65 8UW. Tel Longhorsley 259.

Middlesborough (BTARC)—Thursdays, 8pm. British Telecom, Block 1, Lytton Street, Middlesborough. Now no security requirement. Details from sec Bill Arnold, G4IJM.
Middlesborough (TRG)—Normally last Tuesday in each month. BT HQ. Contact sec Pauline Bland, G8MBK.
Redcar (East Cleveland ARC)—Fridays, 7.30pm. RAFA Club, Esplanade, Redcar. RAE, cw classes, lectures, bar, refreshments. Details from sec G8JLA, or pro G6LNK.

REGION 19—RR R. J. C. Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ. Tel 01-989 6741.

Cheshunt (C&DARC)—4 April ("My trip to Australia", by G3NEE), 11 April (Natter night), 18 April ("The Royal Observer Corps today", by G8LXB), 25 April (Natter night), 8.15pm. The Church Room, Church Lane, Wormley, nr Cheshunt, Herts. Details from Roger Frisby, G4OAA, tel 09924 64795.
Chiswick (ABCARC)—17 April (QRP night), 7.30pm. Committee Room, Chiswick Town Hall, High Road, London W4. Sec W. G. Dyer, G3GEH, tel 01-992 3778.
Ealing (E&DARC)—Tuesdays, 8pm. First floor, Northfields Community Centre, 71a Northcroft Road, Ealing W13. Sec Anton Berg, G4SCR, tel 01-997 1416.
Edgware (E&DRS)—12 April ("Antenna radiation patterns", by Eric Godfrey, G3GG), 26 April (Informal). Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. Sec John Cobley, G4RMD, tel Hatfield 64342.
Harrow (RSH)—6 April (Informal and practical), 13 April (Talk to be announced), 8pm. Harrow Arts Centre, High Road, Harrow Weald. Details from Chris Friel, G4AUF, tel 01-868 5002.
Havering (H&DARC)—4 April (Quarterly business meeting), 11 April (Informal), 18 April ("Kites and kite-aerials", by G3MWF), 25 April (Informal). Fairkytes Art Centre, Billet Lane, Hornchurch, Essex. Details from J. R. Gibbs, G4UQR, 40 Bridge Avenue, Upminster, Essex, tel Upminster 26904.
London (Civil Service ARS)—2 April (Third AGM). Meetings mainly during the lunch hour at The Civil Service Rec Centre, Monck Street, Millbank, SW1, on first and third Mondays in each month. Details from G. Costin, G4GFU, tel 01-632 3875, daytime.
London (Marconi RS) (G2MT and G6STA)—This society has now acquired a 2m installation and is operational during lunchtimes. Contacts would be most acceptable on ssb. Membership is only open to Marconi personnel at Stanmore.
St Albans (Verulam ARC)—10 April (Informal and workshop), 24 April ("Advances in modern mixer systems", by Brian Barber, G8DKK). Informal meetings 8pm onwards, main meetings 7.45 for 8pm. RAFA HQ, New Kent Road, St Albans. Details from Hilary, G4JKS, tel St Albans 59318.
Wanstead (ELGRSGB)—This group has now held an egm to decide how the group should be run. It was decided that for the time being the meetings should be held once a quarter. The next meeting is on 15 April when members of RSGB Council will be present to answer questions on the role of this group. Venue is the Wanstead House Community Centre, The Green, Wanstead, London E11, at 2.30pm. The Green is right opposite Wanstead Underground Station, and Wanstead House is very near to the station.
Watford (WRC)—4 April ("QRP", by Rev G. Dobbs, G3RJV), 18 April (Construction Cup and club quiz), 8pm. Tudor Arms, Bushey Mill Lane, North Watford. Sec Gordon Clarke, G8XXV, tel 01-950 3611.

REGION 20—RR B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, Bristol BS20 8NQ. Tel 0272 848140.

Bath (B&DARC)—18 April (AGM. Sec requests all members to be present), 8pm. Englishcombe Inn, Englishcombe Lane, Bath. Details from pro Colin Ashley, G4UMD, tel Frome 63939, or sec Mike Mason, G4OTY, tel Bath 311046.
Bristol (BRSGBG)—7.30pm. Small Lecture Theatre, Queens Building, Bristol University. The meeting for 30 April will be given on GB2RS. Details from sec Brian, G4FRG, tel 0272 848140, or chairman, Tony, G4ROX, tel 0272 513573.
Bristol (South Bristol ARC)—4 April ("Data Comms RS 232 to X.25", by Steve, G4MCQ), 11

April ("HF night", with Alan, G4TSS), 18 April ("VHF NFD preparation", by Mark, G4KUQ), 25 April ("10m fm operation", with Colin, G4SQQ), 2 May ("23cm operation", by Steve, G4MCQ), 7.30pm. Whitchurch Folk House, East Dundry Road, Whitchurch. Details from Len Baker, G4RZY, tel 0272 834282.

Cheltenham (CARA)—6 April (CARA computer night), 20 April (Natter night), 4 May ("Aerial matching", by G4CHD), 7.30pm. Stanton Room, Charlton Kings Library, Cheltenham. Details from sec Gill Harmsworth, G6COH, tel Cheltenham 525162, or chairman John Holt, G3GWW, tel Witcombe 3435.

Gloucester (GARS)—4 April (Please note no meeting this night), 11 April (Construction contest), 2 May (Demonstration of items entered in the construction contest), 7.30pm. St Barnabus Hall, Stroud Road, Gloucester. Sec advises that because a change in venue is being considered, members who did not attend the formal meeting in March should first check with a committee member for the location for April meetings. Details from Tony Martin, G4HBV, 12 Redwood Close, Podsmead, Gloucester.

Weston-super-Mare (WsMRS)—9 April ("Radio amateurs in times of emergency", by John Kelly, Emergency Planning Officer, Woodspring District of Avon), 14 May ("Principles of direction finding", by G3GMC), 7.30pm. The Rugby Club, (off Drove Road), Weston-super-Mare. Details from sec Dave Restrick, G4/KA0NGP, tel Weston-super-Mare 28482.

Yeovil (Y&DARC)—5 April (AGM. Sec requests all members to be present), 12 April ("Ideas for simple receivers", by G3MYM), 19 April ("Contest operation techniques", by G3GC), 26 April (Preliminary meeting of the RAE class with G3MYM), 7.30pm. The Recreation Centre, Chilton Grove, Yeovil. Details from sec Eric Godfrey, G3GC, Dorset Reach, 60 Chilton Grove, Yeovil BA21 4AW, tel 0935 75533.

Members' Ads

CONDITIONS OF ACCEPTANCE

These subsidized flat-rate advertisements are accepted as a service to members of the RSGB only. They must be submitted on the Members' Ad form printed on the back of a *recent* address label carrier used to mail *Rad Com* to the advertiser: this will automatically provide proof of membership and should not be more than two months old. No acknowledgement of receipt will be sent, and advertisements not clearly worded or punctuated, or which do not comply with the conditions of acceptance, will be returned. No correspondence concerning this service will be entered into.

Trade or business advertisements, even from members, will not be accepted for "Members' Ads" but should be submitted as classified or display advertisements in the usual way. Traders who are members must enclose a signed declaration that the items for sale or wanted are part of, or intended for, their own personal amateur station.

The RSGB reserves the right to refuse advertisements, and accepts no responsibility for errors or omissions, or for the quality of goods offered for sale. Advertisements for citizens band equipment will not be accepted.

Warning. Members are advised that they should, as far as possible, ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The "purchase" of goods legally owned by a finance company could result in the "purchaser" losing both the goods and the cash paid.

The current rate is £1 for 40 words or less: advertisements containing more than 40 words will cost an additional £1 for every additional 40 or less words. Each advertisement must be accompanied by the correct remittance, either as a cheque or postal order made payable to Radio Society of Great Britain.

Closing dates in 1984 for issues in brackets, are **16 April** (June); **16 May** (July); **14 June** (August); **12 July** (September); **23 August** (October); **20 September** (November); **25 October** (December); **22 November** (January 1985).

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS
Do not post to RSGB HQ or Advertising officer.

FOR SALE

Datong FL2 audio filter, £50. Datong keyboard, £65. Azden PCS300 2m handheld, lcd, memories, 3W, charger, as new, £125. *Wanted:* TS700S multimode or TS700G. G4LW, QTHR. Tel Trowbridge 3166.

100W linear model MML144/100S, nice piece of gear, preamp built in, comes with small 240V ac fan for fm use, will throw a Zetagi swr/pwr bridge in for a grand total of £95, no offers. G4JXI, QTHR. Tel Leigh (0942) 605839, after 6pm.

Yaesu FT200/FP200, black, in good cond, £175. G4ONS. Tel Bristol (0272) 699301.

Marconi sig gen TF1066B/1, cw/a.m./fm, 10-470 MHz, exc cond, QRK req to replace stolen TS700G, ser No 361011, or consider 2m ssb or multimode tx/rx. GW8FKB, QTHR. Tel 0248 723143.

Satellit 2100, Grundig 120m, 90m, 75m, 60m, 49m, 41m, 31m, 25m, 20m, 10m, 15m, 13m, 11m bands spread, normal exc cond, looked after, maintained, lw/mw, £250. Buyer collects. C. T. Curtis, 554 Middle Park Avenue, Eltham, London SE9 5QS. Tel 01-859 1191.

Creed 444, vgc, £36. 902DM (new bands), incl Curtis keyer, memories, fsk, £550. ATU to match, 160-10m, £75. Will haggle. G4KDZ. Tel Grays (Essex) (0375) 78783.

SRX30 rx, SEM preamp, good cond, wkg order, buyer to hear and collect, £95. Cash only please. Chandler, 21 Harvard Mansions, St Johns Hill, London SW11 1TB. Tel 01-223 4335.

Dish, glass fibre, 12ft diam, four sections bolt together, factory made, £75. Generator, 3kVA, petrol, 240V, £220. Daiwa remote mic unit, £25. G6DMS, QTHR. Tel 0371-84 250 (Essex).

Yaesu FT480R, £250. Kenpro KR400 rotator, comp with 10m six-core cable, £60. Hansen FS7 2m and 70cm swr/power meter, 200W, £25. All exc cond and boxed. Would consider exchange for BBC Model B. Tel 061-440 0900, after 6pm.

TenTec Omni C power supply, speech processor, electret mic, all TenTec, xtal filters, 500Hz, 1·8kHz, 2·4kHz, all nine bands in fb order, £575. KW1000 linear amp, vgc, £240. Prefer collect. G3DWS, QTHR. Tel 021-475 6267.

Variable metered psu, 5-15V, 10A max, 7A continuous, £15. 240-110V transformer, 1kVA (heavy!), £15. Double beam scope, needs attention, £10. Yaesu headphones, £5. Buyers collect or pay carriage. G4DIC, QTHR. Tel Hinckley (0455) 636315.

IC720A, full gen cov tx/rx, used little, orig packing, mint cond, £725 ono. Can deliver at half cost of petrol. Please write to S. Langlois, GJ4ODX, Merchant Navy College, Greenhithe, Kent DA9 9NY. All replies answered.

HF linear amp, Dentron MLA2500, all bands, immac cond, orig packing, £525. Receivers: Racal RA17L, £185; Eddystone (hf) 830/7, £180: Eddystone (lf) 850/4, £150. Pye uhf (70cm fm), transistor tx/rx, base station, £80. Tel 03306 613, after 7pm.

Miniature "Parvalux" high torque motors (three only), 4500rpm at 115V ac, runs fast enough on 50V for printed circuit drilling with chuck or collet direct on shaft, new, unused, £4.50 each, post paid. G3VCJ, QTHR. Tel 042-43 4726.

TenTec model 670 keyer, delivered, used little. Owner prefers straight key, £15. Rod McMillan, G2CWY, QTHR. Tel 01-445 2508.

