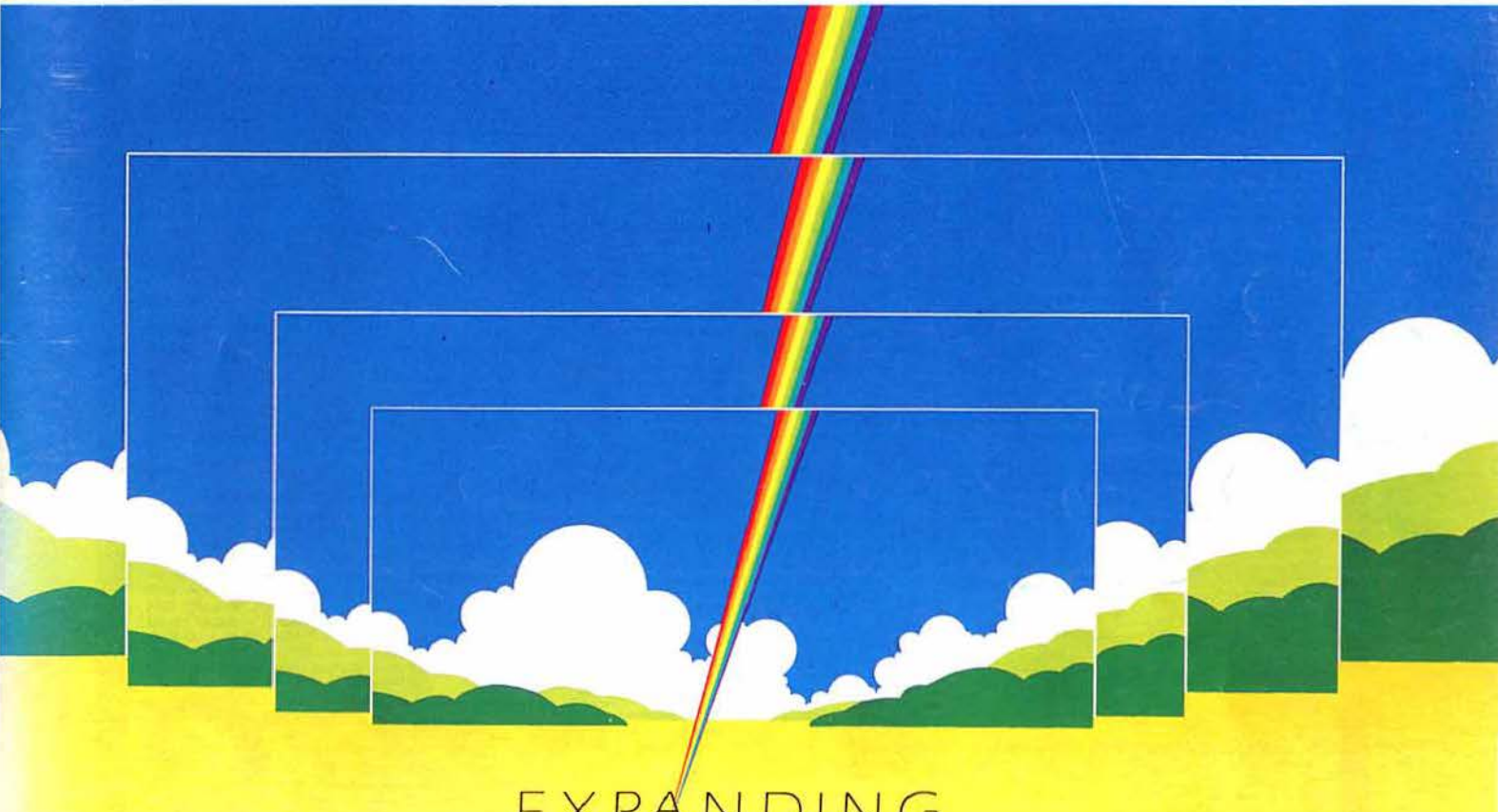
RADio COMmunication

May 1984



EXPANDING HORIZONS

WORLD TELECOMMUNICATION DAY 17 MAY 1984

Journal of the Radio Society of Great Britain

RSGB

Amcomm of London

INTEREST FREE HIRE PURCHASE ON MANY ITEMS

2 YEAR GUARANTEE on MANY PRODUCTS

01-422 9585 FOR FAST DELIVERY

ICOM 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. **£49.95 inc carr. & V.A.T.** CALL AMCOMM 01-422 9585. . . FAST DELIVERY.

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 ski-ing holiday 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, 4998

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

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

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

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

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

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

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

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

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

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

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

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

TS830S HF TRANSCEIVER

AMATEUR BANDS TRANSCEIVER £731.40 inc. VAT

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

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

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

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

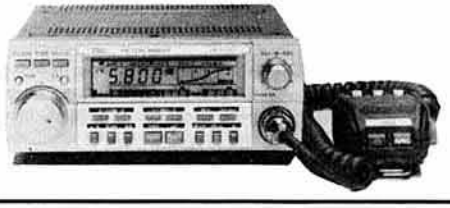
A logical progression from the reliable TS520 series the TS530S was the most popular HF rig in the range. I use the term "was" because TRIO decided to cease production and supplies were no more, however the demand from radio amateurs worldwide for the transceiver have continued and TRIO have reintroduced 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.

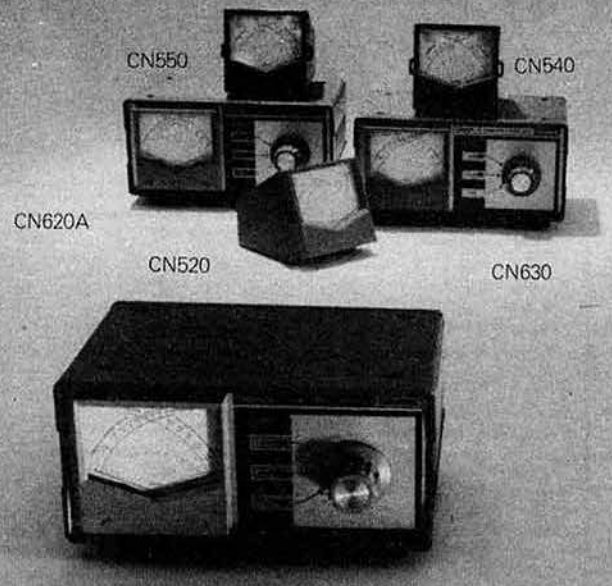


just a part of the range

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.

If I am absolutely honest,

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

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

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

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

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

LOWE ELECTRONICS 03 1029670 1 | Access | BARCLAYCARD VISA | LOWE ELECTRONICS 03 1029670 1 | Access | BARCLAYCARD VISA

EMPORIUM NEWS

Good Morning

A warm thank you to those who attended our official pre-opening of our new shop in **Cambridge.** The **free** raffle was won by **G4HCL** and he is now the proud owner of the **SW200B VHF/UHF SWR/Power meter.** David, Tony, Chris and myself were absolutely knocked over by the response. The **shop** is **now open** and I am sure that Tony, the Manager, his callsign is G4NBS, has already made, and will in the future make, many more friends. You will find a complete list of shops and their telephone numbers on a later page in the magazine.

Just to remind you, **a second-hand list of equipment** showing stock held at each and every one of the Lowe Electronics' shops is prepared here at Matlock by Debra each Thursday. To get a copy of this up-to-date list send a stamped addressed envelope to us and you will receive one by return. To ensure speed and efficiency please mark your envelope S.H. list.

The Belcom LS202E should be in stock as you read this. Before coming over to buy one it would perhaps be a good thing to ring Anne and check the stock situation. **The price** of the LS202E 2 metre dual mode, **FM** and **SSB** rig is **£225.00,** carriage £6.00 by Securicor. To put a **dual** mode hand held transceiver in a package no bigger than the space occupied by an FM rig of one year ago, to my mind, is amazing. The rig is **simple to operate,** has **upper** and **lower** side bands, repeater shift built in, tone burst and an illuminated thumb wheel frequency switch. A clever mobile mount is also available to receive the optional linear amplifier package. As I have said before, **an ideal portable** rig, giving its owner and operator the pleasures and conveniences of both SSB and FM. **I repeat the price £225.00 inc. VAT.**

LS202E

Trio have this month featured the **TS830S** in their advert. A first class valve rig (pair of 6146Bs) with outstanding performance; both on receive and transmit. The advert does not mention other manufacturers' attempts at a copy of the Trio variable band width but I am sure those who operate something other than a Trio TS830S must by now be quite skilled at retuning the station with one hand whilst narrowing the bandwidth with the other. **Or perhaps they are still perplexed!!** Attention to detail by Trio engineers is what we are talking about.

HF5 and **GPV5** aerials seem to be popular at the moment. Perhaps you can buy a cheaper version but it is important to remember that after all that effort putting the aerial in position it is somewhat annoying if performance does not meet expectation. Both the **GPV5** and **HF5** and also the **70 cm GPV7** have been **tried and tested** by amateurs for some years now. Take a listen on the FM channels and undoubtedly you will hear a GPV5 or GPV7. Prices of the aerials are as follows: **GPV5 £38.50,** inc. VAT. **GPV7 £31.60,** inc. VAT. **HF5 £59.95,** inc. VAT. The carriage charge is £6.00. Why not pop along to your local Lowe Shop and pick one up—that way we pay the carriage charge.

Now in stock is the 1984 edition of the **"World Radio & TV Handbook"** priced at **£10.95,** post and packaging £1.75. The book is an invaluable aid to shortwave listening, indeed, I do not know how one could do without it. I was a bit disappointed to see that no mention is made of **"Caroline"** but I suppose copy was complete when she came "on air". Perhaps in 1985 . . . The book uses all international radio and television stations giving everything you ever wanted to know. **For the musically inclined** the catchy musical callsigns of some of the more "aware" stations can be checked in the handbook against printed bars of music. Most helpful. The World Radio & TV Handbook is now to be found alongside my NRD515. The book is stocked by the Lowe shops. **Don't forget** that a **Lowe shop** is also a **source of RSGB books.** Not all titles are stocked but the most popular ones are. Sorry to bore you with the shops—I promise not to mention the word again, at least not until we open the next one!

£168.00 inc VAT (carr. £6)

News of a new competition: this one organized by David, G4KFN, who you all know as a perfect machine standard CW man.

Well, I'll let you into his secret. On those occasions when the shop is empty (rare!) I have heard the sound of key clicks emanating from the showroom. Several days ago **I caught him** with his key plugged in the back of a Telereader "Code Master", price £179.50, inc. VAT, carriage £2.50. **He was sending to himself!** It was on the tip of my tongue to warn him of the dangers of such a practise but instead I ventured across the room and in the middle of a **"K"** tapped him on the shoulder—**simple,** he explained, if you plug in a CW key into the "TTL IN" jack then you can send to the codemaster and it prints out on the monitor exactly what you have sent. Just the device to improve your sending ability but no good for the ego. Since we started the tests many a **confident** bright CW spark has been seen crouched over the unit **muttering.** We have had to screw it down to the desk to prevent it being hurled through the window. Men, **and a few ladies,** have been reduced to tears in the showroom so if you often call CQ on CW and nobody comes back then it may not be your aerial or your rig or even the state of the band, perhaps you require an hour on the Codemaster—**remember** David has had hours of practice and to-date the best score is our friend . . . (name and callsign withheld at owner's request) to whom David awarded 3 out of 10. Seriously, the Telereader Codemaster is a useful piece of equipment —enabling CW, RTTY to be printed out on either a TV or monitor screen or by connecting a printer as hard copy. The Codemaster will also send random characters to test your receive abilities.

Last month I mentioned the **Colour Genie** and the amateur radio programs Keith has prepared: two programs, one a contest log storing around 700 callsigns, reports and the second which will work out your QRA location from map co-ordinates and show on a screen the precise location pinpointed on a map of **either the UK or Europe** of both your own and the station whose QRA you have entered. Additionally, the program will **print** out the beam heading and distance between respective QRA locations. To recap on the log book program, if you have already worked a station then you will be told that you have. You can also search for a specific call sign or groups of call signs and finally, at the end of the day **when your throat is sore** and your **ptt thumb is numb,** then you can print out your own contest log—the tape is available free with the Colour Genie when one is purchased from a Lowe Electronics' shop. For those who are already using a Colour Genie, the tape is available at £5.00, includes p&p.

The biggest problem of advertising is to keep you informed of all the items currently found in our comprehensive range. To help, we would like to remind you that our full price list and the leaflet you require are only a 'phone call away. **Ring Beryl** on (0629) 2817, 2430, 4057 or 4995, mention the rig you want information on and it's as good as done. **By return** you will have a leaflet with details, specification, etc, together with a current price list, **Lowe Card application form** and a list of where to find ou latest shops. Not only that, you will have the **pleasure** of talking to **Beryl,** one of our quartet of attractive vivacious ladies—**Anne, Irene, Debra** being the others. Indeed, a male visitor to the company remarked that he would find it difficult to concentrate working in an environment having **such distractions!**

Anyway, that's about it for now. After that last paragraph I feel quite exhausted, so until next month.

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

David G8GIY

What price

HF Equipment		
IC–751	All band AM,FM,SSB,CW + Gen Cov Rx. 32 Memories.	1049.00
PS35	Internal switched mode power supply	149.00
SM6	Desk microphone	34.50
HM12	Hand microphone with up/down scanning	16.50
EX310	Voice synthesizer module	39.00
RC10	Frequency controller unit	29.95
CR64	High stability xtal unit	49.95
FL32	9MHz CW/RTTY filter – 500Hz	39.00
FL63	9MHz CW/RTTY narrow filter – 250Hz	39.00
FL33	9MHz AM filter – 6KHz	32.50
FL70	9MHz SSB wide filter – 2.8KHz	35.50
FL52a	455KHz CW/RTTY filter – 500Hz	79.00
FL53a	455KHz CW/RTTY narrow filter – 250Hz	79.00
IC–745	All band SSB,CW,AM(Rx only), Gen Cov Rx, 16 mems.	839.00
PS35	Internal switched mode power supply	149.00
SM6	Desk microphone	34.50
HM12	Hand microphone with up/down scanning	16.50
EX310	Voice synthesizer unit	39.00
EX242	FM unit Tx & Rx	32.50
EX241	Marker unit	15.95
EX243	Curtis keyer unit	39.00
FL45	9MHz CW filter – 500Hz	45.00
FL44a	455KHz SSB narrow filter – 2.4KHz	79.00
FL52a	455KHz CW/RTTY filter – 500Hz	79.00
FL53a	455KHz CW/RTTY narrow filter – 250Hz	79.00
FL54	9MHz CW/RTTY narrow filter – 270Hz	39.00
IC–740	No longer available. Accs still in stock.	
PS740	Internal switched mode power supply	149.00
SM5	Desk microphone	34.50
EX241	Marker unit	15.95
EX242	FM unit	32.50
EX243	Curtis keyer	39.00
FL44	455KHz SSB filter – 2.4KHz	79.00
FL45	9MHz filter – 500Hz	45.00
FL52	455KHz CW/RTTY filter – 500Hz	79.00
FL53	455KHz CW/RTTY narrow filter – 250Hz	79.00
FL54	9MHz CW/RTTY narrow filter – 270Hz	39.00
IC–730	10–80 Mtrs compact transceiver	659.00
PS15	External power supply – 20amps	119.00
PS20	External power supply with speaker – 20 amps	176.00
SM5	Desk microphone	34.50
HM7	Hand microphone with pre amp	14.95
EX202	LDA unit for use with AT100/500	13.50
EX203	CW audio filter	14.50
EX205	Transvertor unit	14.00
EX195	Marker unit	17.00
FL44	455KHz SSB filter – 2.4KHz	79.00
FL45	9MHz CW filter – 500Hz	45.00
FM04	FM unit Tx & Rx	49.00
IC–720A	No longer available. Accs still available.	
PS15	External power supply – 20 amps	119.00
PS20	External power supply with speaker 20 amp	176.00
CF1	Cooling fan for PS20	24.00
SM5	Desk microphone	34.50
FL32	CW narrow filter	39.00
FL34	AM xtal filter	34.00
BC10	Memory back up unit	5.95
FM03	FM unit Tx & Rx	89.00
IC–R70	General Coverage Receiver 0.1–30MHz	549.00
EX257	FM unit	32.50
FL63	CW narrow filter	39.00
FL44a	455KHz SSB filter	79.00
CK70	DC cable kit	5.75
7072	Interface unit to transceive with IC720A	97.50
IC–R71	All mode Gen Cov Rx, k'pad entry, 32 memories	649.00
RC11	Remote control unit for above	T.B.A.
IC–2KL	1KW PEP Linear, auto band switching, complete with –	
2KLPS	Power supply to run 2KL linear	1303.33
IC–AT100	100Watt Automatic antenna tuner	269.00
IC–AT500	500Watt Automatic antenna tuner	369.00
IC–PS30	Systems power supply, 25 amps continuous	229.00
IC–AH1	Mobile antenna, 3.5MHz–30MHz	199.00
VHF Equipment		
IC–271E	Multimode base station, 25w, 32 memories	629.00
IC–271H/E	High power version of above, 100w	789.00
PS25	Internal switched mode power supply	89.00
EX310	Speech synthesizer unit	39.00
AG20	Internal receive pre-amp	49.00
SM6	Desk microphone	34.50
IC–290D	25W Multimode mobile, 5 memories, scanning mic	469.00

IC-751, £1049.

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

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

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

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

IC-R71E, £649.

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

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

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

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

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perfection?

IC-27E	25W FM mobile, 9 memories, multi function display	299.00
U216	Voice synthesizer unit	T.B.A.
IC-25H	45W FM mobile, high power version of old IC25E	359.00
BU1	Memory back up unit for mobiles	24.50
	DC leads (flat pin or square 6 pin)	4.50
	DC Plugs (flat 4 pin)	.30
	DC Sockets (flat 4 pin)	.30
IC-2E	Synthesized hand portable, 1.5 watts	169.00
IC-O2E	Synthesized hand held, keypad entry, LCD display	229.00
ML1	10 watt booster unit for 2E	69.00
BP3	Standard battery pack	25.00
BP2	Low volts high capacity (long life)	38.00
VP4	Empty battery pack, takes 6 x AA size cells	7.95
BP5	High volts high capacity (high power)	48.00
BP7	High volts high capacity (for use with O2E ONLY	59.00
BP8	Low volts high capacity	49.00
DC1	12v regulator pack (2E ONLY)	12.50
CP1	12v charger lead for cigar lighter	4.95
FA2	Helical antenna	7.50
LC1	Leatherette case (BP5)	5.00
LC2	Leatherette case (BP4)	5.00
LC3	Leatherette case (BP3)	5.00
LC11	Case for O2E (BP3)	5.00
T/L1	Heavy duty leather case (all batt packs)	21.27
BC25E	240v wall charger for 2E	6.69
BC25U	110v wall charger for 2E (USA)	6.69
BC16E	240v wall charger for O2E (BP8/BP7)	9.95
BC30	Desk top drop in charger (fast and slow) old packs	56.35
BC35E	Desk charger all packs new & old (fast/slow)	56.35
HM9	Speaker microphone	16.50
IC-202S	SSB Portable, + CW, 3 watt output	199.00
BC15E	AC Charger 240v	41.80
BC20	DC Charger 13.8v	41.80
	DC lead	1.75
	Telescopic antenna	1.50
LC25	Leatherette carrying case	8.25
FA1	Helical screw in antenna	7.50
UHF Equipment		
IC-471E	Multimode base station, 25watts, 32 memories	699.00
IC-471H	High power version of above, 75watts.	879.00
PS25	Internal switched mode power supply	89.00
EX310	Voice synthesizer unit	39.00
SM6	Desk microphone	34.50
IC-490E	Multimode mobile, 10 watts, 5 memories	495.00
IC-45E	FM mobile, 10 watts, 5 memories	329.00
BU1	Memory back up unit for mobiles	24.50
	Spare DC leads (flat 4 pin or square 6 pin)	4.50
	DC plugs & sockets (flat 4 pin)	.30
AG1	Mast head pre-amp for 471/451/490	49.00
IC-4E	Synthesized hand portable, 1.5 watts	219.00
IC-O4E	Synthesized hand held, k'pad entry, LCD	T.B.A.
FA3	Flexi 1/4 wave antenna	7.50
	Accessories same as IC2E/O2E	
IC-402	SSB portable + CW, 3 watts output	257.00
BC15E	AC charger 240v	41.80
BC20	DC charger 13.8v	41.80
	DC lead	1.75
LC25	Carrying case	8.25
1.2 GHz Equipment		
IC-120	FM mobile, 1 watt output, 40MHz coverage mems	439.00
BT23E	Bit Zero 23e, 1296MHz linear, lw in – 7/8w out	179.00
50 MHz Equipment		
IC-551	Multimode base station, supplied SSB/CW only	379.00
EX106	FM unit	112.00
EX107	VOX unit	49.00
EX108	Pass band tune unit	97.50
IC-505	Multimode portable, 3/10watt, supplied SSB only	382.00
EX282	FM unit	28.50
BP10	Nicad pack	59.00
BC15	Charger unit	6.50
LC10	Carrying case	22.50
Mobile Mounting Brackets		
MMB5	Mount for 251E, 451E, 720A, 730	12.50
MMB6	Mount for 240,	12.50
MMB7	Mount for 245E	12.50
MMB8	Mount for 255E, 260E	12.50
MMB9	Mount for 290E, 490E	12.50
MMB10	Mount for 25E, 45E, 120	12.50
MMB11	Mount for 22U, 24G	12.50

IC-02E, £229.

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

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

IC-271E, £629.

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

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

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

IC-27E, £299.

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

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

IC-120, £439.

What can we tell you about the IC-120? It is a comparatively new mobile using the 1296MHz, FM frequency. 1296 is now becoming increasingly popular in the U.K., mainly for the person who would like to avoid all the QRM sometimes found on the more widely used 2M waveband.

Later options, soon to be available for the IC-120 will include a linear amplifier and a power supply.

Some of the 120's features include: frequency coverage 1260 to 1300MHz, adjustable repeater shift, 6 memories with scanning facility, spurious emissions are 40dB or better, output power is 1W or more. Mode FM, 2 VFO's, deviation +5KHz and RIT.

More detailed information is easily available from Thanet Electronics Ltd. Break new ground with the IC-120.

Great News from YAESU!

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

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

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

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

NOW IN STOCK!

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

£49·50 Carriage paid

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Norwich (0603) 667189
NORTH STAFFS
Bob Ainge W5MJQ (0538) 754553
SHROPSHIRE
Syd Poole G3IMP, Newport, SALOP (0952) 814275

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,
45 Johnston St., Blackburn.
Tel: 0254 59595
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
Call Peter or Bert G2BAR for prompt and friendly service.
Open: 9 am - 6 pm.
Sat: 9 am - 1 pm

YORKSHIRE
Amateur Electronics UK/ Hooker, 42 Nether Hall Rd.,
Doncaster.
Tel: 0302 25690
Alan G4OEM has a large stock of our product range – why not give him a ring and save yourself some petrol?
Open: 9 am - 6 pm Mon. - Sat.

STOP PRESS

Opening soon!-Our New Norwich Branch
Contact Tim Thirst G4CTT for full details

For full details of these exciting models, send today for the latest BROCHURES. All you need do to obtain the latest information about these exciting developments from the World's No.1 manufacturer of amateur radio equipment is to send 36p in stamps and as an added bonus you will get our credit voucher value £3·60 – a 10 to 1 winner!

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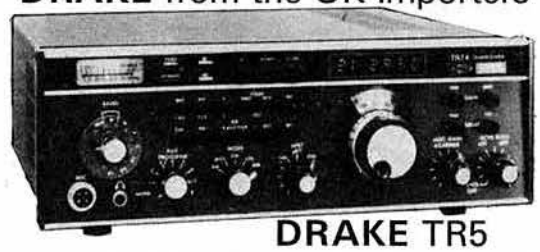
RADIO SHACK

For the best in Amateur Radio and bargains throughout the ranges

COLLINS KWM-380

NEW! YAESU FT-757GX

DRAKE from the UK importers



DRAKE TR5

ICOM IC-751 £1049

ICOM IC-R70 £549

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Two metres FM mobile transceiver

TRIO R2000
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AR-2001

Realistic

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

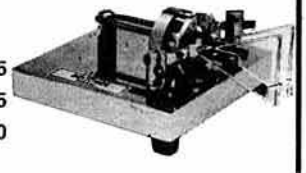
Bearcat

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

BEARCAT BC-20/20FB

BENCHER PADDLES

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



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FACILITIES + UNEQUALLED PERFORMANCE BY YAESU

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

Multimodes for 6m, 2m & 70cm

FT690R	multimode Transceiver 6m	£249.00 inc
FT290R	multimode Transceiver 2m	£269.00 inc
FT790R	multimode Transceiver 70cm	£249·00 inc
SMC 2.2C	2.2Ah nicads C size per set	£21.60 inc
SMC 8C	220mA charger (13A style)	£8.80 inc
MMBII	mobile mount	£26.00 inc
CSC1A	carrying case	£4.20 inc
FL2010	2M 10w amplifier	£63.25 inc
FL6010	6M 10w amplifier	£49.00

FM TRANSCEIVERS

FT230R

FT208R

FT203R	2m Handheld	NEW £169.00 inc
FT230R	2m Transceiver 25w	£259.00 inc
FT730R	70cm Transceiver 10w	£229·00 inc
FT208R	2m Handheld 2.5w	£199.00 inc
FT708R	70cm Handheld 1w	£179·00 inc
SMC 8.9AA	Handy charger (13A style)	£8.05 inc
NC7	Base charger	£32.95 inc
NC8	Base quick charger + psu	£54.05 inc
PA3	DC adaptor and charger	£15.35 inc

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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AUTHORISED YAESU

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

YAESU'S LINE UP FOR '84
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.

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

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

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

FS-500H

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

T3-170L

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

SMC-HS

HF, VHF, UHF ANTENNAS MOBILE VERTICALS

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

SMC 78F

GCD

SMC258

GCD

SMC-HS MOBILE ANTENNAS		£	P&P
SMC6P2T/PL	Telescopic 2M PL259 fitting 0dB¼	5.75	0.85
SMCT144h	Telescopic 2M ¼ 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 ¼ wave BNC fitting 2.5dB¼	7.30	0.65
SMC2QW	2M ¼ wave 0dB¼ 1.6'	2.53	1.85
SMC2NE	2M ⅝ wave fold 3.0dB¼ 4.3'	7.30	2.00
SMC2VF	2M ⅝ wave fold 3.0dB¼ 3.5'	12.65	2.00
SMC78F	2M ⅝ wave fold 4.5dB¼ 5.7'	14.95	2.50
SMC78B	2M ⅝ wave ball 4.5dB¼ 5.6'	14.95	2.59
SMC78SF	2M ⅝ wave short 4.7'	14.95	2.50
SMC88F	2M 8/8 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 × ⅝ fold 5.5dB¼ 3.1'	13.80	2.00
SMC358	70cm 3 × ⅝ 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

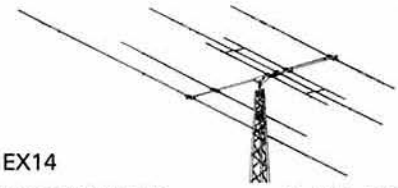
SOMM

HS770

NB: PRICES INCLUDE VAT AT 15%

HF ANTENNAS

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

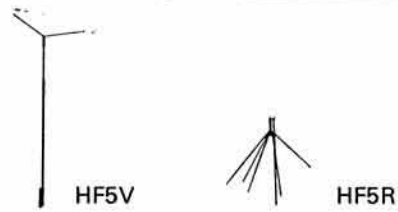


EX14

MULTIBAND BEAMS		Inc VAT	P&P
EX14	Explorer 10-20m	£325.00	£5.95
TH3JN	3 Ele 10-20m	£199.00	£3.50
TH2MK3	2 Ele 10-20m	£169.00	£3.50
TH5DXX	5 Ele 10-20m	£419.00	£6.70
TH7DXX	7 Ele 10-20m	£520.00	£8.75
TB3	3 Ele 10-20 Jaybeam	£189.75	£5.90
HQ1	Mini Quad 10-20	£169.00	£4.00
G4MH	Mini Beam 1-20	£88.50	£4.50
TA33JNR	3 Ele 10-20 Moseley	£177.10	£6.00
Mustang 2	2 Ele 10-20 Moseley	£177.10	£6.90
Mustang 3	3 Ele 10-20 Moseley	£220.80	£6.90
GQ2E	2 Ele 10-20 Quad	£270.25	£5.40
GQ3E	3 Ele 10-20 Quad	£435.00	£9.20
GQ4E	4 Ele 10-20 Quad	£599.00	£10.00
Hyquad	2 Ele 10-15M dipole 20M	£325.00	£6.00
LP1007	Log Periodic 13-20 MHz	£1707.75	DIST
3Y1015D20	3 Ele 10/15M Dipole 20M	£158.70	£5.95
DB10/15A	3 Ele 10-15m	£199.00	£4.80

TB3

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



HF5V HF5R

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

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

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Region 8	*(Kent, East Sussex, West Sussex)*	M. Elliott, G4VEC. Tel 0795 70132.
Region 9	*(Cornwall, Devon)*	W. J. Colclough, G3XC. Tel 0726 860485.
Region 10	*(Dyfed, Gwent, Mid Glamorgan, Powys, South Glamorgan, West Glamorgan)*	E. J. Case, GW4HWR. Tel 0222 810368.
Region 11	*(Clwyd, Gwynedd)*	B. H. Green, GW2FLZ. Tel 0492 49288.
Region 12	*(Grampian, Highland, Island Authorities, Tayside)*	M. R. Hobson, GM8KPH. Tel 0796 2140.
Region 13	*(Borders, Fife, Lothian)*	A. B. Givens, GM3YOR. Tel 0592-200335.
Region 14	*(Central, Dumfries and Galloway, Strathclyde)*	T. G. Wylie, GM4FDM
Region 15	*(Northern Ireland)*	J. T. Barnes, GI3USS. Tel 0247 3948.
Region 16	*(Essex, Norfolk, Suffolk)*	T. D. Howe, G3PLF. Tel 0268 24453.
Region 17	*(Isle of Wight, Channel Islands, Dorset, Hampshire, Wiltshire)*	H. G. Cunningham, G8FG. Tel 0202 876018.
Region 18	*(Cleveland, Durham, Northumberland, Tyne & Wear)*	W. Ricalton, G4ADD. Tel 067 088 259.
Region 19	*(Greater London N of Thames, Hertfordshire)*	R. J. Broadbent, G3AAJ. Tel 01-989 6741.
Region 20	*(Avon, Gloucester, Somerset)*	B. L. Goddard, G4FRG. Tel 0272 848140.

HONORARY OFFICERS

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

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

ANNUAL SUBSCRIPTION RATES

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

RSGB QSL BUREAU

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

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

RSGB NEWS SERVICES

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

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

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

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

EDITORIAL

VALUE FOR MONEY

The role of a national radio society, such as the RSGB, is simply to make amateur radio flourish at the highest possible level. One way in which it does this is by forming a central organization providing the means by which both professional staff and volunteer effort can combine in the best possible way in order to carry out the multitude of tasks which need to be done.

The "output" of the RSGB's centralized effort can be divided broadly into three areas. First the Society provides the focus for interaction between amateur radio and national bodies such as the media, educational authorities, MoD, emergency services, industry, learned institutions and—especially—the UK licensing authority. There are many more, of course. The RSGB is also the link through which amateur radio is co-ordinated worldwide by the International Amateur Radio Union—readers will be aware that an eight-strong RSGB team has recently returned from the week-long triennial IARU Region 1 Conference in Sicily.

The second "output" provided by the RSGB is, to mix a metaphor, in the form of a forum through which volunteer effort (much of it very skilled indeed) can contribute to the benefit of amateur radio. Much of this takes place through the Society's 15 committees (Education, Finance & Staff, HF, HF Contests, IARU, EMC, Membership & Representation, Microwave, Exhibition & Rallies, Propagation Studies, Raynet, Technical & Publications, Licensing Advisory, VHF and VHF Contests). Further effort comes from honorary officers who are involved with the audio-visual library, hf and vhf awards, the Intruder Watch, Observation Service and slow morse transmissions, and the many hundreds of volunteers in the field who work so enthusiastically on behalf of amateur radio. The latter group includes regional and area representatives, QSL Bureau sub-managers, Raynet controllers, intruder watchers, observers, GB2RS newsreaders and reserves, the Antenna Planning Panel, repeater groups, beacon keepers and slow morse senders. This energetic group of people provides a remarkable source of strength to UK amateur radio.

The third "output" comes by way of the services provided for members largely by RSGB staff—such as those involved with the editing and production of this magazine. The collection and dissemination of amateur radio news by *Radio Communication,* GB2RS, Headline News, the *Council Letter* and the recently introduced *RSGB News Bulletin* are all areas in which staff play a vital role; many improvements in this field have been made during the last 12 months. Other areas of activity include the issuing of special event callsigns, the production of books, the availability of reciprocal licensing information, the RSGB QSL Bureau and the staff effort involved in producing and distributing a vast amount of amateur radio information to members and prospective members, and much more of course. In addition to *Radio Communication,* which in terms of editorial content is the largest magazine in the field in the UK, and which is posted directly to members each month, the Society is a major book publisher; indeed, it is the second largest publisher of amateur radio books in the world.

We would like to think that most people who become members of the RSGB do so on the basis that they enjoy amateur radio, recognize that it has to be worked hard for, and wish to support all the combined efforts required to enhance its well-being and to make it flourish. It is interesting to note that the proposed RSGB full subscription of £16.50 goes to support **all** the above activities, without which our hobby of amateur radio would be very weak indeed. There are commercial organizations in the UK which provide **only a monthly magazine** for a comparable fee by **post;** but the difference between simply providing a monthly magazine and carrying out the enormous quantity of work done by the Society in order to ensure the well-being of amateur radio is considerable—as must be obvious from what we have said above. Indeed, we find the difference quite remarkable.

D. A. Evans, G3OUF

Amateur Radio News

Band planning

There appears to be some confusion in the area of band plans at vhf and uhf and the need for them; some beginners and newcomers to the hobby appear to be somewhat confused about the sub-band for beacons in particular. In general terms, the segments 144·845–145MHz and 432·80–433MHz should **never** be used for transmitting purposes since these portions of the 144 and 430MHz bands are set aside for beacons. These are heavily used by those interested in propagation and in dx working, and local working in this part of the band makes this quite impossible. Please do not use these sections of the 144 and 430MHz bands for anything other than listening purposes.

In connection with this, there appears to be some quite widespread misconceptions and misunderstandings in connection with the bandwidth of transmitted signals. It appears to be frequent practice for stations to engage in contacts using fm on, for example 144·95MHz in the belief that this will not cause interference to those who wish to listen for beacons on 144·945 or 144·965MHz. This demonstrates complete misunderstanding of the nature of an fm transmission. In general terms the bandwidth of an fm signal is given by the Nelson approximation of 2(fd + fm) where fd is the deviation frequency and fm is the highest modulating frequency. Since there is an infinite series of sidebands in an fm transmission, this is an approximate figure which in amateur practice implies a bandwidth of about 14kHz in round figures. In any event the beacon sub-band should never be used for transmissions of any kind at any time of day, whether fm or otherwise!

Pirate prosecuted

On 27 January 1984 Robert Burwell was fined a total of £250 and £50 costs at Lymington Magistrates' Court for installing and using a 10W transmitter on 6,628kHz. The court heard that French air traffic control had complained of interference from a station using the callsign "Alpha 2". Mr Burwell stated that he had thought that his transmitter was powerful enough to reach France but not to cause interference to the UK air traffic control centre at West Drayton. The presiding magistrate commented that the offences were very serious and that ". . .the damage which could have been caused. . .was enormous".

1984 *Call Book*

The new edition of the *RSGB Amateur Radio Call Book*, which is now available over-the-counter to members at £5.30, and by post at £6.43, is notable in a number of ways. The publication date had been changed in order to include as many newly-licensed amateurs as possible following the RAE examination in May 1983. This extended revision period, from August 1982 until February 1984, has resulted in a total of over 18,000 additions and more than 10,000 alterations and amendments to existing entries. There are almost three times as many revisions as there were for the 1983 edition, and in consequence the new edition is some 30 per cent larger than the old one. The complete G6--- callsign series is included, as well as the initial callsigns in the G1 series—callsigns up to G1CTZ and G4VSZ are included.

The 1984 edition will be the last to be compiled manually. This involved the use of a system in which each line was typed manually on a card and each card was photographed in turn at high speed to produce the negatives from which the columns were printed. The manual interfiling of new and amended cards in the data bank was extremely time-consuming.

Fortunately, future prospects for reducing the workload are very good, since the Post Office is computerizing its records, and the labour-intensive manual system will be abandoned in favour of more modern computerized methods for the 1985 edition.

Still on the subject of books, the very popular paperback combined edition of Volumes 1 and 2 of the 5th edition of the *Radio Communication Handbook* was recently temporarily out of stock. We now have new supplies and the book can be obtained by post from the sales department at a cost of £9.82 to members or, alternatively, £8.10 over the counter.

SUBSCRIPTION INCREASE—1 JULY 1984

At its meeting on 24 March, Council agreed that the annual subscription rate for corporate members should be increased by £2 from £14.50 to £16.50 per annum, thus accepting a recommendation from the honorary treasurer at an earlier meeting of the Society's Finance & Staff Committee. This represents an increase of 14 per cent over a 33-month period to 1 July 1984, which is less than the predicted rate of inflation. It is regarded as the minimum consistent with maintaining the proper functioning of the Society and the standards of service to its members.

The subscription rates for other categories of membership will be increased roughly in proportion. However, in the case of overseas members the changes in the postal charges since the last increase will also be taken into account. In addition, the increase for associate and student members will be minimized to compensate for the the recent large, 50 per cent, increase in the licence fee; these categories, of course, represent the future of amateur radio.

There are some people who believe that the Society's subscription should be at a higher level, but it is Council's current policy to limit increases as far as possible. By any normal commercial criterion, the annual surpluses made by the Society in recent years are small. Members will have noted that there was a small surplus of income over expenditure in the last published accounts for the 1982/83 financial year. However, the surplus represented only two per cent of the total income. For the six months ended last December, the Society's accounts show a deficit, albeit less than the budgeted deficit. In order to re-invest money in amateur radio, the Society needs to have working capital. It was the use of such capital, namely the accumulated small surpluses of recent years, that enabled the Society to complete the outstandingly successful transaction which allowed the Society to move its headquarters to Potters Bar. We also need capital to invest in new publications and projects to benefit UK amateur radio.

It has been previous Society policy to delay subscription increases until the last moment, with consequent large increases when they occurred. It has now been agreed that rates will be reviewed every two years, to coincide with the start of the Society's financial year on 1 July. This review period seems a reasonable compromise between, say, an annual review, with the disproportionate administrative load, and having large increases at greater intervals. It is worth pointing out that the Society does not receive full financial benefits of any increase until 12 months after the increase comes into force.

The present increase of 14 per cent should be compared with the estimated change of 16 per cent in the Retail Price Index, and that of 17·6 in the Average Earnings Index over the period October 1981 to December 1983. The present increase, therefore, is below these "inflation rates".

IARU news

The Chinese Radio Sports Association, which represents radio amateurs in the People's Republic of China, has applied for membership of the IARU. The CRSA was originally founded in 1964, but it became inactive soon after that date because of the suspension of amateur radio in China until early 1982. Amateur radio in China is still club-based, with no licences for individual stations having yet been granted. There are at present three club stations: BY1PK near the CRSA headquarters (Box 6106, Beijing); BY4AA at the Shanghai branch (Box 205,

ZONE G CONFERENCE

An RSGB Zone G Conference will be held on Saturday 9 June 1984 in the City Mills Hotel, West Mill Street, Perth commencing at 2pm sharp

There are a number of items for discussion, but perhaps the most important item on the agenda will be the future locations of the annual Scottish Amateur Radio Convention.

All members are invited to attend the conference, especially those with an interest in running future events.

FRONT COVER

World Telecommunication Day is celebrated annually on 17 May to mark the anniversary of the founding of the ITU in 1865. Its first name was International Telegraph Union—the only electrical transmission facility at the time being the telegraph—but with the advent of "telecommunications" its title was changed to International Telecommunication Union. The ITU is the United Nations specialized agency for telecommunications, and by selecting "Expanding horizons" as its theme for World Telecommunication Day this year it has chosen to emphasize the new dimension assumed by telecommunications in the development process and the remarkable possibilities offered by current technologies.

Shanghai); and BY8AA at the Sichuan branch (Box 6106, Beijing). There are at present 30 authorized operators, and other applicants are being trained. The CRSA, which is actually part of the Chinese Government, sponsors an annual df contest during the autumn in which selected competitors from the provinces take part. China has a large number of prospective amateurs, and a monthly magazine, *Wuxiandian*, is produced by a publishing company associated with CRSA.

The Japanese Amateur Radio League, JARL, recently visited BY1PK and made a film which, among other things, showed the finals of the amateur radio df competition. Professionally produced, with a commentary in English, fox-hunting Chinese-style is shown in some detail, and the film is recommended viewing. VHS and Beta video copies have been supplied to the RSGB audio-visual library.

An application for membership of the IARU has been received from the Vanuatu Amateur Radio Society, which represents amateurs in the Republic of Vanuatu. The society was founded in May 1980, at which time the country was known as New Hebrides and was jointly administered by France and the UK. There are 25 amateurs in Vanuatu, of which 18 are members of the VARS, and the country's licensing authority is reported to have a very favourable attitude to the hobby. The VARS has a headquarters station with the callsign YJ8DX, and the callsign YJ8ES is used by the society's branch on Espiritu Santo Island.

From no code to all code?

The publisher of the American magazine *73*, Wayne Green, W2NSD, has proposed to the FCC a change to the licence conditions in the USA whereby biennial re-testing of radio amateurs' proficiency in morse code would become mandatory. He has also proposed that amateurs be required to demonstrate a 5wpm increase in their ability to an ultimate figure of 35wpm at each testing period. Those who fail the test would be given 60 days to demonstrate the required ability or otherwise forfeit their licence!

Questions in the House

On 30 January 1984 Mr A. F. Bennett MP asked the Secretary of State for Trade & Industry whether he would take steps to ensure that users of cb radios, particularly the housebound, the handicapped and the sick, did not suffer interference from jamming, broadcasting of music or interruptions with obscenities. Mr Alexander Fletcher replied that it was not possible within existing resources to police cb radio channels in such a way as to ensure complete freedom from misuse. The Radio Interference Service was, however, available to investigate cases of misuse where this could be done without prejudice to priority work.

On 28 February 1984 Mr John Carlisle MP asked the Secretary of State for Trade & Industry whether he was satisfied that existing legislation was sufficient to curb pirate broadcasting. Mr Alexander Fletcher replied that the Government was seeking new powers in the Telecommunications Bill which would enable a pirate station's equipment to be seized pending prosecution. Together with the recently announced provisions for increasing the maximum fine available to the courts to £2,000, it was hoped that this would be an effective weapon against pirate broadcasters.

In a written answer to a question from an MP concerning the scale of use of private mobile radio by the bus industry, Mr Nicholas Ridley said on 5 March 1984 that some 16,000 buses were fitted with private mobile radios, and that some 14,000 of them would be affected by the frequency alterations resulting from WARC 1979. New equipment would be required before 1995.

RFI update

Problems of one sort or another connected with breakthrough are, to say the least, not unknown to radio amateurs. It used to be said that one way of getting round tvi problems was to go out mobile or portable, but it appears that there may be some problems in this area too. An amateur in the USA who experienced difficulties with his car—rough running, stalling and, eventually, refusal to start—was told by the manufacturers, Toyota, that the use of two-way radio equipment was the probable cause, since the vehicle made use of microcomputers and they felt that rf from the transmitter had caused damage. Toyota refused to accept liability, and in a similar case a replacement cost of $400 was quoted.

With the continuing trend to microprocessor-controlled units in cars, the Society would be interested to hear whether any members in the UK have had similar experiences.

Still on the subject of rfi, although in a different context, it is well known that interference to domestic electronic equipment from amateur radio transmitters is a serious problem. It appears that domestic receivers for satellite television systems operating at 11·7GHz will soon become another item of consumer electronic equipment which is vulnerable to breakthrough. The satellite will be at quite a low elevation in the south, and most houses will be able to "see" the satellite and receive its signals on a 1m dish mounted on the house. Those whose view to the satellite is obstructed will probably be connected to local cable distribution systems fed from a single community receiver, as might well be the case, for example, in a block of flats.

The typical receiving system consists of a dish antenna and a double-conversion receiver which feeds a special demodulator: signals are then fed to the tv set itself. The most serious cause for concern is that the i.fs chosen, which are approximately 125–149MHz and 950–1,350MHz, include the 144MHz and 1·3GHz amateur bands. This choice is particularly unfortunate since amateur stations are by far the most common source of strong rf fields in the domestic environment, and any attempt to use low-level signals at these frequencies in close proximity to a transmitter is—to say the least—asking for trouble. The type of receiver installation mentioned is very likely to become a commonplace piece of domestic electronic equipment, and it is vital to ensure that fundamental problems of mutual interference are resolved at the outset if a whole new generation of tvi problems are to be avoided.

Calculations performed by the RSGB Microwave Committee have shown that, because of the close proximity to strong rf fields, a very high standard of construction and screening would be required in the tv receiver in order to prevent the amateur signals leaking into the converter's i.f. section and causing interference. In fact, the committee has raised doubts as to whether sufficient screening could be economically provided and whether its integrity could be maintained over a long period in practice.

The present situation is that an RSGB paper presenting these calculations and expressing the Society's concern was presented to a meeting of BREMA in December. Both the DTI and IBA also presented papers expressing concern at the possibilities of interference from the amateur service and from high-power radars close to 1·3GHz. The meeting agreed

RSGB President, Bob Barrett, GW8HEZ, (right) receiving a Yaesu FT726R transceiver, with all options fitted, for the RSGB headquarters station GB3RS. It is intended to use the FT726R primarily for satellite news broadcasts, in association with AMSAT-UK, on the 430MHz band. The equipment was donated by Yaesu Musen by courtesy of the company's president, Sako Hasegawa, JA1MP. South Midlands Communication Ltd met all the other costs involved. The presentation to the Society was made by Nigel Curzon (centre) and Graham Taylor of SMC Limited at the RSGB VHF Convention in March

that there could be a problem at this frequency, and that it would be desirable to move the first i.f., possibly to 1,450-1,850MHz, in order to avoid difficulties.

There was some doubt as to whether there would be difficulties experienced at 144MHz, and a working party was formed which was tasked with measuring the actual levels of screening which could be achieved in practice. The working party was due to report its findings this month, and these will be reported as soon as they become available.

The choice of i.f. has not been officially finalized, but there is considerable international support for those originally proposed. Whether or not these frequencies will be changed is a matter for international discussion and agreement, and the decision is largely in the hands of the manufacturers. The amateur and radar services concerned have international allocations, and it is of the greatest importance that the correct decisions are made now so as to avoid large-scale problems in the future.