TR2300 2m fm portable, vgc, boxed, £100 ono. PNP comms, rtty boards, PL1A, FP1A transmit, £15. G4BMK rtty tx/rx program for Dragon 32, £8. G4OWY. Tel Weymouth 786930.

Exchange trailer/sailer, 2·5 berth cabin, full inventory, for any working radio gear, or BBC computer add-ons, with cash adjustments. G4KMU, 7 Old Farm Drive, Townhill Park, Southampton. Tel 558843.

Trio TR9130 2m multimode, used very little, less than 12 months old, £320. SP120 extension spkr, £25. Eight-el 2m beam, £15. Revco 2m ground plane antenna, £10. G4RDK. Tel Plymouth 880218.

50W atu for 160-10m, unused, £15. Electrolytics 100V 1000μF, 25p. Ambit 25W linear, £25 ono. Brand new MM144/100LS 100W linear, unwanted gift, £130. Pye Westminster mid-band, £15. Send sae for list of shack clearout. G8WXW, QTHR. Tel Winsford (06065) 52834.

Ten-el Yagi, Jaybeam, vgc, £20. Five-el Yagi t.e.t., three months old, vgc, £10. Will swap for ICSP3, open for other swap offers. G6XCG, QTHR. Tel Basildon 555645.

70cm base station, cabinet type L470, comp with manual, vgc, £80. 70cm multibeam, buyer to dismount, £10. Eddystone RX940, £95 ono. G3OWB, QTHR. Tel 0223 359127.

Eddystone 840C gen cov rx, £50. Prefer buyer collects. G4JPQ, QTHR. Tel Stowmarket 613870.

IC25E 2m fm, 25W, two vfos, five memories, vgc, orig packing, handbook, mobile bracket etc, £210 ono. 5A/7A 13·8V psu, £10 or both for £215. Please write to Miss E. Lawrence, G6TPD, 11 Mabel Road, Hextable, Swanley, Kent BR8 7SH. Can deliver within 40 miles.

FDK750E 2m multimode, £220. G4VPR. Tel Tunbridge Wells 28947.

Icom IC720 with Thanet added unit equals 720A, wonderful tx/rx, nine hambands, gen cov, two vfos, 13V dc mic, cables, guaranteed mint, ssb reported perfect, ask another GD to try it for you, £575. Delivered UK. GD3TIU, QTHR. Tel 0624 3417.

Trio TS820S cw filter, £400. R820 matching rx with everything, £400. Both mint, boxed. MC50 mic, preamp, £20. MMA144V switched 2m preamp, £20. AVO sig gen, type 3, £25. Labgear colour pattern generator, £20. G4LW, QTHR. Tel Trowbridge 3166.

C8900 standard 2m, latest ultra slim model, as new, boxed, £150. Hansen peak wattmeter, £50. Sony 3000 video camera, boxed, £375. Sony F1 portable video, boxed, £475. G4JKP, QTHR. Tel Leicester (0533) 899958.

Collins S-line RX75S3 No14334, TX32S3, No10970, psu, good cond, instruction manuals, reason—silent key, £650. *Wanted:* amplifier, Yaesu, Trio/Kenwood. G4RGJ. Tel Worcester (0905) 421908.

Kenwood TS130SE, WARC, mint cond, £380. Will take in part exchange Sommerkamp TS788DX, t.e.t. HB15M25P 15m mini two-el Yagi, £40, or exchange for 10m Yagi. G3NQX. Tel Kendal (0539) 28166.

Trio 9R59DS rx, exc cond (suit swl), £50 ono. *Radio Communication,* 1973-83, any reasonable offer. Buyer collects. G8OEF. Tel 0509 508466, after 6pm.

Daiwa CN520 cross needle swr and power meter, 1·8MHz-60MHz, 200W/2kW, boxed, as new, £25. G6YDU, QTHR. Tel Valerie, 01-958 7586.

Otter 12ft racing and cruising dinghy, brand new outboard, cover, trolley, car roof rack, spinnaker, full equip, £500 or exchange for hf tx/rx or w.h.y? GM4UTP. Tel Stewart, 0383 822303.

FT708R 70cm hand portable, in orig box, two nicads, NC9C charger, £175. Pye F450L 70cm base station on RB12, £25. 10m fm Icom, repeater shift, display modification, £40. G3XVL. Tel Chris McCarthy, Chesham (0494) 784883.

Drake 2B rx, 2AQ Q-mult/spkr, full 10m band, 30m xtals, £75. *Wanted:* 4D32 or 4D33 valves. Drake T4XC. G3RFI, QTHR. Tel 0767 260800.

TS530S, mint cond, 1·8kHz and 500Hz filters, £450, or without filters, £425. TS120V, nice cond, transverter socket, £230. FTV707 2m transverter, all hf/2m ant switching, almost new, £90. GM3VMB. Tel 0292 312002.

Heathkit HW101 ssb tx/rx, 10-80m bands, comp with power pack, new, unused, offers. Lowe SRX30 rx, 0·5-30MHz cw, usb, lsb, a.m., excellent working order, offers. Robt McGloin, 72 Maree Drive, Cumbernauld, Scotland G67 4LP. Tel 023-67 33770.

Bearcat 100 16ch handheld, programmable scanner, nicads, charger, leather case, helical, exc cond, instruction book, orig packing, £200 ono. Will send by Securicor at my expense. Tel 082347 3562.

Rohde & Schwarz cavity frequency meter, 470MHz-2·5GHz, type WAL, £95. Telonic sweep generator PD8B, 500-1100MHz, 40W rf op, less attenuator, £25. Hewlett Packard counter, 5245L, 10Hz-50MHz, £25. Teleset 11 sig gen, power meter, deviation a.m., fm, 25-500MHz, all transistor, £150. G8BXH, QTHR.

Drake R4C, vgc, extras, £290. FT708R, accessories, £185. YC355D dfm, £80. 1,296MHz corner reflector, new, unused, £25. YM47 mic, £8. Items from previous adverts still available. G8ESK, QTHR. Tel 0274 497438.

Datong morse tutor, £32. Yaesu FT480R, 2m, £290. Datong broadband amplifier, Mode L, rfa, £22. GW6DJN, QTHR. Tel Cwmbran (06333) 4577.

TS130S, Trio, all WARC bands, PS30 mains power unit, MIC30S, used about 10 times, boxed, as new, £425. G3IRQ. Tel Manningtree 2957.

IC720A, as new, £815. Atlas 210X, £250. IC210 2m fm vfo, xtals, £90. Two Barlow Wadley rxs, 0-30MHz, a.m./ssb, fm, two videos, Philips N1700, lots of tapes available, £75 each. IC260E 2m multimode, £250. Creed 75 rx printer, 50/45 bd auto cr/lf, £35. All ono. G3LZN, QTHR. Tel Lapworth (056 43) 2014.

Hilomast WTM/1 telescopic mast, wall mounting, comp with winch, £160. Hygain TH3 Mk3, 10/15/20 antenna, £195. KR400 rotator, controller, cables, £45, or £360 the lot. G4GGV, QTHR. Tel Maidenhead (0628) 20651.

Need more space! *Rad Com* 1970-83, most years comp, free to a good home. G3XVB. Tel Camberley (0726) 33608, evenings and weekends.

FT101ZD fm, WARC, as new, orig packing box, buyer collects, £450. G4KWH, QTHR. Tel Bedford 56139.

TenTec Argonaut 509, QRP tx/rx, 5W input, ssb, cw, full QSK, mint cond, £200. Can be delivered within reasonable distance of London. Tony Smith, G4FAI, QTHR. Tel 01-368 4588.

Koyo solidstate rx, 11 bands, 150kHz-174MHz, bfo, f/tune tape record skt, world time table, mains/battery, used little, recently purchased tx/rx, £45. Buyer collects. G1AVE. Tel Maldon (0621) 55648.

Lens hood and 1A filter, 40·5mm, mint, £3.50. Thornton slide rule, mint cond, £4. Clock radio, unwanted gift, £12.50. Duette TR908 cassette rec/play, mains or battery, good cond, £6. Telefunken mic for group, £7. Buyers pay carr/post. Hall, 38 Old Hall Road, Tingley WF3 1QE.

FT707, FP707, 270Hz cw filter, YH55 headphones, Amtec 200 atu, base compression mic, first mic, vswr bridge, antenna bits and pieces, all boxed, as new, any trial, £560 for quick sale. G4NXX. Tel Abingdon 25898, after 6pm.

ZX81, 1k computer, few hours use, vgc, orig packing, £30. 7ERP teleprinter, 7BRP teleprinter, £15 each. 6S5 tape reader, £10. Prefer buyer collects. J. Hancock, G6ISM, PO Box 49, Leicester.

FT901DE, built-in psu, Curtis keyer, cw filter, good cond, £379 ono. Mic, YD844A to suit, £10. G3SIO, QTHR. Tel Kings Winford 295924.

FT101E, 250Hz cw filter, new boxed pa/driver, spare valves, good cond, FV101 ext vfo, both items, £300. Prefer buyer collect. G3ICH, QTHR. Tel Hemyock (near Taunton) 680234.

Hewlett Packard sampling oscilloscope, 185B + 187C plug-in, dual channel, probes, dc to 1GHz bandwidth, wkg, £85. Power meter HP431C, 478A thermistor mount, 10MHz-10GHz, 0·01-10mW, £100. HP140B, 1425A, 1411A, 1430A, 213B, dc-10GHz sampling/tdr system, £500. G8BXH. Tel 01-428 0974.

EHT capacitors, vgc, by Plastic Capacitors Ltd: 10μF, 5kV (2·5kV pulse), 15μF 4kV, £6 ono. 25μF 3kV, £10 ono. Few only. Metal can, ceramic post. G4NNA, 124 Scotts Road, Southall, Middx. Tel 01-571 0625, evenings.

FT107M, suit diy man, fitted memory, cw filter, 10/18MHz, wkg but poor 21MHz up, mic, workshop manual, £300. Carriage extra. FP107 psu available if required. G4IOT, QTHR. Tel Folkestone 76063.

DX33 triband trapped antenna, 10-15-20m (Western Penetrator), six months old, exc cond, reluctant sale, £140. Channel Master heavy duty rotator (HD9508), good cond, £50. GW4TGF, QTHR. Tel Swansea 403526.

Trio 9130 2m multimode, 25W rf, band and memory scan, up/down mic, mobile mounting, in orig packing, immac, £320. G3ZZD, QTHR. Tel 0892 34117.

Trio TS700G 2m all mode, incl VOX3, ext spkr, owners and service manuals, £250. Kenpro KR600RC rotator, brand new cond, £125. Mirage B1016 linear amp, fitted Mutek preamp, £100. G6BHK, QTHR. Tel 0226 82290, work, 0226 714580, home.

Trio TS520, matching spkr, vfo, new pa tubes, £325. Complete 2m mobile station, Trio TR7730 25W fm, Adonis scan mic, 7λ/8 whip mounting, all in exc cond, £200. Buyer collects. G3KYF, QTHR. Tel 0533 778279.

Yaesu FT902DM hf rig, nine-band, orig packing, used very little, mint cond, £640. G4FXS, QTHR. Tel 021-458 3537.

Yaesu FT290R, nicads, charger, no mods, mint cond, £190. MM linear, 25W, £40. SMC 5λ/8 fold-down antenna, gutter clip, £15. Both not used. SX200N scanning rx, mains psu, as new, £195. G6MEH, QTHR. Tel John, 01-658 3690, evenings.

Yaesu FL2010 2m linear amp for FT290, 3-10W, £35. G4RRG. Tel Worcester 352110.

FT225RD, mint cond, £495. Trio TR2400 quick charger, leather case, £160. ARAC102 2m, 10m rx, £50. Yaesu FT202 handheld, spkr-mic, charger, £60. VIC20, Arfon expan, 16k, 3k games, cw program, books, £160. G4MH minibeam, unused, £70. G4KOR NOT QTHR. Tel 021-744 1683.