News from Canada

The scourge of cable television has been causing some problems in Canada as well as the USA: for the latest on the position in the UK, see this month's *RSGB News Bulletin*. Amateurs in Vancouver recently testified before the Canadian Radio & Television Commission with regard to so-called "Channel-E" interference which has been causing some severe problems in the 144MHz band. The cable company responsible suggested that radio amateurs should be prepared to ". . . share the spectrum", but the commission gave this proposal a somewhat cool reception and complimented the amateurs on the thoroughness of their preparation and presentation. As we went to press, indications are that the commission will rule in favour of radio amateurs and will either force the cable company to modify its system and eliminate the breakthrough or, alternatively, to vacate "Channel E" altogether.

JOTA report

The 1983 Jamboree-on-the-Air took place on 15 and 16 October last year and appears to have been greatly enjoyed by all. Some 13,000 Scouts and Guides took part in the event, with many groups in exotic places: Scouts on Cyprus, Malta, Gozo, Trinidad, the Azores, the Canaries, the Balearics, Guadeloupe, Sardinia, Sicily, Spitsbergen, Greenland, the Faeroes, Antigua and St Helena were heard during the event. Despite the high winds and driving rain experienced over most of the UK on the Saturday, which played havoc with many antennas, some 455 stations from the UK took part and 479 groups in 49 countries were contacted. These included Polish Scout stations and a large participation from Nigerian Scouts.

Some contacts were made via Oscar 10 and on rtty and it would appear that the event attracted a great deal of interest and enthusiasm from Scouts and young people generally. The ability to pass greetings messages was greatly appreciated, and the most original use of this facility was probably made from the JOTA station at Scout headquarters, GB2GP, at Gilwell Park. The station was officially opened by the chairman of Epping Forest District Council, Councillor F. W. Limmer, MBE, and he was able to exchange greetings with another civic dignitary, the Mayor of Northampton, Councillor R. M. Winter, who opened GB2NDS at the same time. This may well be the first occasion in which the heads of two local authorities, both of whom were unlicensed in respect of amateur radio, legally exchanged greetings over the air.

The Society hopes that an extension to the greetings message facility, whereby such messages can be passed overseas, can be negotiated in the not-too-distant future. Certainly it is a popular facility as far as JOTA is concerned, and many young people discover an interest in the hobby through JOTA activities and the passing of greetings messages.

QSL Bureau

Peter Lumb, G3IRM, sub-manager for the callsign series G3IAA-G3KZZ, has moved to 2 Briarwood Avenue, Bury St Edmunds, Suffolk IP33 3QF.

The QSL Bureau manager, G3DRN, has notified the following amendment to the list of QSL Bureau sub-managers published in *Rad Com* January 1984: The address of Mr Newton, G3UKW, sub-manager for the G3UAA—G3VZZ series, is 11 Chestnut Close, not Chestnut Grove.

Courses

The following courses will be held at the Arnold & Carlton College of Further Education, Digby Avenue, Mapperley, Nottingham NG3 6DR, tel 0602 876503:

After the RAE. Five meetings to consider topics from the RAE in greater depth, and topics outside the syllabus which are of interest. Commencing 15 May at 7pm. Fee: £4.20.

Introduction to amateur radio and swl. An introduction to what it is all about, for the complete novice and upwards. Four meetings, commencing 6 June. Fee: £3.36. Tutor: G4DVW.

Enrolment for both courses takes place in the college main building at the first meeting, or beforehand during normal college hours. All enquiries to the general studies department of the college.

More rallies

Further to the information given here last month, the Society will attend the following additional rallies;

24 June — Longleat Mobile Rally;
1 July — Droitwich Mobile Rally;
26 August — 17th Preston Rally.

An incorrect date was given in last month's item: the date of the Scottish Convention is 8 September, as given in "Other Events", not 9 September as stated.

The organizers of the Swindon rally have arranged a BT morse test facility at the event on 13 May: as we went to press there were still some places available. Preference will be given to disabled persons wishing to take the test: contact G8SFM on 0666 89 307.

Magazine changes hands

The publishers of *Amateur Radio* have sold the title to Sovereign Publications, publishers of *Radio & Electronics World*.

Mobile Rallies Calendar

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

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—South East Kent YMCA ARC Spring Cleaning Rally. Dover YMCA Centre, Leyburne Road, Dover. Open 1030-1600. Talk-in by G3YMD on GB3KS and G8YMD on S22 (145·550MHz). Tables available from £5 per site. Refreshments available. Details from G3VSU, 42 Nursery Lane, Whitfield, Dover, tel 0304 822738, or G6AGK, QTHR, tel 022 778 601.
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. Civil Service Sportsground, Bucklesham, nr Ipswich. All the usual attractions—traders, transceiver clinic, antenna testing, fleamarket, car boot sale, vintage radio display and, for the rest of the family, craft and miscellaneous stalls, shooting range, children's play area, castle, steam engine and model flying display. Much improved accommodation . Travel the new Orwell Bridge. Talk-in by GB4SWR on S22 and R3, and RB4. Details from Jack Tootill, G4IFF, 76 Fircroft Road, Ipswich IP1 6PX, tel 0473 44047. Stand space from Patrick Marks, G8VZZ, 1 St Johns Hill, Woodbridge IP12 1HS, tel Woodbridge 3185.
3 June—Spalding & DARS Mobile Rally. Springfields, Spalding. Talk-in on S22 and SU8. Trade stands, 25 acres of garden, bars, restaurants. Details from I. Buffham, G3TMA, tel Spalding 3845.
3 June—RAIBC Picnic, Broadlands, Romsey, Hants. Talk-in from 10.30am on S22. Details from G4COM, QTHR, tel Southampton (0703) 693017.
3 June—Welsh Mobile Rally, organized by Barry College of Further Education RS. New venue: Barry Leisure Centre, Holton Road, Barry, near Cardiff. Well signposted. Open 11am-5pm (disabled from 10am). Special event station GB0BDC will operate during the rally. Trade stands, bring & buy, refreshments, swimming pool in leisure centre, etc. Free car parking, 5min from the famous Barry Island Pleasure Park and beach. Enquiries to Reg Rowles, GW4FOM, tel 0222 565656, evenings.
10 June—Elvaston Castle Mobile Rally, Elvaston Castle Country Park, 5 miles south-east of Derby on the B5010. Organized by the Nunsfield House ARG. Opens 10am. Talk-in will be provided by GB2ECR on both 144 and 432MHz. All the usual facilities including bring & buy sale and flea market. Full on-site catering facilities. Further details from Ian Cage, G4CTZ, QTHR, tel Derby (0332) 799452. Trade enquiries to Mr R. Woolley, G4HIJ, tel Ashbourne 43241.
10 June—Mid-Lanark ARS Open Day. Open 10.30am. Wrangholm Hall, Motherwell. Traders, books, meals, raffle etc. Details from Anne Hood, 4 Murray Road, Law ML8 5HR.
17 June—RNARS Mobile Rally. HMS *Mercury*, near Petersfield, Hants. Open 1000-1730. Talk-in on 144 and 432MHz. Hot and cold refreshments available all day. Many arena events for the family; steam train and engine rides; historic aircraft flypasts etc. Details from A. G. Walker, G4DIU, QTHR, tel 0705 667889.
17 June—Denby Dale Mobile Rally, Shelley High School, nr Skelmanthorpe, Huddersfield. Open 11am. Talk-in on S22 and SU8. Trade stands plus something of interest for the ladies and children. Refreshments, bar. Admission and parking free. Details from G3FQH, QTHR, tel 0484 862390.
24 June—27th Longleat Amateur Radio Mobile Rally. Longleat Park, Warminster. Open 10am-5pm. Trade stands in five 110 by 40ft marquees. Bring & buy extended to 110ft with separate arrangements for over £10 and under £10 items. RSGB bookstand and RSGB HQ staff will be in attendance. British Telecom has authorized the morse test to be taken during the rally, preference being given to handicapped amateurs. Enquiries about the test should be made to the Bristol Group secretary. Attractions include the mast assembly contest for RSGB affiliated clubs, the Bristol Unicorns Marching Band, the Longleat raffle, and, weather permitting, a parachute descent to open the rally, plus all the usual Longleat Park attractions for the family. Entrance to the rally is free and parking is free, but there is a 50p charge for entrance to the park. Camping and caravanning facilities are available for Friday and Saturday night at a reasonable charge. Special event station GB4IMR will be operational before and during the rally, mainly on hf. Details from B. L. Goddard, G4FRG, sec/Longleat organizer, Bristol RSGB Group, 2 Greenfield Park, Portishead, Bristol BS20 8NQ, tel 0272 848140.
1 July—Worcester & DARC Annual Mobile Rally. Droitwich High School, Ombersley Road, Droitwich. Open 11am to 5pm. Attractions will include "Strawberry Fields" and children's fancy dress competition. Details from G4NRD, QTHR.
8 July—West Manchester RC Rally. Burtonwood Motorway Service Area, one mile west of junction with M6 on M62. Talk-in station GB2THF. Details from Alan Nixon, 14 Carlton Road, Lowton St Lukes, Warrington WA3 2EP, tel 0942 725931.
15 July—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.
7 October—Great Lumley ARES Rally. Community Centre, Great Lumley, nr Chester-le-Street, Co Durham. Open 11am. Talk-in on S22. Usual attractions including bring & buy. Further information from Ian Blackman, G4OCQ, QTHR, tel 0385 40827.
3 November—Street & DARS/Lions Club of Glastonbury and Street Rally (proceeds to charity). Crispin Hall, Street, Somerset. Open 11am-4pm. Admission 50p, under 14 years free if accompanied by an adult. Talk-in on 144MHz (S22). Details from Bill Scriven, tel Street 42277.

Special Event Stations

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

1-22 May, GB0WIM
This station is being operated to celebrate the 21st anniversary year of the Wimbledon & DRS. QSL cards will be available. Details from Geoff Mellett, G4MVS, QTHR.

5, 12, 19, 26 May, GB2WEC
Bournemouth & District RAIBC will be operating this station at the Wedgewood Electrical Collection, Old Generating Station, Bargates, Christchurch, Dorset. The collection includes many fine exhibits of electricity from its first days. The station will operate on 3·5MHz ssb and 144MHz fm from 10am to 5pm. The collection will be open to the public on 26 May. A special QSL card will be available via the RSGB Bureau, or direct from G6DUN, QTHR, if an sae is provided. Talk-in will be available on 26 May. Details from G6DUN.

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.

18-20 May, GB8JCZ
The station will be part of the 30th Anniversary National Rally of the Jawa and CZ Owners Club. The rally is at the West Norfolk Rugby Club Ground, North Wooton, nr Kings Lynn. The station will be active on 144MHz. All calls are welcome, especially from other motorcycle enthusiasts. QSL cards will go via the bureau on receipt of a card from the contact station, and OK stations are especially hoped for. Details of the station and rally from G6MEN, tel 0704 74792.

25-27 May, GB4MGB
The station will celebrate the international gathering of the MG Car Club at Silverstone Grand Prix Circuit, Towcester, Northants. Members of the Havering RC and the Northampton RC will operate the station on hf and vhf bands on behalf of the MGCC. It is hoped to link up various MG clubs around the world and in the UK. Special QSL cards will be available. Details from either G6SWT, QTHR or the MG Car Club, 67 Widebargate, Boston, Lincs, England.

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.

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

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

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

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

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

24 June, GB4CVD
The station will be operated by the Radio Society of Harrow as part of Capital Venture Day, an event organized by Capital Radio for the young people of London, in Battersea Park. The station will demonstrate various aspects of amateur radio, from homebrew to microwave and television equipment, and will operate from 11am to 6pm. A special QSL card will be available. Details from G8XBZ.

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

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

Other Events

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

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

COUNCIL PROCEEDINGS

A brief report on the Council meeting held on 14 January 1984

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

The President referred to the recent death of Mr Eric Yeomanson, G3IIR, a past-President of the Society. A minute's silence was observed as a token of remembrance.

Aplogies for absence were received from Messrs Cornish, Pratt and Willis.

Election of executive vice-President, 1984
There were two nominations:
Mrs J. Heathershaw, proposed by Mr O'Brien, seconded by Mr Pinchin; and Mr I. J. Kyle, proposed by Mr McClintock, seconded by Mr Hawkyard.

The two candidates withdrew from the meeting while a ballot was conducted, following which Mrs Heathershaw was elected executive vice-President for 1984.

Appointment of honorary treasurer, 1984-6
Dr Evans proposed that Council accept Mr Cornish's offer to continue as honorary treasurer. This proposal was seconded by Mr Jessop and carried unanimously.

Appointment of honorary officers
The following appointments for three years were approved:
Audio visual library co-ordinator, R. G. Aukland, G2PA;
HF awards manager, P. Miles, G3KDB;
VHF awards manager, J. Hum, G5UM;
HF manager, E. J. Allaway, G3FKM;
Microwave manager, D. S. Evans, G3RPE;
Slow morse practice transmissions organizer, M. A. C. MacBrayne, G3KGU.

The appointment of the vhf manager, K A. M. Fisher, G3WSN, would be considered following the IARU Region 1 Conference in April.

Honorary treasurer's report
Mr Cornish being unable to attend the meeting, Mr O'Brien said that he had seen the draft accounts for the three months to 30 September, which showed a small surplus rather than the expected deficit. A factor in this was an increase in book sales over the same period in the previous year. Membership was also buoyant; the increase currently running at seven per cent per annum, compared with the forecast five per cent.

Mr O'Brien then spoke of the possibility of a subscription increase, and, in defending the annual surplus figures, pointed out that a surplus of two per cent of gross income was minute by commercial standards. It was noted that the cost of committee expenses was remarkably constant and relatively small in relation to the work done by committees.

Finally, Mr O'Brien referred to the legacy fund. Permission to amend the Society's Articles of Association had been received from the Board of Trade too late for inclusion on the agenda of the 1983 annual general meeting. It was therefore anticipated that this would be put to the 1984 agm, and Council should appoint three or four trustees to handle the fund.

Secretary's report
Mr Evans reported:
(i) that during December 1983, RSGB membership had passed the 35,000 mark, which meant that membership had increased by 75 per cent during the past six years. He considered that the STS-9 shuttle mission had been of enormous value to amateur radio, and had generated considerable publicity for amateur radio.
(ii) that two issues of the *RSGB News Bulletin* had now been published, and initial feedback was enthusiastic. By this means it was possible to get written material delivered to all members with *Radio Communication* within a two-week time-scale.
(iii) that the new technical officer was settling in and that a small laboratory had been built and test equipment was being accumulated. A number of projects were on the drawing board but a lot of work was needed before the articles would start to appear in *Radio Communication*.
(iv) on various licensing and related matters concerning the Licensing Advisory Committee and the DTI.

Membership and representation
Council noted that:
(i) reduced subscriptions had been granted to a further five members who were over 65 years of age and had at least 15 years' continuous membership of the Society;
(ii) affiliation had been granted to:
Aberporth Radio Amateurs' Emergency Group, Dyfed;
Bedford Modern School ARC;
Blyth ARC, Northumberland;
Devizes & DARC, Wilts;
Sedgemoor & DARS, Somerset;
South Bristol ARC;
South Lakeland ARS, Ulverston, Cumbria;
Tenbury & DARS, Worcs;
Watford Radio Club;
West Bromwich Central Radio Club;
Windscale AR & Electronics Society, Cumbria;
(iii) the following area representatives had been appointed: A. Saunders, GM3VLB, Borders area of Region 13;
A. W. Wright, GM3IBU, Orkney Islands.

Mr Holmden questioned the procedure relating to waived subscriptions. The result of this was that there would be a discussion at the next Council meeting prior to any further waived subscriptions being granted.

Delegation to IARU Region 1 Conference
Some discussion took place on the organization of the conference, and it was generally felt that spectrum matters should not be included with discussions on administration.

A recommendation for Mr J. Bazley, G3HCT, to attend in place of Dr Allaway, who was not attending as an RSGB delegate, was accepted.

Honoraria
The amounts to be paid to various honorary officers in appreciation of their work for the Society during 1983 were agreed.

Intake and utilization of Council members
Mr Lundegard felt that new Council members were not given enough guidance as to their duties, and he also felt that Council members were under-utilized within committees.

Much discussion took place on the role of Council members, particularly with regard to committees. It was noted that in the past the majority of Council members had been elected after having served on committees of the Society, or as a regional representative.

Mr Baptiste pointed out that Council members were utilized by serving Council, and were not elected on a mandate from the membership. With regard to Council members serving on committees, Mr Baptiste agreed that it was important for Council to keep in touch with committee matters via the minutes, and he reminded Council that if it was concerned about a committee it had the power to request the chairman's attendance at a Council meeting.

Mr Smith said that he felt it was up to each new Council member to ensure he received a proper briefing. He had visited headquarters and spoken to other Council members, and he was quite satisfied with the information made available to him as a new member of Council.

Mr O'Brien said that there was a feeling among the membership that an "apprenticeship" should be served by way of committees, representation scheme etc. He went on to say that it should be borne in mind that committee members were volunteers.

Reference was made to an analysis of committee attendances, and Dr Evans disagreed with the philosophy of the analysis. It was the chairman's job to replace any member of his committee who was not pulling his/her weight; attendance at a meeting did not necessarily prove the committee member was or was not contributing to the work of the committee.

With reference to the question of publication of this information, the President reported that the statement in *Radio Communication* announcing the availability of the data had produced not one single request. He concluded that the membership was simply not interested in this type of information, either for general interest or as an aid to voting in Council elections.

The RSGB and computers
Mr Lundegard introduced a paper which stressed the importance of the future of computers within amateur radio.

Dr Evans said that this subject was under consideration by the Technical & Publications Committee. While anxious to avoid *Radio Communication* becoming computer-orientated, the pace of this topic had accelerated recently, and at its next meeting the committee would be discussing a paper concerning computer articles and a possible computer column in the magazine.

Offences under the Wireless Telegraphy Act
A letter had been received from Mr P. A. Smith, G3CJH, concerning this subject. It was agreed that an article about amateur radio and the Society should be prepared for possible publication in *The Magistrate*, a journal referred to by Mr Smith.

Zone E Council vacancy
Mr Jessop proposed that Mr D. Thomas, GW3RWX, be co-opted Council member for Zone E for 1984. This was seconded by Mr Hall and agreed unanimously.

A letter would be sent to all affiliated societies in Zone E, stating that Council had had to co-opt a member for 1984. Nominations would be sought for a Zone E Council member at the next Council election.

Reports from spectrum managers
Dr Allaway, hf manager, commented on proposals made by the USA licensing authority concerning the waiving of the morse code requirement for certain classes of amateur licence. This has been rejected by both ARRL and amateurs in the USA, and the FCC had decided to drop the proposal. He also reported that Italian amateurs had been having problems on 3·5MHz arising from an ordinance issued prior to WARC 1979. The ARI had reacted strongly and it was believed that the situation has now been sorted out.

Dr Evans, microwave manager, reported on work done in preparation for the IARU Region 1 Conference.

Mr Fisher, vhf manager, reported on recent developments concerning the 50MHz band special permits.

Name of the headquarters building
Mr O'Brien proposed that Alma House be renamed "Lambda House". This was seconded by Mr Hawkyard and agreed unanimously. The general manager estimated that it would be convenient to make this change towards the end of 1984.

Chairman of Membership & Representation Committee
Mr O'Brien proposed that Mr Pinchin be chairman of this committee for 1984. This was seconded by Mr Hall.

Mr Pinchin stated his reluctance to take over the commitment of reviewing the representation scheme. He felt that the Forward Planning Group was a more appropriate body to consider this topic. This was agreed, and Mr Pinchin's appointment was confirmed unanimously.

OBITUARIES

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

Mr I. D. Auchterlonie, GW6OM
Ian Auchterlonie died on 25 February, aged 77. He became interested in radio at the age of 14 and had been licensed since 1924. His Society membership spanned 58 years. After the second world war Ian took a great interest in RSGB activities. He was a Council member during the periods 1947-9 and January 1953 to December 1954, also serving as chairman of the Codes of Practice Committee and on the Membership & Representation Committee for the years 1947-9. During 1949 Ian was the principal organizer and chairman of the Convention Working Committee for the first post-war rally held outside of London.

In 1932, as a special constable, he did pioneer work on police mobile radio in Liverpool. In 1935 he was appointed communications officer with the Manchester City Police, and held the rank of superintendent until he retired in 1964. His first task on moving to Manchester was to establish the regional radio station at Heaton Park. During the war years he was commissioned in the RNVR and worked ashore and afloat on radio and radar installations.

On his retirement he moved to Anglesey from where he was active on the hf bands and 144MHz until illness intervened.

Mr K. Best, GW6ESP
Ken Best died on 4 June 1983, aged 54. He had been interested in amateur radio for many years as an swl, and was licensed in 1981. During his time on the air he became well known in the south-west, helping lost travellers through the local repeaters.

Mr E. W. B. Briscoe, GW4XF
Bill Briscoe died on 7 February. In 1926 he held AA licences 2BCA and 5BB, and during the 'thirties was BRS31. After the second world war he returned to the air as G4XF, and while living in Rainham, Kent, was a member of MARTS Club. He was always heard on the G6NU Kent & Essex Round Robin. After moving to Chepstow in 1976 he kept up contacts with his friends in Kent and Essex on 3·5 and 7MHz. He requested no flowers at his funeral but instead donations to go to the RAIBC, of which he was a long-time member.

Mr H. S. Chadwick, G8ON
Harold Chadwick died on 22 March. He joined the RSGB in 1932 and obtained his callsign in 1937. During the war, from 1941-4, he served with the RAF as an instructor at Cranwell. Before and after this period he was a voluntary interceptor.

After the war he was active on the dx bands, and became CC for Notts & Derby RAEN. He had several articles published in the *RSGB Bulletin* and in *Radio Communication*, the best known perhaps being the G8ON antenna. In recent years he had been involved with Rotarians of Amateur Radio and the Probus net on 3·5MHz ssb. He also gave many lectures.

Mrs L. A. Crane
"Taff" Crane, honorary registrations secretary of Raynet for many years, died on 19 March. She was the wife of Len, G3PED.

An appreciation of Taff's service on behalf of Raynet is recorded in the *Raynet* column on page 412.

Mr W. Doe, G3XRY
Bill Doe died on 9 January, aged 53. He was best known as sales manager of KW of Dartford. He was known to cw operators all over the world.

Mr F. Feeley, G3UW
Frank Feeley died on 15 March, in his early seventies. Frank was licensed in 1934, and was always an avid constructor and experimenter. He was active on the hf and vhf bands until a week before his death, and was a member of Hartlepool ARC.

Mr J. B. Foster, G3IIT
Bernard Foster died on 5 March, aged 78. Most of his working life was spent with the general post office in telephone engineering. This included the years of the second world war when he was seconded to the RAF. He was involved with radio and navigation equipment installations as well as telephones, and this encouraged his interest in amateur radio. He had long been a member of the RSGB and a staunch member of the Cambridge & DARC. After retiring as chairman of the club for an extended period, he was elected an honorary life member. His main interest was 144MHz, and club members managed to keep him on the air until the last few days of a long illness.

Mr P. C. Gilkes, G3JTU
Peter Gilkes died on 25 October 1983. He re-sat the RAE in the mid-'seventies to reclaim his licence and callsign, becoming a very active experimenter, and member of the Daventry Net.

Mr H. Griffiths, G3BOQ
Harry Griffiths died on 18 September 1983. He wan active vice-chairman of the Sutton Coldfield club, and had organized their 25th anniversary exhibition. He had recently won the club's construction award, and was a competent electronic and mechanical engineer.

Mr T. A. Knight, GM4LPI
Tom Knight died on 22 January. He had been vice-chairman of the Easter Ross RC, of which he had been a member of eight years. He was also a member of the RSARS, and was even more interested in construction than operating.

Mr C. F. Parker, G3XYQ
Mr Parker died on 13 February. He joined the Society in 1969, having obtained his licence the year before, and was a keen operator.

Mr W. O. Poupard, RS50004
Wally Poupard died on 16 February. He was a founder member of the Fylde ARS and had been treasurer at the time of his death. A keen swl, he was interested in the hf bands and construction. He had passed the RAE in 1982 but intended to take an A licence direct with a view to cw working. Because he wished to start as a confident cw operator he deferred taking the morse test until his speed was well in excess of the minimum needed to pass.

Mr G. E. Powell, G6SMF
Gilbert Powell died on 10 February, aged 57. As a keen scout commissioner he had been looking forward to putting on his first JOTA this year, and was hoping to obtain an A licence for this purpose.

Mr K. A. Sly, G4MR
Ken Sly, who died on 5 February, aged 68, had been an active amateur ever since he was licensed in 1939. A firm believer in international friendship, he learned Esperanto and applied it where possible to his amateur radio activity. This later led to the formation of the International League of Esperantist Radio Amateurs (ILERA). As its general secretary he did much hard work in this cause.

Squadron Leader A. Southgate, G5ZW
Arthur Southgate, who died in September 1983, had held a licence for over 60 years. Between the wars he had had a radio equipment shop in London, and later served with the Air Ministry in Harrogate, then as an electrical lecturer at Cambridge. He continued operating as a radio amateur until shortly before his death.

Also:
Mr A. S. Carpenter, G3TYJ, on 8 January;
Mr G. A. Chatfield, G6WKD, on 27 February;
Mr K. F. Corry, EI5Q;
Mr N. Craig, G3MVC, on 2 February;
Mr P. Draycott, G3SNK, on 27 February;
Mr J. Dix, G4UBE, on 2 February;
Mr C. W. Johnson, G6LRM, on 1 March;
Mr R. Ledger, G2FKY;
Mr G. F. Merchant, G3PTR, on 25 February;
Mr J. R. Moore, RS35511, on 7 November 1983;
Mr G. H. Powell, G6VPY, on 11 December 1983; and
Mr J. N. Watson, G3AET, on 28 February.

APOLOGY
We apologise to Mr C. H. R. Brooke, G3JEC, for any embarrassment caused by the inadvertent inclusion of his name in the obituary column of the April issue, and are happy to report that he is still "active".

Members' Mailbag

INTERFERENCE

Sir—I read with interest the letter from Mr Normal Fitch, G3FPK (*Rad Com* February) about the problems of interference to the amateur radio service. While I would agree with most of his suggestions regarding the origin of some of these noises, I would argue that before any lobbying takes place we should be in a position to offer some solutions to some of the problems. I know that the RSGB has a committee to investigate the problems of emc and, indeed, *Rad Com* January published a request from the Institution of Electronic & Radio Engineers for interested parties to participate in their studies on this subject. What we need therefore is active involvement, research, and dissemination of accrued knowledge so that radio amateurs can more actively help themselves. I hope also that *Radio Communication* "will do its bit" and keep us abreast of trends and developments from time to time.

D. J. Lee, G4UHJ

The RSGB is actively committed to examining emc problems in which amateur radio is concerned, and will indeed continue to report trends and developments in Radio Communication *from time to time.*

NEWS NET DISCIPLINE

Sir—I wish to register my opinion of the discipline on the 3,650kHz pre-RSGB news net. This surely must be the most used and listened-to frequency in the UK on Sundays. It is a pity that a net such as this, having a wide audience with no doubt many new and aspiring amateurs, cannot show better operating manners.

The net controller, usually Jim, G4ARZ, does a magnificent job of controlling the net, why cannot people make it easier for him? The number of stations breaking in, doubling etc, is an appalling display of discipline, which is needed on a net such as this.

There are ample calls by G4ARZ for stations wishing to check in, why cannot they exercise a little patience and manners in waiting for such a call? This would make the net easier to control and set a better example of our operating procedures, in times of falling standards. We cannot expect our newer friends in the hobby to raise these standards, with displays like this from stations with more experience.

D. R. Brooks, G4IAR

QUALITY VERSUS QUANTITY

Sir—I was enjoying my copy of March *Practical Wireless* until I came to page 57, where I read the draft proposal for a UK novice licence produced by ARNLC secretary Ian Abel, G3ZHI. I am fully aware that these people have been striving for some considerable time to convince the Home Office that there is need for such a licence, and I have noticed from time to time some of their campaign tactics employed.

I don't think that I stand alone in my opinion when I say that I cannot see any good emerging by introducing a novice licence. One reason why I believe some of these pro-novice licence supporters are pressing ahead with the campaign is to pamper the mass of disillusioned ex-cb users who are at present sickened by the way that cb has gone, and are hovering aimlessly in a never-never land between cb and amateur radio, looking for some great white god to come along and give them a "leg-up" into our hobby—mainly due to the fact that they have not got sufficient interest and drive themselves to get anywhere, or are just too lazy and want "molly-coddling". If this is so, then I have to totally disagree with the concept of a novice licence from the start.

A novice licence is not the answer. What is required is proper tuition in the first instance, and a means by which they are put into the right frame of mind and their attitudes are changed to suit the time-honoured methods and spirit of amateur radio, not merely letting them loose on to our bands to cause more problems than the ones we have got already. We are already feeling the effects of some one-time cb operators who have swelled the ranks of amateur radio over the past year or so, especially some of the later G6s and G1s. When was the last time a "CQ" call was heard on S20? When was the last time a "CQ" call was answered by a G6 or G1 station? When was the last time a G6 or G1 station was heard giving his/her callsign phonetically? When was the last time anyone heard **both** callsigns being given at each end of a transmission from a G6 or G1? It goes on and on. If this is what progress in amateur radio is all about, then I feel it is doomed to destruction as the hobby we once knew.

At the time I took interest in amateur radio, and consequently sat the exam, I didn't have a multiple-choice paper, with the bonus that if I failed either part I could sit the failed part again. No, it was pass the whole lot or fail the whole lot; none of this "namby-pamby" system we have today. I accepted the RAE for what it was, and tackled it and the morse test with pride, and after passing both, thought it was a just reward for the time and effort put into it. I will state here and now that in no way was this exceptional; it was the accepted method of progress from shortwave listener-cum-experimenter to radio amateur.

In conclusion, I must say that the whole idea of a novice licence sickens me, and possibly a good number of other amateurs too. Also, why is it that we always seem to end up copying the USA in radio matters? Look what happened when cb was introduced from the USA, with all the resultant chaos. Imagine the consequences to our bands from the leakage of rf from the cable-tv installations now being fitted; we have already been told this is a great possibility. Must we follow yet again in their footsteps? Can't we Britons think for ourselves any more? Surely to goodness it makes more sense to keep up the standards of our hobby than to let them slide. Those people with the right attitudes, interests, enthusiasm and keenness to get along have no worries, they will win through. The other lot will just fall by the wayside until such time as they buck-up their ideas and decide to take up a most rewarding challenge, or stay where they are. After all, isn't it better to have quality as opposed to quantity? One can never get both.

D. J. Walters, G4DFV

OPERATING IN EUROPE

Sir—In these days of easy travel, many radio amateurs must travel in Europe by car and would like to use their equipment there. For almost all countries in Western Europe no special documentation is needed for the vehicle. To operate amateur radio, however, one must apply for a temporary licence for each country, and this can be quite a problem in some cases, and expensive.

Why cannot the authorities in Western Europe, or at least within the EEC, agree to a free reciprocal operating scheme? I have been told by an LX friend that such a move has already been mooted but that Britain would not agree. However, Luxembourg and West Germany do have such reciprocity. I visualise a scheme like this: G3ESP is going on holiday, involving travel through France, Belgium, Luxembourg and Holland. He therefore writes in advance to the relevant authorities (the RSGB could produce a form to simplify this procedure) stating when he will be in the country, and what bands he is likely to use. He then sets off, signing G3ESP/PA, G3ESP/ON etc.

I urge the RSGB to consult with other national societies in an endeavour to get such a scheme started.

W. Farrar, G3ESP

The RSGB is very actively involved "behind the scenes", as it were, in this area. The first point to make is that the complexity of international agreements relating to the use of amateur radio under the normal reciprocal agreement is—not to put too fine a point on it—frightening! The technical translation which is required and the appreciation of differing standards in different countries makes the obtaining of agreements between just two governments a lengthy and laborious process: at present the RSGB, through the DTI, is trying to obtain ordinary reciprocal agreements with Greece, Yugoslavia, Japan and some other countries. There are various barriers to progress, and it will inevitably be some time before agreement can be reached. Given that the problems of obtaining agreement between two governments are quite complicated, one can well imagine that obtaining collective agreement between the countries of Europe is practically a full-time job. The RSGB and other societies in CEPT countries (that is to say the majority of Europe) will be considering the matter of a common licence again during the course of this month. The Society has been in close contact with the DTI on this issue, but we have no doubt that the complexities implicit in obtaining agreement will take a long time to resolve. If only it were as simple as Mr Farrar would have us believe. . . .

WHAT'S IN A NAME?

Sir—Referring to the leader in your February issue, I must agree that the second "imperfect" sense of the word amateur has been applied increasingly during recent years. On the other hand, "ham radio" is universally accepted without generating any unpleasant overtones, possibly since its derivation from amateur is not immediately apparent. The radio "ham" is now part of the language and understood by the majority—whether by Hancock, or the titles of publications both here and abroad—and it is rather too late to change.

I suggest, therefore, that "amateur" be quietly dropped and members concentrate on a substitute title to fit the initials HAM. When vhs stands for video home system, how about "Home And Mobile" radio transmitting stations as an initial, pathetic suggestion? It is not very important so long as it stands for *something;* it will almost always be used as the word ham and seldom translated—viz: RAE, IARU, EEC, UNESCO, (only translatable by those in the higher echelons of the United Nations).

Peter Mackrell, G3AEP

Any offers? It is interesting to note that "ham" is a universally accepted word among the radio amateur fraternity in the USA. The only problem with its use in the UK is the way in which the media habitually misuse it despite constant pressure from the Society. To the average newspaper editor, the word implies anything from legitimate amateur radio to illicit a.m. cb users running a couple of kilowatts!

CONTEST OPERATING

Sir—I refer to the letters published on this subject by G3LP, *et al*, but in particular the letter by G3RLO (March). At the risk of prolonging an argument, I must point out a couple of errors of logic in Mr Davis' letter.

First, he draws the conclusion that nobody is really interested in contests. If this were truly so, there would be no problem, as nobody would take part and the bands would be clear of contest traffic!

Second, the contest information in *Radio Communication* may well not interest Mr Davis. However, the March issue devotes five pages to contest information. A total of 648 contestants are reported on these pages. It should be obvious that a large number of people take part in contests, but do not send in an entry. For example, the winning, multi-operator station in the 144MHz Fixed Contest worked no less than

682 other stations, five times as many people as sent in entries!

If we are generous, and assume that on average only three times as many people take part in contests as send in entries, then some 2,000 people may be assumed to have taken an interest in contests during the period under report. This is over five per cent of RSGB membership, not an insignificant proportion.

However, the main point of this letter is to make a plea for tolerance. I, too, am not really interested in contests, though I often join in to work a new country or two. The contest results in *Radio Communication* are of as little interest to me as the mobile rallies calendar (unless we have one in Nairobi!) or, for that matter, *Microwaves*. However, I would not deny rally enthusiasts or microwave boffins their right to a share of the amateur radio scene.

There is, truly, little enough spectrum space available for all of us to do our individual "thing" to the exclusion of all others. We must learn to be tolerant of other people's (often minority) interests, and be prepared to share the available facilities, including the pages of *Radio Communication*. If this means one occasionally needs to move away from one's favourite frequency, mode or time, then do so in the true spirit of radio amateurs, without (too much) moaning. Have no doubt whatever that your own operating habits are unlikely to meet the universal approval of other operators, either!

By the way, where do all the "G" stations go on hf? The British Isles are almost getting to be rare dx these days.

A. Oakley, 5Z4DJ

Sir—I feel that I should reply to the letter from G5CO published in your March issue concerning contests.

The IARU Region 1 HF Working Group has been studying the problems created by contests, and their rationalization and containment is certainly to be discussed at the forthcoming Region 1 Conference.

The HF Working Group is recommending the adoption of contest *preferred* segments following the IARU tradition of trying to persuade rather than dictate. It is not correct to say that anyone operating outside such segments will be disqualified—the administration of such a rule would be impossible. However, we do hope that any decision reached will be respected as far as possible.

John Allaway, G3FKM,
Chairman, IARU Region 1 HF Working Group

This correspondence, in fact, covers one of the many topics which were discussed at the recent IARU Region 1 Conference, and a full report of the conference proceedings will be published in Radio Communication *in order to bring members fully up to date.*

CHANGING THE G5s

Sir—In view of the amount of confusion last year concerning this matter, it does not seem so strange that you have had only *two* letters from G5s.

When paying my sub in January last year, I had a brief word with the HQ staff on the matter and learned that no one had any ideas as to what was really going to happen. I telephoned RRD shortly before they changed to Chesterfield, and was assured that I was in line for a G4 call.

Just before Christmas, I received a letter from Chesterfield offering me the choice of my present call letters in the G0 series or alternatively, "... the issue of the next available callsign in the current series upon receipt of your instructions". On 28 December I replied to this letter and thanked them for more clearly setting out the reasons for the proposed change. I also asked to be given the next available callsign upon receipt of my letter.

I am an ex-Post Office telegraphist, so it is not strange that I should be concerned with the Havering Club's morse training scheme. I have assisted several members to obtain a G4 call, the latest having sat his test in mid-January. When I heard that he had been licensed (G4WHZ) I phoned Chesterfield to ask what had happened to my application. I was told that they were processing some 6,000 persons from the recent RAE and were only dealing with the G5s "on an agency basis"! Which apparently meant that they would be shelved until somebody could find time to deal with them. Now it seems to me that "somebody" has decided that the easiest way to deal with the problem is to shift the lot to the new series!

What gripes me most about this is—I have been a fully fledged ham for just over 48 years. For nearly 14 years I have been a G5. Now at the stroke of a pen, I am to become one of the newest of new hams!

It is suggested that the confusion that has surrounded the whole affair is partly responsible for the fact that only two letters have been received. There are possibly more reasons, but I wanted to place on record that there is at least one more G5 who is not too happy with the outcome.

Finally, I wear a grey RSGB badge indicating more than 40 years membership in the Society. Trust I can make 50!

Len W. Ensor (G5AQQ)

Since the initiation of the corrspondence concerning the G5 licences, particularly with reference to the publication of the correspondence from Miss Angelika Voss, G5CCI, the Society has, in fact, received three further letters from G5 licensees who are unhappy about the impending change to their callsigns. While having a good deal of sympathy with their point of view, it is a matter for regret that it was not expressed earlier. The original news item was, after all, published Rad Com *March 1983, and it might have been reasonable to expect some reaction at that stage, especially in the light of the speed with which members habitually react to contentious issues which are raised in "Amateur Radio News"! We must reiterate that, whatever our virtues and shortcomings, we cannot divine members' feelings at a distance: we do need feedback on important topics of the day if we are to represent members' views meaningfully, and it is always most welcome whether by letters, telephone calls, comments to committee members and staff at rallies, lectures and regional meetings of various types, or any other means. Without this feedback, we cannot represent members' views.*

Again, we have every sympathy with those G5 licence holders who are unhappy about the enforced change of callsign: had the Society's original proposals regarding future callsign series for radio amateurs been accepted, there would have been no need for the DTI's action. The lesson for the future is that the sooner we are advised of difficulties and problems, the more we are likely to be able to do about solving them. The recent difficulties with cable television in Milton Keynes and the subsequent happy solution demonstrate this principle very well, and it is also very applicable to the frequent problems which arise in the area of planning permission for masts and antennas. The Society can give a very great deal of assistance and advice if approached early in the proceedings, but it is a little difficult if we are approached at the eleventh hour when the enforcement notice has arrived through the letterbox and the Council crane is rumbling up the road!

Please help us to help you.

THE RADIO INTERFERENCE SERVICE

Sir—I have just read the leader by David Evans on the subject of the Radio Interference Service (*Rad Com* March). Whereas I thoroughly concur with his views on the necessity of a continued and effective RIS, I have serious misgivings over the transference of this responsibility from BT to perhaps, the current regulatory body, itself, namely the DTI. Some of the latter's recent pronouncements do little to encourage one's faith in its overall knowledge of amateur radio matters.

In my opinion the true answer to many of the interference problems lies elsewhere. Something the DTI should be thinking about, is imposing upon manufacturers and importers of electronic equipment the responsibility for ensuring that their equipment has been manufactured to adequate technical standards which would obviate most breakthrough problems. There is hardly an amateur who does not dread the acquisition by one of his near neighbours of a video recorder, or even a Trimphone, Whereas the RIS will tell owners of video recorders that the interference experienced on playback (recording is seldom if ever the trouble) is not the amateur's fault, a complete impasse is brought about by seemingly complete indolence on the part of the manufacturer and/or supplier of the inadequate device. Until it is made clear to such parties that responsibility devolves upon them, possibly by legislation, the innocent amateur will either be driven off the air or become involved in acrimonious and heated altercations with the equally-innocent owner of the inadequate equipment. Such owners do not usually posess the technical knowledge to enable them to appreciate that such instances are avoidable by improved design techniques in their equipment. They see it as a simple cause-and-effect situation, which of course it is, **but** they are totally incapable of either recognizing or accepting that the "cause" is not necessarily the amateur but rather the inadequate design of their own equipment. This inability or frequently, point blank refusal to accept even the possibility of their equipment being in some way deficient makes it virtually impossible to implement the recommendations contained in the comment on Owen Jackson's letter (same issue). We have all had it said to us "It works perfectly well when you are not transmitting"—true, but what does one reply? "Your equipment has a deficiency"—also true—but you just try getting John Smith to believe that one. My own troubled video-recorder-owning neighbour is convinced that BT—RIS are in cahoots with me, and nothing will convince him that they are (*sic*) "an independant authority being fair to both parties".

Radio amateurs, by and large, pay very high prices for their equipment which is manufactured to very high technical standards. It seems only fair that others seeking pleasure and entertainment from other forms of electronic equipment should have to do likewise.

J. R. Knight, G3JRK

Sir—With regard to Owen Jackson's letter in your March issue, it would be interesting to note that for emc regulations there are standards already set for this country in VDE 0875, and its equivalent in IEC documentation. The only sad thing about the document is that the only classes of equipment covered are mainly industrial control systems and motor equipment. The specification is for emissions and susceptibility to radio frequency interference. I believe firmly that when the spectrum is an already-crowded resource, the emission and susceptibility standards should apply to all equipment of an electrical nature, industrial and domestic. This would not only help to clean up the spectrum generally, but reduce the work that a sadly depleting RIS will have to cope with. If the specifications don't go far enough, improve them.

Paul E. Bennett, G8XIH

As was said in the March 1984 editorial, the continuing effectiveness of the Radio Interference Service is of paramount importance to all licensed radio amateurs: not least because of the poor standards of immunity which are all too prevalent on the "domestic electronic equipment" scene. The matter of adequate technical standards is a separate issue from that of the continued well-being of the RIS, and in an ideal world one would back up the other. As G8XIH mentions, there are some standards but they do not go anything like far enough, and this is an issue which deeply concerns the Society (see, for example, the item in "Amateur Radio News" this month).

There are, however, two good reasons for some optimism. The first is that as this issue went to press we heard that the Telecommunications Bill had completed its passage through Parliament and now awaits the Royal assent. The second is the introduction into the UK of an EEC standard on immunity, and we hope to give a full report on this topic in a subsequent issue of Radio Communication.

The future form of the Radio Interference

Service remained unclear as we went to press. It is obviously a matter of great concern to the Society that some workable solutions to the problems of lack of staff and lack of finance are found soon.

Finally, it is surprising—to put it no more strongly—that some current BT telephone systems appear to be vulnerable to rf. The Trimphone mentioned by Mr Knight is notorious in this respect, and indeed one member of headquarters staff who is active on 144 and 430MHz has had to revert to using the old-fashioned type of instrument since the Trimphone became completely unusable if anything approaching high power was used for 144MHz ssb work, and 430MHz cw caused it to ring in sympathy with the keying!

THANK YOU, GI

Sir—May I take up a little space to express my thanks to the many GI stations for their considerable help during a visit recently made to the country of Northern Ireland.

On the evening of Sunday 19 February, I had disembarked at Belfast docks to be met by blizzard conditions. Due to the blustery winds, some roadsigns were completely obliterated, and being a complete stranger to that area of Belfast I was at a total loss as to where I was. Almost "up the creek" I had at least one "paddle" to call on for assistance, and as a recent G1 licence-holder I ventured a call on S20. The response was much more than I had bargained for, not only from the people giving guidance but those listening in ready to give help should it have been necessary. During the 12 days of my visit I cannot remember a moment during the days of driving when the airwaves were silent in welcoming a stranger to their country.

The space required in mentioning but a few of these newly-found friends would be too great, but of those reading this in GI-land, who contacted me, may I say I have not met a better fraternity.

Harry Cheetham. G1DCM

INTERFERENCE IN EXCLUSIVE AMATEUR BANDS

Sir—I was interested in G3FPK's comments in your February issue about interference whose characteristics were clearly recognisable to me after spending a lifetime in the PO Radio Service. (I have now retired.) On many occasions I have been delighted by tracking down a source of tv or radio interference after having realized from its "note" and other clues that it had been the cause of some lost QSOs of my own. Ranges of many miles quickly failed to astonish me.

The offenders fall into the category of industrial, scientific and medical equipment. ISM is a statistic in the GPO/HO/DTI annual reports, but it doesn't, of course, take into account any problems caused to the amateur service.

The most violent is the rf heater which is in widespread use for industrial purposes in various forms. The output can be several kilowatts of crude rf, and the fact that interference problems can occur is recognised in the Wireless Telegraphy Act 1949, and in "statutory instruments" related to it, which set aside a number of narrow bands and spot frequencies in hf and vhf bands. Some spot frequencies permit an unlimited radiated field strength, which is a clear pointer to the difficulty of containing the problem.

Because their prime function is to generate a maximum amount of rf as cheaply as possible, a high-power TPTG or self-excited Hartley oscillator is the usual solution.

Raw ac to the anode works well, and frequency stability is minimal in some of the older designs. The frequency shifts according to the work load and power adjustment, plus a further drift while the work is being processed. 1MHz in 27 is not unusual, and in many situations screening of the direct radiation is not a practical proposition. Imagine a dozen of these machines on the top floor of a disused cotton mill 70ft agl, and the line of sight radiation is easily predicted! Sky-wave propagation compounds the problem.

Another well-known category is sw diathermy used in hospitals and by private practitioners. These are of somewhat lower power, but my funny story of one machine which caused tvi only when a fat patient was being treated is well known around the northwest, after having been told on local radio and at club meetings. There is a specification for a totally-screened room to contain patient, machine and accessories, with complete electrical filtering of all incoming supplies (how do you filter the water supply?), but in practice many are used "in the open".

As the rf is not intended for communication purposes, the rules of construction and operation familiar to us do not apply, although the machine is undoubtedly a transmitter. Very often local maintenance, adjustment or repair by persons not skilled in radio techniques results in dirty rf, as noticed by G3FPK. Often there are unsuppressed harmonics and random parasitics. Even the best of them don't have rf which we would call pure—I never met a crystal-controlled job with full smoothing, although there surely must be some.

For various reasons, many operate on "unauthorized" frequencies. I well remember some machines being moved from the Midlands to the Northwest in early Channel 2 405-line tv days (51·75MHz). The machines were on 51MHz and wiped out a whole town!

There is no mechanism for controlling their behaviour until they come to the notice of the RIS by causing tvi or bci. When this happens the criterion is to clear the disturbance on the affected service. In practical terms this may mean cleaning up the "note" and shifting frequency so that fundamental and harmonics fall elsewhere, but it is a daunting prospect to be confronted with a factory full of machines and a management unwilling to pay for professional expertise. At the end of the day the new victim may be an essential or emergency radio service at a greater distance.

I see the problem mainly as a great number of individual sources up and down the country with similar radio signatures. We in highly industralised areas are likely to suffer most, but sky-wave propagation from distant sources cannot be excluded. Two favourite authorized frequencies are 13·56MHz and 27·12MHz, but many are to be found at 30-40MHz. Others (and parasitics) anywhere! It would be helpful if some kind owner would assist research into the actual range by allowing his machine to be fitted with a marker for use as a radio beacon.

In the long-term, strict enforcement of existing regulations plus crystal-control would go a long way towards containing the problem. Why not take advantage of modern technology and mark the rf with its post code?

Gerald Openshaw, G2BTO

This appears to be the answer to the problem raised initially by G3FPK. Anyone have any other offers?

AMATEUR RADIO AFLOAT

Sir—Based in an area of considerable marine activity, the members of the Lymington & DRS would like to draw attention to some contributions that amateur radio could make to safety afloat.

Many people have benefited from a "talk-in" to a meeting or a rally at an unfamiliar location ashore. This assistance is particularly welcome when driving conditions are difficult.

A similar service could be given to amateur stations afloat if licence conditions permitted. Helpful advice to a fellow amateur in a strange port would be welcome. Local knowledge could help small boats to avoid hazards that might involve risk of running aground or even of loss of life. However, the ordinary amateur licensee may not seek such help afloat. Strangely he must buy a separate maritime mobile licence in addition to his normal licence. We believe that fewer than 50 of these licences have been issued. They must therefore cost the Government more to administer than the revenue received in fees. Furthermore these separate licences seem to serve no useful purpose.

In a country surrounded by seas, encouragement of amateur radio activities afloat would be in the national interest. We therefore ask for the normal amateur licence to cover activities in tidal waters and on the high seas.

We believe that the Meteorological Office would be pleased to resume the practice of receiving weather reports from amateur stations on the high seas, and in return permitting their weather reports to be passed on to amateur stations afloat. We believe this would be a sensible thing to allow under the amateur radio licence.

There is a worldwide network of radio amateurs ready to help when there is doubt or difficulty at sea. The Maritime Mobile Net started in 1969 by G3TJY helped to save life in the Pacific in a recent round-the-world race. Amateurs with their practical knowledge of suitable frequencies and their disciplined operating skills can act quickly and positively in securing the safety of small vessels afloat.

We would be very pleased to see concerted action in securing a declaration that these activities are covered by the ordinary amateur radio licence.

A. B. Whatman, G2BQ
chairman

At the present time the Society is engaged in collecting and collating views and opinions on all aspects of licensing, with the aim of instigating a major review of licensing conditions later in the year. The subject of maritime mobile licensing is already on the agenda, but members with interests in this area (and indeed with other special interests) are most welcome to put their view to the Society—please write to the Secretary (LAC) at headquarters.

As far as the emergency aspects of amateur radio are concerned, a number of provisions already apply both to individuals and to Raynet. There is some scope for this type of operation in the existing regulations, but we must stress that members must operate within the terms of their licences, especially with regard to third-party messages. Apart from the emergency provisions referred to above, and with the exception of greetings messages passed from special event stations with GB callsigns under the current conditions for this concession, third-party messages are not permitted under the terms of the UK amateur radio licence.

FUNNY FONETICS

Sir—This is the "funny" phonetic alphabet as I remember it. I believe it is credited to the late Arthur Askey.

A for Horses	*(Hay for horses)*
B for Mutton	*(Beef or mutton)*
C for Thighlander	*(Seaforth Highlander)*
D for Dumb	*(Deaf or dumb)*
E for Brick	*(Heave a brick)*
F for Vescence	*(Effervescence)*
G for Indian	*(Chief or indian)*
H for imself	*(Each for himself)*
I for lutin	*(Highfaluting)*
J for Orange	*(Jaffa orange)*
K for links	*(Cufflinks)*
L for leather	*(Hell for leather)*
M for sis	*(Emphasis)*
N for lope	*(Envelope)*
O for the wings of a dove	
P for you very eyes	*(Before your very eyes)*
Q for a bus	*(Queue for a bus)*
R for mo	*(Half a moment)*
S for you	*(As for you!)*
T for two	*(Tea for two)*
U for old age	*(Youth or old age)*
V for la France	*(Vive la France)*
W for quits	*(Double you for quits)*
X for Breakfast	*(Eggs for breakfast)*
Y for Mistress	*(Wife or Mistress)*
Z for Breeze	*(Zephyr breeze)*

The early "hand-made" phonetics were much more colourful than today's modern standardization. My first callsign 2BAP was Bananas Apples and Pears, which still sounds sweeter to me than Bravo Alpha Papa, and surely is much easier to remember.

W. F. Badcock, RS49812

This letter is one of many concerning this topic. Some have credited the alphabet to Flanagan and Allan, and others to assorted music-hall artistes of the 'twenties and 'thirties. Variations on the alphabet given above have also been received, one or two of which are emphatically not printable! Many thanks to a[illegible]who wrote giving their versions.

Design of an 85W broadband hf linear amplifier

by Robert Bastow, BSc, MPhil, CChem, FRSC, G3BAC*

Bob Bastow's interest in radio began before the war; one of his first major successes being a two-valve medium-wave portable receiver installed in a school desk with the headphone lead running up a jacket sleeve. He was licensed in 1946, and his interest is now mainly in building and testing small homebrew projects with encouragement and advice from the shaving-club net on 3·5MHz. A chemist by profession, he is employed in the pharmaceutical industry on product quality matters.

Introduction

The availability of a wide range of rf power transistors at prices lower than valves of equivalent output power makes them attractive for solidstate linear amplifiers. The use of broadband techniques removes the need for pa tuning and eliminates the losses associated with tank coil switching and with the matching of device output capacitance into pi networks at higher frequencies. Broadband operation also provides for easier matching of the low impedances of transistors to driver and antenna. A disadvantage of this type of operation is the need for filters to remove the harmonics which are inevitably present at appreciable levels in the output.

For powers of the order of 10W and above, the use of push-pull operation gives reduction of even harmonics as well as higher output impedances somewhat nearer that of the load than would be obtained with parallel operation. Also, push-pull gives reduced risk of emitter-base breakdown, as the emitter-base junction of one transistor provides a clamp to the other on the negative cycle.

A wide range of rf power transistors is now available, but it is important that those designed for hf ssb operation are used, as vhf types intended for Class C fm can give rise to non-linearity and parasitic oscillations.

Having built the 10W broadband linear designed by VK3XU [1], the author searched available literature to obtain sufficient theory to enable a higher-powered linear to be designed and built. It is believed that discussion of the design of the amplifier could be of general interest.

Design

The amplifier uses a pair of Mullard 587BLY transistors, which are a stud-mounted TO-60 version of the BLX39, available on the surplus market for about £3 each; a sum not likely to precipitate heart failure should the device fail. The BLX39 is a silicon planar epitaxial transistor capable of 42·5W p.e.p. output at 28MHz in Class AB ssb operation with a supply of 28V; it will withstand severe load mismatch conditions. The design is applicable to other transistors with appropriate substitutions in the formulae to allow for power and voltage differences.

Input matching

The input impedance of transistors over a wide frequency range is somewhat complex, and for devices in the power output range of 10 to 100W it is generally of the order of 1 to 10Ω over 3 to 30MHz. Thus a compromise must be chosen between drive-power requirements and input swr. The input impedance of the BLX39, shown on the Mullard data sheet curves for Class AB operation, has series resistive and capacitative reactive components of 8 and 5Ω respectively at 3·5MHz, falling to 2 and 1·5Ω at 30MHz. In the interest of stability, and to lower the Q of the input transformer, it is recommended that a resistor of 10Ω is connected between

*15 Pitfield Drive, Meopham Green, Nr Gravesend, Kent DA13 0AY.

base and emitter; also, to reduce the overall gain at lower frequencies, a combination of parallel R and C is placed in series with each base. The values chosen give an equivalent series resistance of 6Ω at 3·5MHz, reducing to 3Ω at 30MHz. Thus the overall combination gives a base-to-base impedance of 23Ω at 3·5MHz, reducing to 11Ω at 30MHz.

To provide input matching from the driving source, either a conventionally-wound or a transmission-line transformer can be employed. The use of high permeability ferrite-cored transformers allows for a lower number of turns, giving reduced resistive losses and minimizing problems with self-resonance. To match the 50Ω driving source to the 11 to 23Ω input impedance of the amplifier, a transfer ratio of 4·5:1 to 2:1, or a turns ratio of 2·1:1 to 1·4:1, is required. A ratio of 2:1 was chosen to give a satisfactory input swr at 30MHz. Transformers wound with transmission line can give improved performance at higher frequencies by eliminating the self-capacitance and stray inductance of the windings, as these are absorbed in the characteristics of the transmission line. A disadvantage is the limitation to impedance ratios of 4:1, 9:1 and 16:1, brought about by the transformer action of the bifilar windings or of the line, and the need for two transformers in certain cases of unbalanced-to-balanced matching.

Use of a tv-type balun core in a conventionally-wound transformer provides a means of achieving symmetrical input and, to obtain tight coupling and equal drive to both transistors, the secondary is made from a single turn of braid from coaxial cable acting as a tube through which two turns of 0·5mm plastic-coated wire are threaded to form the primary. Holes are pricked in the braid to allow start and finish of the primary opposite to that of the secondary.

To give adequate reactance in the windings, the designed reactance should be at least four times the load at the lowest working frequency. Thus for a 50Ω load (R_L) at 3·5MHz the inductance L of the primary should be

$$L = \frac{4R_L}{2\pi F} = 10\mu H$$

The core specified gives an inductance of about 0·9μH for one turn ($A_L = 900$, $L = A_L n^2$). For a single core two turns give an inductance of 3·6μH which would give too low a reactance, hence two balun cores are stacked.

Biasing

The biasing system for a linear amplifier must be capable of maintaining a stable bias over a complete drive cycle and a wide range of operating temperatures. With peak base currents of I_c/h_{fe}, where Ic is the peak collector current under rf drive (2A) and h_{fe} is the gain (45) at this current, a low-impedance supply with temperature compensation is required. Some compensation is provided by the built-in emitter resistors in modern ssb transistors, but any external resistor results in power loss and instability due to difficulties in adequate by-passing.

The simplest form of bias is by means of a clamp diode in thermal contact with the pa transistor or its heatsink, but to provide the full base current the series resistor must have a high power dissipation. The circuit shown provides a low-impedance current source and allows for adjustment of the bias to give the recommended zero signal current of 100mA for the pair. Temperature compensation results from thermal contact between the diodes and the 587BLYs. The large by-pass capacitor helps to provide base current on peaks.

Output matching

To avoid saturation of ferrite material by the high collector current peaks, the transformer T2 provides a balanced current supply to the collectors through windings which set up opposing magnetic fields. Tight coupling between the collectors aids rejection of even harmonics, and an artificial centre tap is provided by use of a tightly-coupled transformer of 1:1 ratio plus adequate decoupling.

The output load impedance required for a transistor pa is given by:

$$Z = \frac{Vc^2}{2Po}$$

where Z is the required load impedance
Vc is the peak collector voltage swing
Po is the output power in watts p.e.p.

For a single BLX39 with a 28V supply rail, collector emitter saturation voltage of 1·5 and 42·5W output, Z is 8·3Ω. For a pair in push-pull, the collector to collector load impedance is 16·6Ω. Thus, to match a 50Ω load an impedance ratio of 3:1 is required, which can be provided by a transformer ratio of $\sqrt{3}$:1 or 1·7:1.

This ratio rules out the use of a transmission-line transformer. An efficient conventional transformer must be reasonably loss-free over the range 3·5 to 30MHz, and thus must employ a core which maintains its permeability over this range and does not undergo saturation of flux density. Tight coupling must be maintained between windings to ensure correct impedance transfer and low reflected power losses. This can be achieved by bifilar windings or use of copper braid in the form of tightly-coupled tapes. The number of turns should be kept to a minimum to reduce resistive losses, but should be sufficient to provide adequate inductive reactance at the low-frequency limit.

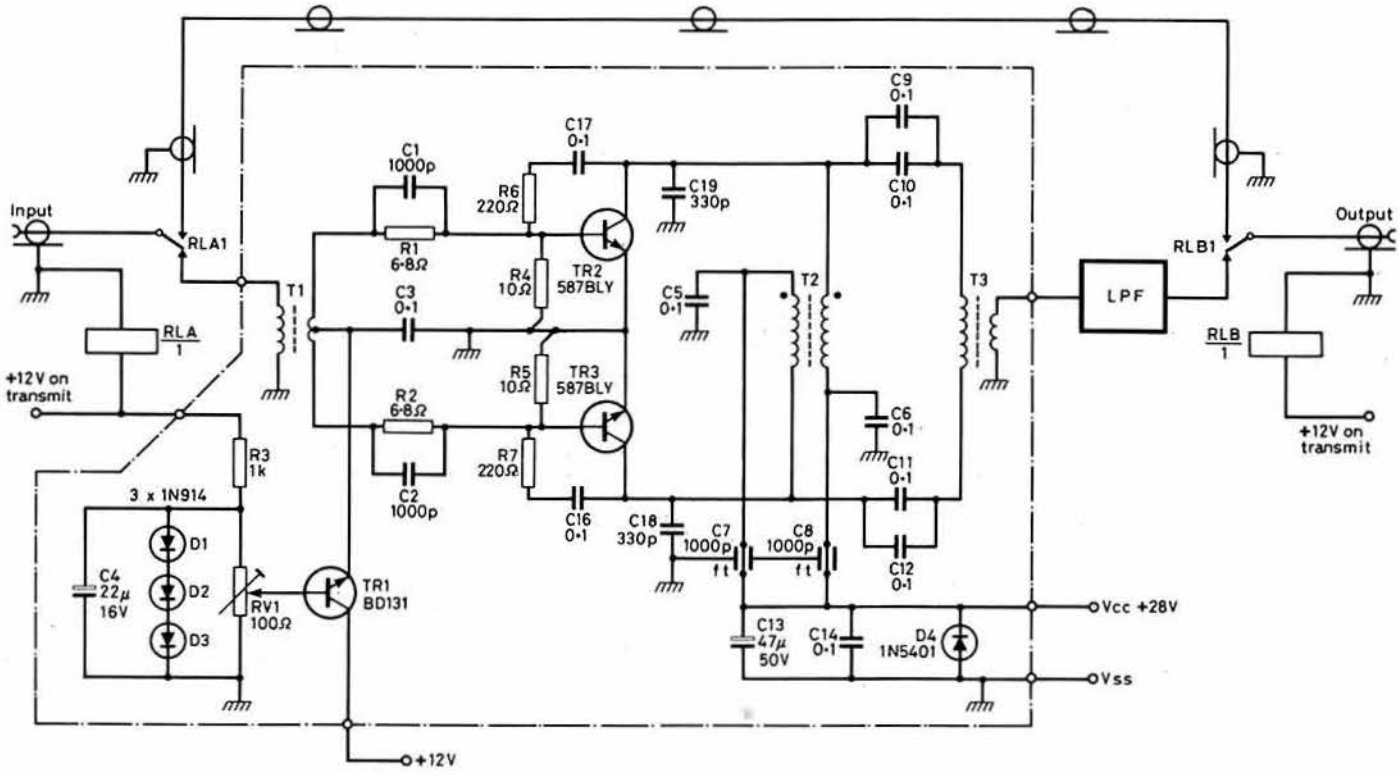
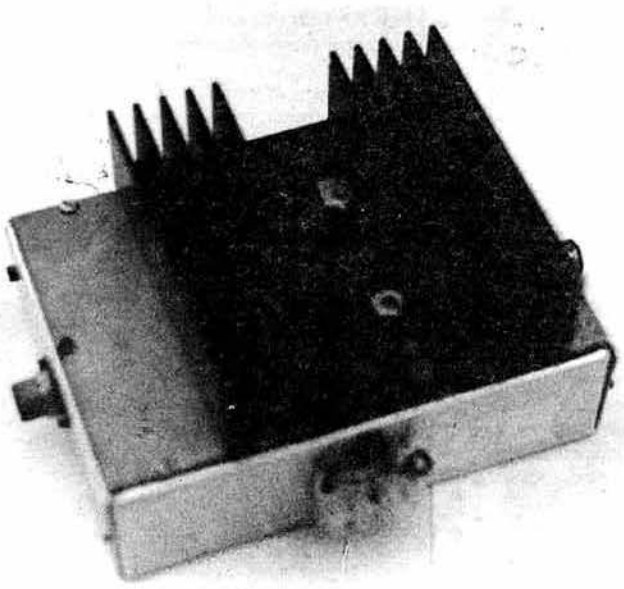
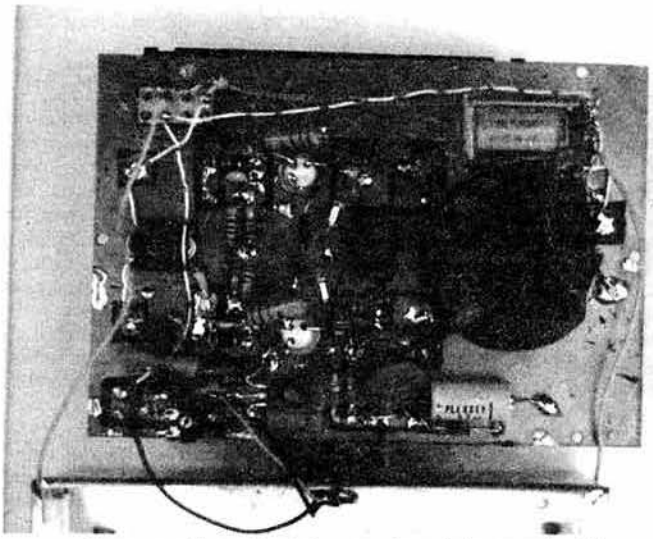


Fig. 1. Linear amplifier circuit diagram



HF linear amplifier mounted on a screening box



Component layout (prototype used one balun core for T1)

Choice of ferrite material and the size of the transformer are dictated by frequency range and power output. Neosid cores are available to the amateur constructor, and data is obtainable to aid design choice [2]. Neosid grade F14 material have a reasonably high permeability of 220, enabling a small number of turns to be used at the low-frequency limit, and have an acceptable loss factor at 30MHz. Grade F25 shows lower losses but its perminvar ferrite material has a tighter hysteresis curve such that irreversible effects occur in high-power applications, it also has a lower permeability of 50.

For a satisfactory inductive reactance X_L of at least four times the collector-to-collector load impedance of 16·6Ω, the primary should have a minimum inductance of:

$$L = \frac{X_L}{2\pi F} = \frac{4 \times 16{\cdot}6}{2\pi \times 3{\cdot}5} = 3\mu H$$

The ferrite rings specified have an A_L value (inductance in nanohenries for one turn) of 181. From the formula $L = A_L n^2$ a total of four turns is required. In practice a larger number of turns can be accommodated by the core, and a total of six was used to reduce the likelihood of saturation problems as discussed below.

If the core is of unsuitable material or of inadequate cross-section such that magnetic saturation occurs, then severe non-linearity will result. For

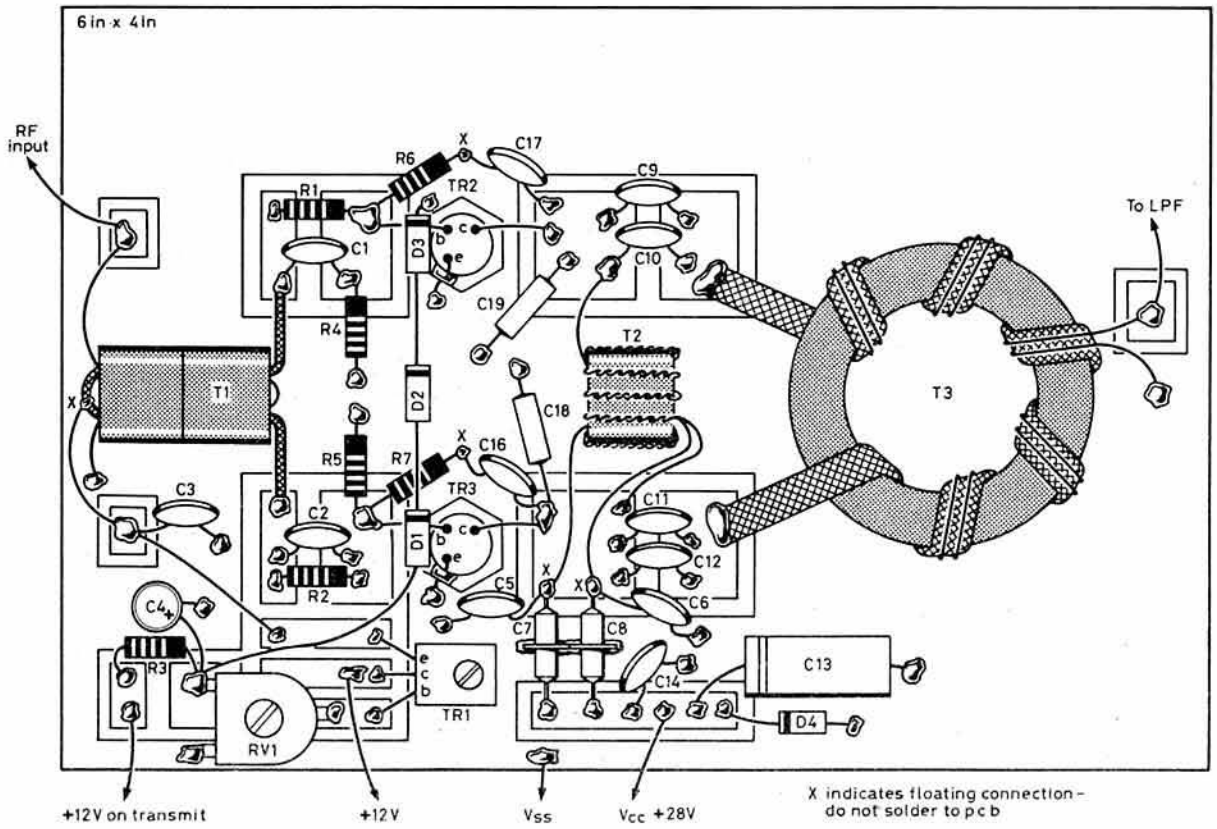


Fig. 2. Linear amplifier pcb component layout

Components list

R1, 2	6·8Ω 0·25W carbon	C7, 8	1,000pF feedthrough
R3	1kΩ 0·25W	C13	47μF 50V electrolytic
R4, 5	10Ω 0·25W carbon	D1-3	1N914 silicon diodes
RV1	100Ω mini preset	D4	1N5401 3A silicon diode
C1, 2	1,000pF 50V disc ceramic	TR1	BD131
C3, 5, 6, 9-12, 14	0·1μF 63V disc ceramic	TR2, 3	587BLY
C4	22μF 16V tantalum	RL1, 2	12V single-pole changeover relay

T1 Input transformer 2:1 turns ratio wound on a pair of Neosid balun cores F14 material (Neosid reference 42001. Small Orders Catalogue reference 405). For winding details see text.

T2 Collector feed choke: eight turns 22swg enamelled copper wire bifilar wound on Neosid 12·7mm ferrite ring core F14 material (Neosid reference 28-013-31). Start of windings indicated with a dot on circuit diagram.

T3 Output transformer 1:1·7 turns ratio wound on a Neosid 38mm ferrite ring core F14 material (Neosid reference 28-042-31. Small Orders Catalogue reference 410). Primary: six turns equally-spaced copper braid from 0·2in coaxial cable. Secondary: 10 turns 18swg enamelled copper wire wound with pairs of turns over each of five turns of the copper braid. Windings insulated from each other and from the core by pvc tape.

85W p.e.p. into a 16·6Ω load, the peak collector-to-collector voltage will be 56V. The maximum flux density reached can be obtained from the formula:

$$Bmax = \frac{Vmax}{2\pi fAn} \quad [3]$$

where Bmax = maxiumum flux density (Tesla)
Vmax = maximum voltage across n turns
f = frequency (Hz)
A = average cross-section of ferrite (m²)
n = number of turns

For the toroid specified the average cross-section is 79·6mm². Thus, substituting in the above equation, the maximum flux density reached at 3·5MHz is 5·3milliTesla(mT). Grade F14 ferrite has a saturation flux density of 350mT, but to avoid any non-linearity and power loss in the ferrite, a practical limit of 10mT is recommended [3]. The 38mm ring is larger than necessary to give the reactance and flux density required, but the 25mm ring in the same material is a thin cylinder giving problems in obtaining tight coupling of the windings.

A common form of construction for broadband output transformers uses a single turn of brass tube for the primary, but this can require a large number of ferrite rings to obtain the necessary inductive reactance and low flux density.

Stability

In addition to base emitter shunting, broadband designs often incorporate collector-to-base or collector-to-collector feedback [1] [4]. This can help to equalize the gain over the frequency range and improve stability; R6 and R7, each of 220Ω, are included for this purpose. Any instability under incorrect loading or mismatch should be removed by such feedback. Decoupling is important at the low circuit impedances present, and good quality disc ceramic capacitors must be used. For the critical collector decoupling, which helps to reduce harmonic content, feedthrough capacitors are used in addition.

Harmonic filtering

In view of the broadband nature of the amplifier, it is essential that suitable filters are used to reduce harmonic radiation; an atu alone is not sufficient for this purpose. Numerous types of lowpass filters exist [4] [5] [6], many requiring computer solutions, but tables are often provided to simplify calculation of component values. The well-known pi-network can provide adequate attenuation of harmonics if several stages are used in cascade. The calculations are considerably simplified in the case of networks with a symmetrical design of equal input and output impedances and a Q of 1 chosen to give a satisfactory bandwidth. Values for the hf amateur bands are given in Appendix 1. The filter should be checked for cut-off below the next highest band by means of a signal generator and oscilloscope, with the filter terminated at input and output with 50Ω carbon resistors.

Construction

A double-sided printed circuit board is used to provide a good groundplane under the components and to aid heat dissipation: glass-fibre board is used, as the unit gets quite hot under two-tone test conditions. The input circuit is made as symmetrical as possible to give equal drive to the transistors. The input transformer T1 is fixed to the board with contact adhesive. The emitter pin is connected to the body of the transistor and to the copper board with a short, soldered connection.

The board is mounted on a large heatsink, and the bias diodes are placed in thermal contact with the output transistors with silicone grease to aid heat transfer.

The output transformer T3 is mounted on a small piece of paxolin sheet with contact adhesive, and this in turn is cemented to the circuit board, thus preventing possible shorting of the copper braid to earth.

Adjustment

The bias potentiometer RV1 should be set with the slider at the earthy end and the amplifier terminated with a 50Ω dummy load. The 12V bias supply should be applied, followed by a low voltage supply, say 6V, to Vcc through a meter. Bias should be adjusted by RV1 to give a low quiescent current of about 20mA for the pair of transistors. The supply voltage Vcc can then be increased to 28V, and the bias adjusted to give 100mA quiescent current. Apply a two-tone rf signal around 3·6MHz at a low level, very much lower than 1W, and gradually increase this drive until about 1A collector current is shown. After about half-a-minute when the heatsink feels warm, remove the drive and re-adjust the bias by RV1 to give a quiescent current of 100mA. Subsequent operation with the heatsink running hotter should result in a quiescent current of about 100mA; if the current increases when the heatsink is hot, improve the thermal contact between diodes and the output transistors.

Correct drive level must be ascertained by observation of two-tone output on a suitable oscilliscope. Drive can be increased until flat-topping occurs and then backed off so that no flattening occurs on speech peaks. To carry out this test on the higher frequency bands, direct coupling to the plates should be used if the oscilloscope amplifier is not suitable for the frequency concerned. Performance figures are given in Appendix 2.

References

[1] "QRP Solid State Linear Amplifier for HF", Drew Diamond, VK3XU. *Amateur Radio* October 1981, pp7-9 (*TT* February 1982, pp140-1).

[2] Neosid Limited, Stonehills House, Howardsgate, Welwyn Garden City, Hertfordshire AL8 6NW.

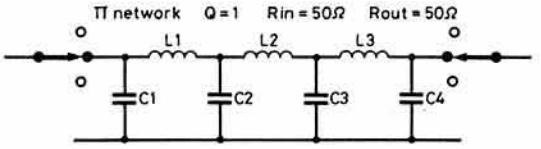
[3] *Transistors for Single-sideband Linear Amplifiers,* Mullard Limited, 1972.

[4] *Solid State Design for the Radio Amateur,* ARRL.

[5] "Modern filter design for the radio amateur", W. H. Allen, G2UJ. *Rad Com* August 1971, pp532-5.

[6] *Radio Communication Handbook,* RSGB.

Appendix 1. Lowpass filters



Band	C1C4	C2C3	L1L2L3	Turns
3·5MHz (f=3·65)	872pF (820+56)	1744pF (1800)	2·18μH	20
7MHz (f=7·05)	452pF (470)	904pF (820+82)	1·13μH	14
14MHz (f=14·15)	225pF (220)	450pF (470)	0·56μH	10
21MHz (f=21·2)	150pF	300pF (270+33)	0·375μH	9
28MHz (f=28·75)	110pF (100+10)	220pF	0·277μH	8

L1L2L3 wound with 22swg enamelled copper wire on Amidon T80-2 toroidal cores (3·5-14MHz) or T80-6 cores (21 and 28MHz).
(TMP Electronic Supplies, Unit 27, Pinfold Workshops, Pinfold Lane, Buckley, Clwyd, N Wales)
C1C2C3C4 polystyrene 2·5 per cent or 1pF tolerance values chosen to give within five per cent of calculated (Radiospares).

Appendix 2. Two-tone performance figures p.e.p.

Band (MHz)	Input (W)	Output (W)	Ic (A)
3·5	2·0	84	3·0
7	2·0	80	3·0
14	2·5	74	2·6
21	2·5	68	2·8
28	3·0	52	2·8

□

A MORSE TERMINAL UNIT

by A. F. Sinclair, GM4BWT*

Introduction

The simple unit described in this constructional article is designed to convert the audio tones from a receiver tuned to a morse signal, into logic 1 and 0 as required for the operation of a morse decode program such as that described in [1]. The unit can be used with any computer and program using the same logic sense, ie logic 0 when a tone is present. The unit will be found useful when learning morse, particularly if used to display a received morse signal on the vdu for later confirmation of the same signal copied by hand.

The circuit can also be used as an rtty terminal unit, simply by utilizing one tone of the rtty signal; the bandwidth of the active filter and phase lock loop circuitry being more than narrow enough to cut off the unwanted tone. The only drawback is the filter and phase lock loop centre frequency of 800Hz, which is of course set to match the average receiver cw filter centre frequency.

The total circuit bandwidth is approximately 100Hz, the curve being very steep-sided and flat within this passband due to the combination of the three-section active filter and the phase lock loop tone decoder. Fig 1 shows the audio response of the terminal unit in the area of interest. If anything, the operator may find the tuning a bit sharp, especially with an older receiver, and in fact some of the vhf beacons with which the unit was tested were found to drift in and out of the terminal's passband quite alarmingly.

The circuit (Fig 2)

The active filters

The active filters in this terminal are based on the standard op-amp bandpass circuit, using the LF353 jfet-bipolar device, the eight-pin dil package containing two op-amps. Three sections are used, with the main parameters of each filter being set by the three resistors and two capacitors in the circuit. The components can, of course, quite easily be changed to produce the filter characteristics required by the operator. R1, in the first section of IC1, sets the gain of the first filter section, bearing in mind that the overall gain of the three sections is equal to the product of the three gain figures used and not their sum. R2 sets the centre frequency of each section, and could be replaced with a preset if desired, although this was not found necessary in the original. Finally, R3 determines the bandwidth of the active filter section. The values of the three resistors are therefore dependent on the value of C3, C4 (C4 = C3), and the bandwidth and the centre frequency required. Using the component numbering around IC1, the basic calculations are as follows:

$R1 = Q/(G \times 2\pi FC)$

$R2 = Q/(G \times 2 \times ((Q \times Q) - 1)) \times 2\pi FC)$

$R3 = 2Q/(G \times 2\pi FC)$

Where $Q = 5$

$G = 1$

$\pi = 3 \cdot 14$

F = Centre frequency

C = C3 = C4 (in this design, C = 10,000pF)

The gain is set at 1, and the Q to 5 in order to give a filter that does not "ring", as this would confuse the computer. With the active filters set for a gain of 1, the overall sensitivity of the terminal unit is set by the voltage requirements at the input terminals of the pll tone decoder, being about 200mV for reliable operation. The input level is set by RV1 such that the unit responds to the cw signal being listened to, but is not triggered by the broadband background noise normally present in the audio output of the receiver in use. Diodes D1 and D2 prevent overloading the filter input, although this is unlikely to happen if the audio input to the terminal unit is taken from a headphone socket or from the af output accessory socket,

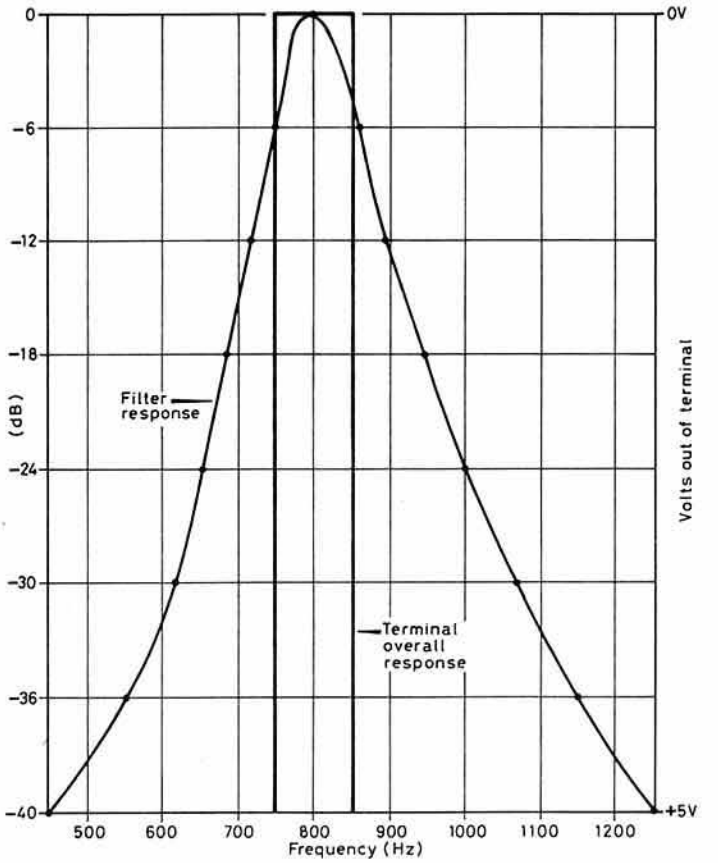


Fig 1. The "rounded" curve illustrates the audio response of the active filters. The "square" curve represents the response to audio of the active filter-pll combination; this "ideal"-looking response curve is given this form mainly by the switching action of the phase lock loop

*Old Railway Cottage, Falahill, By Heriot, Midlothian EH38 5YG.

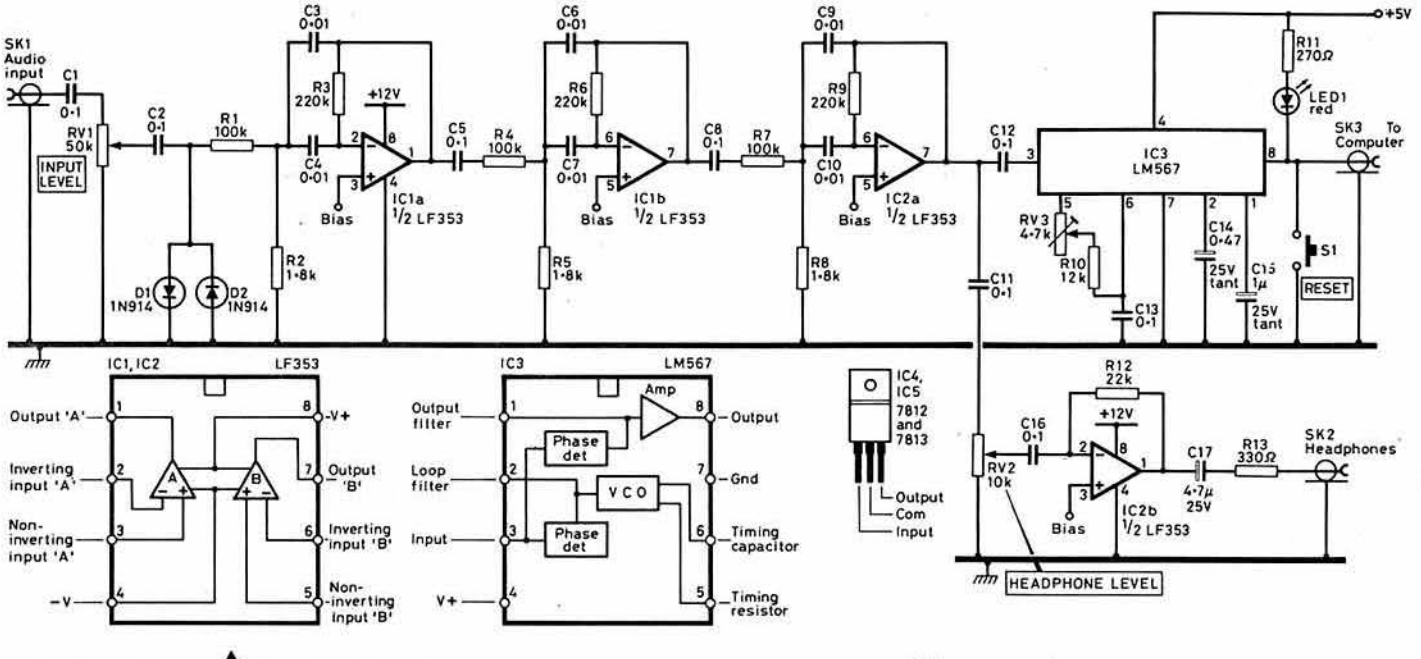


Fig 2. Active filters and pll tone decode circuit

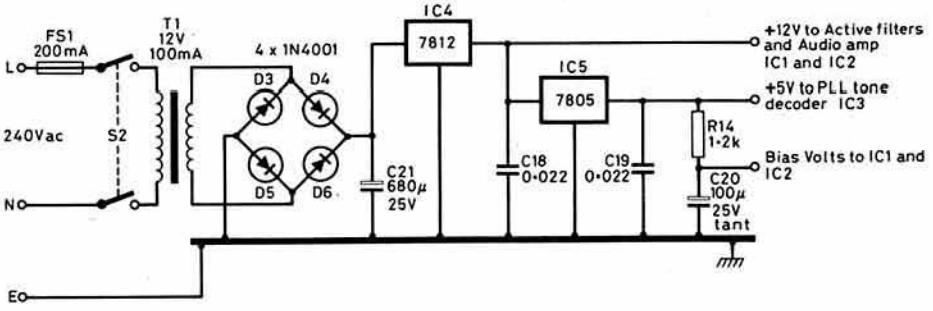


Fig 3. Power supply circuit ▶

as provided on receivers such as the Yaesu FT707. Since the system is configured for a single 12V supply, the bias for the non-inverting inputs of the op-amps is taken from the 5V supply for the pll tone decoder, decoupled by R14 and C20 to prevent any interaction between the stages.

The phase lock loop tone decoder

The actual decoding of the cw tones is performed by the LM567 tone decoder ic, the output of which is normally high, but going low when a sustained tone of the correct frequency is fed into pin 3. The term "sustained" is relative insofar as the LM567 requires a finite number of cycles of the tone to which it is tuned before the signal is recognized as being the wanted one and the output of the ic is taken low. The number of cycles required before locking will occur is inversely proportional to the bandwidth configuration of the circuit, this being set by the values of C14 and C15. There is a conflict between minimum lock time of the loop and minimum bandwidth, but the values given seem to be a good compromise

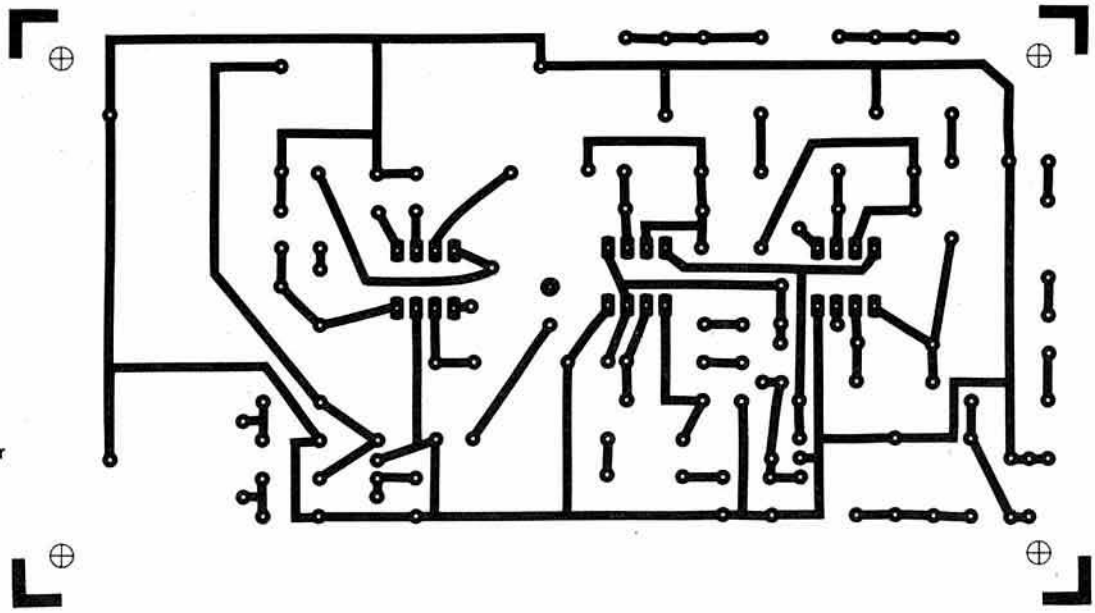


Fig 4. PCB layout, copper conductor side (full size)

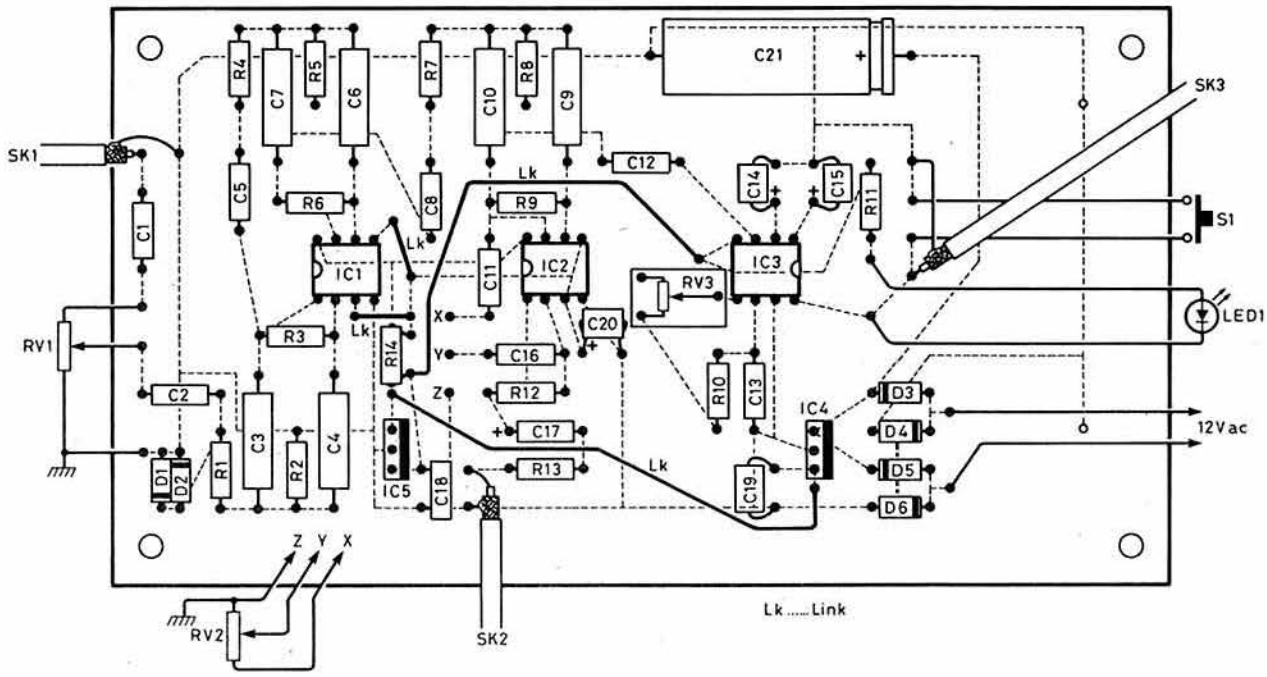


Fig 5. Component layout, links and connectors to off-board controls and sockets (full size)

—unless you try to copy morse at 75wpm, proving once again that the human brain is still the best computer of all. C12 and RV3 set the centre frequency of the phase lock loop, and this is variable over quite a wide range with the component values given. The computer interface is connected directly to pin 8 of the LM567, the l.e.d providing a visual indication of the terminal operation and receiver tuning. The reset switch, when pressed, causes the program to revert to its nominal speed of 17wpm, for use when the received morse is outside the automatic adjustment range of the program, ie between two thirds of the speed of the morse presently being listened to and twice the present speed.

The audio amplifier and power supply

The remaining section of IC2 is configured as a low-gain inverting audio amplifier, and feeds the filtered signal to the headphone socket. By listening to this signal on a pair of headphones and watching the lock indicator l.e.d at the same time, it will be found much easier to tune in the desired cw signal in the presence of interference. It also allows the terminal unit to be used as a cw filter on its own for listening to morse or rtty only—the filters being too selective for intelligible phone reception, RV2 varies the headphone level independently of the rest of the circuit, allowing the operator to set the headphone volume to a comfortable level.

The power supply (Fig 3) is very simple and straight-forward, providing +12V for the active filters and the audio amplifier, +5V for the phase lock loop tone decoder, and a decoupled +5V line to provide bias for the op-amps, allowing them to operate from a single supply, as explained earlier.