FT708, six months old, hardly used, £170. Daiwa 2m 35W linear, as new, £25. Azden mobile mic, MEX55, £15. G6HYD, QTHR. Tel Little Hampton (Sussex) (09064) 22724.

IC402 uhf ssb tx/rx, 20W linear, psu, £220. G8WQV, QTHR. Tel Medway (Kent) (0634) 221061, evenings.

70cm 16-el Yagi by Jaybeam, model PBM16, eight-by-eight configuration, orig box, offers, best taken. Tel 05432 23608.

Goldring GL75 turntable, £10. *Rad Com* June 1980-December 1983, offers? G6GNM, QTHR. Tel 0438 313048.

Icom IC260E, 144MHz, multimode, tx/rx, 1/10W, £230. Sota 144MHz linear amp, 10W input, £75. Sota 13·8V/15A psu, £40. Mutek SLNA144S preamp, £25. MMC144/28 rx conv, £12. Realistic DX150A solidstate rx, 0·5-30MHz, £40. all ono. Steve Ayling, G4ASL, QTHR. Tel 01-668 3386.

FT480R, 2m multimode rig, 18 months old, in vgc, £300 ono. G4LFM. Tel Poole 671191, ext 246, day.

Icom 10m fm tx/rx, boxed, mint cond, £25. G3AAS. Tel Leeds 683107, pm, or 686036, business hours.

Collins TCS12 equipment, tx, rx, orig rcu/spkr mic, key, no psu, £60. R1475 (type 88) rx, no mods, very fair cond, handbook, £35. BC348, rough, £5. Buyers collect. G3WWJ, QTHR. Tel 0223 880101.

Radio Communication, comp unbound volumes, 1968-78, £2.50 per volume. GM8DKG, QTHR. Tel 041-357 3384.

Shack clearance sale: 2m, 70cm and test equipment, components accessories, books, mags (1800 to present day), very good prices. Phone for full lists. G8KDL, QTHR. Tel Steve Whitt, 0473-642635, daytime, 0473 54405, evenings.

Icom IC202S, beacon, satellite xtals, £130 ono. TEK 545B scope with ca plug-in, £130 ono. G6RBL. Tel Chemsford 51510.

TS830S, VFO230, SP30, MC50, additional YK88C, YG455CN, cw filters, used very little, £300 off list price at £750. All boxed with handbooks. Could deliver main motorway routes. GM3RUI NOT QTHR. Tel 06516 528.

FT101ZD Mk3, fan, mic, orig box, £420. GW4KYT, QTHR. Tel Swansea 794213.

Nascom 2, 32k ram A, in Kenilworth case, 9in monitor, zeap, nas dis, d-bug, teletype asr can be used as printer or second keyboard for Nascom, £100-plus of programs incl chess and chess rom, full documentation, all for £275. GI6BEG, QTHR. Tel Carrickfergus 66383.

Shack clearout: FRG7 with 2m converter, ssb filter, £120. Sony CV2000ACE video recorder, tape, spare head, service manual, £120. SSTV scan converter, Robot 400, homebrew, wkg, £150. BW tv camera lens and uhf modulator, £45. G4FBZ, QTHR. Tel 0952 605469.

BBC 32k morse programs: 70 cw abbreviations/punctuation, over 500 words in store, 100 3min plain language tests, save and load your own texts; random allsorts; choose internal speaker or external oscillator, £4.75 incl postage. D. Brandon, G4UXD, 1 Woodlands Road, Chester CH4 8LB.

FT225RD, in exc cond, Mutek board, orig packing, sensible offers only. Peter Crosland. Tel 0905 620041, evenings, or 021-454 8585, daytime.

Trio TS120V hf ssb mobile, base tx/rx, TL120 160W p.e.p., matching amp, SP120 spkr, comp with all leads, manuals, boxed, in vgc. *Wanted:* Drake MN2700 atu. G4HSB, QTHR. Tel Peter, 0642 816608.

Yaesu FT707, £400 ono. FC700 atu, dummy load, power, swr meter, £70 ono. Both mint. G4SAS NOT QTHR. Tel 0675 70732.

Centronics 779 dot matrix printer, cond as new, boxed, manual, £165. Buyer collects W12 or High Wycombe. G4LWA, QTHR. Tel 0494 31755.

AR240, 144 to 148, 5kHz steps, 1W handheld, £80. ZX printer, £20. G4IAG, QTHR. Tel 0676 41814.

KW2000A, £130. FRG7, £120. 3500LA, 80-10, 1·5kW, £120. KW2000A, dc psu, £15. KW103, 75Ω, £20. BC221 hb psu, £20. MCC 50/28MHz, 6m converter, new, £20. G-whip multi mobile, 80-20-15-10, self selecting, £20. DAI el-bug, £8. Cash, collect. G3TRA, QTHR. Tel Leicester 24580.

FDK aircraft band monitor, pll, cw charger, nicads, £40 ono. Hardly used. Garex SX200 scanner, as new, £100 ono. G4NWB, QTHR.

Signal generators: 35kHz-19MHz, cw/a.m./fm, 1μV-1V out, film scale, Marconi made for Army, grey steel case, full manual, calibrated, choice of several, £25-£50. Buyer chooses and collects. Untuned 10mV freq doublers bnc, af-100MHz, £8. G3OGK. Tel Andover (Hants) 781752.

FT480R, boxed, £300 ono. W&D ATV2, £85. Crofton cctv camera, £65. 3/4 vidicon camera, £35. W&D 144PA4/S, £12. TVPG1, £25. Unused TRS80 Model 3, 48k, RS232, two disc drives built-in, high res graphics Model 7 printer, £1,250 ono. G6JEY, QTHR. Tel Mike, Worthing 504615.

9R59DS, £60. Data General Nova 2 16-bit, £90. TRS80 L2, vdu, £160. Lynx camera, £10. 19 set, variometer, R4187, 62HAP61357, Class D a.m. radio kits, £4. Vibrators, various, Eddystone manuals, tx/rx Westinghouse portable, offers. Exchange. *Wanted:* MK14 bits. G4GYA, QTHR. Tel 0827 286395 (Staffs).

Trio 9130 2m tx/rx, exc cond, never used mobile, approx 3h use only, comp with maker's box, manual etc, three months old, £350 ono. Reason for sale, getting married, need the money. G4OCO, QTHR. Tel Banbury (0295) 721123, after 6pm.

Icom IC701, solidstate, 160-10m, 100W, usb/lsb, cw/rtty tx/rx, matching IC701PS psu/spkr, ICSM2 desk mic, Amtech 200W 160-10m random wire atu, all mint cond, in orig boxes, £495. Will gladly demonstrate. Prefer buyer collects (Birmingham). G4OHB. Tel 021-449 3530.

Datong morse tutor, as new, £40. G6LIG, QTHR. Tel Belper 3671 (Derbys), evenings or weekends.

Microwave Modules 4m transverter, 2m i.f., 100W linear amplifier, mint, £175. G3XXN, QTHR. Tel Worksop (0909) 730128.

NRD515 rx, NSD515 tx, power supply, approx 2h use, selling due to business pressure, mint, as new, manuals, cartons, sensible cash offers. Magnum Six processor for KWM2 S-line, £30. Comdel processor, £20. Both as new. G3DAM, QTHR.

FLDX500, FRDX400, 6 and 2m converters, fm, rx, in good cond, recent revalve, reason for sale, hf mobile, £220. Will consider 70cm equipment and cash either way. W.H.Y? G4RVS NOT QTHR. Tel Sheffield (0742) 656147.

Microdot rtty/cw communications terminal incorporating split screen video monitor, five months old, few minutes use only, as new, boxed, £320 ono. Tel Dunstable (Beds) (0582) 606983.

Yaesu YR901 cw/rtty reader, Yaesu YK901 keyboard, £200. G6ZPS. Tel Ewell, 01-394 1465.

Generator, portable Honda E1500, 220V ac, 1·5kW, 12V dc 100W, mint cond, used only 10h, buyer collect or pay carriage from Tyneside, £300. G6SU, QTHR. Tel 091-413 2627.

Yaesu FRG7700, FRT7700 atu, exc cond, £225. G6WXT. Tel Reading (0734) 22719.

Belcom Liner 2, 144MHz ssb tx/rx, preamp fitted, £70. Polaroid Sun 600 camera, £20. G6MEN. Tel 0704 74792.

Collins 75SI rx, Collins 32SI tx, Collins 516F-2 power supply, vgc, offers. G3DUW, QTHR.

2m FDK 700EX, £115 ono. G6TWV. Tel 0226 89578, after 6pm.

Drake R4C rx, 1·5kHz filter, 160m xtal, manual, matching Drake speaker, £285. Versatower P40, comp with head unit, thrust bearing, overworked AR40 rotator, £300. Buyer collects. G4IDL, QTHR. Tel 0709 874100, after 6pm.

FT101ZD, six bands, fan, cw filter, 12V inverter, £450. FC902 atu, nine bands, £95. Transverter MMT 144/28, £60. Transverter, MMT 70/28, £75. All as new, used little. G4JLJ NOT QTHR. Tel Bailey, 01-340 3715, after 6pm.

Computer monitor, Prince 12in, green, 24MHz bandwidth, info, circuit, £70. Will deliver for cost of petrol. G3RDG, QTHR. Tel 01-455 8831.

Yaesu FTV107R transverter frame, cw 2m Mutek front end fitted, plugged for FT102, four months old, 100W pwr/amp, 12V 13A psu, £180. Buyers inspect and collect. Will split, might exchange

w.h.y? G6YRT. Tel Reading 599151, late evenings, weekends.

Standard C800 vhf auto scan rx, 144/145MHz 10ch scan, 1ch tx, five xtals fitted, rx, tx, S20, own nicads, charger, vgc, £45. G6YLA, QTHR. Tel Bracknell (0344) 428218, after 6pm.

Commodore PET 32k, cassette, rtty tu, software, lots of tapes, programming books, £380. Buyer collects or plus carriage. GW4JBQ, QTHR. Tel 0633 55234, office hours.

Charity donation or free to deserving case: Codar AT5, T28, mains psu, collect NW London. G3KYX, QTHR. Tel 01-202 7263.

Daiwa ant rotator, vgc, £85. Two Shure 526T mics, one new, offers around £40. 10m four-el beam ant, £50 incl rotator. Tel Derby 557705.

TR7500 2m fm tx/rx, entire band in 25kHz steps, very simple to operate, perfect for mobile use, 3SK88 preamp, 50W pa, all for £160, might split, or swop for 70cm equipment. G6BAE, QTHR. Tel Maldon 860620.

Spectrum analyser, 3-30MHz, 30kHz sweep, If adaptor, psu, trolley, manual, bargain at £50 (for the larger shack only!). Buyer collects (Oxon). G3SEK. Tel 0235 31559.

Yaesu FT101ZD fm Mk3, fan, as new, used little, £490. YB901P matching panoramic scope, £200. Daiwa auto ant tuner, 12V, £100. MM2001 rtty to tv converter, £150. G3XGZ NOT QTHR. Tel Oxford 249966, ext 294, working hours.

Daiwa Search 9 2m rx, vgc, only four months old, reason for sale, just passed RAE, one xtal, S20, £30 ono. Tel 0494 35275, after 5.30pm.

Drake T4XB/R4B hf tx/rx separates, 160-10m, new WARC bands, rx fitted all filters, mint, handbooks, will not split, £475. SB610 monitorscope, set of spare valves, tube, hbk, mint, £60. FT202R 2m handheld tx/rx, fm, 1W, new nicads, base charger, 6ch, S20-22, R0, R5-6, xtals for R3, helical, λ/4 antenna, mint, handbook, £75. Datong rf speech clipper, mint, £35. High voltage psu, self-contained, fully metered, variac controlled, 0-3,500V at approx 600mA, ideal for 813 or 4CX250 linear, £50. Storno fm base station tx/rx, 2m, handbooks, approx 90W out from 6/40. Almost rebuilt, requires finishing, £40. Buyers collect preferred. G4JQN, QTHR. Tel Westbury (Wilts) (0373) 864478.