Components list

R1, 4, 7	100kΩ	**C1, 2, 5, 8, 11, 12, 13, 16**	0·1μF
R2, 5, 8	1·8kΩ	**C3, 4, 6, 7, 9, 10**	0·01μF polystyrene
R3	220kΩ	**C14**	0·47μF tantalum, 25VW
R6, 9	220kΩ	**C15**	1·0μF tantalum, 25VW
R10	12kΩ	**C17**	4·7μF electrolytic, 25VW
R11	270kΩ	**C18, 19**	0·022μF
R12	22kΩ	**C20**	100μF tantalum, 25VW
R13	330kΩ	**C21**	680μF electrolytic, 25VW
R14	1·2kΩ		
RV1	5kΩ		
RV2	10kΩ		
RV3	4·7kΩ		

All resistors are 0·125W

All capacitors are ceramic unless otherwise stated

IC1, 2	LF353
IC3	LM567
IC4	7812
IC5	7805
FS1	200mA
D1, 2	1N914
D3-6	1N4001
S1	NO push switch
S2	DPDT mains switch
Cabinet	6 by 4·5 by 1·75in
Miscellaneous	Three-pin mains socket, standard jack socket, miniature jack socket, BNC socket, fuse holder, red l.e.d., four rubber feet

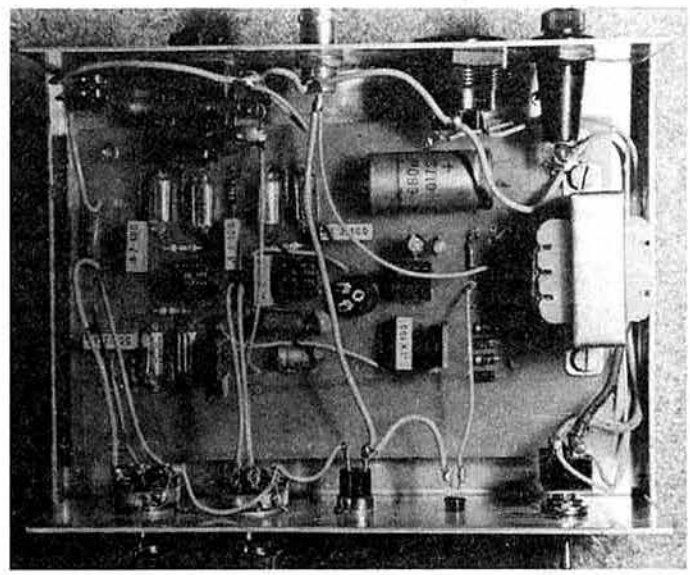
All the above components can be supplied by F. Brown, George IV Bridge, Edinburgh.

Alternative op-amps which could be used without changes to the circuit or pcb layout are: LF353N, TL072CP or TL082CP, all of which are dual-fet op-amps.

Construction of the terminal unit

The circuit is constructed on a single-sided pcb with four wire links, the board being drawn out with a Dalo etch-resistant pen, then etched in ferric chloride. The copper conductor side of the board is shown in Fig 4, with the component overlay, wire links and connections to the off board controls

(Continued on page 399)



Top view of the unit

Universal Crystal Oscillators

by Fred Brown, W6HPH*

FOR MORE THAN half a century radio communication has relied upon the excellent stability of the piezoelectric quartz crystal for frequency control. Because quartz resonators combine extremely high Q with a very low temperature coefficient, it is unlikely that this simple method of frequency determination will soon be supplanted.

Most experimenters have accumulated an assortment of oscillator crystals, and some will be unmarked, or marked with a channel number or the output frequency of a transmitter rather than the actual crystal frequency. A test oscillator for determining the condition of a crystal and its actual frequency is therefore a worthwhile addition to the amateur workshop.

The uco

The ideal universal crystal oscillator (uco) should oscillate with any quartz crystal of any frequency without tuning or other adjustments. It should give some measure of a crystal's inclination to oscillate (in the old days this was called "activity") and should deliver sufficient output to drive a frequency counter.

An exhaustive search for such an ideal uco has evolved the circuit shown in Fig 1. It outperforms an earlier version [1], and will oscillate with any crystal from below 25kHz to beyond the 25MHz upper frequency limit of fundamental-mode crystals. This circuit falls somewhat short of the ideal uco, in that one switch is needed to distinguish between vlf, lf, mf and hf crystals. However, this is a small price to pay for a thousand-to-one frequency range. If testing is limited to crystals above 2MHz, the switch may be omitted.

In essence the circuit is a fairly conventional fet Colpitts oscillator (sometimes called a modified Pierce), with switchable capacitance between source and earth. Strength of oscillation (activity) is indicated on the meter, which responds to rectified rf drain voltage. Output for a frequency counter is also taken from the drain resistor. Oscillation frequency will be close to the parallel resonant combination of the crystal and a shunt capacitance of about 50pF. This frequency is typically a few hundred parts per million above the series resonant frequency.

The uco will oscillate with vhf overtone crystals, but the frequency will be the crystal's fundamental, rather than the overtone. Although the overtone frequency does not bear an *exact* numerical relationship to the fundamental, it will always be very close (usually within 0·1 per cent) to an odd integral (3, 5, 7 etc) multiple of the crystal's fundamental.

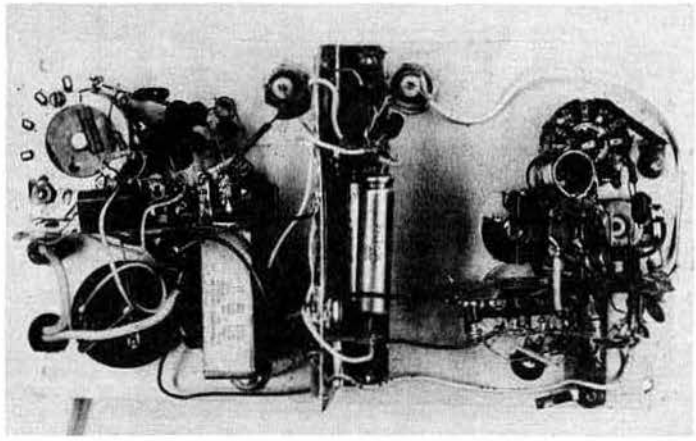
The uoo

Crystals for frequencies above about 20MHz are always overtone types and therefore require some kind of tuned oscillator in order to select the desired overtone. The universal overtone oscillator (uoo), Fig 2, was designed to test vhf crystals and to discover the existence of overtones other than the one represented by the marked frequency.

This it does very well. In fact it's the most sure-fire overtone oscillator this author has ever encountered. With some crystals it's possible to separately tune-in the third, the fifth, the seventh, the ninth, and even the eleventh overtone, and observe each of these frequencies precisely displayed on the counter. The uoo oscillates with any crystal that has a reasonably-active overtone in the range of 20 to 153MHz.

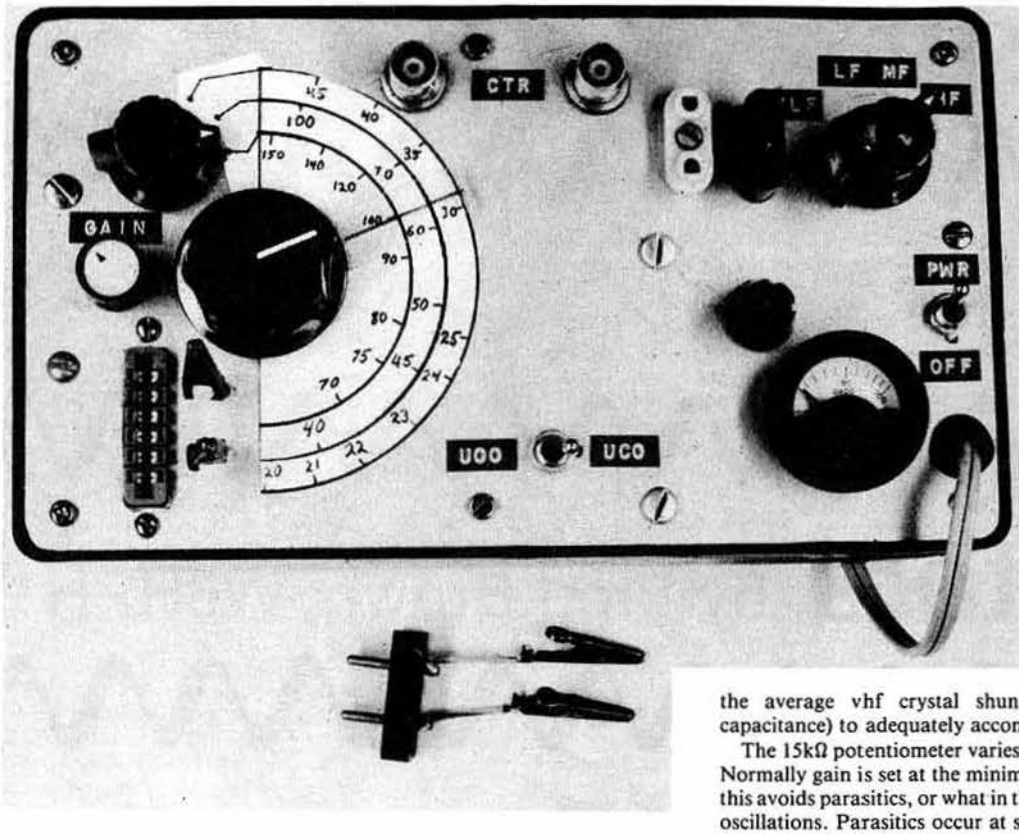
The circuit is an elaboration of one described in *RF Design* [2]. As can be seen from Fig 2, a common emitter stage (TR2) drives an emitter follower (TR3). Feedback is through the crystal, and phasing is such that feedback can occur only at frequencies where the crystal reactance is inductive. That is, at some frequency between series and parallel resonance. Switch S1 allows coverage of the lower vhf spectrum in three overlapping ranges: 20 to 46, 40 to 95 and 68 to 153MHz.

A centre-tapped transformer, T1, permits neutralization of the crystal shunt (or holder) capacitance by means of C_n. This neutralizing capacitor could have been made variable, but the value of 9·1pF is close enough to



All parts easily fit on a 4·25 by 7·63in panel. The uco is at the left and the uoo at the right. Power supply components are mounted on the centre partition

*1169 Los Corderos, Lake San Markos, CA 92069, USA.



The universal crystal oscillator. Use of a 1in meter permits building both oscillators and power supply in a small project box without crowding. The edge connector at lower left is used as the uoo crystal socket and accommodates either HC6/U or HC25/U crystals. Other types, such as those with wire leads, connect to the pair of alligator clips visible just to the right of the edge connector. The two uco sockets at upper right will accept HC6/U and FT243/FT241 crystals. All other types are accommodated by the adapter at lower centre. It is made from a discarded FT241 holder and a pair of small alligator clips

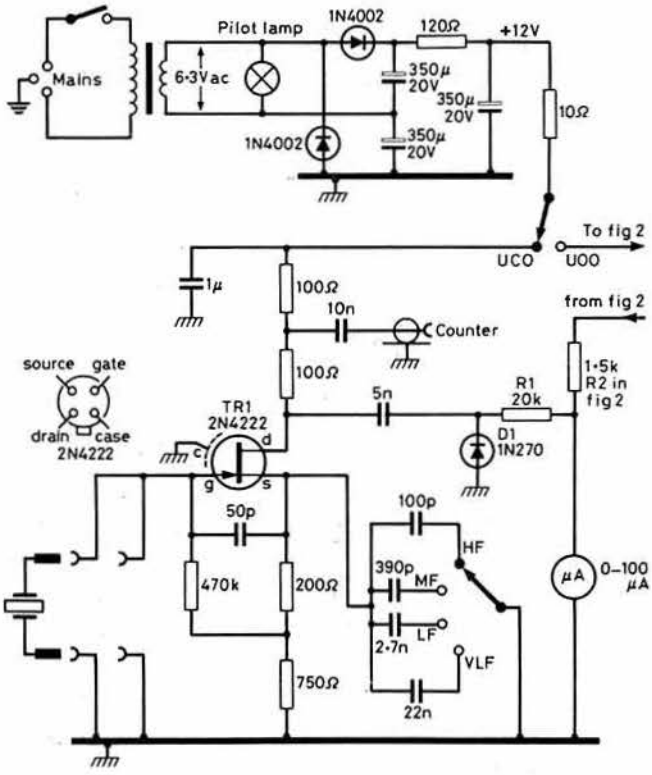


Fig 1. The universal crystal oscillator will oscillate in the fundamental mode of any quartz crystal. A variety of sockets can be wired in parallel to accommodate the more common types of crystal holders. Any 12V dc source can be used as a power supply. The one shown combines a small 6·3V transformer with a full-wave voltage doubler. It also supplies power to the universal overtone oscillator shown in Fig 2. Current drain is 4mA for the uco and 7mA for the uoo. The meter is common to both oscillators. The OA91 is an acceptable substitute if IN270 and IN34 are unobtainable

the average vhf crystal shunt capacitance (plus socket and stray capacitance) to adequately accomplish the task.

The 15kΩ potentiometer varies gain by controlling the base bias of TR3. Normally gain is set at the minimum level which will permit oscillation, as this avoids parasitics, or what in the old days would be called "self-excited" oscillations. Parasitics occur at some points on the tuning dial if the gain is set too high. They may be caused by capacitive coupling between the primary and secondary of T1, or they may be the result of incomplete neutralization. In any event, self-excited oscillations are not much of a problem, and if they occur are readily recognizable on the frequency counter as a count that is not consistent.

The construction of T1 is critical if full frequency coverage is to be realized. This transformer was made from two ferrite beads cemented together as shown in Fig 3. The ferrite was of a type that had a mu of about

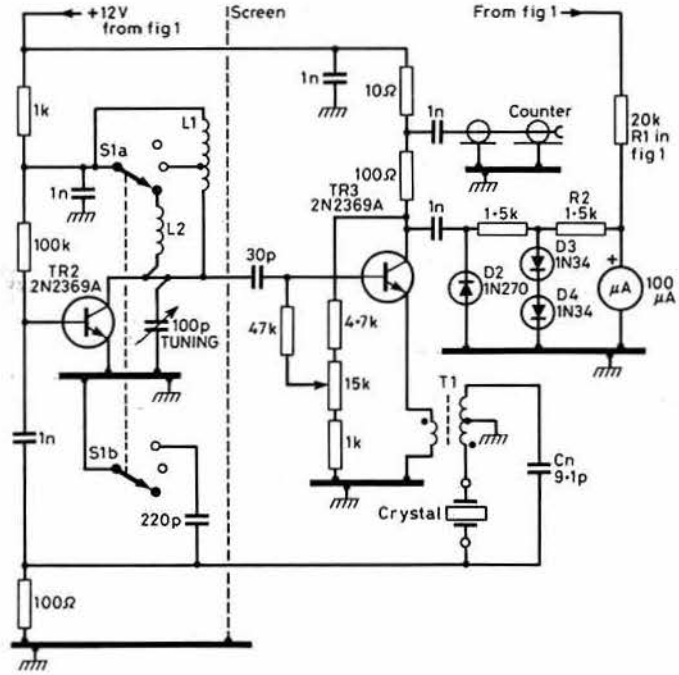
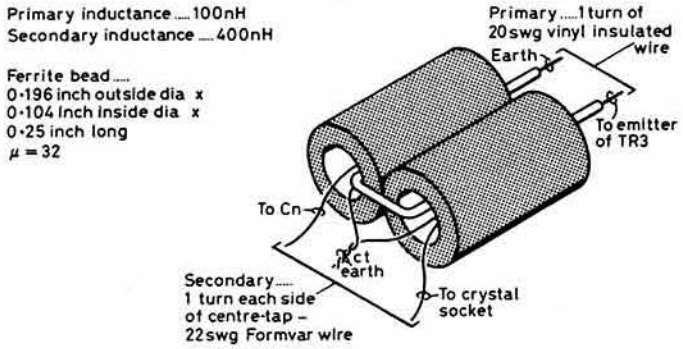


Fig 2. The universal overtone oscillator consists of a two-stage tunable amplifier with a feedback path provided by the crystal. Phasing of transformer T1 should be as shown; see also Fig 3. The uoo will oscillate with opposite phasing, but operation will not be smooth. The range switch, S1, is shown in its highest frequency position. The OA91 is an acceptable substitute if IN270 and IN34 are not obtainable

32 and low losses at vhf. Various trifilar toroidal transformers were tried but none worked as well as the binocular coil. As an alternative, Fig 3 also shows construction of an air-wound trifilar coil which can be used if no ferrite core is available. However, with this airwound transformer the uoo will be restricted to an upper frequency limit of about 125MHz. Germanium diodes D3 and D4 prevent over-deflection of the meter. They also give the meter a somewhat logarithmic response.



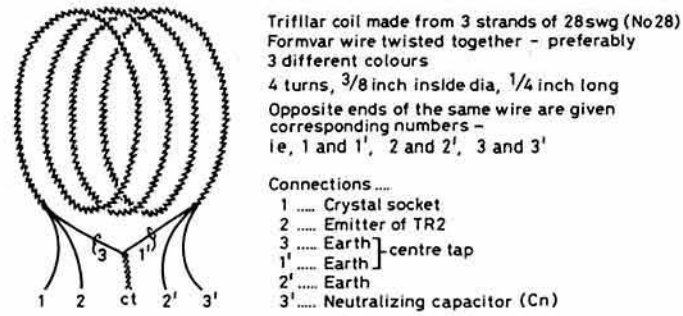


Fig 3. Two possible forms for transformer T1. The binocular coil (top) is preferred; it is made of two ferrite beads cemented together along their length. If a suitable core is not available, T1 can take the form of a trifilar air-wound coil (bottom); with this coil, however, the upper frequency limit will be about 125MHz

Construction

Both oscillators and power supply are built on a 7·63 by 4·25in aluminium panel which forms the cover for a plastic box of 2·25in depth. Most of the layout details should be apparent from the photographs.

The power supply, the uco and the uoo are each built on a separate rectangle of tin-plated sheet steel. This material was cut from the type of can that is tin-plated on *both* sides. Each plate is mounted upright on the panel and miniature terminal strips are used with tie-point wiring. In the case of the uoo, TR2 and associated components are on one side of the tin plate, and parts associated with TR3 are on the reverse side. The plate thereby forms a shield between the two stages, as indicated by the dashed line in Fig 2.

As always, it is essential that the layout be such as to keep all rf leads to minimum lengths; this is especially of concern in the uoo, which must work above 150MHz. In the unit shown, the longest rf lead is about 0·75in and connects T1 to the crystal socket. That is a bit longer than should be tolerated, but the uoo functions well in spite of its length. Layout has permitted most other rf leads to be kept well under 0·5in.

The 100pF tuning capacitor was a screwdriver-adjusted APC type to which a 0·25in shaft was silver-soldered. This capacitor was chosen because of its small size and small minimum capacitance of only 4·4pF. Unfortunately, the straightline relationship between shaft rotation and capacitance causes the tuning to be a bit crowded at the high frequency end of the dial. If a straightline wavelength type of variable is available, it would make a better choice.

References

[1] "A Universal Crystal Oscillator", F. W. Brown, W6HPH. *QST* February 1978, p15.

[2] "Crystal Oscillator Circuits for VHF", R. J. Matthys. *RF Design* May/June 1983, p72. □

A MORSE TERMINAL UNIT

(Continued from page 396)

and sockets illustrated in Fig 5. All the components are non-critical, with the exception of frequency determining resistors and capacitors already mentioned, but they need to be relatively small in order to fit the pcb layout. When the pcb has been completed and tested, it can be housed in a cabinet, as shown in the photograph, Fig 6 giving the physical layout of the prototype terminal unit.

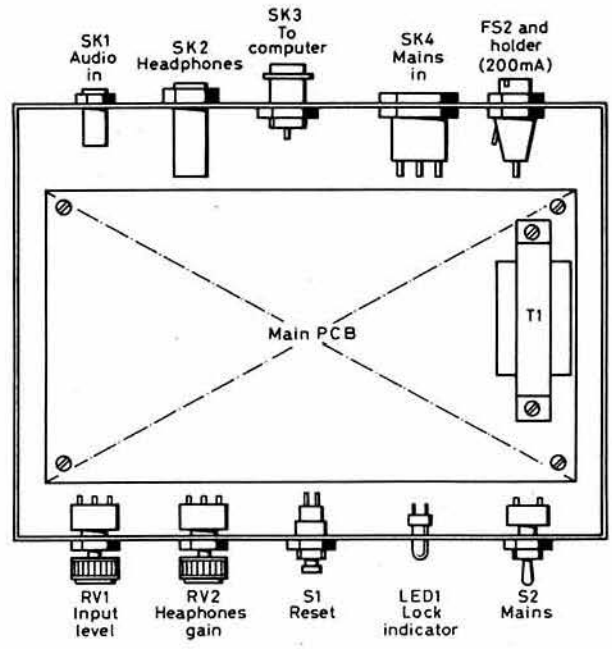


Fig 6. Prototype layout

In use, the gain of the active filters has been found to be sufficient for most receivers. In some cases the overall gain control, RV1, needed to be backed off considerably to prevent false triggering of the unit by the receiver background noise.

Reference

[1] "The MZ80K in the radio amateur's shack", A. F. Sinclair, GM4BWT. *Rad Com* August 1983, p696. □

Technical Topics

by Pat Hawker, G3VA

"IT WAS THE BEST OF TIMES, it was the worst of times . . . it was the epoch of belief, it was the epoch of incredulity." So Charles Dickens opened *A Tale of Two Cities*. Today, we face not the French Revolution but the electronics revolution. Governments place their bets on new technology; chips with everything; the microprocessor will program our lives; electronic surveillance will ensure we conform. We are more and more encouraged to believe that our future depends on rapidly throwing out the old and embracing the new.

Yet the objective of radio communication, in the 90 years since the young Marconi began to see how practical use could be made of the more theoretical ideas of Clerk-Maxwell, Hertz and Lodge, has not changed. It is simply to pass *information* between point A and point B without the use of messengers, wires, or optical fibres. The efficiency of such a link can be measured in various ways for various applications: in some cases by the rate of information-handling; in other cases by the fidelity of the service in terms of speech intelligibility or bit error-rate; by the availability of the link in terms of a 24h day or 365-day year; or by the distance between the two terminals (remembering that it may be more difficult to achieve 24h communication over 100 miles than 1000 miles) . . . etc.

THIS MONTH

There is a danger, or so it seems to me, that radio amateurs are tending to use less-scientific criteria, such as rarity or publicity value. Surely nobody can believe that the recent space shuttle episode (one is tempted to write "fiasco") was a notable example of effective two-way radio communication; or the similar frenzied activity surrounding dxpeditions where the only object appears to be to ensure that your *callsign* is somehow picked out among thousands of others. It is perhaps worth recalling that even for the early transatlantic tests and oceanic tests of the 'twenties reception had to be confirmed by the successful receipt of a special code group. In the 'thirties the RSGB-organized Empire Link stations regularly sent up-to-the-minute news reports to the RSGB via amateur radio—and at least one complete thousand-word technical article published in the *T & R Bulletin* came by amateur radio from New Zealand. Admittedly, the air-mail service and the international telephone service have virtually eliminated the need for handling long messages, but it seems ironic that we now regard a routine exchange of callsign and 599 as the fulfilment of successful long-distance radio communication by amateurs.

Appropriate technology

Take for example, vhf meteor scatter communications. Modern technology is now making it feasible for amateurs to establish computer-controlled links capable of providing a genuine 24h traffic-handling capacity akin to the systems used by professional communicators (see "VHF meteor scatter communications", by Lloyd Vancil, AI7J, *Ham Radio*, February 1984, pp69–75).

In this case amateur practice is distinctly behind the professionals. Yet increasingly, in other areas, one comes across the complaint that radio amateurs are tending to put their requirements too high ("over-specification") or, alternatively, to ignore the very wide tolerances, heat susceptibility and transient vulnerability of most semiconductor devices ("worst case design"). If the transistor had been invented first, we would now be hailing the valve as the answer to all our prayers. *Appropriate technology* is a better guide than all-new technology. Consider for example the need for ever more elaborate protection circuits. As I wrote recently elsewhere: "Today, relatively few equipment faults need be due to basic electronic circuit or component design, while semiconductor devices do not have the inherent failure mechanism of the diminishing cathode emission of thermionic devices. Though it should not be forgotten that for such specialized applications as submerged cable repeaters, the Post Office at their research centre at Dollis Hill in the 'sixties developed valves designed to provide continuous operation for at least 20 years.

"Semiconductor devices do not wear out, but this does not mean they are immortal. Their working lives can be brought to a sudden end by over-voltage transients, although good circuit design can provide protection. Yet protection circuits may not themselves always prove satisfactory, and for some equipment it may be advisable to ask 'do we need a protection circuit for the protection circuit?'.

"Dust-free manufacture of materials is one of the major reasons for improved electronics reliability. But semiconductors can still fail or change characteristics from such mechanisms as electron-migration; that is, the movement of aluminium atoms along a conductor caused by collisions with the conducting electrons to the extent where eventually this results in an open-circuit.

"Also, there is dielectric breakdown; for example, due to defects in the very thin gate insulation regions of metal oxide semiconductors, and that old enemy corrosion, due to absorbed moisture on the chip surfaces. Contamination of materials during manufacture, for example oil contamination from machines, may not show up for months or years."

It needs to be emphasized that we should not think in terms of solidstate versus thermionics. Nobody could implement a "continuous" burst-type meteor scatter link without using a lot of semiconductor devices; yet for an hf transmitter, or possibly even for the signal path of an hf receiver, one could do a lot worse than use those "old-fashioned" valves pictured on the front-cover of a recent *Practical Wireless*.

Comparing receiver front-ends

From time to time *TT* has included several tabulated or graphical comparisons of the front-end performance of popular hf and vhf receivers and transceivers, though stressing always that care should be taken not to regard such measurements as providing a valid *Which?*-type pecking order of receivers. Strong-signal performance is a useful, but by no means absolute, measure of receivers when used with typical antennas in typical locations. This type of tabulation does not take into account such factors as pre-mixer selectivity, which can be as important as dynamic range in coping, for example, with the very strong out-of-band broadcast signals, or ease of operation, selectivity shape factors, "feel" etc.

Nevertheless comparative tables are useful in showing the current state and trend of design specifications. This is particularly so when they are considered in relation with explanatory articles, such as "Dynamic range, intermodulation and phase noise", by Peter Chadwick, G3RZP (*Radio Communication*, March 1984, pp223-8), or "High-frequency receiver performance" by J. A. Dyer, G4OBU, (*Ham Radio*, February 1984, pp33–43), though it should be noted that one of these authors uses dBm (decibels relative to 1mV) whereas the other uses decibels relative to 1μV emf across 50Ω (G4OBU does however provide a useful chart showing how these differ).

Table 1 is taken from *Worldradio*, June 1983, and is based on a paper presented by Rick Craig, N6ND, at the 1983 International DX Convention. It

Table 1. Receiver dynamic range tests compiled by N6ND

Model	Noise floor (dBm)	Two-tone imd (dBm)	Dynamic range (dB)	Third-order intercept (dBm)
R4C (stock)	−134	−64	70	−29
R4C (mod)	−133	−58	75	−20·5
TR7	−130	−34*	96	+14
R7 (preamp on)	−131	−38*	93	+8·5
R7 (preamp off)	−126	−30*	96	+18
TR5	−127	−43	84	−1·0
IC730 (amp on)	−134	−41*	93	+5·5
IC730 (amp off)	−131	−31*	100	+19
IC720	−133	−40*	93	+6·5
IC740 (amp on)	−134	−44*	90	+1
IC740 (amp off)	−130	−35*	95	+12·5
R70 (amp on)	−134	−40*	94	+7
R70 (amp off)	−130	−35*	95	+12·5
TS120S	−132	−64	68	−31
TS180S	−134	−60	74	−23
TS820S	−133	−66	67	−32·5
R820S	−133	−55	78	−16
TS830S	−134	−46	88	−2
TS930S	−131	−38*	93	+8·5
TS430S	−134	−40*	94	+7
FR101S	−132	−57	75	−19·5
FT101B	−134	−81	53	−54·5
FT101EE	−130	−66	64	−34
FT707	−131	−46	85	−3·5
FT901DM	−132	−51	81	−10·5
FT902DM	−134	−58	76	−20
FT-One	−131	−42*	89	+2·5
FT102 (amp on)	−130	−43	87	+0·5
FT102 (amp off)	−118	−29	89	+15·5
FT980	−135	−40	95	+7·5
KWM380	−126	−29*	97	+19·5
Atlas 350XL	−129	−46	83	−4·5
Atlas 210	−125	−40	80	+2·5
Astro 103	−130	−47	83	−5·5
CX7A	−126	−64	62	−33
TenTec Corsair (amp off)	−131	−45	86	−2
TenTec Omni A	−121	−33	88	+11
	−125	−35	90	+10

*Measured with 100kHz spacing (noise sidebands). Other models with 20kHz spacing. All units checked with standard ssb filters and on 14MHz.

lists the noise floor, the two-tone intermodulation distortion values (measured using two signal generators fed simultaneously to the receiver input spaced 20kHz or 100kHz apart) the dynamic range representing the ratio in decibels between the weakest and strongest signals receivable without signficant distortion, noise or non-linearity (note that this is a difficult parameter to measure accurately but is one of the most useful) and the calculated third-order intercept point, which can be considered in this case as about 15dB higher than the 1dB compression point.

The table shows several features that have been commented upon often in the past. For example, that designers striving after very sensitive receivers (ie those with low noise floors around −134dBm) find it very difficult to provide good strong-signal performance as well. In the two-tone imd listing one looks for negative figures around −30 to −45dBm. Modern designs are achieving dynamic ranges in excess of 90dB, but some of those listed provide only 50 to 65dB. A positive third-order intercept figure is desirable, but anything above say −5dBm is reasonable, though note that the early FT101B comes out at −54dBm!

In his *Ham Radio* article G4OBU points out that specifications published by manufacturers are usually based on a "typical" receiver and may be signficantly better than would apply to a "worst case" model. He provides a very rigorous specification that he feels should be met by the "worst case" of a *very* good receiver. I suspect that some manufacturers would feel that G4OBU is asking for a top-grade professional receiver at amateur-radio prices. G4OBU also points out that the figures claimed in some advertisements verge on or beyond what is possible with the present state-of-the-art or from fundamental principles.

Remember that Table 1 represents measurements on one model and may include at least some measurement errors. Nevertheless the values tie up pretty well with individual equipment reviews where this can be checked.

Coaxial cable lore

At one time a radio amateur seeking a low-impedance feeder for an λ/2 dipole would select a length of the best quality twisted electric flex that he could find and hope for the best. A few firms such as Belling-Lee offered special "low-loss" cable of roughly the same type. Then, with the coming of vhf 405-line television in the London area in 1936, the journals began to mention coaxial cable as transmission line *par excellence*! Actually, coaxial cable was a 'twenties technology, having been developed about 1927 by the great C. S. Franklin ("Franklin of Poldhu" and of oscillator fame) one of the pioneer engineers of the Marconi Company. He devised semi-airspaced coaxial transmission line (British patent issued 1929) for the chain of Empire beam hf stations to enable him to transfer some 25kW of rf energy at about 12MHz over a 1,400ft line with an efficiency of better than 90 per cent.

The first coaxial cable that actually came my way was that used to connect the output from wideband distribution amplifiers to banks of HRO receivers; with open-wire transmission lines used to bring in signals from the rhombics and Vs sited well away from the station building—perhaps why I still feel open-wire lines are best for long spans, while admitting that coaxial cable is more convenient for some applications!

Broadcast engineers rely on large-diameter coaxial cable (often 6in) to carry kilowatts of uhf energy up to antenna panels over 1,000ft above ground, although it is no secret that several serious breakdowns have arisen from problems involving such cables. A few American tv broadcasters have used large rectangular or circular waveguide at uhf; these tend to catch the wind, and are even more expensive than large-diameter coaxial cable.

Radio amateurs seldom dispose of sufficient rf energy for overheating or flashover to present a potential problem; for them the difficulty is more usually that cellular and semi-airspaced cable is horribly vulnerable to moisture ingress unless effectively sealed. Methods of sealing cables and connectors have been described on a number of occasions in *TT*. There can still remain the problem that some cables tend to absorb moisture through their outer covering.

Bill Orr, W6SAI, in his *Ham Radio Techniques* (*Ham Radio* January 1984, pp66–7) has put together some useful notes on "the coaxial jungle" including information on the different qualities of cable, how to achieve long life for installed cable, and whether it is possible to determine how long a length of cable is likely remain efficient—although this will be governed to a considerable extent by the environment.

He notes that, in general, the highest-quality cables are those manufactured to meet tight military specifications but, contrary to popular belief, not all RG-8/U cable comes into this category. At one time this cable (52Ω impedance) was widely used by the United States military, but subsequently they standardized on 50Ω cable (eg RG-213/U manufactured to MIL-C-17D or E specification). New mil-spec cable is not cheap. RG-8/U and RG-8A/U cable is still manufactured in volume but no longer to American mil-spec standards. The high cost of copper and other materials has led to cost-cutting. While some manufacturers produce cable which, though not of mil-spec standard, is nevertheless very-high-grade cable by normal standards, some other firms have, for example, reduced the percentage coverage of the outer copper braiding and use lower-grade materials. Whereas some RG-8A/U cable still has up to 97 per cent braid coverage, other cable may have less than 60 per cent coverage. The quality of the outer jacket, the dielectric material and the inner conductors can all vary. This is not to say that a cheap cable may not serve its purpose reasonably effectively, at least for a time.

Over a period of time, the attenuation of any cable will gradually increase; a low-quality cable is likely to change appreciably more quickly than a high-quality cable. Cheaply-manufactured cable may also depart in places along its length from its nominal impedance. Because of the wide environmental differences it is virtually impossible to estimate how long you should expect a cable to last. Deterioration of characteristics is normally fairly gradual in the absence of a major fault due to moisture ingress. There is thus usually no precise "end-point" at which a cable should be replaced; such a decision is likely to be governed by what degree of additional attenuation can be tolerated. At hf, cable losses are much less dramatic than at vhf or uhf. Cable will normally have to be many years old before it presents a real problem on, say, 3·5MHz, but on 28MHz—and even more so at 144MHz—you could easily find old cable absorbing more energy than it delivers into the antenna. Similarly an excellent quality cable that has been installed for only a few months, but ineffectively sealed against moisture, may be quite ruined.

W6SAI lists six factors that can help in achieving a long effective life for a length of coaxial cable:

(1) Keep the cable off the ground and make sure it can dry off after rain. Because modern outer jackets are slightly hygroscopic, moisture can penetrate the jacket material, reach the outer braid and cause corrosion.

(2) Try to keep the cable out of direct sunlight; ultraviolet rays are damaging over time. For prolonged exposure to strong sunlight, the cable outer jacket should be a high molecular weight polyethylene with imbedded carbon black (expensive).

(3) Support the cable every 10ft or less. Do not let it sag on a long run.

(4) Do not let the cable whip around in the wind. Repeated flexing is not conducive to long cable life.

(5) Seal the ends of the cable. Use type-N (waterproof) fittings rather than the cheap and plentiful PL259 plugs. Coat the terminations with non-acid type silicone rubber sealant ("If it smells vinegary, that indicates acetic acid in the sealant. Don't use it.")

(6) Do not step on the cable or otherwise flatten it (eg with fixing staples). And do not bend it around a sharp radius. The minimum recommended bending radius is usually equal to 10 times the outer diameter of the cable (ie about a 5in radius for RG-8A/U or RG-213/U).

While these hints refer specifically to American cables, they should be efound generally applicable to cables manufactured elsewhere. In the UK large quantities of coaxial cable are manufactured for tv receiving antennas, whereas in North America most tv designs are for 300Ω balanced line. Some of the cheaper tv cables will not cope with much rf power, particularly if there is appreciable swr on the line.

The 3423 protection device

A February *TT* item on overvoltage protection reported VK5IK's advocacy in *QST* of the use of the Motorola MC3423P or Texas Instruments SG3423M ic regulators with their inbuilt precision 2·6V reference diodes, rather than depending on the wider tolerances of standard zener diodes. My notes included the suggestion made by VK5IK that although these devices have been available for several years they have been largely overlooked for amateur radio power supply units. This brought hasty denials from both John Nelson, G4FRX, who published information on their use several years ago, and from Dick Ganderton, G8VFM, assistant editor of *Practical Wireless,* who drew my attention to his design for a 5A unit in the September 1980 issue, and more recently to the protection circuits he added to G4JET's "Marchwood" 30A psu (*Practical Wireless* June-July 1983) which also included soft-start protection.

John Nelson also noted my mental aberration in referring to mythical emitter/*cathode* short-circuits on pass transistors and a *nine*-pin ic device. Whoops, sorry!

More seriously, he writes;

"The 3423 is a very useful device. I have used them, and featured them in articles, for about five years. There is one important feature that you did not mention. They are exceedingly sensitive to transients on the mains or battery supply line, and will spuriously trip in the presence of transients lasting only 1 or 2μs, such as those induced, for example, by switching operations in other parts of the circuit that are inductively coupled into supply rails. Low-value tantalum capacitors physically close to the input pins on the 3423 will stop the rot.

"The 3423 will supply more than enough gate drive for any reasonable thyristor likely to be used in crowbar circuitry. The reference to 'turn-on' speed is puzzling; because of the feedback action inherent in thyristors, the turn-on speed of even large devices is very high, and certainly high enough for the mundane duty of crowbar service. It is the turn-off time which is more variable. So-called 'inverter-grade' thyristors are characterized for very fast turn-off, but this parameter is quite irrelevant for crowbar applications. The combination of a 3423 device and any average thyristor likely to be used by an amateur in this application should crowbar a supply rail in a few microseconds unless the thyristor is decidedly defective.

"Turn-on speed is to some extent a function of how hard the gate is driven, and the 3423 provides more than enough drive to turn on the average thyristor in something approaching the minimum turn-on time consistent with its internal structure."

Dick Ganderton, G8VFH, feels strongly that the common form of crowbar overvoltage protection based on a standard zener diode, as shown in Fig 6 of the February *TT*, is "to be avoided at all costs", at least when the psu is powering an expensive unit that does not incorporate its own protection circuits.

The hefty "Marchwood" 30A unit, designed by Nick Allen-Rowlandson, G4JET, with extra protection circuitry added by Dick

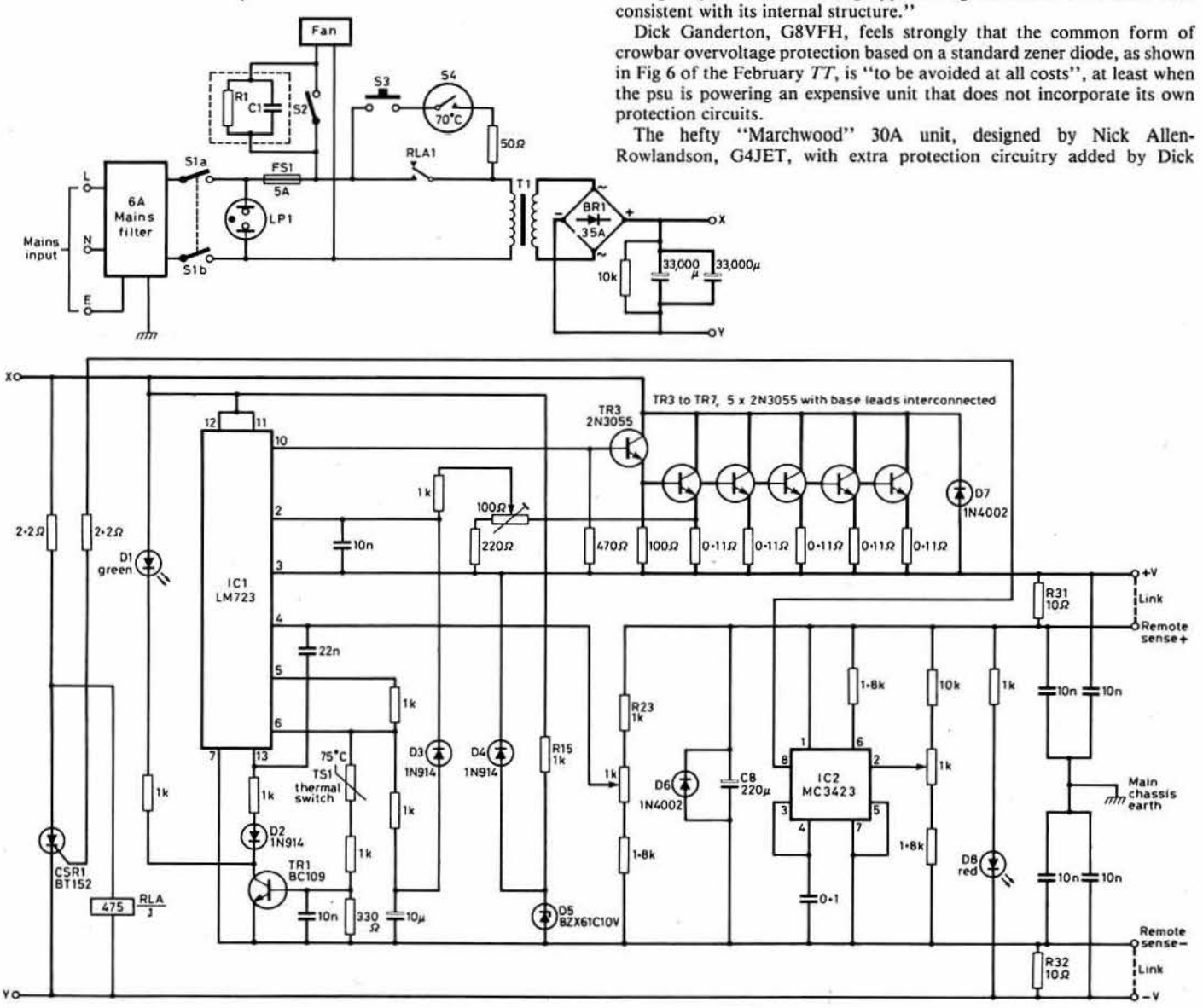


Fig 1. The 30A "Marchwood" psu showing both unregulated section with soft-start and fan supply (indicator lamp LP1 built into mains switch S1) and the regulator and protection circuits. High current feeds indicated by heavier lines. R31 and R32 prevent the remote sense lines becoming unrelated to the main output terminals if the links are inadvertently left out. Note that it could be argued that only bypass transistors could prove workable at the full 30A rating

Ganderton, G8VFH, is shown in Fig 1, although for full design and constructional details it would be advisable to refer to *PW* June/July 1983. An interesting feature is the use of a circuit-breaker type of arrangement triggered from the thyristor to overcome the very real problems presented by attempting to use high-current fuses in low-voltage power supplies: it is pointed out that a fuse rated at 30A will normally last for about 10s at 100A, and you need 500A to persuade it to blow in around 4ms; even high-value reservoir capacitors cannot supply this! My personal, old-fashioned feeling, is that instead of thinking in terms of 12V at 30A we ought to be thinking more in terms of 24V at 15A, 50V at 7·5A, 150V at 2·5A or even (dare I say it) the traditional high voltages at milliamps associated with valve power amplifiers!

New 3425 protection devices

I note from American journals that Motorola have recently introduced a new series of ic protection devices (eg MC3425P1) that provides additional features to the 3423, since they monitor also for undervoltage conditions.

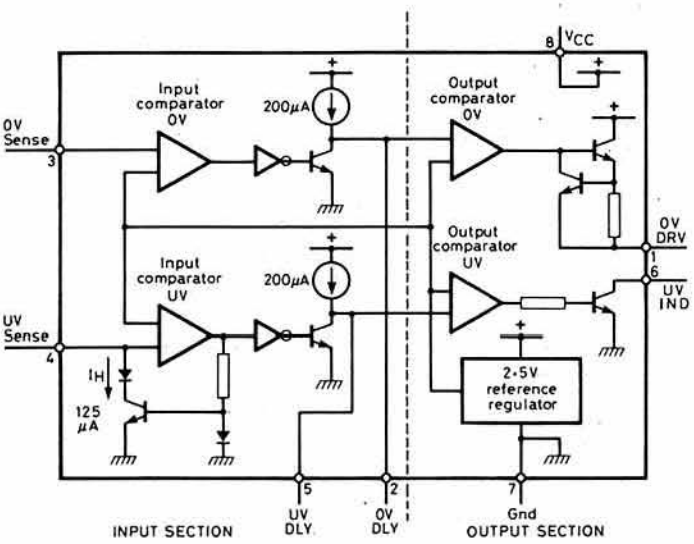


Fig 2. Block outline of the 3425 series of protection devices with the added feature of undervoltage monitoring. Overvoltage output can fire a thyristor crowbar. Undervoltage output can light an l.e.d.

Like the earlier devices, the new range incorporates a precise voltage reference (2·5V). The overvoltage output is suitable for firing a thyristor; the undervoltage output can light an l.e.d. warning light. The device can be used to monitor supplies from 4 to 40V. In effect, it incorporates two similar but independent channels to handle the two functions: Fig 2. The claimed accuracy for the bandgap is within four per cent for the standard eight-pin plastic-packaged device, but in other higher-cost versions this is reduced to as little as one per cent. In the USA, in 100-up quantities, the MC3425P1 costs $1.39. The earlier MC3423P(L) is available in the UK in one-off quantities from RS Components, and I note it is also currently being offered by Midwich Computer Co Ltd (telephone Diss (0379) 898751) for 69p plus VAT and postage.

Switching regulator as battery saver

A lot of devices going into amateur radio equipment these days require a 5V power line, but often these are intended to work alongside other devices running at 12V, the whole unit being powered from a 12V (nominal) battery. This means either wasting a lot of battery power in a 5V linear regulator circuit, or using some form of switching regulator which, in effect, is a dc-dc converter that can operate at high efficiency. If the 5V section draws up to, say, 1A continuously, incorporation of a switching regulator can have quite a dramatic effect on battery life: on the other hand, if only a small part of the total load is required at 5V it would seldom be worth worrying about the power wasted in a linear regulator.

An inexpensive switching regulator that halves the battery voltage, uses no inductors or wound components, yet provides an efficiency above 80 per cent for loads at 5V of up to 1A was described by Tom Durgavich of the National Semiconductor Corporation in the unfortunately now defunct "Designer's Casebook" feature of *Electronics* (24 February 1983): see Fig 3. If the entire load is taken at 5V, the switching regulator can triple the life of a 12·6V 5Ah sealed lead-acid battery: it also means that up to twice as much current can be drawn compared with the battery's recommended discharge rate. It works as follows:

A 6·5kHz oscillator circuit comprising R1, C1 and Schmitt trigger inverter (IC1a) drives TR1-4. Inverters IC1b-e function as switching current sources for the transistors. Only transistors with a high gain and low saturation voltage (such as 2N6714 and 2N6726) are used. When the inverters are low and sinking current, TR1 and TR4 are turned on and TR2 and TR3 turned off. This sequence places C2 and C3 in series, and each capacitor is charged to half the battery voltage. However, when the inverters are high and functioning as current sources, TR1 and TR4 are turned off and TR2 and TR3 turned on, putting C2 and C3 in parallel. The unit thus provides half the voltage and twice the current of the battery.

Voltage regulator IC2, when latched to D1, has a drop of 0·7V and provides the 5·7V required to drive TR5. Since TR5's base-to-emitter voltage is 0·7V, its output voltage is 5·0V and remains regulated until the battery voltage falls to 11·8V.