Trio TR2500 2m handheld, fm portable, vgc, incl three sets of nicads, dc converter, case, £180 ono. Yaesu SC1 console for FT480/780, incl psu, clock tone encoder, £80. 7A psu, £25. *Wanted:* Yaesu FT221, vgc. Tel Tim, Sittingbourne (0795) 75093.

Trio TR9130 multimode, PS30 power supply, BU9A base unit, vgc, £470 ono. Trio TR9130 service manual and TET SQY08 eight-el Quagi, £25 ono. G6HSR NOT QTHR. Tel 021-378 4205, after 6pm.

Microwave Modules MMT148/28 transverter, as new, comp with manual, £65. G4PGB, QTHR. Tel 0279 722612.

Racal RA17 Mk2 rx, case, perfect, £150. G1APG, QTHR. Tel 0772 600239.

Trio 2200, nicads, 12 channels, λ/4 whip, carrying case, mounting bracket, good cond, £40. G4LYH. Tel Gosport 588579.

Fuller keyboard for ZX81 16k rampack, psu, but no ZX81, Scarab rtty board, program, all instructions, £50 ono. G4LXN, QTHR. Tel Chipping Sodbury 318528.

3cm and other microwave equipment and parts, incl Gunn oscolators, couplers, mixers, wavemeters, please send for lists. CT600 rtty for Video Genie, £25. Phil Johnson, GJ8KNV, QTHR. Tel 0534 53333, Tuesday, Wednesday, Thursday evenings only.

Eddystone 750 gc rx, matching spkr, spare valves, manual, £40. BC221 wavemeter, mains ps, charts, spare valves, manual, £20. Carriage extra. *Wanted:* HF mobile whip, Hustler or similar. G3JMO, QTHR. Tel Redcar (0642) 486155.

Ten Creed teleprinters, £4 each, £25 for all, collected. Five vhf masthead amps, B2, Jaybeam, require 12V supply, £2.50 each, £20 all five. Three free Philips tvetts? 12in, 240/12V, uhf/vhf, 405/625. G4MAL NOT QTHR. Tel 0246 206047.

KW2000B, spare valves, £200. HF5 five-band vert, as new, £35. G4TZX. Tel Dymchurch 872060.

FT290R, wkg cond, alc needs attention, hence bargain price of £150 ono. G4SRD. Tel Ron, Melksham (0225) 706362.

FDK Palm 2 handheld tx/rx, toneburst fitted, leather case, spare nicad, charger unit, 10 simplex xtals, six repeater xtals, exc cond, £80. Buyer pays p&p. G4GXF, QTHR. Tel 03752 2089, evenings.

Trio 9000 2m multimode, £215. Mirage B1016 linear amp, preamp, 10W in, 160W out, £110. Daiwa CNW518 atu, swr, pwr meter, £35. Telequipment scope model S32, £25. 62 set tx/rx, £25. Transformers, 1200-0-1200, 400mA, 813 heater transformers, high voltage electrolytic capacitors, many other variable capacitors, parts for hf linear amps. G6ACK, QTHR. Tel Hinckley (0455) 612091.

FT101ZD, fitted fan, mic, FC301 atu, SP901 spkr, £400, would separate. Three-el homebrew quad, 15/20m, £50 ono. G4PZX. Tel Alex, Rowhedge (0206) 28856.

IC260E 144MHz multimode mobile/base, good cond, HM10 scanning mic, mobile clamp, accessory plug, manual, etc, £260 or offers. J. Cook, G8EDG NOT QTHR. Tel Wolverhampton 743679, after 7pm.

Yaesu FT200, in good cond, handbook, spare set valves, FP200, £220 ono. Buyer must collect, inspect. View evenings, weekends. G3SDK, QTHR. Tel Towcester (0327) 50012.

Datong PC1 gen cov converter, permits reception of all hf bands on multimode 2m rigs, £65. Sgt J. Osborne, Sgts Mess, RAF Swanton Morley, Norfolk.

FT227R 2m tx/rx, scanner, handbook, mobile mount, hb psu, £150. FT202 2m handheld, 6ch, xtals, nicads, charger unit, handbook, £100. SB610 monitor scope, book, £75. Will sell or exchange with adjustment for FT707, TS120/130S. G4JA, QTHR. Tel 0507 604967, weekends.

Pentax MX, 50mm f1·7 and 135mm f3·5, Braun 370/BVC hammerhead flash, would exchange for 70cm multimode. G6PRF. Tel 01-340 7573.

Antenna calculations for Commodore 64, helps with feeder and antennas etc, £3. G4MZO, QTHR.

Icom IC280E 2m fm tx/rx, power 1 or 10W, 25kHz steps, three memories, repeater shifts, mobile mounting bracket, instruction manual, vgc, £170. G8ZRE, 31 Broadmead, Vicars Cross, Chester. Tel Dave, Chester (0244) 316673.

MMT 144/28 tx/rx, good performer, but now surplus to requirement, £70 ovno. FT7 interface, homebrew, to above, £7. G4ORF. Tel 0703 864962.

KW Vespa Mk2, psu, spare pa valve, KW202 rx, £100. Buyer collects. G3KXP, QTHR. Tel Romford 61247.

Trio TS930S, fitted auto atu, exc performance from this immaculate tx/rx, currently around £1,300, must sell, so £995. Demonstration arranged. G4OUO. Tel Phil, Gravesend (0414) 64224.

Shack sortout: Icom 240, £120. FT200 tx/rx, £200. Europa transverter, 2m, £55. 10-el beam, two-el beam, 144MHz, £20 each. Icom 10m FM1051, £30. Will exchange FT200 and Icom 240 for FT707 or similar. All items for sale A1 cond. G4KDM. Tel Huddersfield (0484) 864086.

Pair Reyco 7MHz traps, 2kW, new £10. Western Electric balun, 4:1, 1kW, new, £5. Astatic D104 mic, built-in preamp, model TUG9D, as new, £25. *Wanted:* 250 + 250 wide spaced, variable cond. G3CPM, QTHR. Tel 0386 852753.

FT290R, mobile mount, £17.50. FL2010 linear to suit, £42.50. Hard case to fit FT290R, £5. All three, £60. G4NRR. Tel Nigel, 021-744 8672.

Microwave Modules MML 432/100 100W 70cm linear, £200 ono. Two Jaybeam MBM88/70 70cm multibeams, £40 each, or £75 the pair. S. A. Robinson, GI8NBW, QTHR. Tel Ballymoney 62127, or 62238, office hours only.

Datong FL2 multimode filter, £65, post paid. TenTec model 670 keyer, used little, £15, post paid. G2CWY, QTHR. Tel 01-445 2508.

Acorn Atom, fully expanded, fp rom, toolbox rom, colour board, via user port, spare connector, operates from 5V psu, exc cond, manual, ideal experimenter's computer, best offer over £95 secures. G3VYV, QTHR.

Tasco CWR670 rtty terminal, good cond, £150. Realistic PRO 2001 uhf/vhf scanner, just overhauled by Tandy, £100. Tel Peter, Aldershot (0252) 317870, anytime.

Microwave Modules MM4001 rtty, ASCII converter tx/rx 45·45, 50, 75 bauds rtty, RCA keyboard, 12V psu, £195 incl postage. G5CRP. Tel Macclesfield (0625) 614112.

SX200N super scanner, mint, bargain, £185. Eddystone 750, exc, £85. PAM Commander communications rx, a.m./fm, ssb, vhf, uhf, digital readout, mains, battery, new, £150. Eddystone 830/7 rx, £150. Joystick with tuner, £14. Sony CRF230 rx, £160. Tel York (0904) 59035.

Complete 2m portable station, Standard C146A 2W handheld, five channels, eight xtals, auto/manual toneburst, λ/4, and helical antennas, external miniature mic, leather case, new nicads, base station, charger, £90 ono comp. G4CDW NOT QTHR. Tel Graham, 0285 2036, evenings.

Microwave spectrum analyser, TS148/UP, ex-USAF, absolutely mint cond, will exchange for hf tx/rx, must be in same good cond. G4NVW. Tel Colin, Daventry (03272) 76542.

Yaesu FL2100Z 160-10m linear amp, new, unused, £350. Owner gone QRP. G4FVR, QTHR.

Servomex ac voltage stabiliser type AC7 Mk2, range 195-268V, ac at 30A, sell or exchange for 2m rig or w.h.y? Buyer collects as unit weighs 145lb. G3ZZS, QTHR. Tel Plymouth 707550.

Teleprinter KSR33, ASCII, 110baud, mechanical type, needs psu, no punchout, hence price, £35, buyer to collect. GW4PCX, QTHR as GW8YJN.

2kW W6PO metal work unit, finished, anode lines, high quality high power 144MHz amp, £200. 1kW 432MHz metal work kit, built, blower, bargain, £75. P&P £5 each. GJ4ICD. Tel 0534 26788, between 6-7pm.

Starfone M5 mobile rig, 5W uhf/fm, exc cond, compact PMR rig, just out of service, fully wkg, conversion info, lockable mobile mount, mic, separate spkr, £25. G4GSY, QTHR. Tel Manchester (061) 761 5083, preferably after 6pm.

Standard C8800 2m fm tx/rx, memories, fast/slow scan, exc cond, no mods, no problems, comp with orig accessories, packing, £145 ovno. Tel Cobham (Surrey) (09326) 3693.

Eddystone EC10 rx, with book, £35. TenTec RX10 rx, £15. Thermograph seven day clockwork, £20. MFJ audio filter, £5. All exc cond, carriage extra. Davies, 30 Wern Isaf, Dowlais, Merthyr Tydfil, Mid-Glam CF48 3NY. Tel 0685 75294.

TL922 Trio-Kenwood hf 2kW linear amp, brand new, unused, boxed, guaranteed until Jan '85, offers. MBA-R0 morse-rtty-ASCII reader, perfect, hardly used, guaranteed until Jan '85, £120. *Wanted:* hf linear, 250-500W. FT102 or similar. Sephton, 16 Bloemfontein Avenue, Shepherds Bush, London W12 7BL. Tel 01-749 1454.

Yaesu FR50B rx, 160-10m, xtal calibrator, manual, phones, mint, boxed, £75. Hallicrafters SX24 rx, 0·55-45MHz, wkg but bfo needs attention, spkr, phones, manual, £15. 2m converter, 28-30MHz i.f., £6. G1ARU. Tel 0279 506933.

Yaesu FT902DM, four months use from new, mint cond, orig packaging, could deliver reasonable distance, £590. Tel 01-890 4666.

Wartime Murphy valve radio model type A48, lw, mw, sw, still wkg, tuning cylinder dial requires retitling, offers invited for this rx. Buyer collects. G4VNH (G1AWT). Tel 0507 604311.

Trio R2000 communications rx, 150kHz-30MHz, memories, scanning, ssb, cw, a.m., fm, 144-145MHz converter, as new, £330. G1DQM. Tel Bedford (0234) 711904.

TS130V, MC35S mic, mint, £350. Bird model 43 wattmeter, unused, 2-30MHz, 250W plug-in, £80. Trio service manual for TS820, unused, £5. XF9B filter, usb lsb carrier xtals, unused, £10. Tel 02357 66462, evenings (Oxon).

Hewlett Packard 50MHz portable counter timer, £125. Hewlett Packard 410B vtvm, £35. Marconi OA1094 spectrum analyser, big, £50. Buyer inspects and collects. G3UVZ, QTHR. Tel 01-778 4085.

Yaesu FT301S hf rig, matching FT221R, seven bands incl 10MHz, all filters, etc, £275 ono. TW 10/2 transverter, psu, needs work, £20. C4 vertical ant, 6-20m, £20. G4IIL, QTHR. Tel Brighton 607737.