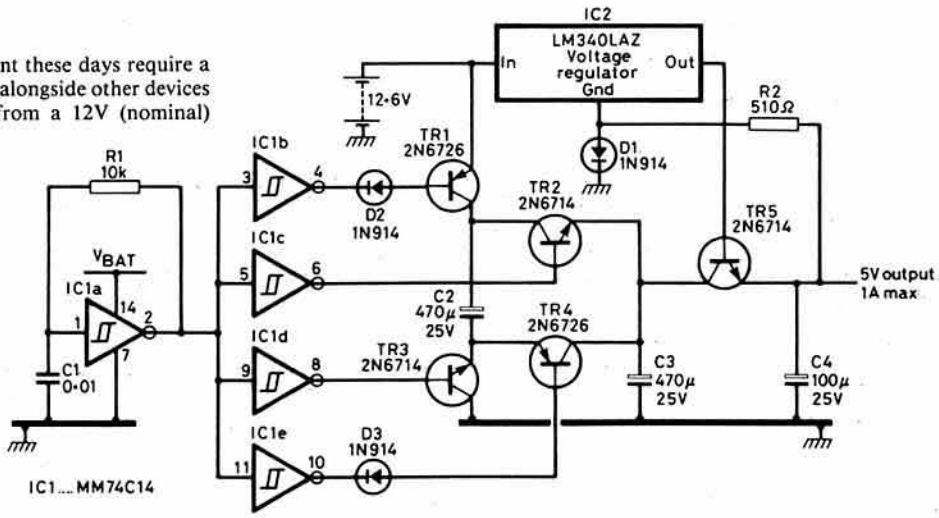


Fig 3. Switching regulator that can extend battery life where 12V batteries are used to power 5V devices. It uses a Schmitt-trigger inverter chip MM74C14, voltage regulator and some discrete components. The arrangement also makes it possible to draw more current from the battery

Time-out battery saver

A time-out unit fitted to, say, a battery-operated test instrument can save the forgetful a lot of wasted power. S. Whitt (*Wireless World* March 1984) shows that this need involve only six components: a 4001B ic, a BFX30 transistor, three resistors and a single capacitor: Fig 4. When the touch switch is activated, up to 450mA can be drawn by the load for a period determined by 0·69 times the time-constant R1 times C. For the values shown this is about 13s, but could easily be increased by using a larger-value capacitor. Quiescent leakage current is less than 100nA, and voltage drop at 200mA only about 0·2V. Resistor R2 determines current limiting, and can be changed should a lower value than 450mA be required.

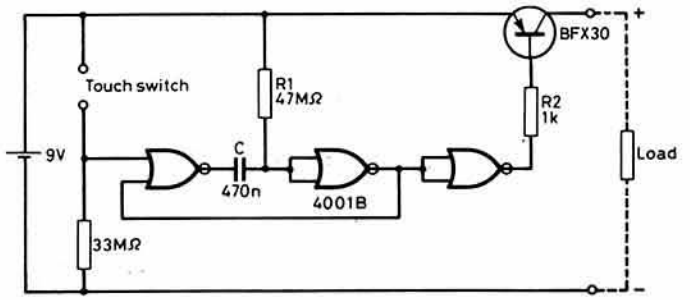


Fig 4. Time-out battery saver that will switch off the load automatically after a period determined by R1 and C. With values shown, this is about 13s

100W dummy load in a jam-jar

Recently, F. Lees, G3PD, decided to build a 50Ω dummy load suitable for use with hf ssb/cw transmitters, using nine 470Ω 1W resistors in parallel immersed in a liquid. Initially he tried water and was puzzled at the high swr until he discovered that the dielectric constant of water is 80. He now fills his jam-jar container (Fig 5) with Castrol GTX oil, and can run the dummy load continuously for 5min from an 813 pa with 100W output before the oil temperature rises to about 60°C. He has since built a similar unit, but designed for 100Ω, and with this linked up to either his 813 or an FT101ZD has the satisfaction of seeing an swr of virtually 1:1. These dummy loads have not been tried above 30MHz where the inductive reactance of the resistors and rods might prove a problem.

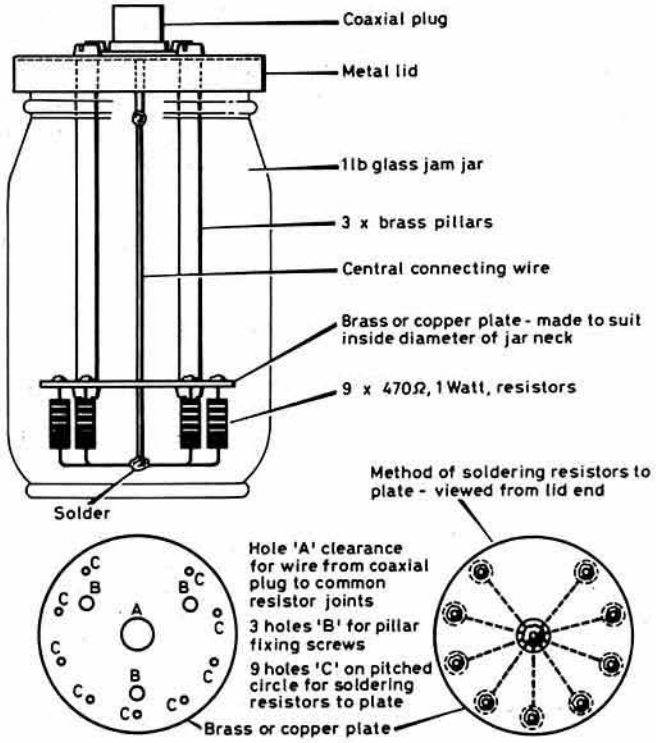


Fig 5. G3PD's 100W load using six 1W resistors in an oil-filled 1lb jam or honey pot. A metal container could be used but a glass jar shows better if anything untoward is happening. The screws on the lid are sealed with a compound that is impervious to oil (G3PD uses Evostick wood adhesive). Keep resistors as near to the bottom of the jar as possible. The dummy load has not been tried above 30MHz

"Surplus" hazards

In the hey-day of government surplus, it was recognized that some airborne equipments posed a particular hazard in that they were sometimes sold off still containing explosive devices intended to prevent their falling intact into enemy hands. As recently as 1982, R. C. Field, G3IPM, reported the unpleasant experience of having an old iff (identification friend or foe) unit which had been in his possession for 36 years explode without warning, wrecking his garden shed but fortunately causing no human damage. It is well known that explosives often become highly unstable with the passage of time.

But during the 'fifties attention was also drawn to the fact that during wartime and for some years afterwards, liberal use had been made of luminous paint on watches, instrument dials, control panels etc of Services equipment. The amount of potentially harmful radiation from these radioactive paints was relatively small, but nevertheless exceeded modern safety standards. A reminder of this radioactivity comes in the form of a note from Ian Mant, G4WWX. He writes: "Some ex-US army transmitter-receivers, type RT-77/GRC-9, have recently appeared on the market. When they were made, the front panel control markings were painted in luminous (radioactive) paint. Although the sets are now about 25 years old and the luminescence has long since faded away, nonetheless much of the original radioactivity still remains. It can easily be detected with a civil defence type of Geiger counter. Readers should be aware of the potential hazard posed by, for example, scraping the panel markings of such sets with the fingers."

Photovoltaic solidstate relays

A novel form of solidstate relay—the photovoltaic relay—capable of being switched by low-level millivolt analogue signals, has been developed by International Rectifier Corporation (*Electronic Design*, 8 March, 1984): Fig 6. It is claimed to be capable of outperforming the more conventional reed relay in a number of applications and, unlike the solidstate photocouplers or optical couplers, which usually consist of an l.e.d. whose light output acts on a photo-sensitive device, the new relay uses the light output to generate a voltage by means of a photovoltaic pile. Thus it does not require any secondary energy source in order to actuate the switching device.

The low current output from the photovoltaic array (akin to solar cells) is used to control a "merged-mosfet" or "bosfet" (bidirectional output switch fet). Response time is only 0·01 to 0·5ms, appreciably faster than a reed relay (presumably making it an excellent keying relay), and there is no question of contact bounce. Devices controlling load currents of up to 1A are stated to be economically practicable, although the article gives no indication of the comparative costs of these photovoltaic relays. For some applications a disadvantage compared with the reed relay is the output capacitance of the order of 10pF, compared with the 0·2pF of a reed relay. Control sensitivity is of the order of 2mA, compared with about 15mA for a reed relay.

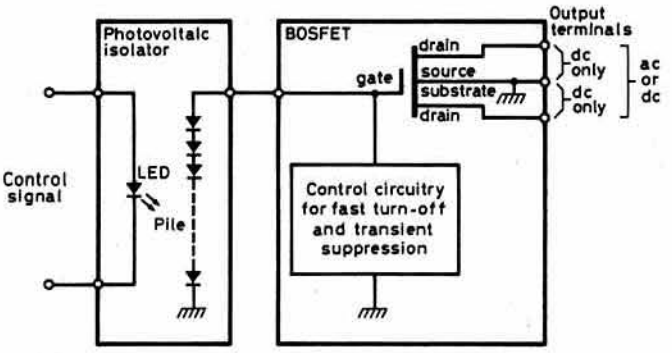


Fig 6. Photovoltaic solidstate relay. Each pole consists of an infrared l.e.d. plus a photovoltaic pile. Voltage from the pile though at very low current, rapidly turns on the bidirectional output switch fet (bosfet) allowing current to flow in either direction between the two drains of the bosfet

Is your mobile operating safe?

In about 1966 the Ministry of Transport sent a profound shiver through the two-way radio communications industry and among many radio amateurs by suddenly putting out a press statement that it proposed to ban the use of a radio transmitter while driving a vehicle. Drivers would be expected to stop before transmitting. As can be imagined there was an immediate outcry from industry etc at the very idea of such a restriction, and in the end the whole idea was quietly dropped. Many people argued, not entirely impartially, that in-car radio should be regarded as an aid rather than a handicap to safety on the roads—though for a few some doubts remained.

To judge from a recent article, "Facing the music", by Lydia Taylor in the RoSPA journal *Care on the Road* (April 1984, pp6–7) there is still a feeling in some circles that even *listening* to a car radio while driving can in some circumstances constitute a hazard. This is largely on the basis that sound inputs to a driver's brain that require mental processing can allegedly interfere with the visual inputs. In other words, background music normally presents no problem (and may actually soothe the savage driver) but anything that requires mental effort or is at all distracting can impair safety. Operation of knobs, switches and push-buttons can interfere with driving, especially if this requires taking one's eyes off the road. The use of stereo headphones or overloud speech or music can impair the driver's monitoring of useful auditory information, from horns outside the vehicle or any warning signs coming from the engine, etc.

Dr Ivan Brown, assistant director of the Medical Research Council's Applied Psychology Unit in Cambridge is quoted as the source for these forebodings which are apparently based on research carried out in 1965 and 1969, presumably including that which led to the Ministry of Transport announcement. He admits that there has been no recent research on this subject in this country, although in some parts of the USA motorists and cyclists are now forbidden to wear stereo headphones, whereas the use of a single earphone is usually permitted. As an example of listening that requires mental effort Dr Brown suggests: "Road safety could be reduced

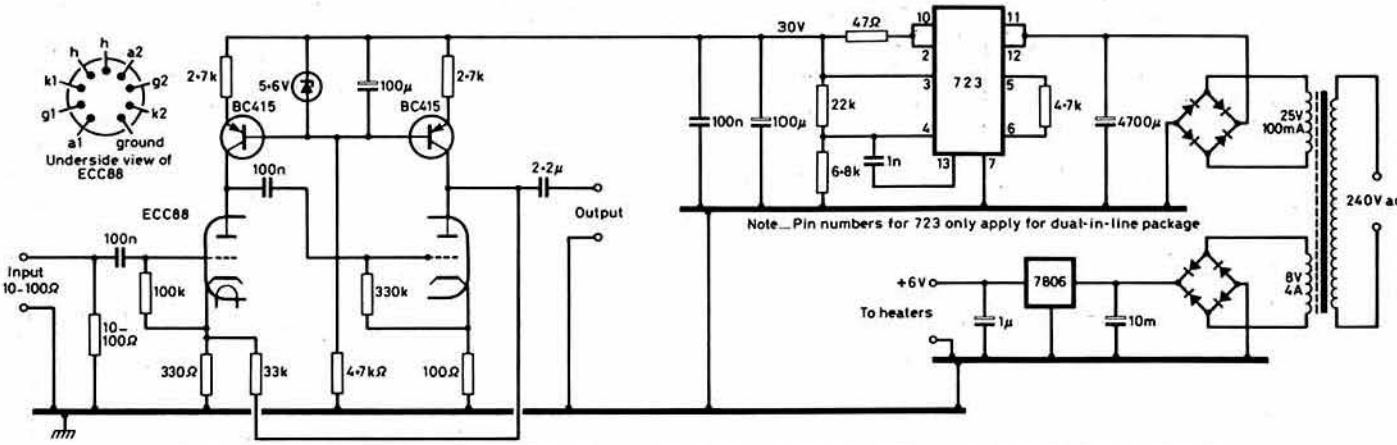


Fig 7. AF preamplifier intended for use with high-fidelity moving-coil pick-ups but using techniques of general interest

if drivers use their in-car radio/cassette players to do their Open University homework."

The article is not concerned with the use of two-way radio but clearly it could be interpreted as a further endorsement of the need always to ensure: (1) that operation of mobile amateur radio equipment in no way entails diverting your attention from safe driving; and (2) that it does not block out your hearing external auditory information. Whether conducting an amateur two-way contact involves "mental effort" is an interesting question—some contacts one hears would suggest *not!*

Hybrid low-noise amplifier

It is seldom these days that one comes across novel ways of using thermionic valves. However, in *Wireless World* (March 1984, "Circuit Ideas"), Per Hojlev of Denmark points out that a valve preamplifier for a low-impedance moving-coil cartridge still tends to provide a more natural sound than most all-semiconductor designs—is easy to construct—and that valves do not necessarily involve very high voltages. While the radio amateur is usually less concerned than the hifi buff in audio quality, the arrangement would be useful as a microphone preamplifier, and some of the power supply techniques could come in handy for feeding a stable valve-type vfo.

Features of the Danish circuit (Fig 7) include the use of voltage regulation for the 30V ht line, a 7806 ic regulator providing a 6V dc source for the ECC88 heater, and the use of low-noise transistors to provide constant-current sources that form the anode loads for each triode section. It is pointed out that the ECC88 dual-triode will work satisfactorily with ht rails as low as 10V, although in this design a 30V line is provided. Overall closed-loop gain (100) is determined by the 33K feedback resistor. The input loading resistor should match the cartridge. Capacitors are critical, and high-quality polycarbonate or polypropylene types should be used for high-quality audio.

Sweepers—are we stuck with them?

The letter from Norman Fitch, G3FPK, in February's *Members Mailbag* about the rough signals that sweep through the 14MHz band, would seem to be the latest manifestation of the "sweepers and creepers" around 27MHz that puzzled both professional and amateur observers over many years (*TT* January 1978). Finally, largely as a result of a series of recordings made by Ted Cook, ZS6BT, in Johannesburg and then analysed in the UK on sophisticated professional equipment, it was shown conclusively that these were not, as originally thought, natural phenomena but signals propagated over many thousands of miles from European ism (industrial, scientific and medical) equipment nominally operating on 27·12MHz without antennas. Until then nobody seems to have imagined that powerful rf generators could cause problems many thousands of miles away.

There is, I am tempted to say unfortunately, an ism frequency at (nominally) 13·56MHz. John R. Hey, G3TDZ, provides some interesting (alarming) information on the industrial thermal-bonding equipment currently used in large wood-working plants. A powerful rf field, applied across or in line with joints involving water-based adhesives such as UF or PVA glue, can cause the glue to harden in a matter of seconds, just as microwave ovens operating at 2·3GHz quickly cook meat.

G3TDZ writes: "The rf generators provide 6, 12 or even 25kW of rf at about 13·56MHz from a single-valve self-excited oscillator (seo). The load is simply tuned for maximum effect, and often crudely connected to the work jig by lengths of plain insulated wire and crocodile clips. Every amateur knows what happens to a red-hot seo with a varying load: it drifts. The nominal 13·56MHz output does not have to drift very far before it intrudes into our 14MHz band. The generator normally remains on for a period varying from a few seconds to almost a minute. I have seen whole doors glued solidly in 14s, and caravan sides in not much longer, with the aid of a 6kW generator.

"In the factory I visited, there were six 6kW and two 12kW generators. When any of these were fired up, I noticed that fluorescent tubes all round the factory, including some high up in the roof, lit up. Who needs a good antenna when you have 12kW to play with?

"These powerful machines, which have virtually no smoothing filters, can be heard on a modest receiver a mile or two away floating wildly between about 12 and 15MHz. No doubt they are RST592 anywhere outside the skip zone. Incidentally, generators used in plastic welding tend to operate at twice this frequency, 27·12MHz *sometimes!*"

There is of course a very real need for powerful ism equipment, with, for example, increasing use of hf and vhf diathermy for hyperthermal treatment of malignant tumours. But it is up to the regulatory authorities to stamp down on crude self-excited power oscillators and insist on stable equipments, free of parasitics and, wherever possible, operated in screened enclosures. Nobody begrudges the allocation of frequency bands for ism operation, but surely the users should be constrained to keep their kilowatt rigs within them—and to lay-off the dx!

Panel lettering, Mark 2

Nick Valentine, G3KWJ/8P6BQ read the note in the February *TT* on panel lettering as suggested by G4KUN. He feels, however, that there are more advantages in laying out the design on ordinary white paper than with a technique involving the use of white carbon paper. He writes:

"My method is to have a perspex covering or facing to the front panel; at the moment I am using 3mm thick perspex, but the thinner the better. This is lettered on the back in reverse with the aid of a stencil and drawing pen matched to the stencil; using the type of drawing ink used for drafting films, as there are then no problems in getting the ink to 'wet' the perspex —which proved a major difficulty in the early days. When the lettering is complete it is sprayed with white (or to a colour of your choice) paint. This gives an indestructible, cleanable front panel. It all takes only a few minutes. The first time this technique came to my notice was in an article by L. Nelson-Jones in a 1968 issue of *Wireless World* to provide panel lettering for a signal generator. Since then I have always found it very useful."

Tips and topics

A French research subsidiary of Philips (LEP) has succeeded in integrating a complete 12GHz down-converter (about 1GHz output, 4·5dB noise factor, 28dB gain), including all active and passive components, on to a single GaAs chip. The work is aimed at providing the "outdoor" electronics for DBS (direct broadcasting from satellite) but would appear to open the way to very sensitive consumer-priced microwave receivers, for example for the 10GHz amateur band. The development, however, is still only at the experimental stage and it may be some time before these devices go into production. □

4-2-70

*by Ken Willis, G8VR**

BY THE DATE of the introduction of summer time (25 March), conditions had been unusually flat for a long time, reflecting a very unsettled weather pattern which affected Europe generally. However, with this issue we are into the month of May, and things should improve, not only tropo-wise but also with the occurrence of some sporadic-E, at least towards the end of the month. Readers with reception facilities between 40 and 80MHz should observe some Es on these frequencies practically every day, and the higher in frequency the action gets, the closer should you move towards the 2m rig. I am frequently reminded that many readers are not interested in weak-signal work, and use only fm into simple antennas; but I would just comment that some startling contacts have been made via Es using just such equipment, so do not hesitate to put out some "CQ" calls on the simplex channels when Es is about. If your local repeater starts speaking some foreign tongue, move off to a simplex frequency and try for a direct two-way contact, since this will count for an award, whereas repeater contacts do not, nor were repeaters meant for dx QSOs.

There have been many occasions when someone driving home from work with mobile equipment worked terrific dx while the fixed stations with full legal power and the big antennas couldn't work the station at the remote end. You just have to be lucky enough to be in the right spot when it all happens, so let's hear more this year from the fm fraternity when they receive those S9 reports from the Azores or Sicily.

Repeater news

The experimental 2m ssb repeater GB3SF being built by Tony Whitaker, G3RKL, for installation at Sheffield nears completion, and if all went to plan it came on the air on 18 April (World Amateur Radio Day). This would celebrate the day by "doing something different in amateur radio". In view of the controversy which has surrounded this development, its operation is sure to provoke great interest. Tony dispelled many myths about this type of repeater through his lectures at the vhf conventions at Sandown Park and Wolverhampton last year. The engineering problems in the design of such an installation are quite formidable, but in this case are happily in very accomplished hands.

GM8LBC reports that shortly after DTI approval had been received for the operation of GB3LU (R3), it became operational at 1315gmt on 17 February to become the most northerly repeater in Britain. GB3BI (Mounteagle, Black Isle) on R5, and GB3CA (Carlisle) on RB13, are both nearing completion and are due on soon.

Some technical details are to hand which relate to GB3OC (Orkney-Caithness Repeater Group); initial contacts through GB3OC were described last month. The unit is based on a Uniden 2030, the receiver being modified by the addition of a preamplifier and improved squelch characteristics which give a faster response time. The transmitter has been derated to 5W, and is used as a driver for a 2N6084 power amplifier. This delivers about 11W to the antenna. Control logic is based on the GB3US board. A single groundplane antenna is used at about 20ft above ground (Wideford Hill, the site, is some 730ft asl), and is fed through a cavity system.

The South-West Hertfordshire UHF Group has the responsibility for providing and maintaining three uhf/vhf stations in the area. One of these is GB3HR (RB14) which is on a site at Stanmore (it was originally at Bushey Heath). There were problems following the change of site, but these have now been cleared up and things are working out well, with reports of good coverage for mobiles operating in the St Albans, Edgware, Harrow and Watford areas. There is still some work to be done on the receiver which will further improve matters.

Other stations operated by this group are GB3BH, a 1·3GHz beacon/repeater; and GB3SWH, a 10GHz beacon. The group would welcome reception reports on any of their installations sent to the secretary, Trevor Groves, G4KUJ, QTHR. Contributions towards the upkeep of the facilities provided would also be very useful, send to Brian Greenaway, G3THQ, QTHR.

The third newsletter of the Cambridgeshire Repeater Group, issued last February, contains very interesting and detailed information on the four installations provided by that group. GB3PY was reported still to be in the throes of paperwork associated with a proposed site-change, as mentioned in *4-2-70* in November 1983. The main part of the newsletter deals with GB3PT (RB12), the Barkway repeater, which has now been on the air for five years. It is still the only operational rtty repeater, although one more has been licensed and two more proposed. The repeater is situated on the Pye Telecommunications radio site at Barkway, Herts (AM71f), and was constructed by members of the Pye Telecommunications Amateur Repeater Group. Responsibility for the operation of this system, together with that for GB3PI (R6) and GB3PY (RB14) was transferred in 1982 to the Cambridgeshire Group. Because of the unique nature of this installation and the experience gained in its operation, it is hoped that a full article describing both the technical features and the method of accessing the repeater will be published in *Radio Communication*.

While on the subject of rtty, the spring newsletter of the British Amateur Radio Teleprinter Group (BARTG) has just been published under its new title *Datacom*. This is in the form of a booklet with no fewer than 108 pages, all packed with useful rtty information, including details of equipment for home construction to enable amateurs to operate in this mode, which is so suited to vhf operators who also like to use micro-computers. (Membership secretary of BARTG is G6MOK, QTHR.)

Jerry Goldsmith, G4CJG, is a sea-going radio-electronics officer who has an FT290 and other gear with him on board ship, with which he checks vhf activity around the world. When off the Canary Islands a few weeks ago, he noted that the repeaters there now include their QTH with the call, for example, EA9S-RO21e. Off the same point he could hear the Madeira repeaters at S9-plus (QRB 300 miles). He has also been to Japan, where he says vhf activity is "amazing" but with very good adherence to band plans. Many of the contacts are quite local, with no great dx-chasing, and repeater activity on fm was very high. Off Australia, Jerry heard many repeaters along the Queensland and New South Wales coasts, simply sending their identifier callsigns with very little traffic being carried. His general conclusions from observations made around the world are that in the majority of countries, 2m repeaters are very simple devices (carrier access with no "tail" when the input drops), and many appear to transmit no callsigns.

G6XWO (Norfolk) reports that at a recent meeting, a new repeater group was formed to operate GB3NN (RB2), located 3km south of Wells-Next-The-Sea, Norfolk (AM05f). He says that site approval and a franchise have already been received, while licensing procedure has been initiated. The aim is to have the repeater operational by June or July this year. The equipment is a Pye 460 uhf unit converted to 70cm, with four stacked J-poles for the receiving antenna and four stacked dipoles for transmission. The site is approximately 300ft asl and the antennas are about 70ft high; the transmitter erp being 12W. Contributions towards the operational costs of GB3NN would be much appreciated by the keeper, Bill Tuck, G8KZP, QTHR.

Pete Weller, GM3XOQ (Shetland) says that GB3LU is working very well on R3, and quotes the site as being 600ft asl, about a mile from the famous Lerwick beacon. The repeater is tone-accessed with carrier-re-access. No time-out is fitted at present, but will be if the repeater is abused.

Beacons

The hardware for the 50MHz beacon at RSGB headquarters (GB3NHQ) (National Head Quarters) is virtually ready, and as we went to press final clearance was awaited from the DTI.

A site is still needed for the "GB3WHA complex", the Sussex beacons on 70 and 432MHz which had to be turned off when "the owners" needed their site back. Beaconkeeper G3DME is still searching, but even when one is located there will still remain the administrative work to obtain a licence, so there appears to be no immediate prospect of these becoming operational.

On the subject of whether GB3SUT should be sited elsewhere when it is temporarily shut down while the tv mast is changed at Sutton Coldfield, some fresh input has been received. G8TFI (Dursley, Glos) is of the opinion

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

that beacons are needed on a line west of London. He currently relies on microwave beacons GB3BPO and GB3NWK (on 1,296MHz) to judge conditions, especially now that GB3WHA is off the air. He comments that stations in the Kent and London areas have only the local Wrotham beacon, plus the Cornish beacon to the west which they probably cannot hear under flat conditions. This highlights the problem of beacons; as we have said before, a local beacon is not much use to anyone interested in weak-signal working. Dave Sellars, G3PBV, would like to have the GB3SUT beacon firing to the southwest. At present he can usually hear it under reasonable conditions, but not all the time in the way that he hears GB3VHF on 2m. One can appreciate problems which amateurs in Devon might encounter due to the hilly nature of the terrain screening beacons in one or more directions. Certainly there is very little in the way of beaconry, at the right sort of distance from those parts, which beam in the right direction to give them a signal which is just detectable under flat conditions and an obvious marker when the bands are open.

Chris Guttridge, G3TCU, praises the 4m beacon service, and has missed the GB3ANG signal since this beacon is still QRT. He feels, however, that there is really no point in having the high-speed ms message as part of the GB3ANG format, and this seems reasonable enough since ms reflections on 70MHz are frequently long enough for full identification of the signal at normal cw speeds, and there is precious little else on the beacon frequency to cause any doubt as to what is being received. On the other hand, Phil finds the GB3BUX keying format entirely satisfactory, with the long periods of continuous but narrow fsk providing instant recognition of the signal. Situated in Godalming, Surrey, G3TCU says that he hears GB3BUX always, typically S3–4, rising to S8–9 during a major tropo opening and down to S2 about 10 per cent of the time. GB3CTC is typically S2–3 with him, up to S5–6 in major openings and down to S1 about 10 per cent of the time. GB3ANG was S1, up to S3 in major openings and zero about 30–40 per cent of the time. Phil hears EI3RF "once in a blue moon", there being blue moons over Goldalming some two or three times each year.

The series of regular questionnaires to European vhf managers which relate to beacon status, initiated recently by RSGB headquarters, has already brought some response. This should prove to be a most valuable service, since there is nothing worse than sitting for hours on a beacon frequency waiting for it to "surface", only to discover later that the beacon was off the air for some reason. Meanwhile here are some more beacons from the DL7QY list, updated to 15 January 1984. As mentioned last month, not all will beam in a direction which favours the UK, but those who like to listen around may wish to have them on a list, especially as the Es season approaches.

Callsign	QRG (MHz)	Maidenhead QTH	Current Squares QTH	Power (W)
DL0UB	144·850	JO62QL	GM47b	5
LA5VHF	144·855	JP99KP	ET13e	25
LA2VHF	144·870	JP53EG	FX52d	50
OY6VHF	144·885	IP62NA	WW76d	60
SK7VHF	144·920	JO65SN	GP38c	30
DL0SG	144·975	JN68EQ	GI22c	15
LZ2F	145·980	KN33WM	ND40f	25
OY6UHF	432·885	IP62NA	WW76d	30
OZ4UHF	432·895	JO75JE	HP64c	20
SK6UHF	432·920	JO67BF	GR61a	10
OZ1UHF	432·955	JO47WB	ER80j	30
DL1XV	433·143	JN67LQ	GH25c	40

Aurora

On the afternoon of 20 October 1981, an aurora was observed which was intensive enough to penetrate deep into the south of England and into the Continent; stations in the Scandinavian countries and UP2, UR2, UQ2 etc being worked by operators in the London area. It lasted several hours, and during the event the American spacecraft *Explorer 1* was taking photographs of it from above, using auroral imaging instrumentation developed by the University of Iowa. Fig 1 is a black-and-white print of one of the pictures taken of this event from the satellite. The colour versions are much more dramatic (the colours being computer-generated) and show better graduation of intensity, but nevertheless the illustration is fascinating for what it tells the radio amateur about the nature of such phenomena.

The outlines of the British Isles, Europe and North Africa, with Greenland and Iceland to the north-east, are clearly visible, these being drawn by the computer to correct scale. The shading shows the ionized region which is the active part of the aurora, and from which we amateurs reflect vhf signals to work the dx. The lighter areas within the shading represent the regions of highest ionisation—regions from which reflections will probably be the strongest. This particular photograph was taken with photometers which responded to visible wavelengths, so the shading should approximate somewhat to the spread of the visual aurora borealis or "northern lights" which Scottish operators no doubt see for themselves during some of the more intense auroras.

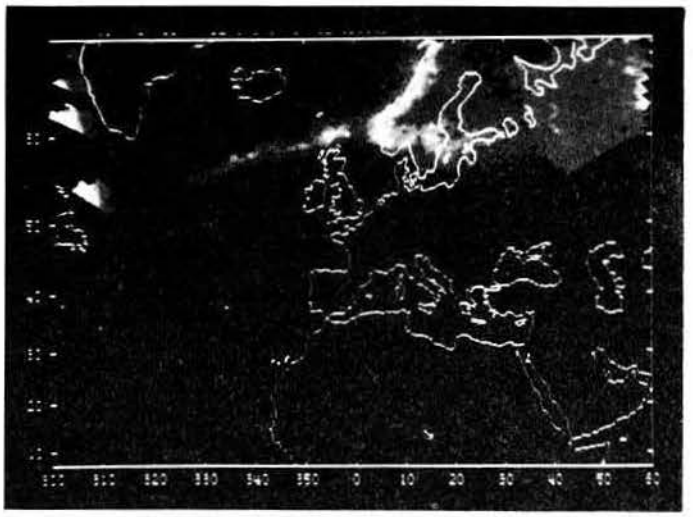


Fig 1. Spacecraft photograph of the aurora of 20 October 1981 at 2045gmt.
Courtesy: University of Iowa and K1KI

If you were active on the day that this aurora took place, it will be very interesting to check your log to see where the reflections for your own contacts might have taken place. The photograph was taken quite late in the event—around 2045gmt, whereas the aurora was noticed in the south as early as 1500gmt. Note from the illustration how it is possible to be too far north to access the aurora for making contacts to the south. Observe also how widespread is the event over Finland, Estonia, Latvia and Lithuania, where it penetrates sufficiently south in those regions to permit stations in OK, SP, OE etc also to access the "cloud". This was borne out by contacts made by European operators.

The illustration shows why it is difficult to work Iceland or even the Faeroes by aurora, since in an event with a spread of the type shown, stations in those countries would have great difficulty in pointing their antennas at the active region in such a way to achieve reflections to the south where the bulk of the operators are to be found. It is interesting, however, to see how far out over the Atlantic the event spreads. One is tempted to think that if the aurora were centred over the Atlantic, then it might *just* be possible for stations in Eire to work the most easterly stations on the North American continent, but this is virtually impossible on a "single hop" due to the low height of the auroral disturbance (typically in the E-layer region).

GM4IHJ (Fife) reports auroral events at his location as follows:

2 February	2110 to 2158	GMs worked TF and LA tv visible.
4 February	1401 to 1958	DL, PA, GW worked. GB3SIX 52A.
6 February	2040 to 2156	Auroral Es tv to Norway.
10 February	1955 to 2152	GB3LER, LA, GM on 2m. SP and LA tv received.
12 February	2130 to 2204	GB3LER and GM only.
13 February	1643 to 1705	Auroral Es and tv to Arctic Norway.
17 February	1640 to 1900	ditto
26 February	1730 to 1930	GM on 2m plus auroral Es.
29 February	1320 to 1329	Arctic tv via aurora.
1 March	1759 to 1819	Strong burst of aurora. This event was reported by N0AN to be very strong in Iowa. He worked six states on 2m via Au.
6 March	1723 to 1804	Arctic tv via aurora.
7 March	1801 to 1843	Auroral Es and Norwegian tv.

While these reports may not be of much value to an operator in the south of the country whose main interest is in making contacts via aurora, John's reports show how frequent auroral activity is, and how fleeting its presence can be. Any serious student of propagation must therefore endeavour to monitor or record over long periods if openings are not to be missed.

Activity in some rare squares

SM6EOC has provided some information on operators who reside in much-wanted squares, or who aim to activate such squares during the year on a temporary basis.

IN3CCD (FF) has moved to a new location and is active on ssb/ms. IN3TWX (FG) is looking for schedules on ms cw and should be contacted QTHR. SM6GWA (FS) works ssb/ms.

For those who prefer tropo and aurora modes, LA2OG (EW) and OH5BB (OU) are ones to look out for. The Faeroe Islands are not all that easy to work, despite the fact that distance-wise they are not much further away than many European countries regularly accessed by tropo, aurora and Es. OH7UV/8 plans to operate from the Faeroes this year, while other stations QRV there are OY3H (ssb tropo), OY5A, OY5J and OY9R (tropo during summer months), OY5NS (aurora, tropo, ms cw and ssb), all of these being in WW square. In WV square, OY9JD can operate ssb/ms, and often goes /P into WW square. There was at least one major opening during

the afternoon hours into OY last summer which extended right down the eastern part of the UK, so it may pay to turn the beam up that way when the weather pattern suggests propagation along that path.

Finally, LA0DT/MM will be active from AN, AO, BM and BN during the period 14 October to 14 November using ssb (144·300MHz for calls) and "horizontal fm" on 144·650MHz. We hear all too little about what the fm addicts hear and work, so any input to *4-2-70* in this context would be welcome.

Meteor scatter

There has not been much in the way of ms news to arrive this month, so the opportunity is taken to reproduce the ms procedures for both cw and ssb working, which incidentally are set out in the *Amateur Radio Operating Manual* and other publications. However, several readers have asked for this procedural information to be printed in *4-2-70*, so here it is in the form accepted by all European operators.

QSO procedure

1. *Calling*
   The QSO starts with one station calling the other, eg "SM3BIU DL7QY SM3BIU DL7QY. . ." The letters DE are **not** used.
   In random meteor scatter operation the calls is "CQ DL7QY CQ DL7QY. . ."

2. *Reporting system*
   The report consists of two numbers:

First number (burst duration)	Second number (signal strength)
2: bursts up to 5s	6: up to S3
3: bursts 5-20s	7: S4-5
4: bursts 20-120s	8: S6-7
5: bursts longer than 120s	9: S8 and stronger

3. *Reporting procedure*
   A report is sent when the operator has positive evidence of having received the correspondent's or his own callsign, or parts of them. The report is given as follows: "UA1WWI1BEP 26 26 UA1WW I1BEP 26 26 . . ." The report should be sent only **two times** per set of callsigns. The report must **not** be changed during a QSO, in spite of the fact that the signal strength might well justify it.

4. *Confirmation procedure*
   (a) As soon as either operator copies both the calls and the report, he can start sending a confirmation. **This means that all letters and numbers have been correctly received.**
   Confirmation message: "SM7FJE G3SEK R26R26 SM7. . ." A station with an R at the end of the callsign could possibly send "GW3ZTH I4BER RR27 RR27 GW. . ."
   (b) When either operator receives a confirmation message (eg R27) and all other required information is complete, he must confirm with a string of Rs, inserting his own call after every 8th R. Example: "RRRRRRRRHG5AIR RR. . ." When the other operator has receive Rs the QSO is complete, and he may respond in the same manner, usually for three periods.

5. Requirements for a complete QSO: **both** operators **must** have copied **both callsigns, the report,** and also an **"R"** to confirm that the other operator has done the same.

Missing information (cw only)

If one of the operators receives the confirmation report at an early stage of the QSO, the other operator has all the information he needs. The following strings might then be used to ask for missing information:

BBB. . .	both calls missing
MMM. . .	my call missing
YYY. . .	your call missing
SSS. . .	duration and signal strength missing
OOO. . .	all information incomplete

The operator should now respond by transmitting the required information only. This approach must be used with great caution in order to prevent confusion.

Sked duration

Every uninterrupted sked period must be considered as a separate trial. This means that it is not possible to break off and then continue a QSO. Sked periods are usually in the range of 1-3h.

Meteor scatter work on ssb

QSOs are conducted in the same way as on cw. Letters are generally spelt in the ICAO alphabet, but may be spoken without phonetics during a sked. The letter R in confirmation reports is pronounced "Roger".

Timing

1. All meteor scatter enthusiasts living in the same area should agree to transmit simultaneously, as far as possible, to avoid mutual interference. Suggested time periods are **5min on cw** and **1min on ssb** for normal scheduled contacts. Different time periods are recommended for random (unscheduled) contacts.
2. If possible, north-bound and west-bound transmissions should be made in periods 1, 3, 5, etc, counting from the full hour (eg HH 00-HH 05, HH 10-HH 15, etc). South-bound and east-bound transmissions should be made in periods 2, 4, 6 etc.
3. When arranging schedules, which are normally of two hours, use *even* hours, eg 0000-0200, 0200-0400, and *not* odd hours such as 0100-0300. This makes the best use of everyone's operating time, and in random operation it indicates how much time a station may have before the next scheduled contact.

Unfortunately the "missing information procedure" is all too seldom understood and, if one attempts to use it, it often confuses the operator at the far end, though its value can be enormous in situations where the lack of a letter or two, or a report, is holding up completion of a contact.

G4OIG (Northampton) continues his ms cw activities and made very good use of the minor shower Zeta Bootids on 11 March to work OK1OA (HK), receiving six good bursts and 20 pings from him. Gerald says that reports that he runs 100W have been over-rated. He can squeeze only 60-70W from his amplifier—"positively QRP" for sporadic meteors in his view. It shows what can be done with such powers and a simple antenna such as a nine-element.

Paul Kerslake, G4NDG (Tiverton), is another relative newcomer to ms cw working, and is fascinated by the mode. He did not manage to complete with EA6FB (Ibiza), but had a very good contact with LA6QBA in FT square. He now has a sked with the same station from GV.

RSGB headquarters now has supplies of the booklet *Meteor Scatter Data* compiled by Geoff Grayer, G3NAQ, and Chris Bartram, G4DGU. This useful publication lists the major showers by date and gives a graphical (histogram) print-out of the expected maximum time and probability of making contacts in all the major directions (eg NE to SW, E to W etc), and at £2.92 post paid (to RSGB members) it is a "must" for the shelves of every ms enthusiast.

We still need someone to take the initiative in establishing an alternative vhf net on 80m. EA3ADW called in on the 14MHz net and made the convincing point that not only do we need this net for night-time use, but as the solar cycle declines still further, propagation on 14MHz will at times make daytime contacts between close European stations difficult if not impossible, so alternative frequencies should be settled if this very useful meeting place of vhf operators is not to be prejudiced.

Propagation—the eternal mystery

The longer one operates on the vhf bands, the less one seems to know about the mechanism of propagation. Just when it appears that theory has accounted for all the observed phenomena, something crops up which causes one to wonder just what is "up there" bending vhf/uhf waves around the curvature of the earth. From time to time letters reach *4-2-70* on the subject of apparent abnormal or unusual propagation, and for those who like to ponder such matters, some examples are included here.

Dave Newman, G4GLT, is well known to readers of this feature for his long-time interest in 50MHz propagation. Having moved house recently, he is just about ready to go again, but the subject he writes about occurred in 1983. On 21 and 26 September 1983, during the afternoon, GW3LDH (Wrexham) copied beacons ZS6PW and ZS6VHF on 50MHz. For some weeks prior to this, and before dismantling his station to move house, Dave Newman had been monitoring the band on a regular basis and heard nothing in the way of dx. He says that at the time that GW3LDH heard the South African beacons, the solar flux was at a very low level, so propagation over this path would not normally be expected. However, Dave says that his ZS friends, notably ZS6BUF and ZS6BT, have told him that as far as they are concerned you can "throw the solar flux out of the window". They believe that seasonal factors (especially the equinoxes) and geomagnetic indices are of greater importance, since in September 1983 these beacon signals were received by GW3LDH from ZS (by F2?). Dave says that at the same time several ZS6 amateurs reported copying the Cyprus beacon 5B4CY. G4GLT concludes by saying that the day of the equinox is 23 September, the declination of the sun passing through zero degrees, so it may be no coincidence that the openings recorded by GW3LDH occurred three days either side of the day of equinox. The moral? Listen on 50MHz on the appropriate days this year to see if the trend continues.

On a quite different topic, G4CJG has been operating /A from Somerset, keeping in touch with his friend Nick, G4KUX, in Co Durham, and using a nine-element Tonna and 150W. At the other end, Nick used (initially) 400W to an eight-element from a 1,200ft asl site, the antenna being changed later to the now famous 4 × 19 element array. From the Somerset site, near Porlock, Jerry, G4CJG/A, had a 100 per cent success rate in contacting G4KUX, with signals never below S2. What was interesting, however, was that the take-off was across the Bristol Channel, and best copy was always obtained when the sea-level was 60 to 80 per cent off high tide. Allowing for general tropo conditions, Jerry thinks that signals would vary 2-3 S-points between low and high tides, suggesting a significant rôle played by the surface of the water in propagating the wave.

Finally, some comments from John Branegan, GM4IHJ, who spends, it seems, every spare moment checking on propagation on one frequency or another, and who has built up over the years a vast store of knowledge on the subject. John says that after keeping detailed records for seven years, and having had access to the studies and records of people like F8SH, the evidence all points to the fact that anomalous propagation at vhf is much more frequent than has generally been accepted in the past, and he can see certain rules emerging. He recognizes the solar cycle as a major factor, and its effect on muf is well understood, but it introduces other factors as well, such as coronal hole auroras and the almost concurrent auroral Es propagation. Until recently many amateurs, John says, were either unaware of, or would not accept the presence of auroral E propagation, and he believes this to be due to the fact that between 1978 and 1983, around the

peak of the solar cycle, auroral Es were practically non-existent. Now, as the sun's magnetic cycle begins to switch, the auroral Es are back again. GM4IHJ uses frequencies around 50MHz a lot for checking propagation. It is his view that if all Europe had a 50MHz allocation, then all through the past winter contacts with Scandinavia and Iceland would have been a regular occurrence. John is adamant, however, that to carry out serious work on propagation monitoring, a "proper" antenna is needed, and the wire dipole in the roofspace, though useful in certain conditions, is no substitute for a three-element beam, whether monitoring tv or broadcast transmissions from afar.

50MHz

Activity among the 50MHz permit-holders continues much as before. The lack of any F2 propagation and the poor tropo conditions have meant that little has been reported in the way of unusual dx. The number of applicants for permits following the decision of the DTI to increase the total to 100 has exceeded the remaining permits available, so once again there will need to be a selection based on the details supplied by the applicant.

Bob Scase, G6XHC (Surrey), is a keen listener on 50MHz who has submitted a most detailed report of what he has heard since April 1983 using a five-element antenna at a height of 7m, and a receiving converter into an FRG7700 general coverage receiver. He has logged more than 30 of the permit-holders, many of them on numerous occasions, and he has also heard beacons ZB2VHF and 5B4CY. He made tape-recordings of the signals as they were copied so that he could analyse them at leisure. He also listens on the Six-Metre Net on 80m so that he can keep in touch with what the 50MHz stations are working and hearing. Detailed studies of a single band such as this can prove to be a fascinating project, and provide much interest even during periods when nothing much is happening on the vhf/uhf bands.

Amateurs recently licensed may not know of the Six Metre Group which caters for amateurs or listeners with an interest in 50MHz operation. They publish a regular newsletter, *Six News*, full of useful information on what is happening on the band around the world. Contact G3COJ, QTHR, for further information.

G4CJG comments that a reference made some time ago to a "pseudo" beacon on about 50·86MHz might have been the third harmonic of a British Telecom transmitter on 16,954kHz located at Rugby and signing GKC. One or two of these used to crop up on 2m and 70cm in the early days of vhf, and one in particular in the Home Counties used to go auroral, a most useful indicator!

VHF/UHF Convention 1984

The twenty-ninth RSGB National VHF/UHF Convention, organized by the VHF and Microwave committees, was held at Sandown Park racecourse on Saturday 24 March. Despite a rainy, windy day, attendance broke all records, around 2,500 being present to participate in a full lecture programme and a trade show which was also the biggest ever held at this event—some 25 per cent more trading organizations booking space this year. This event will be fully reported in another issue of *Rad Com*, but meanwhile let it not go unrecorded that an event such as this can only take place, let alone prove to be a success, through the tireless efforts of a few volunteers who put the whole show together—manhandling tables, chairs and equipment a few hours before the opening time, and then packing it all away again immediately the last visitor has departed. Much of this fell on the shoulders of committee members, who also handled the forward planning to get lecturers, facilities and everything else required on the right spot at the right time. Special mention must be made of Les Hawkyard, G5HD, and his wife, who between them undertook the arduous task of providing for the many and diverse needs of the traders.

The full write-up will include more details. It was good to have so many "eyeball' contacts with *4-2-70* readers, and in future it will be possible to put a "face" to many of the letters which arrive every month.

Peter Blair, G3LTF (l), with Bob Reif, W1XP, after the highly popular moonbounce lecture at the VHF Convention.

Expeditions

PA3BZO wishes to draw attention to the fact that he intends to operate from Lichtenstein (HB0) on 23 and 24 June, using both 2m and 70cm. Operation will be from 0800 to 1700gmt, and the team will consist of PA3BZO, PA3BXM, PA3CIL and PB0ACG. The site sounds interesting since, if weather permits, they will be on the Augstenberg mountain some 2,365m asl, close to the town of Malbun in locator EH79g. PA3BZO thinks that if a contact is made on 70cm between HB0 and G, it will be a "first" for the band. Does anyone have any information on this? Those particularly anxious to get in on this act can telephone PA3BZO (Mr P. V. D. Bos) on 09-314120-23292 after 1600gmt.

G8TFI (Glos) says that the reports that he will be /P in Eire during the Perseids are not correct, though he hopes to be active again from GM this year during long weekends, probably late in July or early September.

A letter from G6ABU has unscrambled some incorrect information on the Derbyshire Hills Contest Group's plans to operate portable from Eire. It was reported in March *4-2-70* that the group had dropped its plans for an expedition this year, and that instead, a group of operators from across the country were getting together to activate WL square. In fact the Derbyshire Hills Group *is* the one mounting this expedition, but since it would have strained the group's resources to go it alone, assistance from other operators was sought, and at the time of writing those intending to be present are G8ROU, G8XVJ, G6HKS, G6ABU, G4VVZ and GW8VHI, though others may join in later. The intention is to publish full details in the July *4-2-70*, but present plans are to operate from WL from 4 August for two weeks on the bands listed in the March issue.

Readers writing in to give information on expeditions should note that the last date for the receipt of copy for the July issue will be 23 May, and for the August issue, 22 June. Expedition organizers sending in operating reports after the groups have returned should also appreciate the need to send in the details early so that the information is still topical when it appears in print.