KW Atlanta, cw power supply, vfo, handbook, £200. RA17, £150. Marconi sig gen TF867, £25. Cossor oscilloscope model 1052, £25. Linear, requires completing or for parts, £15. Property silent key, G3JTU. G3OXV, QTHR. Tel Daventry 2265.

Hirschman rotator 250, used very little, good cond. £25. Halbar six-el quad, £10. G4TJE NOT QTHR. Tel 01-290 5827, after 5.30pm.

Datong D70 morse tutor, three months old, boxed, as new, perfect cond, £40. G6TYP NOT QTHR. Tel Kings Langley 65823.

FT101Z fm nine-band, fan, desk mic, spare tubes, immac, £400. SEM Transmatch, top band, fitted Ezitune, as new, £65. Scarab ZX81, rtty cassette, built pcb, £10. G4LVP, QTHR. Tel Hitchin 58728.

Morse tuition program tapes for Commodore 64, VIC 20, Dragon, Spectrum, ZX81-16k (specify), with full operating and learning instructions. checks and scores your copy. Characters introduced in stages for easy, fast learning from complete beginner to test standard and beyond. Sends any amount at any speed of random character groups for learning or a typed-in text for plain language practice. The best program to get you that A licence, £6. GW3RRI, QTHR. Tel 0286 881886.

Microwave Modules transverter MMT1296/144, £135. Daiwa uhf swr meter CN650, £85. Jaybeam antenna D15/1296, £20. Three coaxial two-way switches, £5 each. *VHF Communications* Vols 1-14, £25. A. E. Burnard, G2FCA, QTHR. Tel Newport Pagnell (0908) 613523.

Yaesu 101E Mk3 fm (Holdings), spare valves, £325. Trio TS120V, £250. Eight digit 600MHz counter, £65. Hirschmann RO250 rotator, £35. Shure 444D, £25. Datong D70, £35. AM 6kHz filter for 101E, £10. Sirtel 6A psu, £25. 200W 10m linear, faulty, £30. G4RSY. Tel 01-651 0633 (Croydon).

FRG7700, matching atu, converter, mint cond, boxed, £290. MM2001 rtty converter to tv, as new, £125. G4GIQ, QTHR. Tel Northwich 45584.

Icom 260E 2m multimode, 10W, home-built, power supply, swr power meter, £255. Tel Chelmsford 466956.

Yaesu FC102 antenna tuner, £130. Tono 9000E communications terminal, rtty, ASCII, cw word processor etc, £500. G3USP, QTHR.

Sentinel 2m preamp, £10. 2m to mw switched converter, £15. QM70 432-6 to 2m converter, £15. Sentinel 1·5/30MHz auto preamp, £14. Datong FL2 audio filter, £55. Hamgear rx atu/preamp/calibrator, £20. Mains/battery automatic change, 12V, 2A, psu, £12. 13 new valves for FT401, two bm, no pa, £13. Table mic UD844, £12. G4ALV, QTHR. Tel 01-460 3852.

RAE practice program tapes for Commodore 64, VIC20, Spectrum, ZX81-16k (specify, VIC20 needs memory expansion). Tests you on all RAE calculations. Don't let your maths make you fail the exam. Pass with this program, £6. GW3RRI, QTHR. Tel 0286 881886.

PSU, 13V, 17A, £65. MML 144/100 2m linear, 100W, £70. MML 432/100 70cm linear, £150. Oric, BBC programs, rtty, £7.50. Morse tutor, £4.50. QTH locator, £4.50. GEC Hiband mobile, £15. G8KMV, QTHR. Tel 0438 354689.

Creed 7E teleprinter, 240V, silence cover, 2F automatic transmitter, hs tape winder, set of spring tension gauges, manuals, £25 the lot. Buyer collects. G3WYU, QTHR. Tel Ramsgate (Kent) (0843) 587548.

Yaesu FRG7700 rx, non memory, £250. FRT7700 atu, £40. Mizuho AP-M1 audio processor, £35. All boxed, manual, instructions, licence awaited. BRS 47613. Tel Tom, 0643 4743, evenings.

Nag 144XL 2m linear, 250W, p.e.p. output for 10W in using 4CX350F, built-in power supply, preamp, £200. G4CQR, QTHR. Tel Crowborough 64202.

IC280E 2m, fm, mobile, comp with remote mounting kit, three memory channels, good cond, £120 ono. G4TAW (QTHR G8EZM). Tel 0689 30334.

Ex-NASA satellite tracking rx, diversity a.m./fm, 130-140MHz, fully synthesized, built-in spectrum display, sig calibrator, diversity combiner, comp set of spare units enough for second system, manuals, associated cables, other equipment offers, £750 plus. G6JQL, QTHR. Tel 0602 253665.

Yaesu FT101 10-160m, £270 cash, or will exch for a Yaesu FRG7700. Tel 0902 896833.

Mini beam G4MH, less than 12 months old, £40. Buyer collects. G4UIK. Tel Ashbourne 70657.

QTH locator program tapes for Commodore 64, VIC20, Spectrum, ZX81-16k (specify). Input locator (coverage extends to 13 large squares) or lat/long, gives lat/long of locator, distance, beam heading, contest score and total. Easy, accurate, £6. GW3RRI, QTHR. Tel 0286 881886.

Icom IC24G 2m 10W fm, mint cond, boxed, all accessories, manufacturers manual, £110 ono. Class D wavemeter No1 Mk2, 240V ac operation, vgc, £10 ono. G3ZOC, QTHR. Tel Preston (0772) 746733, anytime.

Realistic PRO2008 programmable scanning rx, covers 68-88MHz, 144-174MHz, 410-512MHz, in 18, 160 synthesizer steps eight scanner channels, new cond, £65. G8OSY. Tel Whiteparish (07948) 286.

FT221RD 2m multimode, Mutek board, YC221 digital display, full 11 xtals fitted, 600kHz, 1·6MHz repeater shifts, superior tx/rx in exc cond, £430. MMT 432/144R 70cm transverter, vgc, £125. Mutek TLNA 432S, switched 70cm preamp, 1·4dB nF, new price £74.90, £50. Datong rf speech clipper, switchable piptone, £30. MM 2m and 70cm bandpass filters, 40W, £7 each. Cavity wave meter, calibrated 144-500MHz usable to 1·2GHz, requires ext meter, £16. Complete 2m 70cm station, £640. MM 15dB attenuator, £8. Tel Malvern (06845) 66202, before 7pm.

HQ1 minibeam, £45. AR40 rotator, £35. Two 10ft sections steel lattice mast, £30. G3MRJ. Tel Tadley (07356) 4606, evenings.

Drake TR4C, 300W p.e.p., 15 spare valves, £260. External vfo, spkr, £40. MN4 matching network, £45. Shure 444 mic, £25. Tono 350 computer, £125. BW tv, 5in screen, suitable vdu, £40. G4EUU, QTHR. Tel Havant 483879.

TS520S, YG3395C cw filter, DS1A dc-dc unit, as new, £300, buyer collects. G3OVT, QTHR. Tel 0438 350136.

Trio TS130S tx/rx, mobile mount, ac psu, WARC bands, ideal fixed or mobile rig, 100W output, as new cond, £400 ono. G3PVX, QTHR. Tel Peter, 01-866 6432, after 7pm.

Drake R4B, xtalled nine bands, recently revalved, T4X additional xtals 160/10m, MS4 spkr, AC4 psu rebuilt 1983, MN4 atu, £295. TR7010 2m ssb/cw, R&EW preamp, VFO700S to give coverage 144MHz to 145MHz, £135. GM4IAO, QTHR. Tel 0466 2673.

Realistic DX302, communications rx, 10kHz-30MHz, absolutely mint cond, digital display, cost £289, sell £140 ono, or swap for pet disc drives. W.H.Y? G4OAK, QTHR. Tel Storrington (09066) 5151, daytime, evenings or weekends.

Moseley Elan three-el 28/21MHz larger boom, £50. Hustler mobile antenna, coils, 28/21MHz, ball mounting, £15. Buyer collects. G3JLB, QTHR. Tel 0474 534694.

Personalized computer dx list, comprehensive printout giving prefix, country, ITU and CQ zones, continent, bearing and distance from your QTH. Now includes location and cross reference for the Russian callsigns. Send name, callsign, location, longitude and latitude, £5. VHF contest program for BBC micro, checks for duplicates, calculates score, prints in RSGB type format, gives best dx info for contest, totals each page, £4. Checklog program for the BBC micro, stores all callsigns, other facilities include contact number search, sorted page display on last letter of callsigns, £4. Random access filer for BBC micro, disc users only, lets you store callsigns, names, QTHs, QSL sent and received for all your contacts, not limited by the available memory of the micro but only by the room on disc, comes dedicated to amateur radio but includes info to easily change the program and use it for any data base application supplied on disc, £10. All incl p&p. G4IAU, QTHR. Tel Dave, 0924 270707.

Sommerkamp FT767DX, FP767 psu, spkr, FC767 atu, used very little, still one year's guarantee, £500. Tandy DX200 rx, £65. Both still in orig packing. G4SPP, QTHR. Tel Blackburn (0254) 65803.

Trio TS930S, auto ant tuner built-in, up down scan mic, as new, £1,000. Buyer to collect please. G4BXY, 372 Gosbrook Road, Caversham, Reading, Berks.

Gem quad, aluminium spider, eight glass fibre spreaders, cost new today £275, need space, hence only £99 to clear. Carriage to be arranged. Tel Ayr (0292) 531225, before 8pm.

EA12 Eddystone amateur bands rx, in exc cond, comp with matching plinth spkr, £135 ono. G4MVS, QTHR. Tel 01-644 8249.

FT290R, nicads, in vgc, helical antenna, £180. Eddystone EC10 gen cov rx, fm facility, £65. Homebrew hf linear amplifier, offers in region £150. G4FIE, QTHR. Tel Leicester 773870.

Variac V6M 120V in, 0-135V out at 6A, £10. Advance cvt MT140A, 190-260V ac in, 230V rms out, 150W, £5. 2-8MHz 19in rack mounting vfo/freq meter, TMC model PMO5, manual, £25. Buyers to collect. G3RFI, QTHR. Tel 0767 260800.

Sky Ace 517 air band monitor, hardly used, slight scratch on grill. Atari computer game, several cartridges, no reasonable offer refused. Sell separately. G4SIB. Tel Newdigate (Surrey) 362.

IC2E, spare charger, battery pack, case, spkr-mic, 12V charging lead, gc, orig box, £140 ono. Carriage extra. GW6SRL. Tel Shane, Colwyn Bay 518007.

KW201 rx, Q-mult, 100kHz cal handbook, cct diagram, exc cond, £110. *Wanted:* Sentinel top band rx converter. G2HLL, QTHR. Tel Leeds (0532) 685792.

ASR33 teletype corporation, RS232, stand, auto transformer, tape reader, tape punch, manuals, paper etc, vgc, £55. Will deliver Gloucestershire area. DNT 29MHz fm 4W tx/rx mic, mobile mount etc, new, £35. G8JAY, QTHR.

Generator, four-stroke, petrol, 15V, 15A, electric start, used to float charge car battery for high capacity 12V supply, comp with leads, distribution box, £50 or exchange with cash adjustment for 240V generator. G8POG, QTHR. Tel Oxford (0865) 67165.

Datong speech processor, manual type, £35. T4XC, AC4, ps, R4C rx, three extra xtals, noise blanker, offers. Buyer collects except speech processor. G2UZ, QTHR. Tel Leeds 784074.

Datong morse tutor, £30. Icom cw filter, 250Hz, fitting instructions for ICR70, IC720, IC720A, £15. Hi-mound morse key HH808, marble base, ball race bearings, silver contacts, £24. All items exc cond. G3WLX, QTHR. Tel Gt Milton 643 (Nr Oxford).

SSB tx filter xtals, two pairs B7G vacuum mounted 461·111kHz/459·259kHz, carrier xtal in FT241, 461·8kHz, £10 the set plus postage. G3GOT, QTHR. Tel Terling 229.