From here and there

Bob McHenry, G3NSM, says that he apparently misunderstood DL7QY since Claus still expects Bob to mail out all *DUBUS* copies to UK subscribers as before (see *4-2-70* February). Some subscriptions for the current year are still available at £5 each. Write to G3NSM, QTHR, for further details.

Walter Blanchard, G3JKV (Dorking) has a complete set of colour slides of auroras photographed by the *Explorer I* spacecraft in 1981. A black and white print of one of these slides is shown above, and a full-colour shot was published in *QST* November 1983. Walter says he is prepared to show these slides at club meetings and give an appropriate talk based on them. Write to him QTHR for further information.

G3JKV also points out discrepancies which he has noted in QRB figures derived from different micro programs. He quotes the figures for auroral record claims on 70MHz (*4-2-70* March), and notes that the discrepancies are not uniform. As he says, the formula for calculating such distances is pretty well standardized, so such errors should not occur, and contest results could of course suffer if such mistakes pass unnoticed. G8VR has also noticed that two separate programs which provide QRB, one for contest scoring and another for giving the distance between different squares, yield different results for the same pair of locations. There is a great tendency to assume that what the vdu shows is the truth, so we need compatible programs. Check yours with this example, YT75j to ZK02a: G3JKV measures it at 903·07km; GM3WOJ made it 896, and the program used at G8VR gave 906.

G4CJG heard a G station on cw calling EA1VHF, the Spanish beacon, and later complaining that despite the fact that the signal was 599, no answer was received. A poor receiver at the beacon site, do you think?

GM3XOQ reports much-increased activity from the Shetland Islands, with several amateurs now being equipped with ssb and beam antennas. He expects them to be looking south for the dx during summer "lifts".

G3BPV has abandoned 2m, saying it is "utter chaos around 144·300 . . . not helped by those who insist on whistling and tuning on the frequency". We know what he means. He thinks it time 2m was used like hf bands with no calling frequency now that band occupancy is so high. As he says, "They don't have calling channels on 80m". □

Microwaves

*by Mike Dixon, G3PFR**

Modifications to the 3·4GHz converter

Recently, when constructing the G4FRE/G3WDG interdigital converter (*Microwaves*, February 1983), I had severe misgivings about soldering-in the rather difficult-to-obtain BXY28 varactor. A modification to the design of the mounting, which does not appear to affect the stability or amount of local oscillator drive available at the mixer, is given in Fig 1. It allows easy mounting (and dismounting, should this be needed) of the device.

The decoupling disc is tapped 4BA (or, if preferred, a comparable metric thread size) and a brass half-nut is jigged into place and soldered to one side of the disc. Jigging is most easily carried out using a chrome-plated or stainless steel bolt which will not "take" solder and can subsequently be easily removed. The requisite length of brass studding is faced-off and centre-drilled 0·062in (1·6mm) to a depth of about 0·125in (3·2mm). The low-Q resonator is similarly centre-drilled. A TO3 insulator-bush is carefully filed out to just clear the studding, and the resonator mounting-bar drilled to just clear the bush. The assembly of the components should be obvious from the figure.

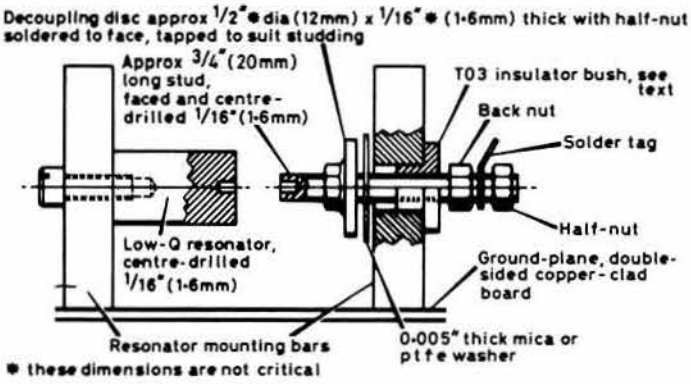


Fig 1. Alternative mounting arrangements for local oscillator final multiplier diode, G4FRE/G3WDG 3·4GHz receive converter

Slight inaccuracies in construction are not too important. The elasticity of the plastic bush and the ability of the studding to move slightly in the hole in the resonator mounting-bar (without shorting) will allow the constructor to align the two diode mounting holes. The diode does not need to be clamped tightly in place—finger tightness is quite adequate. Judicious tightening of the decoupling disc nut and the back nut will allow the insulators and disc to be clamped firmly to the resonator mounting-bar while holding the diode gently in place but with good ohmic contact.

I can recommend this converter design as being easy to construct and virtually "sure-fire". Alignment using the methods suggested by G3WDG is also quite easy—indeed, it looks as if this is one of those simple, reliable and easy to construct designs referred to in last month's column. Is there a comparable design for an efficient 3·4GHz transmit multiplier or multiplier-mixer?

Band designations

Reference was made last month to "X-band and other radar frequencies". One often sees this type of quotation in professional journals, and the definition of what constitutes a band may be unclear to the newcomer, just as amateur reference to "13cm" or "6cm" is also rather indefinite. Hence there is now a preference to use somewhat more definitive designations for the amateur allocations.

In amateur practice, at least in the UK, microwaves "start" at 1GHz and the bands are referred to by frequency rather than by wavelength—for example 5·7GHz and 10GHz rather than "6cm" or "3cm". Searching around the literature I have arrived at what I believe to be a correct interpretation of the professional band designations. This is given in Table 1, and any other information to correct or extend this table would be welcome. Possibly some of the confusion arises from the apparent lack of logic in the lettering sequence! To add further to the confusion, a new system starting at 100MHz appears to be coming into use alongside the old.

Table 1. Microwave band designations (UK)

Old designation	Frequency (GHz)	New designation	Frequency (GHz)
L	1·0—2·0	A	0·1—0·25
S	2·0—4·0	B	0·25—0·5
C	4·0—8·0	C	0·5—1·0
X	8·0—12·0	D	1·0—2·0
J	12·0—18·0	E	2·0—3·0
K	18·0—26·0	F	3·0—4·0
Q	26·0—40·0	G	4·0—6·0
V	40·0—60·0	H	6·0—8·0
O	60·0—90·0	I	8·0—10·0
		J	10·0—20·0
		K	20·0—40·0
		L	40·0—60·0
		M	60·0—100·0

Operational news

My thanks to various contributors for quite a number of items of interest this month. Keep it up!

On 1·3GHz, Adrian, G8PSF, reported receipt of his 20 squares "sticker", and said that this was achieved in six months with a mere 1·5W to a 15/15 Jaybeam. With contacts in eight countries (this also qualifies him for the Dutch SHF6 certificate), Adrian added that he was delighted with the results so far and hopes that "it will encourage other QRP operators to have a crack at microwaves—frankly I thought that it would take years and years to work any sort of dx on microwaves". Encouragement indeed!

From G6ADE (via G5UM) comes the information that DK5AI is believed to be the only station active on 1·3GHz from FL square, and similarly, F6DZK from AI square. If heard on 144MHz or 432MHz, both are able to QSY on request. Also on 1·3GHz, G3VZV reported in the *BATC Newsflash* that the first UK tv repeater, GB3GV (Leicester), came on air on 19 February just three days after the release of the licences. On channel RMT1, the relevant frequencies are: vision (in) 1,276·5, (out) 1,311·5MHz; sound (in) 1,282·5, (out) 1,317·5MHz. The device should be able to receive either fm or a.m. modes, but will retransmit only a.m. to normal broadcast standards. Access is via a "valid" video signal at the input. GB3TV (Luton) and GB3VR (Worthing) are expected to come into operation very soon, both on channel RMT2, fm only, vision (in) 1,249·0, (out) 1,318·5MHz, with sound on a 6MHz sub-carrier.

On 2·3GHz, the DF0EME test scheduled for 10 March (information received too late to publish) was successful, with DF0EME working OE9XXI. Signal polarization on OE9XXI again gave some trouble. G3WDG/G4KGC reported copying DF0EME very well with "rapid fading similar to that experienced on 10GHz troposcatter signals". OE9XXI was also copied, but with much weaker signals.

Jürgen Dahms, DC0DA, has supplied confirmatory details of his 3·4GHz beacon which is sited with, and uses the same callsign as, the 1·3GHz beacon DB0JO. Beaming 275° on 3,456·150MHz with 2·5W erp, it has already been heard by G4FRE and G3LQR—other reports will, of course, be welcome. Jürgen said that he regularly monitors GB3BPO for indications of good propagation, and that during good conditions "my 23cm receiver is standing-by on 1,296·2MHz for calls from G to try on higher frequencies". He is QRV all bands up to and including 5·7GHz, and hopes to have 10GHz operational later this year.

Component supplies

Steve Davies, G4KNZ, who handles the Microwave Committee component supply service, has announced a revision of procedure designed to make the service easier to handle. The prices quoted below do not include postage, but there will now be a standard postal charge of 50p per order (not per item). Prices are now: MGF1402 GaAsfet, £12.50; MD4901 snap varactor, £7; 94·666MHz crystals, £3; Microwave Committee driver board, £4.60; low voltage-drop regulator board, £1.60. Steve also has a limited stock of the following mixer and detector diodes—1N26A, 1N23D, 1N21D, 1N78 and 1N833—an sae will bring details and prices. Cheques should be made payable to "RSGB Microwave Committee" and sent to Steve at the address given in the March *Microwaves*.

Sheffield round table

In addition to the informal arrangements mentioned last month, Barry, G8AGN, is proposing to give a short presentation on "microwave propagation", and to introduce for discussion the subject of digital modulation techniques as a means of improving current "wide band" equipment performance. □

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

EPHEMERIS
Satellite news and views

*by R. O. Phillips, G4IQQ**

Uosat 2

The launch of Uosat 2 at 1759 on 1 March 1984 probably attracted more media attention than the exploits of W5LFL on board the STS *Columbia*. Little can be said of the launch except that it went very much according to plan. The spacecraft separated from the launch vehicle at 1911, and a series of instructions was transmitted from the command station at the University of Surrey which activated the 145·825MHz beacon for a number of short periods to evaluate the initial performance of the spacecraft. This procedure was repeated for the second orbit, during which period the beacon was set to provide check-summed telemetry at 1,200bps, on which I will comment later.

The third orbit was the last of the day within range of the UK and passed without incident. However, during the night, reports were received that all was not well and the spacecraft appeared to have gone silent. Repeated attempts to re-activate the spacecraft met with no success, and it looked as if some catastrophic failure had occurred. A number of theories were suggested, including collision with the launcher (remember Oscar 10), failure of some part of the on-board power sub-system, or a hardware/software problem associated with the spacecraft computer.

Some of the more sensitive receiving stations around the world noticed a rise in the level of broadband noise around the Uosat 2 telemetry frequency which correlated with the predicted visibility times. This led to the theory that the beacon transmitter may have become unstable; indeed a similar anomaly had been encountered during the thermal-vacuum testing prior to launch, but it had been thought that this had been rectified.

As a result of the problem that arose during the early life of Uosat 1, caused by blocking of the telecommand channel, a program had been prepared for Uosat 2 to terminate all beacon transmissions in the event of no commands having been received for a period of 21 days. Whether or not the program had been correctly loaded into the spacecraft computer was not known but no change of status had been observed at the end of the three weeks. Towards the end of March attempts were continuing to command the spacecraft using the 435 and 1,269MHz up-links, without apparent success.

If the problem is that of blocking the command receivers, it may be possible to make use of the high-power facilities of the Stanford Research Institute which were employed to overcome the problems with Uosat 1. One major difference, however, is that in the case of the earlier satellite the beacon transmitters were operating correctly (except that only one should have been operating at a time) whereas with Uosat 2 the beacon transmitter fault may give rise to additional complications. Only time and a lot more effort will tell.

Earlier, I referred to the telemetry transmissions at 1,200bps during the first few orbits of the new satellite. One immediately noticeable improvement over Uosat 1 was the much increased deviation, which resulted in a higher signal-to-noise ratio of the demodulated signal for a given input level. Fortunately a tape recorder was left running at this QTH during the second orbit, and subsequently the signals were fed directly into a NASCOM computer for decoding. A sample of one complete frame is given in Fig 1 (complete with a single error on channel 00). The frame contains 70 channels in the format NNDDDC, where NN is the channel number (00–69 decimal), DDD is the three-byte data value (in hexadecimal), and C is a single-byte (hexadecimal) checksum for error detection.

The header of each frame contains the message UOSAT 2, followed by the date in the form YY—year, MM—month, DD—date, W—day of the week, and hours, minutes and seconds HHMMSS. Clearly the clock had not been initialized but it was running, as could be seen from subsequent frames.

```
UOSAT 2                    0000410014605

-002*1801187F02415203534104045505032406019E07042108033809027C
-10510511305612000313083914001415003716000717596C18590519545C
-20285D21191A22663323000124000625000726092F276047285971294780
-30517031036732284F33606034000735348536420337387838428539432F
-40759F41000542670743000744171745003246000247430448437C494180
-50655351091C52661653668E54847A55000556000357421558427659436D
-60836B615BC562B00C63024364040665010266000067000168000E69000F
```

Fig 1. Telemetry recorded at 1,200bps during the second orbit of Uosat 2

Uosat 1

During the period immediately prior to the launch of Uosat 2, the beacons on Uosat 1 were switched-off, partly to avoid any confusion between signals from the two satellites. In fact the orbital characteristics are such that simultaneous visibility of both satellites would only occur at very high latitudes. Subsequent to the problems described above, the beacon transmissions on Uosat 1 reverted back to their normal schedule and, along with the usual information, now carry status reports on Uosat 2.

Oscar 10

Activity on both the mode B (435–145MHz) and mode L (1,269–435MHz) transponders remains high, with particular interest in the latter. In the last few months a number of successful attempts have been made at Amtor (Amateur microprocessor telex over radio) via the mode B transponder. This highly reliable form of digital transmission has become very popular on the hf bands, and now seems destined to be the same on satellites. The scheme, which was adapted from that used for commercial long-distance telex transmissions by Peter Martinez, G3PLX, can be supported by many home computers equipped with the suitable software and hardware interface.

Last month I gave details of the Stoner Cup competition for activity via Oscar 10 which began on 15 April and will continue for three months. The use of the Maidenhead locator system for points scoring has caused a certain amount of confusion, since this method had not been used before in an international competition. The system identifies a particular location by means of a six-character code which defines a rectangle 5min in longitude by 2·5min in latitude, similar in concept to the commonly-used QTH locator scheme for vhf operation in Europe. A simple computer program to calculate the appropriate square from a given latitude and longitude was given in the spring issue of the AMSAT-UK publication *Oscar News*. In addition to the two categories of eirp mentioned last month, it has now been stated that any station consistently running high power, which is defined as a downlink signal 6dB higher than the telemetry beacon, will be disqualified.

Other news

A lecture entitled "Third generation amateur satellites" will be given at the Institution of Electrical Engineers in London on Wednesday 16 May 1984. The lecture will cover the design and construction of the Phase 3 satellites, as well as methods of operation and equipment requirements. The formal proceedings begin at 1730 and tea may be obtained at 1700.

The latest information concerning the Phase 3C spacecraft indicates a possible launch opportunity on the first development flight of Ariane 4 in 1985–6. Additional passengers are likely to be the meteorological satellite Meteosat and the French amateur satellite Arsene. □

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RAYNET

*by Geoff Griffiths, G3STG**

Chairman, Raynet Committee

The late Taff Crane, membership secretary

Raynet members throughout the UK will have been saddened to learn of the death of Taff Crane in March. She had suffered a long and painful illness, but despite that she had continued to maintain the Raynet membership records until shortly before her death. In particular, her cheery notes to controllers were always much appreciated. Sincere condolences to Len in his loss.

A real pity with members such as Taff, and Jane Balestrini, our supplies officer, is that their work is done so quietly and efficiently that we all tend to take it for granted. Without them, much of what Raynet has achieved would just not have happened.

Membership registration scheme

Dave Lankshear, G3TJP, bravely stepped into the breach and has been looking after the existing manual system since mid-March. By now, all controllers will have been supplied with details of the new computerized membership scheme, and documentation. Undoubtedly there will be be "bugs" in the new arrangements despite the very considerable work which has gone into the system, but hopefully they will be few.

There was one notable explosion of fury on the 3·5MHz Sunday morning net when some of the details were being discussed. Some of the controllers detected a plot to remove the two-year membership concession which had taken so long to wrest from "them up there", but all is now well on that front, I hope. If you have any worries as to the operation of the scheme, why not enquire any Sunday morning at 0830 on 3,790kHz, when all will be revealed.

I hope that the new format of the scheme appeals to members. I am sure that as the potential benefits work their way through to groups, everyone will agree that this is a positive step forward.

Unauthorized operation

A recent discussion brought home to me that some group controllers are facing for the first time the likelihood that amateur band transceivers are to be provided out of public funds for eventual operation by Raynet operators. Not that that in itself presents any problem, but the thought of having this equipment not under the eagle eye of an amateur at all times, but installed in comparatively public places, has caused some concern. This situation has existed for many years in some groups' territories without any problems being experienced. The secret seems to be to insist with the user service that the mic is kept secure in a location remote from the installation, but accessible to the group. At the same time, disconnection of the antenna and power supplies is also a useful precaution.

Group exercise reports

Whatever happens to all those reports we send to HQ? Do all the results of those hours at the typewriter, or chewing a pencil become destined for the membership service officer's wastepaper bin?

Not at all. The reports that groups have submitted over the last 12 months have been very interesting and have revealed much about the day-to-day activities of Raynet where it matters—with the individual groups.

Our zonal co-ordinator, Joan Heathershaw, G4CHH, is preparing an analysis of the most important lessons which you have highlighted in those reports, and it is hoped to publish them shortly for your information. Certainly, when they are put together they present a pattern of tips and hints which might take individual groups many years to learn the hard way.

One report that I am looking forward to reading when it arrives is the one relating to the sponsored run between the police service and the prison service. Traditionally, this run has taken place between Birmingham and Bristol and back, with communications for the prison service being provided by Raynet. Need I say which team has the better record? This year, I gather, the run is to take place along the Pennine Way, and that is obviously going to place very large demands upon the communications systems with large numbers of Raynet groups being involved.

RTTY

The use of rtty seems to be becoming more and more of an everyday topic of conversation wherever Raynet members get together. More groups are reported to be investigating the use of this mode, and becoming enthusiastic users.

There has for some time been a very encouraging level of co-operation between Raynet and BARTG. Ted Batts, G8LWY, has been a corresponding member of the Raynet Committee for a number of years, and has given much encouragement to the developments we now see taking place. The BARTG newsletter, now entitled *Datacom*, often seems to carry reference to Raynet activities, and I know that Stuart Dodson, G3PPD, would be happy to supply a sample copy to any group for them to have a look at—but beware, you may be hooked.

Mike Watson. G8CPH, of South Anglia Raynet has gained a reputation of being the man to talk to if your group is thinking of acquiring Creed 444s in first-class condition, and the PAG terminal unit in kit form has earned itself a reputation for both performance and reliability. Mike came along to a recent committee meeting and revealed that the PAG is now available for the first time in ready-built form, and very impressive it looked too.

My own group in Leicestershire recently had a very professional demonstration evening laid on by the lads from Radio Products, who brought along to one of our meetings at County Hall all sorts of goodies, including a couple of their terminal units. Arnold Kay, G4SPY, claims that for weaker signals his unit is capable of superior performance, being able to copy signals well down into the noise, and trials of the Radprint rtty terminal unit have certainly been living up to those claims.

Undoubtedly many groups have their own expertise in rtty, and I know that many groups are running construction programmes among themselves and producing very successful units. So if your group has not yet thought about the use of rtty, what advantages does this offer? South Anglia Group has done some investigations into the speed of passing large volumes of accurate information under exercise conditions by phone and by rtty, and there are very substantial advantages reported for rtty under these conditions, with, in some cases, up to 400 per cent increase in circuit capacity.

RTTY seems to have offered one group other advantages recently. In Yorkshire, members were working for a user service during the National Breakdown Motor Rally, and were suffering some deliberate interference. A fatal accident then occurred, and in order to achieve security and to avoid the jammers, they QSYd to rtty on 432MHz. At least one of the stations worked mobile rtty, and all involved were very impressed with the results that this operation produced. So what about that extra inter-county traffic on 432MHz rtty?

RTTY the South Anglia way

Having learnt from experience on exercises that the biggest weakness on the rtty side was the "off-air" time when shifts changed and members recovered or connected their own Type 7 series Creed teleprinters, South Anglia Raynet Group decided that it needed to have its own equipment. Approaches were made to BT to purchase Creed 444s (TP15s) which were coming out of service, but it took two years of negotiations before they agreed to sell 30 sets to the group.

These were deployed around Suffolk, two at each district council, others in the police headquarters at Martlesham, and some in reserve. The idea of having two 444s at each location was so that one could be linked via a PAG terminal unit to the vhf/uhf radio, while the other with its own PAG terminal unit could be used exclusively for tape cutting. The PAG unit was designed by Alan Dorling, G8CJL, specifically for Raynet use, and many hundreds are now in service with Raynet members, county and district councils.

In 1983 word got around that more 444s were available, and enquiries to Raynet controllers soon established that there was a market for these. Now well over 1,000 444s and PAG terminal units are in use by Raynet members; and by county and district councils who pay for them on behalf of Raynet. A recent exercise tested South Anglia Raynet Group's communications with the adjacent counties of Essex, Cambridgeshire and Norfolk, and police and fire service observers were most impressed by the results. □

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SWL News

*by Bob Treacher, BRS 32525**

Overseas news

Philip Aliband, RS42876, wrote from Liuxuesheng Lou in the People's Republic of China. He is spending nine months at Fudan University, Shanghai, as part of his university course in Chinese. Most of his time has to be devoted to studying Chinese, but part of his luggage was a Sony ICF2001 receiver, which he uses at every opportunity. He monitors the broadcast stations particularly on medium wave, but when dxing on the amateur bands he finds them crowded out with JAs, in particular on 21 and 7MHz. Stations from DU, YB and KG6 also figure quite extensively. No Gs had been heard at the time Philip wrote but European countries logged were F, I, ON and YU. Good openings occur to Latin America in the afternoons, but the South Pacific has only provided ZK2RS. Shanghai is China's largest and most industrial city, and electrical noise is a very big problem. A tip for would-be dxpeditioners who hope to join the growing band of amateurs anxious to be one of the first to operate from China is to go to Hainan Dao. The island is off the southern tip of China, and there is apparently no electrical interference. Philip had heard 1Z9A regularly and had also read in *Radio Communication* about BY4AA's operation from Shanghai; he heard him once on 21MHz. An article and photograph about the BY4AA operation appeared in *Wenhuibao*, Shanghai's local newspaper. Philip was busy translating it when he wrote.

RST and all that

An amateur friend recently told me of a QSL card he had received from a newcomer to our hobby on which the listener had reported my friend's signal on 3·78MHz using ssb and giving a report of 538!

When sending a station a listener report of his signals on ssb, only the readability (R) and signal strength (S) are necessary—for example 57. If, however, the station is using cw, then the readability, signal strength and tone (T) should be reported—for example 579. R will normally be "5", unless heavy QRM makes the signal difficult to copy, when a "4" or "3" would be given. Signal strength varies from 1 to 9 depending on the strength of the signals on which you are reporting on, while the tone is also on a scale from 1 to 9, depending on the tone of the cw. Most stations give a "9" here unless the signal is defective in some way. A report to my friend saying that he was 538 on ssb was therefore totally meaningless and certainly would not result in a QSL card by return.

Another form of reporting noted in the past by amateur listeners which also raises eyebrows is to use the SINPO or SINFO broadcast band reporting system when sending QSL cards to amateur stations. This system is totally correct when reporting to broadcast stations, as it reports signal strength, interference, noise, fading and overall on a 1-5 system. A perfect transmission with no interference, noise or fading from Radio WNYW on the 16m band would therefore get an swl report of 55555. However, although better than giving an amateur station a 538 ssb report, this system should not really be used when reporting to amateur stations.

DX news

Ceri Jones, BRS53051, is sitting the RAE this month and during breaks from studying caught OD5ST, VK9NL, J28DN and 7X5ST for four new countries. QSL cards received during March included HI8RVF, A71BK and A92CX.

Brad Bradbury, BRS1066, took part in both the 7MHz CW and BERU contests with encouraging results. 1·8MHz provided some interesting stations—CT2BQ, FC8TT, UA9CBR and YV1OB. K6UA/A6 had been logged on 3·5MHz, while 28MHz had shown signs of life in March to provide KC7UU/5N6, VE3LKU/HI8, TL8ER, W6QL/ZP5 and HR1DAP.

Robert Small, BRS8841, complained that his father, G3ALI, had received his VU7WCY QSL cards but that there were no signs of his! However, YV0AA on 3·5 to 28MHz ssb and 7 to 21MHz cw provided some consolation. 1·8MHz had provided Robert's first W in the shape of K8ZZO. UA2FFH was another new one on that band. 1A0KM was logged on 7MHz (an operation your scribe knew nothing about!). XU1SS, W8JBI/J8, CX1FV and VP8KF were new on 21MHz cw. On the QSL card front, the KP2A/KP1 cards came direct, two years after the operation, plus ZK2RS on 7MHz. DJ6SI/9L, CY0SAB, VP2MSS, K2KTT/PJ7, 5H3WCY and KL7IRT (7MHz) also provided much needed confirmations.

144MHz had started to claim the interests of Martin Parry, BRS52543, who entered the March Open with disappointing results (your scribe was otherwise engaged during that weekend). A Frenchman in AK80f was the best dx on the band, while the best on 432MHz was a G in AM72c. Never mind, summer will soon be with us! However, 1·8MHz had got its usual going over with Martin fairing very well. 7X5AB (0610), HI8JAG (0442), HK6BRK (0516), YV2IF (0348), ZL2BT (0718) and CT2CE (0558) were all logged on ssb between 21 February and 3 March. 7MHz came up with T30, VR6, VP8, ZL7, ZK2, YV0, 3D2 and 8Q7, also all on ssb, between 15 February and 7 March.

The ARRL contest on 3/4 March claimed a few more hours of David Whitaker's beauty sleep, but 9Y4VU on 1·8MHz made it all bearable. 1A0KM was caught on 7 and 3·5MHz. 9U5JB was a new one on 28 and 21MHz, and VR6TC was added on 7MHz. David was another to neglect the hf bands for the March Open. He seems to have faired slightly better than Martin Parry, logging GJ4ICD, F1DYD/P, PE0MAR/P and PI4VLI. Also heard were a station signing HG5A and an OH4. David considered both to be phoneys, but it will be interesting to watch for the contest write-up to see if they were real. It was undoubtedly too early in the season for Es, and conditions were too poor for a tropospheric opening over that distance. It is also unlikely to have been ms. Perhaps they were phoneys trying to liven up an otherwise ordinary contest. . .or were they?

1984 HF Countries Table
(Starting score 150)

G listings

Station	DXCC	28	21	14	7	3·5	1·8	Total
BRS8841	—	39	108	127	114	122	39	549
BRS25429	176	46	84	99	88	114	51	472
BRS31879	153	72	92	99	60	62	36	421
BRS1066	127	41	82	75	74	51	43	366
BRS18529	—	1	42	21	47	80	6	197

DX listings

Station	DXCC	28	21	14	7	3·5	1·8	Total
ORS45992	144	16	54	118	13	33	0	234

Newcomers

P.L.C.Riley, RS41542, is by no means a newcomer to amateur radio, but his interesting letter concerning the effect of the January gales on his antennas was his first to *SWL News*. The night of 14 January brought gales to Cheshire the like of which had not been witnessed before. The bottom section of the base-mounting bracket of his HF5V sheared, with the HF5 trap vertical collapsing to the ground from a height of 62ft. After extensive repairs and a change to UR67 coaxial cable everything is now back in tip-top condition. Also in use at BRS41542's QTH is a horizontal tri-pole antenna with a balun, tuned by an atu for 3·5 and 1·8MHz. Each element is 31ft long and the third element apparently improves polar diagrams dramatically—quite a novel idea which gives a two or three "S" point improvement over the HF5 vertical.

Bill Solley, RS84947, uses a Drake SSR1 receiver and feels his best dx to date has been KL7IF. He has also met VP8QI personally when on his return from Rothera Base in Antarctica. Bill suggested several unworkable ideas concerning an swl callbook, and how the *RSGB Amateur Radio Call Book* should indicate which amateurs answer swl reports. He also remained in the dark over the 14MHz beacons, as he was not a member of the Society when the story first broke last year. To recap, the beacons can be found on 14·100MHz, and each one transmits in sequence for one minute every 10 minutes. 4U1UN/B transmits on the hour and at 10, 20, 30 etc minutes past the hour; W6WX/B at 01, 11, 21 and 31 minutes past the hour, and KH6O/B, JA2IGY, 4X6TU/B, OH2B, CT3B and ZS6DN/B follow suit until 07, 17, 27 and 37 minutes past each hour. A two-minute break occurs at 08 until 10, 18 to 20 minutes etc past each hour. Reports should be sent to W6RQ. Bill's final point concerned his other hobby of archaeology. He was interested in getting in touch with other amateur enthusiasts who share this pursuit. His address is 7 Downfield Close, Alveston, Bristol BS12 2NJ.

Finale

Despite the small number of table entries, I have started the hf table this month. Let us have many more entries soon as it would be a pity to lose this facet of *SWL News*. Scores, news and views should reach me at the address below by Monday 14 May, with late news no later than Tuesday 22 May.□

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The Month on The Air

*by John Allaway, G3FKM**

G3SWH RAISES the very important question of QSL managers and their varying quality. He finds that most are excellent but that others do not quite meet up to his hopes, and asks for guidance on exactly what should be enclosed with a card to make sure of a reply by a given route. Should one irc with an sae be enough for direct surface QSL? He quotes examples of QSL cards coming through bureaux even after several ircs have been sent. Superficially the answer seems very simple—surely if return postage is paid it should be posted? However that is not always the whole story. Some QSL managers not only take on the chore of filling out cards for their charges, but also pay for their printing. In addition to this it is not by any means the case that all countries have a free outgoing QSL bureau, and this can mean that even sending out a card that way can cost him money. So perhaps there are not all that many making a profit after all . . .

By a strange coincidence Martin, G4EFE, has raised a number of points noted as QSL manager for VS5DD. He emphasizes the point that the inclusion of an sae is vital—applications without these tend to get pushed to the back of the pile for deciphering later! Overseas applicants often forget to include their country on their return envelope, and this can mean having to re-open it after it has been sealed. Martin does point out that, as logs only arrive at monthly intervals, posting to him by first-class mail is rather a waste of money.

Many readers will have read of the fact that Bill Windle, G8VG, became a silent key on 7 December last. They will be pleased to hear that his callsign has been re-issued to his son Peter, who was formerly G3HVG.

Overseas news

G4GEE visited Lesotho during late January, and operated for a while as 7P8DD. He found cw almost impossible to use due to jamming from the USSR but did make about 30 QSOs with the UK, mostly on 21MHz. 7MHz was a dream band to use during daylight hours, and was used extensively by the well-organized emergency amateur radio services during the cyclone which hit 3D6 and ZS5 while he was there. There are very few active amateurs, most of whom are ex-patriates—including 7P8s CI, CL and CM. Bob makes the point that adequate return postage should be sent when applying for QSLs via the 7P8 bureau, which is financed by the Lesotho RC and which spends most of its income on postage. 7P8CT (G3ABK) has left Lesotho and is unlikely to return; QSLs for both him and 7P8DD should be sent to G4GEE (see "QTH Corner").

Barrie Clark, A4XJP, has been on Masirah Is, Sultanate of Oman, for two-and-a-half years and will return to the UK in June. Anyone still needing an A4XJP card should write to the address in "QTH Corner" immediately. All QSOs had been confirmed via the bureau to the end of January 1984, and everything will be made completely up-to-date and handed to the bureau manager before he leaves. A4XJP is on the air most days, generally on cw from 0400 to 1000 or 2000 to 2300 according to the week. Barry has been Masirah Is representative of the Royal Omani ARS.

Paul Kirby, 3D6AK, reports that he made contact on 1·8MHz with G3RPB just after 0200 on 21 August last year. Other UK stations worked on the band were G3YUV, GW3YDX, G3RBP and GM3YCB. After early October the QRN level became too high, but Paul hopes to be back in 3D6 in August and to make some more contacts.

The Ex-G Radio Club has elected the following officers for the 1984–5 period: president, WB8ATR; vice-president, ZL2BKI; directors–G2CWL/W8, WB2CHL, ZL3QA and WA6LEC.

Hamssi-84 will be the 25th summer "happening" of SRAL, the Finnish society. It will take place in Rauhalati (near Kuopio) from 19 to 22 July. There will be many interesting activities (including a Finnish sauna) as well as SRAL forums, technical and dx talks, outdoor events, and special programmes for the family. Further information may be obtained from Joxa Hartikainen, OH7OO, Kauppakatu 45, SF 70100 Kuopio, Finland (tel (358) 71 124311).

Amateur radio is prospering in Egypt. SU1ER has sent a list of members of the Egypt ARS which contains 16 names. Class 1 licence holders are SU1s AA, MI, AL, BA, CR, ER, IM, KG, KH and MA, and some of them appear on 7,080, 14,280, 21,380, or 28,580kHz, mostly on Fridays and Saturdays between 1600 and 2000. Ezzat makes a special plea for people to note that there is no Egyptian QSL bureau and that cards should be sent to the addresses in "QTH Corner". Only cards for SU1ER and SU1MR, together with correspondence for EARS, should be sent to Box 33, Air Port, Cairo.

DX news

G3WPF has received a detailed list from NE8Z (formerly WB8ABN) of past operations for which he still has logs. They are as follows: F0MH (1969), FG0MH (1971), KZ5GC (1979–80), PJ8RD, VP2AAB and VP2EEL (all 1971), ZF1CW (1969), WB8ABN/HC (1971/74–5), HC1EE (1974 only), HC1MD, HC1MM, HC5EE (1974–81), HC7EE (1980), HC8EE (1977/79–80), HC8MD (1981), HC8MM (1979), HC8VHF (1981, 50MHz), HC9A (1981), HD5EE (1976–9), HD8CD, HD8EE and HD9EE (1977), HD9X (1979–80), HD0E (Oct 1978), and HD0EE (1977). Rick can be contacted at the address in "QTH Corner".

From DL1FL, information that the position in Poland, amateur-radio wise, was discussed during the IARU reception held during the recent SW BC WARC in Geneva. All 8,000 former licensees many apply to have their licences back, but it seems that so far only about 4,500 have done so.

DF3NZ/ST2 is said to be on 14,150kHz daily at 1600, and on Tuesdays and Thursdays also on the USSR dx net on 3,640kHz. Another interesting African is F6FBN/TT, who has been on all bands—he seems to like 14,020, 21,020 and 28,020kHz, and asks for QSLs to his home address.

The DXAC is still undecided on country status for the Pribilof Is, but a decision may have been made by the time this is read. On searching through old QSL cards I discovered one from KL7DNE for a QSO in 1961—he was located on St Peter Is in the Pribilofs. It is believed that the position with regard to 4U1VIC is also under reconsideration.

On 31 May the Durban branch of the SARL will be on the air with a special station to celebrate Republic Day. The callsign will be ZS5RSA and operation will cover 3·5 to 28MHz, cw and ssb. This is the fifth year of this activity and a special QSL card will be sent to those making contact.

There now seems to be some doubt about the legality of the station claiming to be G8GRN/5X. OH2BH reports that the former G8GRN is now G4CTQ, who is currently operating from the Sudan.

DX News Sheet reports that many of the QSL cards sent out by the LU/Z expedition, which took place in 1982–3, seem to have gone astray. They recommend reapplying to LU1DZ for LU3ZI cards, and to LU2AH for QSL cards for LU5ZA, LU5ZE, LU5ZI or LU5ZR. (LU2AH, Gorostiaga 2320 P-15A, 1426 Buenos Aires, Argentina).

T30AT has a new QSL manager (G4GED—see "QTH Corner") who reports that the large backlog had been cleared by the end of February. Dave asks anyone who QSLd direct to the previous manager and did not receive a reply to re-submit to him. All requests must enclose return postage otherwise they will be sent via the bureau, and this may involve a long delay. T30AT and T30DB are often to be found on 14,150kHz around 1900.

Ezzat, SU1ER, and daughter Magi, SU1MR

*10 Knightlow Road, Birmingham B17 8QB

Expeditions

DXpress says that there will be activity from Spratly Is commencing about 2 May and continuing for a week. The call will be 1S1JZ and there will be three operators, all from the Philippines. Beams and linears have been promised. ARRL is now accepting 1S1CK cards for DXCC credit.

CY9SAB hopes to be on Sable Is a number of times this spring. He goes at very short notice in a two-engined light aircraft which lands on the beach and sometimes stays several days. He has a TS830, and among other antennas an inverted-V for 1·8MHz.

LA9PX has told G4KXW that he expects to be sailing to Hitra Is (200km west of Trondheim) between 17 and 20 May, between 30 May and 3 June, and for a longer period between 20 June and 20 August. He may also visit other island groups. His callsign will be LA9PX/P, and activity will be mostly on 3·5 and 7MHz cw and ssb in the late evenings. The island counts as Norway for DXCC but is separate (EU-36) for the IOTA Award.

Algeria

KC2XX had the pleasure of attending the 20th anniversary agm of the Amateurs Radio Algeriens (ARA). He says that M. Yacoubi, 7X2SX, the club's president and founder, remains the motivator for amateur radio in the country, having defended and nurtured it for some 20 years. Amateurs in Algeria are acutely aware that they must behave correctly and that at present they must exercise some discretion over making contact with certain countries. The Algerian government sees amateur radio as serving a number of useful functions—it attracts students into telecommunications and increases the pool of qualified personnel, it is an internationally recognized "sport" and puts the country on the map within a prestigious sub-culture, and it holds potential as a recreation for the handicapped. Technical competence compares with that in other developing countries, and the main problems arise from the lack of foreign exchange to buy equipment and literature. The size of Algeria poses problems for ARA, and the formation of club, rather than individual, stations is being encouraged—these are loaned equipment by the PTT.

USSR callsigns

A new system of regular callsigns will be in use from 1 May 1984 and full details (supplied by OK3BG, OK1HH, and DL1FL) are as follows:

The first letter of the prefix will be U or R—whether on hf or vhf. The second letter will denote the republic (A,N,V,W and Z for Russian SFSR) as in the present system. In callsigns with three-letter suffixes the administrative territorial unit (oblast, region, etc) is indicated in Russian SFSR by the first letter in connection with the prefix number, and in other republics by the first letter only.

Individual stations will have three letter suffixes ending in two letters from the AA-VZ series. Club stations will also have three-letter suffixes ending in two letters from WA-ZZ series. In Russian SFSR they will have the prefix UZ. In the Russian SFSR the existing system of call area numbers (1,2,3,4,6,9, and 0) will continue, but the other republics will use all numbers 0 to 9 (eg UB1-UB0, UJ1-UJ0).

All UK, EZ, and EY calls are discontinued, and pre- 1 May calls with three-letter suffixes ending in the WA-ZZ series will be changed into the AA-VZ series, and the first letter will be changed in calls belonging to stations located in Alma Ata, Navoi, Tales, Tashkent, or Sevastopol. Stations in Kiev will be changed to UT fromt their previous UB. Old two-letter calls will remain unchanged.

Well-known expeditioner DL1RK(l) and G3FAS (r) with DF8ZH in the shack used by DL1RK, DJ2PD and DF8ZH during their visit to CT3 last November

Miss Bharathi, VU2RBI, shown operating from the Laccadive Is—a QSL from the recent VU7WCY expedition

Welcome

To the following who joined the Society during February: DA4QA, EI4AYB, EI5FM, F8WN, HB9NG, KC4MJ, LX1GH, LX1PL, N2DXJ, OH0NC, OZ8AE, SM4DHP, V3CE, VE7AFJ, VK8GB, W2KN, W2KPQ, ZC4WW, ZS5PA, J. Hammond (ZC), G. Stockley (VE3), A. Spiteri (9H), K. Wood (Z2), M. Hurley (EI), and T. Chotisorayuth (HS).

JOTA 1983

The UK report on the 26th International JOTA says that UK participation fell from 523 (in 1982) to 455. Likewise activity in other countries fell from 628 (in 56 countries) to 479 (in 49 countries). A conservative estimate indicates that over 12,500 Scouts and Guides took part in the event. Groups taking part were located in ZC4, 9H1, 9H4, 9Y, CT2, EA8, EA6, FG, IT, IS, JW, OX, OY, V2, ZD7, SP and 5N, and other countries. The 1984 event will take place on 20 and 21 October. British Scouts may obtain details of other events by joining the UK Scout Net which meets at 9am every Saturday on 3,740kHz, or on the European net at 0930 on Saturday on 14,290kHz.

European DX Council conference

The European DX Council, an association of shortwave listeners and dx organizations in Europe, is holding its annual conference during the period 8–11 June 1984 in Stockholm, Sweden. The conference, organized by Radio Sweden International and the Swedish DX Federation, will have a special event station operating during the period 8–10 June, callsign 7SK0AC. Members of the Swedish Radio Amateur Radio Club (SK0AC) will operate the station, together with visiting operators from 4S, 9M, HV, OE and LA. The station will operate at various times from 1500gmt on 8 June on the following frequencies:

Daylight hours: cw 14,060 and 21,060kHz; ssb 14,320 and 21,350kHz.
Night hours: cw 3,550kHz; ssb 3,700kHz.
144MHz band operation will also take place.

UBA general meeting

The annual general meeting of UBA (the Belgian society) will take place on 12 May at the Crest Hotel, Antwerp. There will be an exhibition of radio and computer equipment, a df competition, and a dinner/dance. Intending visitors should contact ON5AZ.

1984 28MHz Table

G3XQU—111	G3TXF—47 (cw)	GW4TEJ—21 (ssb)
G4SKI—99	G3SXW—44 (cw)	G4OBK—8 (cw)
G4MUW—62 (ssb)	G4PEL—43	G4FVK—2
G4TTR—55	G4NXG/M—35 (ssb)	G3XTT—2
G4RAB—52	G4DXW—25	

Contests

Peace to the World Contest

2100 12 May to 2100 13 May

Open to licensed amateurs and listeners. Entrants may be: A, single-operator, single-band; B, single-operator, all-band; C, multi-operator, all-band, single transmitter; and D, listener. CW and phone 3·5 to 28MHz but

QTH CORNER

A4XJP	(to June 1984) B. Clark, BERS, Masirah Is, Sultanate of Oman.
W6KG/CE0	YASME Foundation, PO Box 2025, Castro Valley, Cal, 94546, USA.
NE8Z	Rick Dorsch, PO Box 62, Rochester, Mich, 48063, USA.
SU1AA	via SU1AL.
SU1AL	Loufty Moursy El-Mahdi, 13 El-Giza St, Giza, Egypt.
SU1BA	B.A. Bassiouni, Muqattam City, Cairo, Egypt.
SU1CR	Mohamed Shafie Reda, 50 Khedr ElTouny St, Nasr City, Cairo, Egypt.
SU1ER	Ezzat Sayed Ramadan, Box 33, Air Port, Cairo, Egypt.
SU1IM	Ibrahim Ibr. Mohamed, Box 840, Cairo, Egypt.
SU1KG	Mohamed Hassan Shaltout, 29 Omar Ben El-Khattab St, Pyramids, Giza, Egypt.
SU1KH	Mohamed Ahmed Rashed, 83 El-Mahatta St, El-Zaitoun, Cairo, Egypt.
SU1MA	Abdel-Moety Attiya, Box 840, Cairo, Egypt.
SU1MI	via SU1IM.
T30AT	via D. Richardson, G4GED, 92 Betham Rd, Greenford, Middx UB6 8SA.
VS5DD	M. Peters, G4EFE, 17 Hartley Gardens, Tadley, Basingstoke, Hants RG26 6UT.
ZK1XL	via ZK1CG, V. Rivera, Nikao, Cook Is.
ZL8AAS	ZL1AAS, R. Litten, 146 Sandspit Rd, Howick, Auckland, New Zealand.
ZL8AMO	ZL1AMO, R. Wright, 28 Chorley Av, Massey Henderson, Auckland 8, New Zealand.
ZL8BQD	ZL1BQD, R. Runciman, 36 Cardiff Rd, Pakuranga, New Zealand.
ZL0AJW/8	via ZL1BQD (see above).
ZL0AJW	via W6EC, D. Ausherman, 100 Sanders St, Fort Bidwell, Cal, 96112, USA.
3V8PS	via IN3RZY, D. Monauni, PO Box 212, 39100 Bolzano, Italy.
7P6CT, 7P6DD	Dr. R. Nash, G4GEE, 135 Farren Rd, Wyken, Coventry CV2 5EH.

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no cross-mode. Participants must operate within the segments 3,505-3,600kHz, 7,005-7,040kHz, 14,010-14,100kHz, 21,010-21,150kHz and 28,010-28,200kHz (on cw) and 3,600-3,650kHz, 7,040-7,100kHz, 14,150-14,350kHz, 21,200-21,450kHz, and 28,400-29,100kHz (on ssb). Exchange RS/T plus QSO number (from 001). USSR stations will also indicate their oblast number. Each QSO with own continent counts one point, with others three. Listeners score three points for recording both sides of a contact, only one if one side is noted. QSOs with own country count only as multiplier. Stations may be worked once per band only on one mode. The multiplier is the total of countries worked on each band added together—using the R-150-S list (this is essentially the DXCC list plus oblasts 002, 013, 014, 056, 084 to 098 inclusive, 159, plus Novaya Zemlya, the Kuril Is, and New Siberian Is. Some small "countries" like GU and GJ are not included. Unfortunately a current list was not supplied with the rules). Post logs before 1 July to CQ-M Contest Committee, PO Box 88, Moscow, USSR. Note that participants are able to claim the R-150-S, R-100-0, W-100-U, R-15-R, R-10-R, and R-6-K awards on the basis of their log contents provided that the stations in the USSR worked have also submitted a log. All who contact more than 10 USSR stations will be awarded commemorative badges.

VI Diploma Guide Dog Competition

0000 2 June to 2400 3 June

3·5 to 28MHz, phone only. Work members of URME (the Society of Handicapped Amateurs of Spain)—each QSO counts one point per contact, per band, per day. QSOs with ED1UR count five points, and this station must be worked at least once. Exchange RS and serial QSO number (from 001). Include name and callsign on each log sheet and mark duplicates. Send logs to arrive by 15 July to: URME, VI Guide Dog Competition, PO Box 175, Avila, Spain. Diplomas will be awarded to those with 50 points, and continental champions will receive a special trophy.

JY9CL (G3MUL), operating at the amateur radio club premises in Amman, Jordan, when he visited in October 1983

Rules of the **Helvetia Contest** were given in last month's column. Results of the 1983 event show UK scores as follows: **G3ESF** (16,350 points), G4IQM (15,729), **GM4LGM** (12,096), G3VOF (5,130), G3HRY (3,720), G4OKN (2,838), G8QZ (390), and G3XWZ (240).

HARTS activity weekend

The Hong Kong society's special activity period this year will be from 0700 2 June to 0700 3 June. As many VS6s as are able will be on the air on all bands/modes as well as Oscar 10. HARTS issues three attractive awards —more details will be given in next month's column.

Awards

MM Certificate

For contact (or reception report) with MM members or expeditions. These are: UA4WBJ, UA4WBJ/UG9G, UA4WBJ/U9F, UA4WBJ/U7K, RX4WBJ, UA4WCE, UA4WCE/U9G, UA4WCE/U9F, UA4WCE/U7K, RX4WCE, UA4WBQ/U9G, UA4WBQ/U7K and UK4WAE/U9G. Send QSO information plus seven ircs to: MM, Box 15, Izhevsk, 426064, USSR.

R-150-S Award

Issued to licensed amateurs and listeners for confirmed QSOs/reception reports since 1 June 1956 with 150 countries from the R-150-S list (obtainable for one irc from Box 88) including all 15 republics of the USSR. They must be all cw or all phone, and a list of contacts—checked against QSLs by a national society awards manager (G3KDB)—should be sent with 14 ircs to: Central Radio Club, Box 88, Moscow, USSR.

R-6-K Award

For QSOs/reception reports from Europe, Africa, Asia, N America, S America, and Oceania, plus three with European and three with Asiatic USSR since 7 May 1962. There are three classes: (a) First, all 3·5MHz; (b) Second, all 7MHz; and (c) Third, any band/s. Apply as for R-150-S.

R-100-0 Award

For contacts/reception reports after 1 January 1957 with 100 oblasts. Three classes (as R-6-K). All cw or all phone. Apply as for R-150-S.

Ontario Bicentennial Award

For collecting 200 points from working Ontario stations during 1984. Each different station counts 20 points, and if using a special prefix this is increased to 40. Send list of QSOs and three ircs to VE3LSS, Bicentennial Project, LDSS, Listowel, Ont, N4W 2M4, Canada.

Around the bands

G8KG's summary reads as follows: "The upsurge in solar activity which began late in January was still in evidence at the time of writing (25 March), though there were signs that it might be at least temporarily running out of steam. At this time the 27-day average solar flux had been above 120sfu for over 50 days, but was falling, while the highest daily figure in March was only 136sfu as compared with 174 in February and 180 in January.

"The effect of this upsurge on the general progress of Cycle 21 is that mean activity for the first quarter of 1984 is at least as high as for the corresponding period a year ago. In broad terms the cycle seems to be 'marking time'."

As always, thanks to the following for information supplied—G2HKU, G3YY, G5JL, G3s BDS, GVV, KSH, YRM, GM4CHX, G4s EHQ, ETZ, LRS, NXG/M, OBK, TTR, UOL and UYR, and RS10906.

Stations listed in italics were using A1A.

1·8MHz. 0000 ED9EA, *LX/DF2PI.* 0100 VE1YX, *4X4NJ.* 0300 EA9KF. 0500 *WA3EFL,* 4U1ITU. 0600 *JW5NM,* K2BU. 1900 *EA6KZ, 9H1FN.* 2200 RA2EDB.

3·5MHz. 0000 EA6TB, *ZB2EO.* 0500 *PA0VDV/PJ2,* T77V, W6NLZ, W7BGH, W7ZRC, YS9RVE. 0600 *FC9VN N7CW* (Ariz), *ZLs 2OM, 3GQ.* 0700 *ZL1AIZ.* 2200 VK6LK, 4N9YU. 2300 C53AL, FM7WS, G3ZGC/J6L, 7X2SL.

7MHz. 0000 *CO7W, VU2BK, 4S7DA, 6Y5HN.* 0700 *KK9A/V2A, VE7, VK, VP9BK, W6-W7, ZL.* 1800 *UA9YAN, VK3MR, ZB2EO.* 1900 A71AD, *CN2AQ,* JH3TKM. 2200 *VK6RU.* 2300 CN8CX, *PA0VDV/PJ2,* TR8CR, YK5UDX (?).

10MHz. 0200 *NP4V.* 0700 *K5ONF, W6YDF, ZL.* 0800 *CT4DX, VK2PA, W7BNK, ZL4QO.* 0900 *JP1BTA, VK3VJ, VK7RJ.* 1000 *JW5NM, K5ONF.* 1600 *JP1BTA.* 1900 *JP1BTA, W4FX, 9H1BB.* 2100 *SV5OX, VK3VJ, VK6GF, YV0AA.* 2200 *KV4AD, DL2GG/YV5.* 2300 *LU6AMW, PA0VDV/PJ2, K4LTA/PJ7, VP2KCA.*

14MHz. 0600 VK, ZL. 0800 KL7QY, T30AT, *ZK1XL.* 0900 *OX3UD.* 1000 FK8TR, YI1BGD, *9V1TL.* 1300 *ZL2VS, ZL0AEA.* 1400 W6. 1600 3A2LF. 1700 FB8WJ, 9M2DF. 1800 KH6BB. 1900 *J37AJ,* ZL4BC, *4S7EF.* 2000 *HH2CF,* HH5CB,

JW6MY, LU1ZA, VP2KCA, VP8KF. **2100** A71BK, VP5GT. **2200** *KC7UU/5N6.* **2300** EL2AN, *W7TPU.*

18MHz. 0900 *CT, DL, F, G, OE.* **1100** *LA7CE.* **1600** *I4MSN.* **1700** *C6ABA.* **1900** *OE1EUO.*

21MHz. 0800 *JA.* **0900** *HL1CX, TA1UA.* **1000** *JW5NM.* **1100** VK, *VP8KF, VS6HI, 4S7DA,* KC7UU/5N6. **1200** *FM7CT, VK6HD, VS6BQ.* **1300** HZ1AJ, *TF6JZ.* **1400** HV3SJ, TU2LE, *3B8FK.* **1500** C53EZ. YV0AA. **1600** S83H, TL8ER, YC4FW. **1700** *TJ1QS,* W6-W7. **1800** KK9A/V2A, OE8HFL/YK. **1900** HH7PV, KH6OR, W5, W7. **2200** *VS6JF, 6W1CC.*

24MHz. 0900 *DL7GK, VK6AKG.* **1500** *DL7AA.*

28MHz. 0900 *ZC4BI, KC7UU/5N6.* **1000** HL1AKH, JA, VK4QN, 9N1RNK. **1100** C53AL, DF3NZ/ST2. **1200** *A4XJZ,* KF6ME/DU2, VK6UV, *VK8HA, ZS,* 4S7VG. **1300** A71BJ, FB8WJ, *J28DX,* TL8YD, TR0AB, VP8LP. **1500** A92Z, D44BC, HH2VP, S83H, TU73, VP2EC, ZD9BV, 3B8FK, 5N1ARY, 7P8CM. **1600** CE, *EA8GS,* W5QO, ZD7CW, *5U7SDV.* **1700** *N0DDQ* (Colo.). **1800** *CE5BYU,* HK0HEU, *LU, PY, PZ, VP8KF,* 6W8AR. **1900** *VP2KCA, 6Y5HN.* **2000** *K4LTA/PJ7.* **2100** *YV3IUP.*

Thanks once more to the following for items extracted: 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), *CQ Magazine* (W1WY), and *DXNL* (DL3RK).

Closing date for **July** issue will be **24 May**—all items to reach G3FKM by that date please. □

HF propagation predictions for May 1984

Using the table

The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band, ie 0 = 0000, 2 = 0200, 4 = 0400 etc.

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

	28MHz				21MHz				14MHz				10MHz				7MHz				3·5MHz			
GMT	000 024	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						122	212	32	214	666	667	885	766	544	445	789	763	211	112	478	43			4†
Malta						122	222	43	313	777	677	897	977	655	455	799	986	322	223	578	†† 3			24†
Gibraltar						1		21	2	466	566	885	855	765	556	799	987	533	223	578	†† 4	2		25†
Iceland									1	34	444	564	633	565	555	678	776	533	223	457	554	2		24
ASIA																								
Osaka						11	111		1 1	243	234	463		2	2	463				23				
Hong Kong						123	223	2	1 1	133	235	774	2		2	475				253				2
Bangkok					1	234	334	41	211	123	235	786	3		2	577	1			255				22
Singapore					1	344	334	41	211	123	235	784	3		2	577	1			256				23
New Delhi					1	334	334	42	322	112	235	786	63		2	578	4			257				24
Teheran	11	1	1		1	444	445	641	545	322	235	798	853		2	578	73			257	4			24
Colombo	11	1			1	345	445	12	332	113	235	686	63		2	578	5			257	2			24
Bahrain	111	111	21		2	445	556	752	655	222	235	798	863		2	578	73			257	4			24
Cyprus	111	111	21		1	566	656	762	767	655	566	899	986	322	234	689	863	1	1	368	†4			35
Aden	112	223	3		1 1	545	567	853	865	311	235	799	973		2	578	751			257	52			24
OCEANIA																								
Suva (S)							11	1	1	243	233	541	2	321	2	43		1		11				
Suva (L)				1	11	3		63	224	631	11	263	3	42	1	431	1	1		11				
Wellington (S)									112	442	221	153	113	321	2	352	1	1		12				
Wellington (L)					11	1		3	545	51		55	224	42		253	1	1		12				
Sydney (S)						232			113	653	223	424	1 1	32	2	464		1		251				2
Sydney (L)					1			4	422	53		46	112	42		163		2		141				
Perth	11				1	455	1		423	353	211	12	42	12	2	462	2			256				23
Honolulu							1	1	1	132	114	421	13	321	2	2	1	1						
AFRICA																								
Seychelles	112	223	1		1 1	545	567	632	755	212	235	789	963		2	578	74			257	5			24
Mauritius	112	223	31		1	556	667	863	716	323	235	799	953		2	578	751			257	52			24
Nairobi	112	334	4		2 1	545	668	854	866	422	235	799	985	1	2	578	772			257	54			24
Harare	112	345	52		2	555	678	974	965	622	235	799	986	3	2	478	874			257	54			24
Capetown	11	354	1			465	678	51	41	653	235	776	871	42	2	478	873	1		257	54			24
Lagos	11	355	62		21	354	568	982	985	642	124	799	997	41	1	478	874	1		257	542			24
Ascension Is	11	124	63			64	457	983	751	153	123	789	985	32	1	478	875	1		157	552			24
Dakar	11	134	53		1	164	566	884	876	653	222	689	997	42		378	875	1		157	552			24
Las Palmas		11	22		1	155	456	773	855	776	666	799	998	643	333	589	886	321	111	268	†† 3			35
S AMERICA																								
South Shetland		134	3				467	84	1 1	2	224	786	645	21	1	468	775	1		146	552			3
Falkland Is		123	43			1	567	882	633	213	224	688	987	42	1	368	775	2		136	552			3
Rio de Janeiro	1	122	43		1	4	456	884	875	233	222	589	997	42		258	775	2		37	552			4
Buenos Aires		122	33		1	1 3	456	784	875	6 3	223	579	997	42		248	775	2		16	552			3
Lima			12		2	1	344	464	853	452	232	247	886	421		15	775	2		2	442			
Bogota			1		2	12	333	354	853	343	221	137	886	42		4	675	2		1	342			
N AMERICA																								
Barbados		1	12		2	14	344	465	964	443	211	147	987	42		15	775	2		3	442			
Jamaica			1		1	1	233	344	742	213	221	126	786	421		3	575	2		1	242			
Bermuda					1	2	222	243	731	223	221	247	786	421		14	575	2		1	242			
New York							112	132	631	13	222	236	675	321		13	474	2		1	42			
Mexico							111	132	521	1	232	113	475	32		1	154	2			22			
Montreal							111	122	621	13	222	246	675	321		13	364	2		1	42			
Denver								1	421	1	122	223	355	31		1	144	2						
Los Angeles								11	311	1	23	222	245	31	1		24	1						
Vancouver									211	11	12	222	235	32	1		14	1						
Fairbanks									111	232	112	222	123	321	2	211	1	1						

The provisional mean sunspot number for February 1984 issued by the Sunspot Index Data Centre, Brussels, was 84·5. The maximum daily sunspot number was 121 on 23 February, and the minimum was 50 on 18 February. The predicted smoothed sunspot numbers for May, June, July, and August 1984 are, respectively: (classical method) 50, 49, 48, and 46; (SIDC adjusted values) 41, 38, 36 and 35.

Contest News

RSGB SSB Field Day/IARU Region 1 HF Phone Field Day 1984 rules

1. Eligible entrants. Members or groups of members of the RSGB located in the British Isles.
2. The general rules for RSGB hf contests, published in the January 1984 issue of *Radio Communication*, will apply.
3. Period. 1500gmt Saturday 1 September to 1500gmt Sunday 2 September.
4. Sections.
(a) Open. Multi-operator, maximum licensed power. Equipment: one transmitter and one receiver, or one transceiver plus an additional receiver if desired. Antenna: no restriction.
(b) Restricted. Multi-operator, 200W p.e.p. input maximum. Equipment: only one transmitter and one receiver, or one transceiver. Antenna: only one antenna may be used which must be a single element such as a dipole, long wire, W3DZZ, or trapped vertical, having not more than two elevated support points. No part of the antenna may be higher than 15m above ground level.
Notes (these apply to both sections).
(i) Stand-by equipment is allowed, but it may not be connected at the same time as the main equipment.
(ii) The use of support points for antennas from permanent buildings or structures is not permitted.
5. Location. Each portable station must operate from the same site for the duration of the contest and may not be located in a permanent building or use public mains supply.
6. Power. Power for all equipment may be derived only from a portable generator on the site, accumulators, or batteries.
7. Installation. No equipment or antennas may be installed or erected on the site prior to 24 hours before the start of the contest. This does not apply to the storage of equipment.
8. Contacts. Phone only in the 3·5, 7, 14, 21 and 28MHz bands.
9. Contest call and exchange. Call "CQ Field Day". Exchange RS plus serial number starting with 001.
10. Scoring
(a) QSO with a fixed station in IARU Region 1 ... ... 2 points
(b) QSO with any station outside IARU Region 1 ... ... 3 points
(c) QSO with a portable or mobile station in IARU Region 1 ... 5 points
See Appendix for list of IARU Region 1 countries.
11. Multiplier. Each DXCC country worked on each band gives one multiplier.
12. Final score. The total points scored on all bands is to be multiplied by the total number of different countries worked on each band to give the final score (ie total QSO points × multiplier = final score).
13. Logs. Separate logs are required for each band, together with a check list showing the countries worked on each band. Log sheets are to be headed: date/gmt; station worked; RS and serial number sent; RS and serial number received; operator; new country/multiplier; points. RSGB HF Contest Log Sheets should be used.
14. Declaration. Logs must be accompanied by an RSGB HF Contest Cover/Summary Sheet with the declaration signed by the person responsible for the contest entry.
15. Address for logs: RSGB HF Contests Committee, c/o P. Miles, G3KDB, PO Box 73, Lichfield, Staffs WS13 6UJ.
16. Deadline for logs: postmarked not later than the Monday 22 days after the end of the contest.
17. Awards. The leading station in the Open Section will receive the Northumbria Trophy. The leading station in the Restricted Section, and the entrants placed second and third in each section will receive certificates of merit. Certificates will also be awarded to the stations submitting the leading check log from each continent.
IARU Region 1 will award certificates to the top 10 stations in each section in the combined results table.
18. Any log found to contain more than five unmarked duplicate contacts for which points have been claimed will be automatically disqualified. Points to the rate of 10 times the contact value will be deducted for each unmarked duplicate contact up to five.
Appendix
IARU Region 1 countries include those in Europe, Africa, USSR, Mongolia, ITU Zone 39. For a precise definition refer to the RSGB *Amateur Radio Operating Manual*.

21/28MHz Telephony Contest 1984 rules

TRANSMITTING SECTION
1. The general rules for RSGB hf contests, published in the January 1984 issue of *Radio Communication* will apply.
2. Eligible entrants
(a) British Isles. RSGB members only.
(b) Overseas (including EI). All licensed amateurs.
3. Period. 0700 to 1900gmt Sunday 14 October 1984.
4. Sections. (i) Single-operator. (ii) Multi-operator, multi-band only.
5. Frequencies/mode. 21 and 28MHz, phone only. Entrants are requested **not** to operate in the bands 21·400 to 21·450MHz; 28·200 to 28·400MHz and 29·100 to 29·700MHz.
6. Exchange. RS report and serial number starting at 001.
7. Scoring.
(a) British Isles entrants: Three points for each completed contact with a station in the rest of the world. Multipliers will be countries on the ARRL Countries List except that VO1, VO2, VE, VK, ZL call areas and USA and Japanese call areas irrespective of prefix, will count as separate countries. Contacts with British Isles stations will not count for points or multipliers.
(b) Overseas entrants: Three points for each completed contact with a station in the British Isles. Multipliers will be British Isles prefixes which are: G0, G2, G3, G4, G5, G6, G8, GD0, GD2, GD3, GD4, GD5, GD6, GD8, GI0, GI2, GI3, GI4, GI5, GI6, GI8, GJ0, GJ2, GJ3, GJ4, GJ5, GJ6, GJ8, GM0, GM2, GM3, GM4, GM5, GM6, GM8, GU0, GU2, GU3, GU4, GU5, GU6, GU8, GW0, GW2, GW3, GW4, GW5, GW6, GW8. Contacts with GB stations will not count for points or multipliers.
For all entrants the total score will be the number of points on each band added together times the number of multipliers on each band added together. Unmarked duplicate contacts will be penalized at 10 times the points claimed. Entries containing five or more such duplicates will be automatically disqualified.
8. Logs. Log sheets to be headed: date/time gmt; station worked; RS and serial number sent; RS and serial number received; multiplier; points claimed. Separate logs must be submitted for each band and a summary sheet showing the multipliers worked on each band must be included.
9. Declaration. Each entry must be accompanied by the following declaration, signed and dated: "I declare that this station was operated strictly in accordance with the rules and spirit of the contest and agree that the decision of the Council of the RSGB shall be final in all cases of dispute".
10. Address for logs. RSGB HF Contests Committee, c/o Mr D. Lawley, G4BUO, 220 Shipbourne Road, Tonbridge, Kent TN10 3EL, UK.
11. Closing date for logs. British Isles entries must be received by 4 November 1984. Overseas entries must be received by 10 December 1984.
12. Awards.
(a) British Isles. The Whitworth Trophy will be awarded to the leading British Isles entrant and the Powditch Trophy will be awarded to the leading British Isles entrant on 28MHz. Certificates of merit will be awarded to those placed second and third overall and to the leading station in the multi-operator section.
(b) Overseas. Certificates of merit will be awarded to those placed first, second and third overall, and to the leading station in the multi-operator section. Certificates of merit will also be awarded to the leading station in each country.

RECEIVING SECTION
Rules as for the transmitting section except as varied below.
2. Eligible entrants.
(a) British Isles: RSGB members only.
(b) Overseas (including EI): all swls.
Note that holders of transmitting licences for frequencies above 30MHz may enter the receiving section.
7. Scoring/multipliers. British Isles swls should only log overseas stations in contact with British Isles stations taking part in the contest. Overseas swls should only log British Isles stations in contact with overseas stations taking part in the contest. Scoring and multipliers as the transmitting section.
8. Logs. Logs to the headed: date/time gmt; callsign of station heard; callsign being worked; RS and serial number sent by the station heard; multiplier; points claimed. A summary sheet showing multipliers heard on each band must be included.
Note: In the column headed station being worked, the same callsign may only appear once in every three contacts logged except when the logged station is a new multiplier for the receiving station.
9. Declaration. Each log must be accompanied by the following declaration: "I declare that this station was operated within the rules of the contest and I do not hold a transmitting licence for frequencies below 30MHz".
12. Awards. The Metcalf Trophy will be awarded to the leading British Isles entrant. The Powditch Receiving Trophy will be awarded to the leading British entrant on 28MHz. Certificates of merit will be awarded to those placed second and third overall and to the leading entrants in each overseas country.

21MHz CW Contest 1984 rules

Special note for both sections: entrants are particularly requested to use standard size (A4) log sheets.

TRANSMITTING SECTION
1. The general rules for RSGB hf contests, published in the January 1984 issue of *Radio Communication*, will apply.
2. Eligible entrants. Single operator stations only. British Isles entrants must be members of RSGB. Overseas entrants, all licensed amateurs.
3. Period. 0700 to 1900gmt, Sunday 21 October 1984.
4. Sections.
(a) British Isles section.
(b) QRP British Isles section. British Isles stations using less than 10W input.
(c) Overseas section (including EI).
(d) QRP Overseas section. Overseas stations using less than 10W input.
5. Frequency/mode. 21MHz. CW only. Entrants are requested **not** to operate in the band 21·075 to 21·125MHz.
6. Exchange. RST report plus a progressive QSO number starting with 001.
7. Scoring.
(a) British Isles stations. Only contacts with overseas stations will count for points. Each contact shall score three points. The final score is the number of countries worked multiplied by the total number of points.

The ARRL Countries List will apply with the exception that VO1, VO2, VE, VK, ZL and USA and Japanese call areas, irrespective of prefix, will count as separate countries.

(b) Overseas stations. Each completed contact with a British Isles station will score three points. The final score is the number of British Isles prefixes multiplied by the total number of points. British Isles prefixes are; G0, G2, G3, G4, G5, G6, G8, GD0, GD2, GD3, GD4, GD5, GD6, GD8, GI0, GI2, GI3, GI4, GI5, GI6, GI8, GJ0, GJ2, GJ3, GJ4, GJ5, GJ6, GJ8, GM0, GM2, GM3, GM4, GM6, GM8, GU0, GU1, GU2, GU3, GU4, GU5, GU6, GU8, GW0, GW2, GW3, GW4, GW5, GW6, and GW8. Contacts with GB stations will not count for points or multipliers.

Duplicate contacts. Unmarked duplicate contacts for which points have been claimed will be penalized at 10 times the claimed points. Entries containing more than five such duplicates will be automatically disqualified.

8. Logs. Log sheets to be headed: Date/time gmt; station worked; RST and serial number sent; RST and serial number received; multiplier; points claimed. They should be submitted with a cover sheet indicating antenna, equipment and power used and must include a separate list of countries worked as specified in rule 7 above.

9. Declaration. Each entry must be accompanied by the following declaration, signed and dated: "I declare that this station was operated strictly in accordance with the rules and spirit of the contest and agree that the decision of the Council of the RSGB will be final in all cases of dispute".

10. Address for logs. RSGB HF Contests Committee, c/o R. A. Treacher, BRS32525, 79 Granby Road, Eltham, London SE9 1EH, England.

11. Closing date for logs. British Isles entrants, 26 November 1984: overseas entrants, 31 December 1984.

12. Awards. The leading British Isles station will be awarded the T. E. Wilson G6VQ Cup, and will also receive RSGB publications to the value of £10. Certificates of merit will be awarded to the leading three stations in each section, and to the leading station in each overseas country.

RECEIVING SECTION

Rules as transmitting section except where specified below.

2. Eligible entrants

(a) British Isles. RSGB members only.

(b) Overseas (including EI) all swls.

Holders of transmitting licences for frequencies above 30MHz may also enter the receiving section.

7. Scoring. British Isles swls should only log overseas stations in contact with British Isles stations participating in the contest.

Overseas swls should only log British Isles stations in contact with overseas stations participating in the contest. Scoring and multipliers as in transmitting section.

11. Logs. Log sheets to be headed: date/time gmt; callsign of station heard; report and serial No sent; callsign of station being worked; multiplier; points claimed.

Note. In the column headed station being worked, the same callsign may only appear once in every three contacts except when the logged station is a new multiplier for the receiving station.

Each entry should be accompanied by a completed declaration: "I declare that this station was operated within the rules of the contest and that I do not hold a transmitting licence for frequencies below 30MHz".

12. Awards. Certificates of merit will be awarded to the leading three entries from the British Isles, and to the leading entrant from each overseas country.

Summer 1·8MHz Contest 1984 rules

1. Aim of the contest. To encourage the use of 1·8MHz band.

2. Eligible entrants. Single or multi-operator. British Isles entrants must also be members of the RSGB.

3. Period. 2100gmt Saturday 23 June to 0100gmt 24 June 1984.

4. Sections.

(a) British Isles stations

(b) Overseas stations (including EI).

5. Frequency/mode. 1·81–2·0MHz cw only.

6. Contest call and exchange. CQ test, RST plus serial number starting at 001. British stations must also give their county codes as published in the January 1984 issue of *Radio Communication*.

7. Scoring.

(a) British Isles section. Three points for each contact, with a bonus of five points for the first contact with each new British Isles county/region and the first contact with each new country outside the British Isles.

(b) Overseas section. Three points for each contact with a station in the British Isles (not EI), with a bonus of five points for the first contact with each new county/region.

8. Logs. Log sheets to be headed: date/gmt; callsign; RST/number sent; RST/number received; code received; bonus; points.

9. Declaration. Each entry must be accompanied by the following declaration, signed and dated: "I declare that this station was operated strictly in accordance with the rules and spirit of the contest, and agree that the decision of the Council of the RSGB shall be final in all cases of dispute".

10. Address for logs. HF Contests Committee, c/o Roger Western, G3SXW, 23 Portsmouth Avenue, Thames Ditton, Surrey KT7 0RU.

11. Closing date for logs. Logs must be postmarked not later than Monday 9 July 1984.

12. Awards.

(a) Certificates of merit will be sent to the first three stations in each section and to the leading entrant from each overseas country.

(b) A certificate of merit will be awarded to the highest placed entry from a station which has not entered the Summer 1·8MHz Contest before. Candidates for this award should mark their entries "First-time entrant".

(c) A certificate of merit will be awarded to the highest placed entrant in the British Isles section who has reached pensionable age on or before 25 June 1984. Candidates for this award should mark their entries "Senior Citizens' Award".

June 70MHz & SWL Contest rules

0900—1500gmt, 3 June 1984

This contest coincides with the latter part of HF NFD, and will be run on this date as an experiment to gauge the demand for an event that class B licensees can take part in (under supervision) while helping with HF NFD, and to encourage groups to try vhf operation from "hf" sites and vice versa. Comments will be very welcome and will determine the form that next year's event will take.

The following general rules, published in the supplement to the January 1984 issue of *Radio Communication*, will apply 1, 2, 3, 4e, 5a, 6a, 7a, 9, 10a 11a, 12a, 13–24.

All entries and check logs to VHF Contests Committee, c/o B. J. Morton, G4HWA, 39 Green Lane, Blackwater, Hampshire GU17 9DG.

June 1,296MHz Trophy Contest rules

1600–2400gmt, 9 June 1984

The following general rules, published in the supplement to the January 1984 issue of *Radio Communication*, will apply 1, 2, 3, 4e, 5a, 6a, 7a, 9, 10a, 11a, 12b, 13–24.

All entries and check logs to: VHF Contests Committee, c/o G. M. C. Stone, G3FZL, 11 Liphook Crescent, Forest Hill, London SE23 3BN.

June 432MHz Trophy & SWL Contest rules

0900–1700gmt, 10 June 1984

The following general rules, published in the supplement to the January 1984 issue of *Radio Communication*, will apply: 1, 2, 3, 4e, 5a, 6a, 7a, 9, 10a, 11a, 12b, 13–24.

All entries and check logs to: VHF Contests Committee, c/o R. W. Marshall, G4ERP, 44 Malleson Road, Gotherington, Cheltenham, Glos GL52 4ET.

The VHF Contests Committee is always pleased to receive good black and white photographs with contest entries with a view to publishing them with the results, if they prove suitable and there is sufficient space.

Cumulative Contests 1984 results

While the activity was high during the six separate Cumulative Contest sessions in January, the number of logs received was disappointing. Over 150 different callsigns appear in the logs, with 100 or more being active in two or more sessions, but from these only 36 transmitting entries and just one receiving entry were sent for checking. As will be seen from the tabulations, there were 15 logs for 1·8MHz, 23 for 3·5MHz and 27 for 7MHz. (Some stations' logs covered more than one band.)

There were a number of very accurate logs, and a few had no errors at all. One of these was from G4UPS, who not only had a faultless entry, but also made the highest scores on all three bands. Although his call is fairly recent he is an experienced operator and is perhaps better known under his previous call of ZD8TC. In addition to the certificate for G4UPS, the committee has decided to award a runner's-up certificate to G3SYA, who also had an error-free log and a good score in all six sessions. As there was only one swl log (from BRS52868), the committee felt unable to award a certificate in this section. Thanks are due to him and to the others who sent in check logs. These were most useful for cross-checking the accuracy of the entrants' logs.

There seems to have been some confusion about the rule relating to serial numbers. Some entrants started at 001 for each session (as was intended), while others carried their numbers over from session to session. As these contests are a friendly affair with a minimum of restrictions and rules, this was not a problem and no penalties were incurred. Some entrants asked why they were not permitted to work European stations, but this was not the case as any completed QSO counted for points. The adjudicator was in Monaco during the 7MHz sessions and made a number of contacts with contestants from the station of 3A2AH.

The addition of the two sessions on 7MHz seems to have been well received and will become a regular feature of these contests. The committee is very grateful to all those who sent in comments. As in previous years there are far too many to print in full, but a selection is given below. In the report on the earlier 28MHz cumulatives mention was made of entrants who failed to put their callsigns on their logs, and it again happened in this contest. This does cause extra work for the adjudicator and can result in the wrong score being credited to an entrant.

Comments from entrants

"This is my first contest attempt. Enjoyed it very much, thanks for the effort."—*G4OOT*. "Thanks for enjoyable series of contests. I liked the scoring system as it certainly encouraged careful operation and less essence on speed."—*G4ARI*. "This is my first ever contest and enjoyed it very much. These short contests are ideal for new operators such as myself. More please."—*G4TFU*.

"Sincerely hope that there will be repeat next year on 7MHz."—*G4KGK*. "There seemed to be more stations taking part this year and that entrants were taking the contests more seriously. I was asked several times for the third letter of my call as some of the G4's could not believe that a G3 + 2 was taking part."—*G3SB*. "First session benefitted people getting ready for AFS. An hour earlier start would give better conditions (on 80)."—*G3RZP*. "I like these short sharp contests, just the ticket."—*G4QK*. "Many thanks for another set of enjoyable contests."—*G3MCX*. "Again I enjoyed the free and easy atmosphere and especially the more hectic 7MHz sessions. The presence of the two Continental contests during the second session provided good contest experience. Please make 7MHz a permanent feature."—*G4GXI*. "All sessions lively, but not so many old-timers this year."—*G2HLU*. "Have never participated before, but short sharp sessions are always fun and easy to fit in."—*G3SXW*. "Thoroughly enjoy these 2h contests. General standard of operation was high. Please continue these and add more 2h contests to the list please."—*G3YCP*. "I really enjoyed these mini-contests. Not everyone has the room for 3·5 and 1·8MHz aerials so thanks

for including 7MHz."—*G4MVA*. "There was a fault on my receiver during the 3·5MHz contest which introduced 50dB of attenuation. Funnily enough this did not seem to make much difference. I wonder if there is a moral of some sort in that."—*G4WYK*.

And finally, there was a long letter from G3KSH, who felt that some of the rules were imprecise, particularly those covering serial numbers and the stations that could be worked. This is the fourth set of cumulatives using the same rules and there have not previously been any difficulties, but he is of course correct and the committee will reframe the rules in question to avoid future misunderstandings. By popular request, the next set of cumulatives will be on 28MHz phone later in the summer, with further cw sessions next winter. *G6LX*

1·8MHz

Posn	Callsign	Club	17/1	26/1	Total
1	G4UPS	Yeovil	153	108	271
2	G3SYA	Preston	126	102	228
3	G4OGB	Scunthorpe	75	84	159
4	G3GHY	—	81	72	153
5	G3MCX	SRCC	66	66	132
6	G3SXW	HF Contests Com	69	60	129
7	G4OBK	Leyland Hundred	—	126	126
8	G4BOU	Verulam	56	42	78
9	G4ECI	Stockport	75	—	75
10	G3AWR	RNARS	9	60	69
11	G4OTV	—	53	—	53
12	G4GXI	Easington	12	—	12
—	G3WYK	—	—	C/Log	—
—	G3TXF	HF Contests Com	C/Log	—	—
—	G6LX	HF Contests Com	C/Log	C/Log	—

3·5MHz

Posn	Callsign	Club	7/1	15/1	Total
1	G4UPS	Yeovil	156	171	327
2	G3SYA	Preston	159	144	303
3	G4OGB	Scunthorpe	162	138	300
4	G3YCP	—	123	168	291
5	G2HLU	—	144	132	276
6	G3RZP	—	123	144	267
7	G3SB	—	129	123	252
8	G4IZZ	—	108	114	222
9	G4KDL	Lowestoft	84	126	210
10	G4BOU	Verulam	57	147	204
11	G3GHY	—	90	99	189
12	G3MCX	SRCC	84	99	183
	G3WYK	—	183	—	183
14	G3AWR	RNARS	81	90	171
	G4TFU	—	84	87	171
16	G4ARI	Leicester Poly	156	—	156
17	G4ECI	Stockport	135	—	135
18	G4GXI	Easington	57	75	132
19	G4OTV	—	—	111	111
20	G3KSH	—	45	57	102
21	G4PVB	Verulam	27	9	36
—	G3TXF	HF Contests Com	C/Log	—	—
—	G4QK	—	C/Log	—	—
—	G6LX	—	C/Log	—	—

7MHz

Posn	Callsign	Club	21/1	29/1	Total
1	G4UPS	Yeovil	213	174	387
2	G3SYA	Preston	201	159	360
3	G4BOU	Verulam	147	144	291
4	GM3SID	—	168	122	290
5	G4KGK	Ainsdale	126	159	285
6	G4OTV	—	156	117	273
7	G2HLU	—	126	135	261
8	G4MVA	Scarborough	135	120	255
9	G4GXI	Easington	126	114	240
10	G4KDL	Lowestoft	120	96	216
11	G3SB	—	111	99	210
12	G3AWR	RNARS	105	96	201
	G3RZP	—	99	102	201
14	G3MCX	SRCC	96	102	198
	G4OGB	Scunthorpe	105	93	198
16	G4IQM	Crawley	168	—	168
	G4OOT	Ainsdale	78	90	168
18	GW4PXQ	—	81	78	159
19	G4IZZ	—	150	—	150
20	G4NFX	—	66	75	141
21	G4ARI	Leicester Poly	126	—	126
22	G3HQH	—	—	117	117
	G4MUL	—	—	117	117
24	G4ECI	Stockport	114	—	114
25	G4NSE	—	105	—	105
26	G3KSH	—	75	—	75
27	G4PVB	Verulam	12	3	15
—	3A2AH (G6LX)	HF Contests Com	C/Log	C/Log	—

February 144MHz CW Contest results

Conditions were very poor for this contest, but in spite of this activity was reasonably high, with 34 entries and many more stations active. Comments included the following: "Conditions were flat! Low activity from Continent made the event hard work but enjoyable"—*G4MDZ*; Extremely hard going from the West Country in all directions"—*G6GN*; "Nice first 2h—then gale force wind, horizontal rain and hail"—*G4NDG/P*; "A hard slog trying to raise the more easterly stations, who all appeared to be beaming east. Local weather conditions didn't help either"—*G3DAO*; "As callsign will show, this was my first attempt at a cw contest. Approached it with some trepidation, but was pleasantly surprised"—*G4WAD/P*.

Overall the contest was enjoyed by the participants. It seems that there are sufficient dedicated cw operators to make a cw contest worthwhile regardless of conditions.

Congratulations and certificates go to the winner, G4MDZ, and to the runner up, G4NUT, the North Bucks Contest Group. A check log was received from GW3POM, who intends to enter the next cw contest. *G3FZL*

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
1	G4MDZ	1,132	112	AL76	DK3FW	606
2	G4NUT	1,045	110	ZM77	DK8IK	695
3	G4DCV	967	101	AL67	DK3FW	591
4	G4CVI	847	90	ZK04	DL2OM	635
5	PA0NIE	689	49	CL12	G3DAO	605
6	GW4MGR/P	644	84	YN64	PA0FAS	560
7	G4TLH	580	78	YN38	PA3CIC	854
8	G4SFY/A	566	52	AM18	DL3AAL	627
9	G4KDL	544	54	AM49	DF8IK	561
10	G4NOK	509	74	ZN23	PA0FAS	503
11	G6GN	427	55	YL48	PE1JUP	487
12	G4ARI	423	79	ZM24	GM3WCS	399
13	G4WAD/P	365	65	ZM71	DF7KF	603
14	G3PWN	322	36	ZO80	PA3CEV	475
15	G3KZR	308	64	ZL68	G3BW	430
16	G3UKC	296	44	AL56	G3BW	474
17	G4OAD	284	57	AL33	DF7KF	434
18	G4AFF	278	37	YK38	PA0RDY	548
19	G4HTD/P	277	39	YK21	PA0FAS	688
20	G4NDG/P	270	50	YK03	PA3CMC	657
21	G4PIQ	256	42	AL16	DL2OM	482
22	G4PGW/P	237	41	YL72	PA0NIE	568
23	G3DAO	192	24	XK30	PA0NIE	605
24	G3LRS	172	36	ZM25	PA0RDY	411
25	G5UM	170	40	ZM26	PA0NIE	410
26	G3TUX	147	33	ZL77	PA0NIE	360
27	G4OTV	140	40	AL62	GW3NYY	302
28	G4FKS	120	24	ZN13	G4DCV	361
29	G3GC	109	29	YK07	F6FLB	312
30	G4ERT	103	31	ZM24	F6FLB	287
31	G4PLM	86	31	ZM24	G3BW	253
32	G4HZF	53	13	ZN40	G4HTD/P	300
33	G2DHV	43	23	AL41	F6FLB	136
34	GW3XWK	17	9	YL37	G4HTD/P	129

21MHz CW Contest 1983 results

The following are the results of the overseas section which were accidentally omitted from the tables in last month's issue.

OVERSEAS SECTION

Posn	Callsign	Multn	Points	Pos	Callsign	Multn	Points
1	9H1EL	16	9,552	53	UA9CBM	7	686
2	UA3DJN	17	8,619	54	UM8MBA	7	630
3	4N4DD	14	5,950		UL7TAY	7	630
4	UA4PWW	13	5,460	56	JA7KM	7	588
5	WB2FFY/I7	14	4,788	57	JA2BP	5	585
6	UA3DLN	11	4,521	58	UP2BFU	6	576
7	UC2OCN	13	4,290	59	UC2AW	9	567
8	UJ8JAS	13	4,160		SP5BR	7	567
9	LZ2DN	12	3,780	61	JH6HSW	5	540
10	UA1ZCP	11	3,630	62	OH9TD	6	522
11	EA5CF	12	3,536	63	JA1BNW	6	486
12	HH2VP	13	3,471	64	JA2RMU	7	483
13	YO8BZO	10	3,420	65	JH3WKE	5	475
14	UY5ZI	13	3,393	66	JH6ECK	6	468
15	3D6AK	12	3,228	67	UA9FV	5	465
16	UB5QAP	13	3,159	68	JA9CWJ	6	432
17	W9OA	11	2,772	69	K8LWP	6	414
18	VE3JKZ	11	2,761	70	JA1BSU	6	408
19	UC2OAG	9	2,511		YU5EXC	8	408
20	ZS2GH	12	2,472	72	UK8AAI	6	378
21	UB5ICS	11	2,277	73	KV8Q	6	360
22	HK3NBB	11	2,244		OH6DZ	6	360
23	UA6LFX	9	2,133	75	JH7HWR/7	5	350
24	AJ0N	10	1,920	76	W8IQ	6	348
25	JR6YAH	8	1,800	77	OH6RC	5	315
26	JA1HGY	9	1,728	78	UA0JAD	4	308
	9K2BE	9	1,728	79	W5RIT	6	264
28	OK1TW	10	1,700	80	W2KTF	5	255
29	YU1EA	8	1,672	81	OH1UM	4	216
30	UA6AJO	9	1,611	82	JR1TLA	5	175
31	N4NX	8	1,584	83	JA7YFB	4	164
32	UA3BK	9	1,503	84	JR4ISK	4	156
33	UA3DSP	8	1,440		UR2RKS	4	156
34	OH5AD	7	1,260	86	OH2BUZ	5	150
35	EA8AGF	9	1,233	87	ZM1AMM	4	132
36	VE2DPO	9	1,134	88	JA7EDZ	4	124
37	K3VW	8	1,104	89	OH6GZ	4	120
38	SM0KV/0	8	1,080		VK4ANY	4	120
39	LZ2VU	9	1,071	91	KA7FEF	4	108
40	W4MLA	8	1,056		W5EIJ	4	108
41	JA1YAG	8	928	93	OH3OS	3	99
42	G4ABI/ST2	10	890	94	OH3BU	3	90
43	N6RA	8	888	95	JH1MTR	4	84
	YU7SF	8	888	96	W1OPJ	3	81
45	K2SX	8	840	97	OK1KZ	3	63
	UA4PAZ	7	840	98	JR3XEX	2	48
47	K5MM	8	824	99	JA2SAP/1	2	42
48	JH0BBA	7	819	100	JA1OYB	2	36
49	UA3YAO	9	810	101	JR1AQF	2	30
50	UP2BB	9	747	102	JA7YGW	3	27
51	JH1KLN	7	735	103	W0IZV	2	12
52	ON4XG	7	693	104	JA1AAT	1	3

SWL HF Championship 1983 results

The introduction of this championship seems to have increased the number of swl logs received for the Society's hf contests in 1983. Eleven listeners sent logs, and even this low number is an improvement over recent years. The HF Contests Committee is confident that this trend will continue in 1984. Rules for this year's championship were published on p58 of the January 1984 issue of *Radio Communication*.

Congratulations to John Goodrick, BRS44395, and Brad Bradbury, BRS1066, who will each receive certificates. To those who were not so fortunate in 1983, the committee is sure that 1984 will bring better luck. Please continue to support the Society's contests this year to ensure that they are retained. The committee feels that the hf contest listener is now better provided for than in the past, but if any swl has any comments or suggestions regarding the Society's contests they are invited to contact Bob

Treacher, whose address can be found in *SWL News*. Any constructive ideas will certainly be considered by the committee with a view to implementation in the future.

Posn	Callsign	Contests 7MHz SSB	7MHz CW	T&C SSB	RRU CW	21/28MHz SSB	21MHz CW	Total points
1	BRS44395	50	55	30	35	45	80	295
2	BRS1066	45	70	10	50	25	65	265
3	BRS32525	70	—	50	—	80	—	200
4	BRS48909	—	—	35	—	55	—	90
5	BRS28198	55	—	25	—	5	—	85
	BRS52868	—	—	—	30	—	55	85
7	BRS20249	35	—	20	—	15	—	70
8	J. Singleton	—	—	—	—	65	—	65
9	BRS26407	—	—	—	—	35	—	35
10	BRS44000	—	—	15	—	—	—	15
11	BRS49070	—	—	5	—	—	—	5

IARU Region 1 VHF/UHF/SHF Contest 1983 results

The following tables have been extracted from results received from NRRL, the Norwegian section of the IARU. Further information can be obtained by contacting the chairman of the VHF Contests Committee, G3XDY, QTHR.

SECTION 1—144MHz SINGLE-OPERATOR

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	OK1FM/P	689	213,365	199	G3HRY	104	18,165
2	F6CJG/P	490	200,818	238	G6HXU	97	14,209
3	GJ4ICD	591	198,732	302	GM4SGB	63	10,258
17	GW4ALG/P	490	99,789	320	G6TTW	50	8,947
18	G8YDW/P	511	99,264	342	G6NWF	58	7,432
35	G4ARI	435	63,519	375	G8GGG/P	67	5,863
86	GW6DTD/P	148	39,175	423	G8NMQ	31	3,557
137	G6EPN/P	154	26,598	427	G6OKU	30	3,424
159	G4AGQ	138	23,125	Total entries: 469			

SECTION 2—144MHz MULTI-OPERATOR

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	F6CTT/P	1008	330,018	118	GW3EOP/P	385	85,416
2	EA2LY/P	514	327,444	119	G4ILI/P	477	84,556
3	G4LIP/P	910	285,299	138	G3WKS/P	403	78,753
6	G4APA/P	724	242,442	144	G4TVI/P	353	74,676
9	G4MRS/P	781	226,989	149	G3YMD/P	310	73,185
11	G4BWG/P	710	217,768	171	G3UHF/P	392	66,666
22	G8BQX/P	630	176,267	174	G6CHL/P	444	64,489
34	G8SJP/P	555	153,167	196	G2XV/P	317	58,771
39	GW4ULX/P	589	146,019	204	G4OHM/P	424	55,763
40	GW3OXD/P	670	144,613	259	G6RVC/P	324	45,420
42	G6EKR/P	505	142,038	263	G4GTT	332	44,660
46	G6XKU/P	570	138,419	266	G3ULT/P	235	43,836
53	G4DEZ/A	537	131,014	269	G6LJO/P	341	43,300
54	GD4IOM	436	130,478	289	G8COI/P	287	39,157
64	G4SIV	395	121,892	297	GM6LNM	143	38,192
66	G8HRC/P	446	121,277	310	G4TAW/P	246	35,441
68	G4NUT	513	118,504	318	G4SNX/P	182	33,962
82	G3ISO/P	489	105,143	358	GM6SXF/P	123	27,641
88	G6VWH	518	100,619	360	G8WDC/A	214	27,272
89	G8YQT/P	495	100,307	367	GM4MFL/P	130	26,020
97	G4NVA/P	496	95,694	395	GI3CFH/P	80	22,091
103	G3WQK/P	322	92,058	424	G8IGQ/P	131	18,313
104	G4HUP/P	524	92,001	429	G6XQN	117	16,817
117	GM4CCC/P	336	85,561	460	G3YZD	75	9,392
Total entries: 490							

SECTION 3—432MHz SINGLE-OPERATOR

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	OK1CA/P	274	96,954	223	G3PBV	22	6,231
2	DF6GX/P	314	81,261	229	G4AGQ	48	5,655
3	DK2GR	300	77,972	240	G6GJD	22	5,186
59	G4CQR	153	26,055	310	G6CMV	10	1,973
95	G3JXN	114	18,298	320	G6BBS	12	1,641
197	G3HRY	47	8,176	333	G4ITF	13	1,458
222	G6ETA	45	6,380	355	G4LRT	6	707
Total entries: 366							

SECTION 4—432MHz MULTI-OPERATOR

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	DK8VR/A	659	168,042	69	G4GZO/P	190	34,236
2	F6CTT/P	466	156,092	74	G8YEE/P	149	32,733
3	DK5VI/P	498	129,531	77	G3PIA/P	181	31,612
9	G4PUB/P	330	88,839	86	G3TQF/P	155	28,926
20	G4MRS/P	275	76,464	91	GW3EOP/P	134	26,980
25	G4LOJ/P	239	66,786	106	G4MVN/P	130	22,188
32	G4SIV	233	62,156	110	G4SSS/P	99	21,624
34	G4THB/P	182	61,538	112	G8OHM/P	137	21,465
47	G6EKR/P	216	52,431	131	GM8TSI/P	67	17,966
60	G3FVA/P	192	38,423	146	G6LJO/P	116	14,855
64	G8HRC/P	143	36,599	192	GM3TAL/P	8	3,460
Total entries: 207							

SECTION 5—1·3GHz SINGLE-OPERATOR

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	DJ5BV	108	24,111	56	G8CZZ	30	2,698
2	F2TU/P	93	23,712	60	G4LRT	23	2,405
3	PA0EZ	98	19,132	73	G3PBV	7	1,773
20	G3JXN	59	7,822	100	G4UCW	7	888
25	G4KIY	40	6,755	113	G6CMV	5	566
31	G4NQC	39	5,679	Total entries: 128			

SECTION 6—1·3GHz MULTI-OPERATOR

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	DL0HC/P	157	27,865	30	G4NVA/P	54	10,045
2	G4ALE/P	103	24,484	32	G8FEZ/P	43	8,731
3	OK1KIR/P	76	23,685	36	G3YKI/P	43	7,784
5	G4FSG/P	79	18,489	37	G3OHM/P	53	7,385
7	G4NXO/P	90	18,489	52	G4JDI/P	37	4,437
17	G4HWA/P	53	13,876	62	G8KAX/P	20	3,271
19	G4ANT/P	59	13,512	85	GM8MJV/P	4	796
28	G3UHF/P	66	10,447	Total entries: 93			

Contests Calendar

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)*
12-13 May	Peace to the world contest *(Rules in May* MOTA*)*
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 *(Details in May issue)*
2-3 June	HF NFD *(Rules in February issue)*
2-3 June	VI Diploma Guide Dog Competition *(Rules in May* MOTA*)*
3 June	70MHz & SWL *(Rules in May issue)*
9 June	1,296MHz Trophy *(Rules in May issue)*
10 June	432MHz Trophy & SWL *(Rules in May issue)*
10 June	DF Qualifying Event Dartford Heath *(Details in May issue)*
23-24 June	Summer 1·8MHz *(Rules in May issue)*
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 *(Rules in May issue)*
1-2 September	144MHz Trophy and IARU VHF & SWL
9 September	DF Qualifying Event Chelmsford/Colchester
16 September	70MHz Trophy & SWL
October-December	432MHz Cumulative
October-December	1,296MHz Cumulative
6 October	DF Double Night Event Slade
6-7 October	432MHz-24GHz & IARU UHF
14 October	21/28MHz Phone *(Rules in May issue)*
21 October	21MHz CW *(Rules in May issue)*
27 October	DF Treble Night Event Mid-Thames
28 October	70MHz Fixed
3-4 November	144MHz CW & Marconi Memorial
4 November	LF CW WAB*
10-11 November	2nd 1·8MHz
12, 20, 28 November / 6-14, December	28MHz Cumulatives
2 December	144MHz Fixed
16 December	70MHz CW

* Rules, logsheets and other information from Steve Lawrence, 7 Ashfield Road, Market Harborough, Leics.