ATV rig, 70cm Sirkit tx/rx, 14W peak sync, 2·3 and 4·5MHz video filters, MM600/432 atv up converter, latest CQ tv mags, moved to poor atv location, £130 the lot. Will separate. G6LVO, QTHR. Tel Geoff 04626 76422.

Katsumi MK1024 memory keyer, will store approx 80 characters built-in twin paddle, 240/12V, £75. G4OBK, QTHR. Tel Chorley 74451.

TR7800 2m fm, 25W, new pa, £150. Tel Cragg, Bournemouth (0202) 426647.

Radio valves, older types and more modern British and American, many new in orig packs, some used, many older components, mostly new, unused, various mains and output transformers, some tv ics, reasonable prices plus p&p. G6AGF. Tel 09867 2292.

SX200N scanning rx, 26-88, 108-180, 380-514MHz, a.m./fm, mint cond, 240V, psu, operation manual, £240. Datong morse tutor, D70, key, £45. Tel 02514 28526 (Hants).

TS700G 2m multimode, manual, vox unit, orig packing, any trial, exc cond, £295 ono. Mizuho 2m, ssb/cw, 144·100-144·300, nicads, charger, perfect, £75 ono. Concentrating on hf. G4LAV, QTHR. Tel Crewe (0270) 68471.

Mosley TA33JNR triband beam, Kenpro KR400RC rotator, control, Jaybeam 10XY vertical horizontal beam, £200 the lot. Will split. G4ODK NOT QTHR. Tel Basildon 418058.

FT708R 70cm handheld, λ/4, 5λ/8 whips, charger, car converter/charger, spkr/mic, case, etc, £180. G4UFC. Tel Ilkeston (Derbys) (0602) 302990.

MM tx/rx, 144/28, mint cond, used very little. £70 plus carriage. *Wanted:* AR88 S-meter and spkr, must be genuine original. G3ESB, QTHR. Tel 0332 671536.

Trio R2000 rx, 150Hz-30MHz, less than one year old, all modes, save £70 on new price, £360. VHF conversion unit for above, fits internally, 118-170MHz, £85. Yaesu FR77700 atu, £35. Tono 550 communications terminal, cw, rtty, ASCII, £249. Less than one year old. G6LDS. Tel Worcester (0905) 26171.

Icom 1050, 10m fm, £27. Solartron scope CD1012, 25MHz, £75. Akai portable vtr, VT110 monochrome camera, accessories, manual, £98. Ajax yacht tx/rx, 12V, six xtals, a.m. only, would convert to 160 or 80m, £25. 1in vidicon, £15. *Wanted:* Pye or Storno rig to convert top 4m (mobile). Inexpensive hf rig suitable for 12V mobile operation. One needing work might suit. G4ULR. Tel Norwich (0603) 51656.

FT200, matching psu, Shure 444 mic, exc cond, £210. Datong FL2, four months old, £70 ono. Buyer inspects, collects. G4RQI, 5 Rutland Road, Weymouth, Dorset.

Yaesu FT290R, 2m, nicads, charger, carrying case, boxed, mint, £210. G6WNG. Tel Earlswood 2449 (Warks).

Transmitting valves, QQV03-20A, £12. QQV03-10A, £3. 829B with ceramic base, £6. Pair 6L6GB (Sylvania), £5 pair. 2E26, £3. 5763, £2. 5B/255M, £3. 5B/257M, (12V htr), £3. 5B/252M, £2. G3GOT, QTHR. Tel Terling 229.

Sommerkamp FT767DX (Yaesu FT707), 100W tx/rx, Yaesu FP707, psu, Yaesu FC707 atu, vgc, boxed, £485, no split. HF5V antenna, HF5R radial kit, £75. Lowe FX1 mf wavemeter, £30. G4OQN. Tel 01-898 9856, after 6pm.

Microwave Modules MMT144/28, mint, still guaranteed, £70. MMC 144/28, £20. G3LLL fm tx/rx, toneburst, repeater shift boards, £25. Buyers to collect or pay postage. G4FLY, QTHR. Tel 0734 594495.

FRDX400 160-10m, 4m, 2m, not new bands, £100. G3XUG, QTHR. Tel Ron, Leeds (0532) 639697.

Video camera, bw, vidicon tube, lens, uhf modulator, £65. G4LMS, QTHR. Tel 0924 469288.

TS700G preamp, variable output power, £300. Matching vox unit, £25. No split. G8SDN, QTHR. Tel 0525 714128 (Beds).

Trio TS120V hf tx/rx, £250. Welz AC38M atu, £50. G-whip Flexi-Ten 10-band hf mobile ant £35. Datong DC144/28 2m converter, £20. G4PSU. Tel Alan, 0344 486792, after 6pm please.

For sale or swap: Sharp MZ80K, 48k, built-in vdu, cassette, want FT780 or £250. W.H.Y? G6MSM. Tel 0323 840209.

Trio TS830S tx/rx, one month old, obviously brand new cond, £590. Matching AT230 atu, same age, same cond, £90. G4WFT. Tel Rushden 313150, after 6pm.

FDK750E 2m multimode, 18 months old, perfect wkg order, cw all accessories, £250 ono, or exchange for 2m handheld with cash adjustment. G6ATA, QTHR. Tel Steve, 0235 24184.

Fantastic uhf/vhf/lf QTH, suit serious dxer. 750ft

asl, four beds, det modern home, approx 1/6 acre, private drive, located in small sought-after Chiltern Hills village, school, churches, shop, etc, nearby. London 35 miles, High Wycombe, 6 miles. Clear all-round take off. Versatower plus other antennas to be left if required. Early viewing recommended. First "G" 5BWAZ, first Supreme Award plus numerous others obtained. £69,950 ono. G3MCS, ZL26c, QTHR. Tel 084 44 4343.

Large selection of radio mags: *Practical Wireless, Hobby Electronics, Shortwave, Radio Modeller,* over 150 from 1977 to 1983, free to any swl or charity, Scout club, etc, just collect. EI7EQ, QTHR. Manus·McClafferty, Errarooey, Falcarragh, Co Donegal, Eire.

FT707, used little, good cond, £325. G4EBX, QTHR. Tel 0773 812766.

1,000MHz dual beam oscilloscope, Hewlett Packard 185A, comp with two plug-in amplifiers, must be sold, £100 or offers. G6BKX, QTHR.

HF10 and 70cm gear: Trio TS120V, 80-10m, five-band, stab PS20, £295 or split. Trio TR8400, 70cm, fm, 10W, 430/40, £180. 10 fm or hf linear, 200W out, 10W in, Farnell 30A switcher, adjusts 14·5-22V, £55. HF rotator, £85. Carriage extra. Tel Ted, Blackpool 700637.

Alumast 30ft tower in three sections, total weight 75lb, hinged base, cost £250, accept £160. Heathkit gdo, £20. Icom IC249, £110. Mains transformers, 0-350V, 0-425V, 200mA, 2x6·3V, 3A, 5V 3A, £10. G3UCE. Tel 0524 822125 (nr Lancaster).

HQ1 minibeam, incl £20 new parts, price new now £170, good results proved, £70, carriage extra. A. Hill, G4PYQ NOT QTHR. Tel 061-480 4550, daytime, work, or 061-366 0927, evenings and weekends.

Oscilloscope, Farnell model 124D, double beam, good wkg order, comp with professional probes, £110 ono. G3WDW. Tel Bradford (0274) 633387.

Pantax SP500 slr camera, 35mm, exc cond, £85. Beaulieu 4008 ZM2 Super 8 cine camera, fitted metal case, charger etc, vgc, £275, or swap for IC2E, 70cm gear, hf rig, w.h.y? G4RBR. Tel Chris, 01-979 1798, daytime, 01-398 8172, evenings.

Yaesu FT290R, nicads, case, whip, antenna, charger, £220 ono. DRAE morse tutor, £35 ono. consider exchange FT77 or similar with adjustment. G1ELN. Tel Disley (06632) 2545.

Icom 25E, mint, scanning mic, £200, or exchange for IC02E in similar cond. G4PCK, QTHR. Tel Torquay 38134, evenings.

MML432/50, as new, £95. Tel 0954 210388, evenings.

Ten fm rigs, DNT M40FM or LCL 2740 fm, modified, tested, 29·310-29·700MHz, unused, perfect, £33 each. Kenwood R300 rx, £90. Zetagi 30W linear for 10fm, £18. G4SNO. Tel 0562 884824, evenings.

Strumech Versatower P40, incl Mosley triband rotator, Ham 2, Jaybeam eight-el, cables, exc cond, seen wkg, buyer collects, £265 the lot. G4FRK, QTHR. Tel Cleveleys 852027.

30ft tower, winches etc, requires post, £150, buyer collects. Trio R59DE rx, Creed 75 teleprinter, spares, manuals, 813 valves, approx 5cwt ham gear, sae for list. G3FXI, QTHR. Tel Southport 65570.

12AVQ 20-15-10 vertical groundplane antenna, £30 ono. Buyer to dismantle/collect. BK100 mechanical bug key, £10. G3URE, QTHR. Tel Newcastle upon Tyne (0632) 362526.

Trio TS830S hf tx/rx, SP230, AT230, boxed, hardly used, £650. FRG7700 gen cov rx, FRT7700 atu, boxed, as new, £225. G4NSW, QTHR. Tel 0400 81438.

Sony ICF6800W 1-30MHz synth rx, usb, lsb, a.m.-w, a.m.-n, preselector, rf gain, mw, v sens, wbfm, 88-108MHz, good audio op, tape op, timer ip, mains, int batts, ext 9V dc, £225 ovno. G8SDN, QTHR. Tel 0525 714128 (Beds).

Trio 7010 2m ssb tx/rx, mic, mobile mount, £87. Mains/dc psu, £13. Trio remote vfo 700S for 7010 or Trio TS700S 2m tx/rx, £45. Acos hi-fi xtal mics type 16-1 (two), £4 each. G2FUU, QTHR. Tel Nazeing (Essex) 2274.

For sale, swop or part exchange: Telequip D53A oscilloscope, true dual beam, four input, tested, wkg, for hf atu, prefer FC902, but anything considered including about £50. Could deliver reasonable distance, prefer buyer test and collect. G4UXO. Tel Luton 581545.

KDK FM2025E mobile 25/12·5kHz synth fm scanning rig, preamp, £150 ono. SR9 fm rx, £20. G8SDN, QTHR. Tel 0525 714128 (Beds).

PSU, 100A lambda, fully metered, dc volts, 0-40 fsd, 12-30+ adjustable, ovp adj, amp meter 0-100, runs 80A, continuous, input 240V ac, can be seen wkg. Tel 0621 828807.

New mains transformers sec, 20·0·20V 3A, £3. 12V 2A, £2. 15V 2A, £2.50. 17V 2A, £2.75. 22V 1A + 6V 0·5A, £2. 9·5V, 1A, £1.75. 12V 250mA, £1. 50 + 16V, 0·5A + 11 + 8V, 0·25A, £4. 6V 200mA, 50p. P&P, £1 any amount. D70 morse tutor, £35 incl p&p. E. Hawker, GW4JCE, 31 Ystad Celyn, Maesteg, Mid-Glam. Tel 0656 732919.

Trio TR2300, cw VB2300, 10W linear, MB1 mobile mount, £120. G4AQK, QTHR. Tel Swindon 825748, after 6pm.

Advance constant voltage transformer (or as isolation) cv series, 245V out, 150W lamp, could take 200W circuit, £5. Two 80Y valves, ceramic holders, £3 pair. Transformer 240V to 3·5-40-0-40-3·5V, 10A, £5. G3MBL, QTHR. Tel 01-445 4321.

TenTec Century 21 cw tx/rx, five bands, 3·5/28MHz, dc input power can be varied from zero to 70W max, full break-in cw operation, built-in power supply, orig, brand new cond, manual, packing, £180. G3PKR, QTHR.

Surplus Yaesu FTDX560, hf tx/rx, revalved, £185. TL120 linear, vgc, £125. TR2400 mic, case, etc, £120. IC240, £100. TR7200G, xtalled, £80. Sota 70cm 50W linear, £85. All ono. G4LVK, QTHR. Tel Alan Kelly, 021-445 2088, after 6pm.

High pass filter TCC for tv feeder, £3. Tuning condensers, air-spaced, mixed valves, some 500pF twin, 10 for £5. Three-gang, 260pF per section, £3. 20W modulator, metal 6L6s, Collins transformer, less p&p, £5. G3MBL, QTHR. Tel 01-445 4321.

Datong D70 morse tutor, as new, £37. Post paid, or would part exchange for 2m multimode gear, suitable mobile. *Wanted:* 2m multimode, synthesized, details, asking price to Tony, G4OKC, 19 Lower Rea Road, Brixham, Devon. Tel 08045 4248.

2m and 10m station: Belcom K5102 26-30MHz all mode tx/rx, Microwave Modules MMT 148/28 transverter, MMR/15/10 15dB attenuator, £210. 2m fm linear, 60W, £35. Fritzell 80/40m trap dipole, £18.50. Datong rf clipper, £25. AM25B, £15. G3VOF, QTHR. Tel Ingrebourne 73366.

Icom AT100 auto hf ant tuner, as new, boxed, manual, £195 ovno. G4SIN, QTHR. Tel 01-458 7677.

Second world war radio gear, USA radio altimeters, tuning units, BC221s, RAF vhf rxs, MCR1 mini comm rx, etc, offers lot or exchange hf tx/rx, old wireless sets, gramophones, cameras. Recent *QSTs, 73s, Ham Radio,* £6 dozen. Tel Jim Taylor, 0202 510400.

Yaesu FTDX560 tx/rx, external vfo, spkr, cw filter, mic, fan, spare valves, £250 ono. Prefer local buyer. GI4GYE, QTHR. Tel Belfast 771679.

KW2000 hf tx/rx, comp with manual, some spare valves, in good wkg order, £110. Tel Abingdon (0235) 22429.

Yaesu 202 handheld 2m rig, six channels fitted, case, whip, nicads, charger, £95 ono. Will post if required. G6PGQ. Tel Martin, Worcester Park (Surrey) 01-330 5196, after 6pm.

RTTY teleprinter rolls, £1 each. Black ribbons, 75p. Teleradio audio generator, 10Hz to 100kHz, £35. High impedance mic on stand, £8. Hodec 12V 3A stabilized psu, £10. Aircraft type morse key, £3. All items plus postage. G3RDG, QTHR. Tel 01-455 8831.

Icom IC251E, ICSM2, mic, £420 or offers. FT708R handheld, base charger, £230 or offers. MM 2m preamp, £20. Prefer buyers collect. G6UMM. Tel Charles, 240 1277, weekdays, 9-5.30pm, or 987 2296, after 7pm.

Kenwood DM81 dip meter, brand new, £45. Tel 0565 54650, evenings and weekends.

FRG7700 Yaesu rx, mint cond, £250. MM432 to 28MHz converter, £20. G3XTQ NOT QTHR. Tel 0525 24281.

Drake R4C, T4XC, MS4, new bands, 500Hz, 250Hz filters, new branded pa valves, £450. G6HXR, QTHR. Tel 0634 240520.

WANTED

Have you got any of the following equipment left sitting on the shelf since updating to something more state-of-the-art? Microwave Modules MMC1296/144 23cm-2m converter, c.1978 model (not the MMK gasfet version). Microwave Modules MMV1296 70-23cm varactor tripler. Heathkit HW30 Tower 144MHz a.m. valve xtal tx with valve trf rx. G8GZZ, QTHR. Tel Ned, Woking (04862) 23506.

Circuit diagrams and information on: Advance psu MG5-40; Farnell psu, 15/2TRC, 12/12V; Advance af generator J2B; Advance millivoltmeter 77B. Want to buy VIC20, Bencher lever, YO901P, FV901DM, SP901, Thruline 250H, Eddystone bug key. G3AZI, QTHR. Tel Preston (0772) 37815.

TT21 QRO linear amp. Copy of article from *Rad Com* (early 70s) required. Orig material returned immediately and costs refunded. G3VNI, QTHR.

Info and circuit diagram for clandestine receiver type MCR1 or parts for same. G4JGG. Tel 0908 368420.

Homebrewed valve equipment for QRP cw station, rx, tx, frequency meter, atu, w.h.y? GW8HZW, QTHR.

Urgently needed by disabled amateur: handbook or photocopy and vfo for FDK Multi U11 70cm rig. Any information at all most welcome. G1AIE, 44 Burford Road, Brentford, Middx TW8 0LS. Tel Clive, 01-568 0844.

Old callbooks, pre-1981. 3CX1500A valves, and or bases. High voltage feedthroughs, 5kV+. G4RZZ (G6AZM, QTHR).

Manual or circuit diagram for Hallicrafters SX101A to buy, or borrow for copying. All costs refunded. G8BHF. Tel High Wycombe (0494) 442322.

NCX5 instruction manuals, loan or buy. G4NMR, QTHR. Tel 0905 423723.

2m fm mobile rig, synthesized type, £65 offered. HF linear or power amp in any cond for parts. Details to J. Martin, 27 Stanton Road, Ensbury Park, Bournemouth, Dorset BH10 5DS.

Varactor diodes BXY36 etc, package B or C. 2C39 or variants. Microwave Modules 23cm tripler, 384MHz source, transverter or w.h.y? for 23cm. *For sale:* 23cm interdigitial filter, £20. G3VVB, QTHR. Tel Mevagissey 842368.

Components for hb 813 or 4CX250B hf linear amps. Part completed, wkg or not, hb or commercial. All replies considered. G4JA, QTHR. Tel 0507 604967, weekends only.

Valve screening cans with bases for the large earlier UX types, 2in diameter. National Velvet Vernier dial type B. G4IMT, QTHR. Tel Bath 891254.

For Icom IC700T board which contains audio amp, modulator, oscillator, xtal filter, i.f. stages, or xtal filter only. Heathkit electronic switch S3U. G4FQW, QTHR. Tel Accrington 391682, evenings.

Video heads for Philips N1700, top rotor only required. Head coils should be untouched and not damaged. G6NVL, QTHR. Tel Manston (Kent) 368, anytime.

Eddystone 770R in good cond, reasonable price please. Tel 01-556 4050, after 6pm.

AR88D or BC348, good cond, will collect within reason, good home given to your treasured rx. G4RQL, QTHR. Tel Woodborough 344, evenings.

KW109 antenna tuner in good cond. G4CJL, QTHR. Tel Stalbridge (0963) 63357.

Top price R1120, T1119, R1139, T1138, R1395, T1394, T1396, R1398, T1397, R1400, T1399, all ex-RAF T1422. D. Parsonage, 52 Bramble Lane, Mansfield, Notts.

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.

Morse key, older the better, top price paid for double current c1915 and similar. For own use by dedicated telegraphist. G3BEX, QTHR. Tel 049 46 5097.

Trio 9500 in wkg, good cond, comp as possible. Ownership validation is required. G3HJK, QTHR.

Manual or circuit diagram for Sony Tektronix 335 oscilloscope, buy or borrow. GM4DAE, QTHR. Tel 041-778 5040.

Info wanted: on ZHC glass fibre quad poles from users, on how they found them, any data appreciated. Poles to mast casting. G3HJK, QTHR.

FM board FT101ZD Mk3, your price paid. Tel 01-572 8168, after 6pm.

Split stator capacitor, 150 or 200pF wide spaced, for atu, your price paid. G3MMM, QTHR. Tel Ashford (Kent) (0233) 22996.

Dish for 23cm required by contest group. Distance no object but must be complete with feed. Peter Crosland, Red Lion Cottage, Holt Heath, Worcester. Tel 0905 620041, evenings, or 021-454 8585, during business hours.

UHF bases for 4CX250, must be SK620A or equivalent. Cushcraft 214B Jnr boomer. GW8VHI, QTHR. Tel Reg, 0639 821308.

Atlas 215X HQ1 mini beam, good cond. G4CEM, QTHR. Tel Hitchin (0462) 32990.

Mullard QQV03/10 valves for project. Rod McMillan, G2CWY, QTHR. Tel 01-445 2508.

Any QSL cards designated GB3LI, located in Lundy Island, Bristol channel during the 1950s, either sent or received. Please send to Keith Hamlyn, G8AYE, Ty Dedwydd, Quickley Lane, Chorleywood, Herts WD3 5PD. Many thanks.

Operating manual required for Trio 9R59D, all band communications rx. Circuit diagram for good solidstate scope, utilizing 3BP1 tube. C. H.

Kaufman, G1CHK. Tel Wickersley (0709) 548564.
Trio 7010 or Icom 211 or transverter. G4ODQ, QTHR. Tel 0509 843830, evenings.
Old manuals: G3IMW would like to borrow (maximum two weeks) to photocopy, service manuals of classic rx/txs eg AR88, HRO, Collins, Eddystone, Hallicrafters, Central Electronics, second world war etc. Postage/hire paid. G3IMW, QTHR. Tel 01-340 0789.
Buy or borrow instruction manual and circuit diagram for Solartron Solarscope CD711S2. Andy Holden, 5 Bolton Lane, Ipswich, Suffolk. Tel 222282, evenings after 9pm.
Codar AT5 mains psu, gwo, orig unmodified or equivalent stabilized homebrew. Will take with non-wkg tx if unwilling to separate. G1BZQ, 3 Newis Crescent, Clifton, Shefford, Beds SG17 5HT. Tel Hitchin 815373.
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HW8 QRP tx/rx, in good cond, list mods, if any. All replies answered. G4GLC, QTHR. Tel Loughborough (0509) 212583.
AR88, HRO, other similar "classic" rxs. Anything considered, incl scrap sets for spares, but top price offered for a fine example. G4LQF, 14 Regent Road, Harborne, Birmingham 17. Tel 021-426 3663.
Can anyone tell me the name of the firm selling Vibroplex bug keys at an exhibition two or three years ago? G3HGE, QTHR. Tel 028484 452.
Manual for Trio JR310 rx. Will purchase or pay all costs to borrow for copying. G4VLB NOT QTHR. Tel 061-480 1549.
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Amplifier IC2KL, PSU, or FL210Z. G4OWV. Tel 0493 663195.
Kenwood rx R599S, must be in first class cond. Tel Morris, Bolton 52384.
Drake desk mic, 7075, 7077, types. *For sale:* Drake MN4C atu, swr power meter, 160-10m, as new, boxed, from USA, full instructions book, £90. G3VDU, QTHR. Tel Pete, Nuneaton 349461.
Plessey frequency synthesizer PG331. Service manual/setup info. Will pay costs, photocopying etc. Any info would be greatly appreciated. Tel Oxford (0865) 750681, evenings.
Magnetrons from second world war for private collection. CV38, CV41, CV56, CV64, etc. Strong, 20 Coolgardie Road, Ashford, Middx. Tel Ashford (Middx) 53990.
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SP820, must be in pristine cond, price and particulars. Have Datong UC1 2m-hf hf-2m converter. Would exchange for 70cm tx or rtty system for 48k Spectrum. G6XJO NOT QTHR. Tel Trevor, 0642 217994.
AVO Universal bridge years 1955/1965, model price etc. G4KFW, QTHR. Tel 021-357 2009.
Circuit diagrams for loan for tx type 1HR-1BC-AB4T. Valiant series made by Ultra Electronics Ltd, London. GW6YYA. Tel 0244 536811.
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Manuals for Taylor 68 a.m. sig gen serial No15791 and AR88D. Will accept orig or copy. Can photocopy. GM8LNH, QTHR. Tel 0721 20161.
Can anyone help with information on the adaptor antenna to trans type ZA 56234. G3KVT, QTHR. Tel 0603 860452.
Heathkit SB600 spkr, cabinet, must be vgc, spkr optional. G3BDS, QTHR. Tel 0905 424722.

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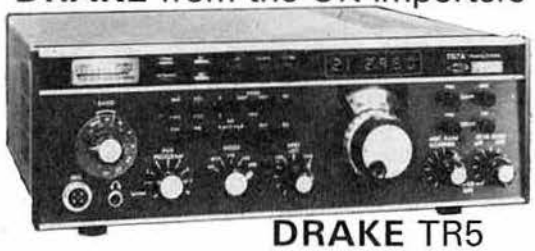

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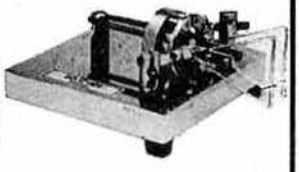

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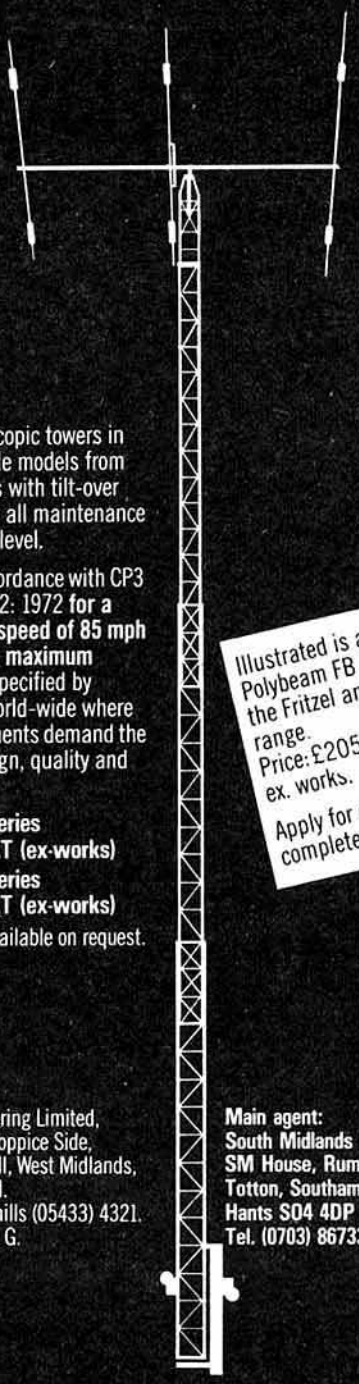

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HATELY ANTENNA TECHNOLOGY

GM3HAT GM3HAT/A

DIPOLE of DELIGHT

MONOBAND VERSIONS

Yet again we announce new developments. This month there are available two MONOBAND versions of the DIPOLE of DELIGHT, designed to the same formulae as the multiband type and therefore having the same good attributes:

(i) Low SWR (ii) good balance (iii) exceptional bandwidth (iv) high efficiency

They are priced low enough to allow experimenters to purchase band by band as interests develop, or conditions change. They would make ideal holiday, reserve or field day antennas.

DDM 14 is a monobander for 14·0 to 14·35 MHz and is 10·7 metres long (36 ft)
DDM 21 is a monobander for 21·0 to 21·45 MHz and is 7 metres long (24 ft)

Both are capable of radiating 800 W pep and are lightweight and waterproofed. Without coax cable (not supplied with any of our antennas) these monoband DD's weigh less than 250 grams and can be supported very easily either from their ends or from their centre-cards as inverted V's. An integral SO 239 socket is moulded into the centre capacitor BALUN card.

THE MONOBAND DIPOLE of DELIGHT

An operator with a monoband DD has probably the most efficient radiowave generator and receptor that has ever been marketed. The monoband DD is balanced and yet coax fed and thus provides the superb protection against local interference fields that have become to be expected of all the DD's. The capacitive BALUN provides balance but as well gives:

1. Truly monoband operation and prevents overtone radiation (3/2 or 5/2 wavelengths resonance) and again reduces the chance of VHF interference on transmit.
2. Cancellation of the remnant inductive reactance said * to be present at the cut in a halfwave dipole, always further exacerbated by use of transformer baluns.
3. Cable energy impedance transformation to the travelling wave impedance of the oppositely travelling waves on the radiating conductors.
4. Freedom from the need to cut the dipole 5% short and thereby set it off-tune into the capacitive zone as is done with traditional "cut-&-coax" antennas to tune out ' previously mentioned. The DD is a genuine electrical half wavelength.

As evidence of the good radiation and reception behaviour of the monobanders we quote SWR figures as well as the increase of noise noted between a dummy 50 ohm source at room temperature and the Galactic Noise received during a winter evening. Also given is the noise voltage, worst case, of TV timebase noise in the same bandwidth (SSB filter) all measured on a TRUE-RMS voltmeter in the audio system of an 8dB noise factor transceiver.

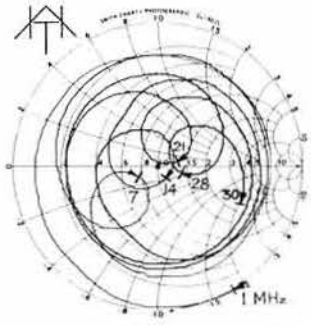
DDM 14						
f MHz	14·0	14·1	14·2	14·3	14·35	Noise: 50 ohm, Galactic, TV Tb.
S to 1	1·12	1·05	1·03	1·05	1·07	Microvolts: 0·24 1·23 2·9 (EMF)

DDM 21							
f MHz	21·0	21·1	21·2	21·3	21·4	21·45	
S to 1	1·08	1·05	1·03	1·05	1·08	1·10	" 0·24 0·92 1·3 (EMF)

In practical trials using prototypes here at GM3HAT we have several times been told by stations in the "Three A's" (America, Asia and Australia) that we are the strongest station audible from Europe at the time; it is with astonishment that the distant operator is told that we are using only a halfwave dipole at halfwave height.

ANTENNA TECHNOLOGY

This month we show a Smith Chart again. It is the feeder input impedance of a four band multiband DD fed with 15 metres of 50 ohm coax and hanging in the suburban environment at 8 metres height.



Our provisionally patented design can be used to design 1, 2, 3, 4, or 5 bander dipoles or ground plane antennas on any frequencies provided they're spaced by more than about 1·3 times in frequency. Serious commercial enquiries are invited. We are planning to be at the Anglo-Scottish Rally at Kelso on May 6th for direct sales of our range and technical enquiries.

PRICES and DELIVERY UK includes P&P and VAT
DX includes P&P (Air Mail outside Europe)

				UK	DX
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DD14/21/28	length 10·7m	(36 ft)		£46.75	£46.50
DD7/14/21/28L	length 21m	(69 ft)		£58.50	£58.00
DDM14	length 10·7m	(36 ft)		£15.98	£15.28
DDM21	length 7m	(24 ft)		£11.64	£11.50

Foreign Cheques may be written in ANY CURRENCY equivalent on day of signature to £.

*Ref Kraus "Antennas" Eqn 10-59, Z = 73 + j42·5 ohms

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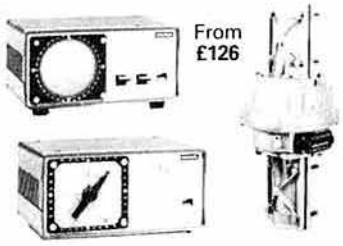

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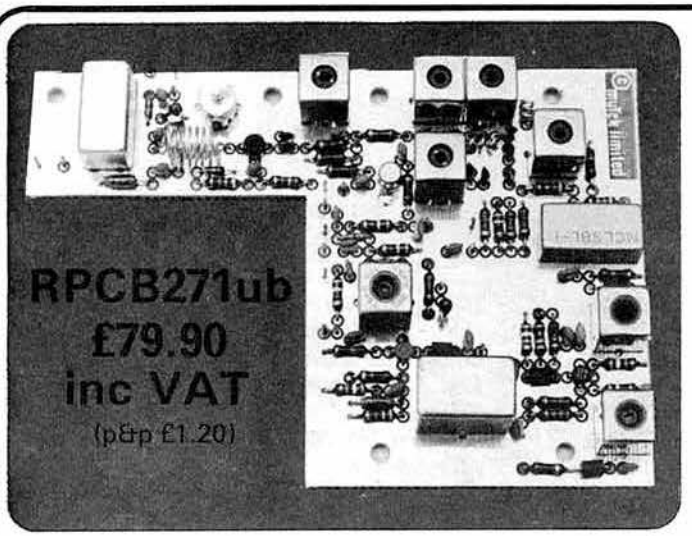

We've done it again! The new replacement front-end for Icom's superb new IC271 transceiver is shown above. It has been designed to fit in the position normally occupied by Icom's optional 'preamp', and if you are wondering why the board is a funny shape, Icom didn't give us quite enough space and we had to turn the corner!!
Performance-wise, it's all you'd expect from a muTek front-end; good low noise figure (2dB typical), and superlative strong-signal performance. An on-board antenna transfer relay ensures that the overall sensitivity isn't limited by the sometimes dubious quality of 'black box' changeover switching too.
Fitting is really very straightforward. It's not necessary to reduce the transceiver to 'kitform', and the majority of the interfacing to the '271 is in fact via plugs and sockets!
As usual, give us a ring for more info.

Stephen Prior G4SJP.

THE RANGE		Price £
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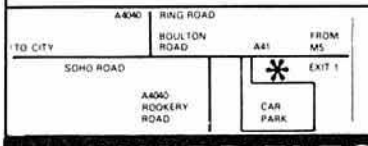

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- *Unique over-drive protection circuit*
- *Mobile mount on all 100 Watt models*

LPM144-1-100	**£172.50**
LPM144-3-100	**£172.50**
LPM144-10-100	**£149.50**
LPM144-25-160	**£207.00**
LPM144-3-180	**£235.75**
LPM144-10-180	**£235.75**

LINEAR PART NUMBERING SYSTEM

LINEAR — LPM144-3-100 — OUTPUT POWER

PREAMP

RF METER — FREQUENCY (BAND) — INPUT POWER

L144-1-100	**£143.75**
L144-3-100	**£143.75**
L144-10-100	**£120.75**
L144-25-160	**£178.25**
L144-3-180	**£207.00**
L144-10-180	**£207.00**

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12/6A £52.90
- 13·8V, 6A continuous output
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- 10A output terminals
- LED shut down indicator
- Fully protected

12/25A £138.00
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- Large 30A current meter
- 30A output terminals
- LED shut down indicator
- Fully protected

12/12A £95.45
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- Fully protected

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- Large output meter
- LED shut down indicator
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Our Guarantee *Our aim is to provide you with high quality products at realistic prices, to give you the best value for your money.*

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YAESU MUSEN

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 and displays offsets. A remarkable secondary display indicates frequency change by scrolling sideways, with the 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 ≏ 47 MHz, ≏ 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 ±3p.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 (AMI), 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-B8	Hand Scan Microphone
MD-1-B8	Desk Scan Microphone
D3000026	Curtis Keyer Unit
FIF-80	Computer Interface NEC PC8001
FIF65	Computer Interface Apple II
FIF232C	RS232 Interface

RECEIVER

Sensitivity (2-30MHz)

J3E/A1A/J1B	:0.25μV	(2.4 KHz)
(10dB S + N/N)	0.16μV	(600 Hz)
	0.10μV	(300 Hz)
A3E	:1.40μV	(6 KHz)
(10dB S + N/N)	1.25μV	(5 KHz)
	1.00μV	(3 KHz)
G3E (12dB SINAD)	:0.60μV	(12 KHz)

Sensitivity (150 KHz-2 MHz)

J3E/A1A/J1B	:4.0μV	(2.4 KHz)
(10dB S + N/N)	2.6μV	(600 Hz)
	1.6μV	(300 Hz)
A3E	:22μV	(6 KHz)
(10dB S + N/N)	20μV	(5 KHz)
	16μV	(3KHz)

Dynamic range
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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