SECTION 7—2·3GHz SINGLE-OPERATOR

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	DK2UO	38	6,845	18	G3JXN	11	1,373
2	PA0EZ	39	6,135	30	G3WDG	7	461
3	DC9XO	27	6,022	34	G4LRT	7	375
Total entries: 43							

SECTION 8—2·3GHz MULTI-OPERATOR

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	DK0NA	26	6,363	12	G4FAW/P	15	1,821
2	OK1KIR/P	21	6,320	19	G4OHM/P	13	1,328
3	PA3BPC/P	37	6,203	25	G3ZUD/P	8	828
6	G3ZIG/P	17	3,917	30	G8FUO/P	1	33
8	G4GLN/P	13	2,213	Total entries: 30			

SECTION 9—3·4GHz SINGLE-OPERATOR

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	DC9XO	13	2,127	16	G4LRT	1	35
10	G4MBS	2	184	Total entries: 18			

SECTION 10—3·4GHz MULTI-OPERATOR

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	DK0NA	8	1,481	8	G3TQF/P	1	35
Total entries: 10							

SECTION 11—5·7GHz SINGLE OPERATOR

Posn	Callsign	QSOs	Points
1	DJ7FJ/P	2	225
Total entries: 6			

SECTION 12—5·7GHz MULTI-OPERATOR

Posn	Callsign	QSOs	Points
1	DK0NA	4	150
Total entries: 4			

SECTION 13—10GHz SINGLE OPERATOR

Posn	Callsign	QSOs	Points
1	I4CHY/4	32	4,868
43	G4FHQ/P	5	348
Total entries: 52			

SECTION 14—10GHz MULTI-OPERATOR

Posn	Callsign	QSOs	Points
1	HB9AJF/P	20	2,968
Total entries: 18			

SECTION 15—24GHz SINGLE-OPERATOR

Posn	Callsign	QSOs	Points
1	OE2BM/2	3	333
Total entries: 4			

SECTION 16—24GHz MULTI-OPERATOR

Posn	Callsign	QSOs	Points
1	DF6WCY	1	24
Total entries: 1			

OVERALL UHF/SHF RESULTS—SINGLE-OPERATOR

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	PA0EZ	323	205,042	315	G4FHQ/P	5	6,960
2	DC9XO	139	181,906	322	G6ETA	45	6,380
3	DJ5AP/P	171	180,355	331	G4AGQ	48	5,655
24	G3JXN	184	71,138	341	G6GJD	22	5,186
87	G4KIY	40	33,775	351	G6CMV	15	4,803
108	G4NQC	39	28,395	353	G3WDG	7	4,610
129	G4CQR	153	26,055	355	G4UCW	7	4,440
184	G4LRT	37	17,182	373	G4MBS	2	3,680
209	G3PBV	29	15,096	419	G6BBS	12	1,641
230	G8CZZ	30	13,490	432	G4ITF	13	1,458
297	G3HRY	47	8,176	Total entries: 468			

OVERALL UHF/SHF RESULTS—MULTI-OPERATOR

Posn	Callsign	QSOs	Points	Posn	Callsign	QSOs	Points
1	OK1KIR/P	472	294,358	50	G8OHM/P	203	71,670
2	PA3BPC/P	494	255,979	59	G4SIV	233	62,156
3	G4PUB/P	446	233,389	65	G3TQF/P	201	60,091
8	G4MRS/P	369	190,059	77	G8HRC/P	163	52,954
9	G4LOJ/P	315	173,516	113	G3PIA/P	181	31,612
18	G4THB/P	235	130,918	131	GW3EOP/P	134	26,980
30	G6EKR/P	259	96,086	148	G4MVN/P	130	22,188
32	G4NXO/P	90	92,775	149	GM8TSI/P	71	21,946
35	G3FVA/P	258	90,658	151	G4SSS/P	99	21,624
40	G8YEE/P	203	82,958	182	G6LJO/P	116	14,855
47	G4GZO/P	233	73,156	221	GM3TAL/P	8	3,460

Total entries: 236

DF Qualifying Event Coventry

Date: 20 May 1984
Map: OS sheet 151 1:50,000 series, Stratford-upon-Avon
Assembly: 1300bst for start at 1320bst
Location: Warwick Race Course car park, ngr 276 647

Competitors requiring tea should notify Mr G. Whenham, 33 Chapel Street, Bishops Itchington, Leamington Spa, Warwickshire CV33 0RB, tel 0926 612806, not later than 13 May 1984.

DF Qualifying Event Dartford Heath

Date: 10 June 1984
Map: OS sheet 177, 1:50,000 series, East London
Assembly: 1300bst for start at 1320bst
Location: 0·5km SE of Dartford Heath on minor road parallel to and south of the A2(T), ngr 527 726.

Competitors requiring tea should notify Mr C. Merry, 19 Faesten Way, Joydens Wood, Bexley, Kent, tel 0322 523729, not later than 3 June 1984. Competitors approaching from the north should note that the M25 is now open between the M10 and the Dartford Tunnel.

2nd 1·8MHz Contest results 1983 erratum

The HF Contests Committee apologizes to all concerned for an error which appeared in the results table published in the March issue. The Senior Citizens Award was given to G8RZ, and not to G3KSH, as shown.

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 **July** issue should reach them by **12 May** and for the **August** issue by **12 June.**

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.

Accrington (NW Repeater Group)—17 May ("How to blow up your rig in three easy lessons", by Harry Leeming, G3LLL), 8pm. Globe Bowling Club, Willows Lane, Accrington. Sec Howard Aspinall, G3RXH, tel 0282 50367, office hours only.

Ainsdale (AARC)—8 May (Lecture evening), 22 May (Preparation for NFD), 1, 15, 29 May (DF hunts, 7.30pm start), 8pm. Scout HQ, Marine Drive, near Pier, Southport. Sec David Norris, G4TUR.

Barnoldswick (Rolls-Royce ARC)—2 May (Fox hunt), 6 June (To be announced), 8pm. Rolls-Royce Sports & Social Club, Barnoldswick. Morse classes Mondays, 7.30pm. Sec Leslie Logan, G4ILG, tel 0282 812288.

Bury (BRS)—8 May ("Confessions II" by Clive Hardisty, G8XUR), 1, 15, 22, 29 May (Informal meetings), 8pm. Mosses Community Centre, Cecil Street, Bury. Pro Malcolm Pritchard, G3VNQ.

Fylde (FARS)—1 May (Visit to HMS Inskip), 15 May (Equipment sale), 5 June (Top band fox hunting), 7.45pm. Kite Club, Blackpool Airport.

The talk on air navigation and air traffic control by Mr J. Jefferson, senior air traffic controller, Blackpool Airport, was voted a great success by a full club room at the recent meeting. He outlined air navigation since RAF days to the present time, from primitive df equipment to present day radar and automatic instrument landing systems where a series of planes can be landed without actually seeing them.

Visitors included some members of Thornton Cleveleys club and all were interested to know that for the very modest club subscription, this carries full membership of the Kite Club, where in summer you have the added bonus of a full view across the airport and appropriate refreshment.

Pro F. F. Whitehead, G4CSA, tel Lytham 737680.

Manchester (South Manchester RC)—4 May (Discussion evening), 11 May ("Japanese morse", by Norman Kendrick, G3CSG), 18 May (AGM), 25 May (To be announced), 8pm. Sale Moor Community Centre, Norris Road, Sale. Informal meetings Mondays. Sec David Holland, G3WFT, tel 061-973 1837.

Preston (PARS)—10 May ("Application of computers to amateur use", by Ray Jones, G3NKL), 24 May (Preparation for HF NFD and "Contest use of the FT101", by G3SYA), 8pm. Lonsdale Club, Fullwood Hall Lane, Fullwood, Preston. Sec George Earnshaw, G3ZXC, tel 0772 718175.

Stockport (SRS)—9 May ("Microcomputers in relation to amateur radio", by Joel, G3OWW), 16, 23 May (Informal meetings), 8.15pm. Blossoms Hotel, Wellington Road South, Stockport, Sec Mel Betts, G4FFW, tel 061-224 7880.

Thornton Cleveleys (TCARS)—7 May (Jerry Vallely on "Aeroplanes"), 14 May (Club on the air), 21 May (NFD preparation), 28 May (Natter night), 7.30pm. Norbreck 1st Scout Hut, Carr Road, Bispham. Sec Mrs Janet Bullock, 26 Lancaster Avenue, Thornton Cleveleys, tel Blackpool 826451.

Wirral (WARS)—2 May (To be announced), 16 May (Technical talk), 30 May (Pre-NFD planning meeting), 6 June (Demonstration of equipment by Lowe Electronics Ltd), 7.45pm. Guide Hut, Westbourne Road, West Kirby, Wirral. Sec Cedric Cawthorne, G4KPY, tel 051-625 7311.

Wirral (W & DARC)—8 May (Inter-club quiz night, first round at Chester ARS, 7.45pm), 9 May ("Lets build a repeater", by John G8UZZ & Co), 13 May (First of the Sunday df contests), 23 May (Equipment demonstration by Gordon Adams, G3LEQ), 30 May (DF practice from Heswall lay-by, 7.30pm), 8pm. Irby Cricket Club, Irby, Wirral. Sec Gerry Scott, G8TRY, tel 051-630 1393.

REGION 2—RR P. N. Butterfield, G4AAQ, 43 Lynwood Crescent, Pontefract WF8 3QT, West Yorks. Tel 0977 791071.

Goole (GR&ES)—1 May (Mini df evening), 8 May ("Computer logic", by Steve Price, G8VHL), 15 May (Bill Richards, G3XAY, df trophy event), 22 May ("Construction", by Ray Thornton, G6KCE), 29 May (Video night), 7.45pm. Junior Chamber Buildings, Boothferry Road, Goole. Details from Richard, G8IOH, or G8VHL.

Halifax (H&DARS)—22 May (Lowe Electronics demonstration), 7.30pm. Running Man, Pellon Lane, Halifax. Details from G. M. Townend, G4SDX, 26 Roundhill, Holmfield, Halifax HX2 9XJ, tel 0422 248542. The club now has a quarterly newsletter, "QRZ", and would welcome contributions from members.

Halifax (Northern Heights ARS)—2 May (Lecture by Alan Robinson, G3TQA), 16 May (Construction competition), 30 May (VHF/UHF Field Day organization), first and third Wednesday in each month, 8pm. Bradshaw Tavern, Bradshaw, Halifax. Sec G6CJL, 5 Park Fields, Moor End Road, Halifax HX2 0RF, tel Halifax 54635. Club net frequency 145·275MHz. Note: the sec of the club will be changing, but meanwhile contact G6CJL.

Leeds (L&DARS)—Mondays, 14 May ("Traffic signalling", by G4KAX) 21 May (Special components sale featuring a Lincoln trader), 8pm. Old Hall Golf Club, Woodhall Lane, Calverly, Leeds. Sec Chris Camm, G8TZT.

Marsden (Pennine & DARS)—Alternate Wednesdays. The sec is currently compiling a list of activities. The Olive Branch Inn, Manchester Road, Marsden. Details from J. S. Shaw, G4RAJ, 48 Oaklands Drive, Dalton, Huddersfield HD5 8PR, tel Huddersfield 35955.

Mexborough (M & DARS)—4 May (Quiz night), 11 May (Video film of British birds by John Swift), 18 May ("Nicad battery charger for use in cars", by G3MWN), 25 May (Winemaking).

Wednesday nights are educational, ie cw classes, technical questions etc. The club is currently re-vamping the shack to provide all the home comforts. Harrop Hall, Dolcliffe Road, Mexborough. Sec D. Lamb, G6YGZ, 15 The Wapping, Hooton Roberts, Rotherham S60 4PG.

Spen Valley (SVARS)—24 May (Contest briefing and talk by G3SDY), 7 June (Surplus sale), 21 June (Summer social evening). Old Bank Working Mens Club, Mirfield. Sec I. Jones, G4MLW, tel Heckmondwike 409739.

Todmorden (T&DARS)—7 May (Demonstration station on hf bands and natter night), 4 June (Natter night). Queen Hotel, Todmorden. Details from sec G6MDB, 283 Halifax Road, Todmorden, Lancs OL14 5SQ.

UK FM Group (Northern)—6 May, 3 June, 7.30pm. Royal Hotel, Barnsley. Details from sec G6BHK.

I would like to take the opportunity of thanking Dave Smith, G4DAX, on behalf of all members in Region 2, for all his hard work as RR in the past.

Would *all* club secs please note that by the time you read this you should have received a letter from me. If not, please contact me immediately. *Please* ensure that your club news is sent in by the

deadline; it can be telephoned through and left on an answering machine during working hours, if necessary, tel Pontefract 791071.

REGION 3—RR L. W. Craven, G4EQI, Grass Moor, Radford Road, Alvechurch, Birmingham B48 7DT. Tel 021-445 1347.

Birmingham (Midland ARS)—15 May (To be announced on GB2RS), 7.30pm. 294a Broad Street, Birmingham B1 2DS. 20 May, Drayton Manor Rally. Sec G8BHE, tel 021-422 9787.

Birmingham (South Birmingham RS)—9 May ("Signals from muscles", by Dave, G3OXL). Pastoral Centre, St Lawrence Church Hall, off Bunbury Road, Northfield. 20 May, Drayton Manor Mobile Rally. Sec G8RGQ, tel 021-459 8312.

Bromsgrove (BARS)—7 May (Special event station at Catshill Village Fete for Bromsgrove Boys Brigade), 10 May (AGM), 8pm. British Legion Club, Birmingham Road, Bromsgrove. Sec Alan Kelly, G4LVK, tel 021-445 2088.

Evesham (Triple B Contest Group)—Newly affiliated, callsign G4WET. Sec D. J. Cannings-Bushell, G4WAD, 24 Almond Close, Evesham, tel Evesham (0386) 6246.

Halesowen (MEB Sports & Social Club)—8 May ("Contests", by Dave Ackrill, G6MVQ), 22 May (General meeting), 8pm. MEBHQ Social Club, Mucklow Hill, Halesowen. Sec G4RWH, tel 021-747 8784.

Hereford (HARS)—4 May ("Procedure and band plans, No 1"—vhf), 18 May (Arrangements for NFD). Civil Defence HQ, Gaol Street, Hereford. New sec G3WRQ, tel Hereford (0432) 54064.

Redditch (RRC)—10 May ("Automobile electrics", by Roger Nolan, G3KWK), 24 May (Natter night), 8pm. WRVS Centre, Ludlow Road, Redditch. Sec Ray, tel Alcester (0789) 762041.

Shrewsbury (Salop ARS)—3, 10 and 31 May (Natter nights), 24 May (Fox hunt), 8pm. Albert Hotel, Smithfield Road, Shrewsbury. Sec G6UDB, tel Shrewsbury (0743) 62737.

Solihull (SARS)—15 May ("Operating procedures", by Tom Douglas, G3BA), 7.30pm. The Manor House, High Street, Solihull. Sec G6HSZ, tel 021-742 3378.

Stourbridge (StARS)—7 May (Want to operate G6OI and G6SRS on air?) 21 May (Speaker tba), 8pm. Robin Woods Centre, School Street, off Enville Street, Stourbridge. Sec G8JTL, tel Lye (593) 4019.

Stourbridge (Wordsley RC)—3 May ("Business computers", by Steve, G4TCU), 17 May (Film on "Leyland sports car development"), 31 May ("The arts of the Japanese sword", by Cllr William Gray JP and Mr Ray Pitt), 8pm. Vine Inn, Camp Hill, Wordsley. Sec Andrew, G4TGM, tel Kingswinford (2) 295082.

Stratford-on-Avon (S-on-A&DARC)—14 May ("Aerials", by Dave Yates, G3PGQ), 28 May (Construction), 7.30pm. Old Control Tower, Bearley Radio Station, Bearley, nr Stratford. Sec Ian, G6CWK, tel Stratford (0789) 68863.

Sutton Coldfield (SCARS)—14 May (Natter night), 7.30pm. 28 May (No meeting—Spring Bank Holiday). Central Library, Sainsbury Centre, Sutton Coldfield. Sec G6UFD, tel 021-358 6501.

Telford (T&DARS)—May–September (10GHz cumulatives monthly), 5/6 May (432-24GHz contest), 20 May (Drayton Manor Mobile Rally), 19/20 May (144MHz contest). Dawley Bank Community Centre, Dawley Bank, Telford. Sec G6ECA, tel Telford (0952) 503758.

Stoke-on-Trent (North Staffs ARS)—Regular Monday meetings, 8pm. Harold Clowes Community Centre, off Dawlish Road, Bentilee, Stoke-on-Trent. New sec David, G6MLI, tel 0782 332657.

Warwick (Mid-Warwickshire ARS)—8 May ("The electron microscope", by Mike Webb, G3OOQ), 22 May ("Electro magnetic pulse", by Mike Jones, G4WAJ), 8pm. 61 Emscote Road, Warwick. Sec G4TIL, tel Southam (092681) 4765.

Wolverhampton (WARS)—1 May (Home-built equipment competition), 15 May (Committee meeting), 27 May (DF hunt), 29 May ("Demonstration of amateur radio computers running on BBC microcomputer", by Peter Burden, G3UBX), 8 and 22 May (Natter nights), 8pm. MEB Club, St Marks Road, off Chapel Ash, Wolverhampton. Sec Martin, G6ZHV, tel Wolverhampton (0902) 763387.

Worcester (W&DARC)—30 April ("Talk on electricity", by MEB staff). Oddfellows Club. 21 May (Informal evening), 8pm. Old Pheasant Inn, New Street, Worcester. Sec Alasdair, G4NRD, tel Evesham (0386) 41508.

Wythall (WRC)—Newly affiliated. Regular Tuesday meetings at 7.30pm. Community Centre, Wythall House, Silver Street, Wythall, Worcs B47 6LZ. Sec Mike Goode, G4SMA, tel 021-444 2427.

Members of the Leicestershire WAB Group pictured with their latest new member. L to r: Steve Lawrence, G4EOF, Bob Nash, G4GEE, Dave Brooks, G4IAR, Judith Brooks, G4IAQ, swl Rachel Brooks

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REGION 4—RR M. Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ. Tel Derby (0332) 556875.

Bolsover (BARS)—Wednesdays, 23 May ("RSGB questions & answers", by Martin Shardlow, G3SZJ), 7.30pm. Angel Hotel, Bolsover. Sec Ian Mellors, G4WCX, tel Mansfield 811129.

Buxton (BARS)—8 May ("Worked All Britain awards", by Bob Nash, G4GEE), 22 May (Construction night, Mike Thompson, G4HEU), 8pm. Egerton Hotel, St Johns Road, Buxton. Sec Dave Cooper, G6MIF, tel Buxton 6174.

Derby (D&DARS)—Wednesdays, 2 May (Junk sale), 7.30pm. 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.

Derby (NHARG)—4 May (Shack night on the air), 11 May ("The oscilloscope", Les Jackson, G3OZ), 18 May (John Stiles of Radio Derby), 25 May ("Nuclear power", by Jock Smith, G3EMJ), 1 June (Rally planning), 7.45pm. Nunsfield House, Boulton Lane, Alvaston, Derby. Sec John Robson, G4PZY, tel Derby 767994.

Grantham (GRC)—15 May (Junk sale and bring & buy sale), 8pm. Shirley Croft Hotel, Harrowby Road, Grantham. Sec John Kirton, G8WWJ, tel Grantham 65743.

Hinckley (HARES)—9 May (Quiz with Ibstock club), 23 May ("50 years of amateur radio", by Tom Douglas, G3BA), 7.30pm. John Cleveland College, Butts Lane, Hinckley. Sec Norman Geary, G8STX, tel Hinckley 632778.

Leicester (L Polytechnic ARS)—9 May (Inter-club df contest, assembly at Hawthorn Building, 7pm). Sec Chris. R Honey, G6MFP.

Lincoln (LSWC)—9 May ("DXpedition to St Pierre et Miquelon", tape/slide lecture), 23 May (AGM), 8pm. City Engineers Club, Waterside South, Lincoln. Sec Pam Rose, G4STO, tel Gainsborough 788356.

Melton Mowbray (MMARS)—18 May ("Amtor", by G3XTL, or "Data communications", by G4AMK), 7.30pm. St John Ambulance HQ, Asfordby Hill, Melton Mowbray. Sec Richard Winters, G3NVK, tel Melton Mowbray 63369.

Newark (N&DARS)—3 May (Junk sale), 4 and 5 May (Special event station at The Newark Show), 16 May (Natter and noggin at The Fox, Kelham), 7.30pm. Palace Theatre, Appleton Gate, Newark. Sec Roger Hiscock, G4MDV, tel East Stoke 539.

Scunthorpe (SARC)—Tuesdays and Thursdays, 7pm. Grange Farm Hobbies Centre, Franklin Crescent, Scunthorpe. Sec Ida Aizlewood, G6ZCA, tel Scunthorpe 732268.

Spalding (S&DARS)—11 May ("Any questions", G4OO, G3VPR, G3XBS and G4ODA), 3 June (Rally at Springfields), 8pm. Maple Room, White Hart Hotel, 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, home, or 0582 21151, works.

Bedford (B&DARC)—30 May (Visit to Charles Wells Brewery (provisional)). Ravensden. Sec Les, G4PBE.

Cambridge (C&DARC)—4 May (Talk by Martin Mann, G4FFO, on "Very low frequencies"), 11 May (Informal, morse classes, operating club station G2XV), 18 May (Construction evening), 25 May (Informal, morse classes and operating club station G2XV), 7.30pm. Coleridge Community College, Radegund Road. Details from Dave, G8JKV.

Dunstable Downs (DDRC)—11 May (TV show repeat), 25 May ("Oscar 10", by G3VZV), 8pm. Chews House, Dunstable Downs. Sec P. G. Seaford, G8XTW.

Leighton Linslade (LLRC)—7 May (No meeting), 21 May ("Model engineering", by Michael Kingston), 7–10pm. Vandyke Community College, Room A64, Vandyke Road, Leighton Buzzard. Sec Peter Brazier, G6JFN.

Luton (KPC & Continental Microwave ARC)—2 May (Informal evening), 8pm. Club House, Tenby Drive, Luton. Sec G3DOT. Club open to employees only.

Milton Keynes (MKARC)—14 May (Video, "Aerial Circus", by Dud Charman). Details from RR5.

Northampton (NRC)—3 May (Discussion evening), 10 May (Supt Clinton from Northants police to give a talk on police communications), 17 May ("Clandestine radio in Japanese PoW camps", by Tom Douglas, G3BA), 24 May (Discussion evening), 31 May ("On foot" df hunt in Harlestone Firs (first part of G4UFU tankard award)), 8pm. Kingsthorpe Community Centre. Sec Keith Howell, G6MFS, 9 Pytchley Way, Brixworth, Northampton, tel Northampton 881464.

Peterborough (GPARC)—24 May (Preparations for VHF NFD), 7.30pm. Southfields Junior School, Stanground, Peterborough. Sec Frank Brisley, G4NRJ, tel 0733 231848.

Shefford (S&DARS)—3 May ("Bee keeping", by Mr Culpin), 10 May (Discussion, "What good are radio contests"), 17 May (Natter night), 24 May ("Morse mysteries", by Andy, G4DAQ), 31 May (NFD planning and what goes on during the NFD), 8pm. Church Hall, Shefford. Sec Alan, G4PSO.

Wellingborough (Nene Valley RC)—2 May (Ladies night and buffet), 9 May (Natter night), 16 May ("Building and operating the Heathkit HW8", by John, G3DOT), 23 May (Natter night), 30 May (No meeting). Dolben Arms, Finedon. Details from Lionel, G4PLJ.

While typing this report I have heard that at least two clubs in the region have either closed down or are about to close down due to lack of support. To me this is very sad and as your RR I feel partly responsible. If a club in your area is having any such trouble please get in touch with me. *John, G3DOT, RR5.*

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HA3 7EA. Tel Penn (049481) 4240.

Aylesbury (AVRS)—Tuesdays, fortnightly. 25 May ("Alternative energy", by Norman Lipman, G6ASA), 8pm. Haydon Hall Community Hall, Aylesbury. Club net 8pm other Tuesdays, S22 and around 3·6MHz. Details from Cathy Clark, tel 0844 51461.

High Wycombe (Chiltern ARC)—30 May ("Private mobile radio (pmr)", by Steve, G4CYR), 8pm. Science Block, Sir William Ramsay School,

Rose Avenue, Hazelmere, High Wycombe. Details from G3NCL, tel High Wycombe 712020.
Iver (Home Counties Amateur TV Group)—Fourth Wednesday in each month, 8.30pm. 23 May ("Slow scan tv"). Richings Park Sports & Social Club, Iver, Bucks. Talk-in is provided on 145·200MHz. Details from P. M. Andrews, G6MMJ.
Maidenhead (M&DARS)—15 May (Preparations for NFD). Details from G3VCT, tel Bourne End 21036.
Oxford (O&DARS)—Second and fourth Wednesday in each month, 7.30pm. Civil Service Club, Marston Road, Oxford. Please note new sec C. M. May, G3PMI, tel Oxford 52859.
Oxford (RAFARS)—16 May, 7.30pm. Civil Service Club, Marsden Road, Oxford. Club net 3170MHz, last Sunday in each month, 11.45am. Details from E. C. Palmer, G3FVC.
Slough (Burnham Beeches RC)—First Monday in each month, 8pm. St John Ambulance HQ, Burlington Avenue, Slough. Please note new sec Diana Betts, G4MVV.

REGION 7—RR to be appointed
Crystal Palace (CP&DRC)—19 May ("World War Two equipment"), 8pm. All Saints Parish Room, Upper Norwood, SE19. Details from sec G. M. C. Stone, 11 Liphook Crescent, SE23, tel 01-699 6940.
Sutton & Cheam (S&CRS)—4 May (AGM at SCOLA), 18 May ("Amateur satellites", by Ron Broadbent, G3AAJ, sec of Amsat-UK, at Downs), 1 June (TBA, at Downs), 2-3 June (HF NFD, at Legal & General). Meetings at Downs Lawn Tennis Club, Holland Avenue, Cheam, and Sutton College of Liberal Arts. Details from acting sec Jack Korndorffer, G2DMR.
Wimbledon (W&DRS)—11 May (Film night), 25 May (Constructional contest), 8pm. St John Ambulance HQ, 124 Kingston Road, Wimbledon SW19. From 1-22 May a special event station, GB0WIM will be in operation to commemorate the 21st anniversary of the society. Details from Geoff Mellett, G4MVS.

REGION 8—RR M. Elliott, G4VEC, 20 Haysel, Sittingbourne, Kent ME10 4QE. Tel 0795 70132
Canterbury (East Kent ARS)—3 May (Talk by Dennis, G3MDO, subject to be announced), 17 May (Natter night). The Cabin, Kings Road, Herne Bay. On 19 August the club will be running a mobile rally at the Herne Bay Secondary School, Greenhill. Details from Stuart Alexander, G6LZG, tel Canterbury 68913.
Chichester (CARC)—5 May (Club meeting in the Long Room), 17 May (Club meeting in the Long Room), 7.30pm. Fernleigh Centre, 40 North Street, Chichester. Details from Christopher Bryan, G4EHG, tel Chichester 789587.
Crawley (CARC)—11 May (Club dinner at Goff's Park Hotel), 17 May (Lecture and demonstration on antenna workings, using scaled down models, by Mr H. V. Sims. This is a most instructive and interesting lecture, considered a must for novice and expert. There is no entrance fee, but donations to cover expenses will be welcome. The lecture will be held in the lecture theatre, Crawley Technical College), 8pm. Details from David, G4IQM, tel Crawley 882641. Details about club dinner from Geoff, G3YVR, tel Crawley 883253.
Kent Repeater Group—18 May (AGM). Electronics Building, University of Kent, Canterbury. Details from sec M. W. Stoneham, G4RVV, tel 02273 69828.
Maidstone (MARS)—Fridays, 18 May ("Scarab systems", rtty by computer), 25 May (AGM (8pm)), 7.30pm. YMCA Sportscentre, Melrose Close, Cripple Street, Maidstone. Details from Graham Edy, G4AXD, tel Maidstone 29462.
Margate (Radio Club of Thanet)—8 May ("Printed circuit boards" by G3DNR), 13 May (Fox hunt), 18 May (Visit to H.M. Coastguard station), 22 May (To be arranged). Grosvenor Club, Grosvenor Place, Margate. Details from Ian Gane, G4NEF, tel Thanet 594154.
Medway (MARTS)—11 May ("The RSGB", by John Nelson, G4FRX). Further details from new club sec Andy Wallis, G4TQS, tel Medway 393960.
Tunbridge Wells (West Kent ARS)—4 May (Club agm), 18 May (Construction contest). Adult Education Centre, Monson Road, Tunbridge Wells. Informal meetings on 8 and 22 May. Victoria Road Drill Hall, Tunbridge Wells. Details from Brian Guinnessy, G4MXL, tel 0892 32877, after 7pm.

REGION 9—RR W. J. Colclough, G3XC, "Highview", Indian Queens, St Columb, Cornwall TR9 6LL. Tel 0726 860485.
Axe Vale (AVARC)—4 May ("Aerials", by G3GC), 7.30pm. Cavaliers Inn, Axminster, Devon. Sec Bob Newland, Ham House, Lyme Road, Uplyme, Lyme Regis, Dorset DT7 3XA, tel 02974 5282.
Camelford (North Cornwall RC)—2 May (Fox-hunt), 7.30pm. RAOB Club, Fore Street, Camelford, Cornwall. Pro Jack Boundy, G8ZOK, tel Tintagel 770542.
Cornish (CRAC)—3 May (No details available); Computer group: 21 May ("Basicode", by G3VWK and G4EIK). The Church Hall, Treleigh, on the Redruth bypass. Sec Simon, G4PEM, tel Penzance 3948.
Exeter (EARS)—14 May (Surplus equipment sale), 7.30pm. Community Centre, St Davids Hill, 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.
North Devon (NDARC)—Odd months, fourth Wednesdays, 7.30pm. Community College, Abbotsham Road, Bideford. Even months, fourth Wednesday, 7.30pm. Community College, Chaddiford Lane, Pilton, Barnstaple. Chairman, Les Hawkyard, G5HD; treasurer, Jeff Beal, G4ELU; sec, George Hughes, G4CG; assistant sec, Charles Searl, G4LST. On 22-24 May at Pilton there will be an exhibition from 0900-2100h entitled "Satellites and moon rock" at which NDRC will be represented. Details from sec, tel 0271 3683.
Plymouth (PARC)—14 May (Rally briefing and NFD brief), 28 May (No meeting), 7.30pm. Sec G6XZG, PO Box 46, Plymouth PL1 1SY.
Plymouth (PCFERC)—Club call G4VKQ. Students Union, Devonport Annexe, Paradise Road, Devonport. Details from sec Jon Lee, G4TSN.
Stockland Hill Repeater Group—The group has been reformed. The sec/treasurer is Roger Jones, G3YMK, 10 Oak Close, Upottery, nr Honiton, Devon EX14 9QG, to whom all enquiries should be sent.

REGION 10—RR E. J. Case, GW4HWR, 2 Abbey Close, Tyrhiw, Taffswell, Mid-Glam CF4 7RS. Tel 0222 810368.
Aberystwyth (ARSGBG)—8 May (Natter night). Bay Hotel (on the sea front, opposite the bandstand). Sec J. M. Pryse, GW4JXB, tel 0970 828446.
Barry (BCoFERS)—Thursdays, 7.45pm. Barry College of Further Education Annexe, Weycock Cross, Barry. Please note change of sec, it is now Mrs Margaret Beynon, GW4GSH.
Cardiff (CRSGBG)—Second Monday of each month, 13 May ("A homebrew Woodpecker blanker", by John Case, GW4HWR), 7.30pm. Pantmawr Hotel, Pantmawr Estate, Whitchurch, Cardiff. Sec Cyril Laws, GW6ZHP, tel Cowbridge 3212.
Newport (NARS)—7 May (Centre closed), 14 May (Dudley, GW6ZUQ, "Broadcast bands, part 2"), 21 May (RSGB film), 28 May (Centre closed), 4 June (Free/HF Group), 7pm. Brynglas House, Brynglas Road, Newport. Sec Robert Johns, GW4NXD, tel Pontypool 56348.

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)—10 May (Talk by Dr David Last, GW3MZY, subject to be announced), 7.45pm. Green Lawns Hotel, Bay View Road. Sec Mr J. N. Wright, GW4KGI, 46 The Dale, Woodlands, Abergele, Clwyd LL28 7DS, tel 0745 823674.
Dolgellau (Meirion ARS) (GW4LZP)—3 May, 8pm. Dolserau Hall Hotel, one mile east of Dolgellau. Sec W. K. Judge, GW4KEV, Tyddyn Mawr, Arthog, nr Dolgellau, Gwynedd.
Rhyl (R&DARC) (GW4ARC)—7 May (Activity night), 21 May (Talk by Gordon Adams, G3LEQ, on "Propagation"), 7.30pm. 1st Rhyl Scout HQ, Tynewydd Road, Rhyl. Sec Mr J. McCann, GW4PFC, 67 Ashley Court, St Asaph, Clwyd LL17 0PL, tel 0745 583467.
Upper Bangor (Dragon RC) (GW4TTA)—7 and 21 May, 8pm. Ffriddoedd Refectory, UCNW, Menai Avenue, Upper Bangor. Sec Mr D. N. F. Whitehouse, GW4URY, Pendyffryn, Pentraeth, Anglesey, tel Pentraeth 224.
Wrexham (WARS)—Second and fourth Wednesday in each month, 23 May (Final judging of constructor's award). Friends Meeting House, Holt Road, Wrexham. Sec Pete Higgs, GW4IGF, tel Rossett 570212.

British Steel Corporation ARS (Port Talbot), held a very successful Christmas social on 10 December 1983. The photograph shows from left to right John, GW4HWR, RR10; Brian, GW4KYT, chairman; Reg, GW4ESV, sec; John, GW4LKS, vice-chairman; and Roy, GW4HQQ, treasurer. Photo Reg, GW8VHI

REGION 12—RR M. R. Hobson, GM8KPH, 17 Well Brae, Pitlochry, Perthshire PH16 5HH. Tel 0796 2140.
Caithness (CARC)—9 May (Talk by Sector Officer, HM Coastguard, on communications), 13 June (Rig check night. See how bad your rig is), 7.30pm. Loch Watten Hotel, Watten, (midway between Wick and Thurso). Details from sec Ian Morrison, GM4MIM, tel 0995 3960.
Dundee (Kingsway Technical College ARC)—Tuesdays, 7.30pm. St Michaels School, Grayham Street, Dundee. Details from sec Berni Deans, GM4TQN, 4 Deanbank Street, Dundee.
Forfar (F&DARC)—The club is now meeting again and has a full programme. 13 May (Special event station for the Area Scout Association). Details from sec Ken, GM1ABN, tel 0307 63095.
Orkney (Kirkwall)—First Wednesday in each month, 7.30pm. Lynfield Hotel, Kirkwall. RAE class available. Details of club, RAE, or GB3OC from area rep Bill, GM3IBU.

REGION 13—RR Andrew Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife KY1 2LH. Tel Kirkcaldy (0592) 200335.
Berwick-upon-Tweed (Borders ARS)—First and third Friday each month, 7.30pm. Tweedview Hotel, Tweed Street, Berwick-upon-Tweed. Details from GM8BDX or G3HDT, tel 0289 88260.
Dalgety Bay (Marconi Space & Defence Systems ARC)—19 May (Open Day). Details from GM4HRL.
Dunfermline (DARS) (GM3IDS)—There have been some recent alterations to the club programme. Details from GM8IID, tel 728778.
Edinburgh (Lothians RS) (GM3HAM)—9 May ("Radio communication" by C. H. C. Matthews), 13 June (AGM), 27 June (Forward planning), 7.30pm. Harwell House Hotel, 13 Ettrick Road, Edinburgh. 23 May (DF hunt, meet at Braid Hills Hotel). Details from GM4HWO, not QTHR, tel 031-332 5502.
Glenrothes (G&DARC) (GM3ULG/GM4GRC)—

British Rail Amateur Radio Society

Details of this national society, which is open to all British Rail employees, may be obtained from chairman Ron Hooper, G3SCW, or sec G. Sims, G4GNQ, 85 Surrey Street, Glossop, Derby SK13 9AJ.

Wednesdays and third Sunday each month, 2 May (Visit to Fife Police HQ (limit 20 persons)), 20 May ("6m and 23cm", by GM4DIJ and GM8BJF), 7.30pm. Provosts Land Centre, Leslie, Fife. Details from GM4LYQ, tel 745047.

Edinburgh (Leith Nautical College AR&EC) (GM4AXG)—Mondays, 6-8.30pm for electronic construction. Room T2-4, Leith Nautical College, 24 Milton Road East, Edinburgh. Details from Susan Beech, GM4SGB, at the college.

REGION 15—RR J. T. Barnes, GI3USS, Whitegables, 95 Crawfordsburn Road, Bangor, Co Down BT19 1BJ. Tel 0247 3948.

Bangor (B&DARS) (GI3XRQ)—First Friday in each month, 4 May ("Satellites", by Gordon, GI6ATZ), 8pm. Sands Hotel, Bangor. 11 May (Annual dinner in Quarter Deck Restaurant, Crosby Street, Bangor, 7.30 for 8pm). Details from sec GI3OCK, or any officer.

Ballyclare (EARC) (GI4KKK)—Second Tuesday in each month, 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 or any officer.

REGION 16—RR T. D. Howe, G3PLF, 18 Vange Hill Drive, Basildon, Essex SS16 4DD. Tel 0268 24453.

Braintree (B&DARS)—7 May ("Receivers old and new", by club members), 21 May (AGM), 7.45pm. Braintree Community Centre, Victoria Street. Details from Pat Penny, G6TAF, tel Braintree 26487.

Chelmsford (CARS)—1 May ("RF power transistors", by G3WHR), 7.30pm. Marconi College, Arbour Lane. Details from Andrew Mead, G4KQE, tel Silver End 83094.

Colchester (CRA)—3 May ("Nostalgia 2", by Frank Osborn), 17 May (Preparation for NFD and Anglian Mobile Rally), 7.30pm. Colchester Institute, Sheepen Road. Details from Frank Howe, G3FIJ, tel Colchester 851189.

Ipswich (IRC)—27 May (East Suffolk Wireless Revival, "The Hollies"), 8pm. Club Room, Rose & Crown, Norwich Road. Details from Jack Tootill, G4IFF, tel Ipswich 44047.

Vange (VARS)—3 May (No meeting), 10 May (HF station on the air), 17 May (Shell photographic club), 24 May (G4OJN), 31 May (Construction contest), 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)—Meeting dates for this club will continue to be the first Tuesday and third Wednesday in each month until the end of June 1984. 8pm. The Wolversdene Club. Sec G8OPR.

Basingstoke (BARC)—8 May ("Electro-magnetic compatibility", by G3HCQ), 7.30pm. The Swan, Sherborne St John, near Basingstoke. Chairman G4WIZ, tel (07356) 5185.

Bournemouth (BRS)—4 May ("Tests on your radio", by G4VNM), 18 May ("SSTV", by G3VPC), 7.30pm. Kinson Community Centre, Kinson, Bournemouth. Sec G4EKE, tel Ferndown (0202) 877945.

Fareham (F&DARC)—2 and 30 May (OTA natter night), 9 May (Planning meeting for arts and crafts exhibition), 16 May (Arts and crafts exhibition), 23 May ("Basic computing techniques", by Mr Sinclair), 7.30pm. Portchester Community Centre, Westlands Grove, Portchester. Sec G4ITG, tel Fareham 234904.

Farnborough (F&DRS)—9 May ("AMSAT-UK", talk on latest developments), 23 May (HF Field Day, preview), 7.30pm. Railway Enthusiasts Club, Access Road, off Hawley Lane, Farnborough. Pro G4MBZ, tel Farnborough 837581.

Horndean (H&DARC)—7 May (Regional rep's visit and talk), 7.30pm. Merchiston Hall, London Road, Horndean. Sec G6IOV.

Liphook (Three Counties ARC)—9 May (Natter night), 23 May (Fareham Repeater Group, running and maintaining a repeater), 8pm. Railway Hotel, Liphook. Sec G4WUV, tel Bordon 3395.

Swindon (S&DARC)—3 May ("Design and use of long Yagis", by G3SEK), 10 May (Rally planning meeting), 13 May (Swindon Radio and Electronics Rally), 17 and 24 May (Natter night), 31 May (AGM). Park School, Marlowe Avenue, Swindown. Chairman G8CPA, tel Swindon 20734.

Winchester (WARC)—19 May (Demonstration of amateur tv), 7.30pm. The Scouts Log Cabin, Stockbridge Road, Winchester. Sec G3SHQ, tel Twyford (0962) 713003.

Basingstoke ARC recently held an amateur radio display at their local library. Seen here are, l to r: G4SQZ, G3CBU, G6LSH with G4SWF operating computer based rtty equipment which formed part of GB4BLE, their special event station. ***Photo:*** **Jim Miller, G4VOA**

Your RR, having already enjoyed his three score years and ten, has decided that it's time to hand over to the younger generation. The attention of members in Region 17 is called to the nominating and voting procedure for the June elections as published in *Rad Com*.

REGION 19—RR R. J. C. Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ. Tel 01-986 6741.

Cheshunt (C&DARC)—2 May ("Contest ops", by G3WFM), 9 May (Natter night), 16 May ("Amtor, packets/rtty", by G3NRW), 23 May (Natter night), 30 May (2m portable, Baas Hill Common), 8.15pm. The Church Room, Church Lane, Wormley, nr Cheshunt, Herts. Details from Roger Frisby, G4OAA, tel 09924 64795.

Chiswick (ABCARC)—15 May ("The swr meter" —discussion), 7.30pm. Committee Room, Chiswick Town Hall, High Road, London W4. Sec W. G. Dyer, G3GEH, tel 01-992 3778.

Edgware (E&DRS)—10 May ("Ferrite materials", by Neosid), 24 May (Constructor contest). Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware.

Harrow (RSH)—4 May (Informal and practical), 11 May ("WAB", by G4HNL), 18 May (Informal), 25 May ("Quartes"), 8pm. Harrow Arts Centre, High Road, Harrow Weald. Details from Chris Friel, G4AUF, tel 01-868 5002.

Havering (H&DARC)—2 May ("Topband dx", by G4AKY), 9 May (Pre-contest briefing then informal), 16 May ("EMC sub-committee", by Sheila, G3HCQ), 23 May (Pre-contest NFD, then informal), 30 May (The G4MYO DF Hunt). Meetings are held in the Fairkytes Art Centre, Billet Lane, Hornchurch, Essex. Details from J. R. Gibbs, G4UQR, 40 Bridge Avenue, Upminster, Essex, tel Upminster 26904.

Southgate (SARC)—10 May (Talk by Marconi Co Ltd), 8pm. St Thomas's Church Hall, Prince George Avenue, London N14. A/Pro R. Snary, G4OBE.

St Albans (Verulam ARC)—8 May (Informal and workshop), 22 May ("Amateur radio on a shoestring", by Rev Dobbs, G3RJV), 8pm. RAFA HQ, New Kent Road, St Albans. Details from Hilary, G4JKS, tel St Albans 59328.

Watford (WRC)—2 May ("RTTY, Amtor and packets", by Ian Wade, G3NRW), 16 May ("UK metre wave and awards", by G5UM), 8pm. Tudor Arms, Bushey Mill Lane, North Watford. Details from sec Gordon Clarke, G8XXV, tel 01-950 3611.

The Guild of Air Pilots & Air Navigators recently visited the Rolls-Royce aero engine factory at Bristol. One of the Guild members, G3JKV (right), was personally welcomed by G3MCY, who is a manager at Rolls-Royce and a former RAF navigator. There are around 30 licensed amateurs on the site. G3MCY and G3JKV are pictured here beside a Harrier 'jump-jet' aircraft

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REGION 20—RR B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, Bristol BS20 8NQ. Tel 0272 848140.

Bristol (BRSGBG)—28 May (Meeting in the large lecture theatre, Queens Building, Bristol University). As the lecture details have not yet been finalised the information will be given over GB2RS. Details from sec Brian, G4FRG, tel 0272 848140.

Bristol (South Bristol ARC)—2 May ("23cm operation", by G4MCQ and G6GN), 9 May ("QSL card and awards rally", by Les Wooldridge), 16 May ("Fox hunt briefing", by G4OPQ and G8XIH), 23 May ("2m ssb night", by G6ZTX and G6ZTY), 30 May ("ATV night", by G8WAX), 6 June ("Radio Interference Service", by G3OUK), 7.30pm. Whitchurch Folk House, East Dundry Road, Whitchurch. Details from Len Baker, G4RZY, tel 0272 834282.

Cheltenham (CARA)—4 May ("Aerial matching", by G4CHD), 18 May (Natter night), 7.30pm. Stanton Room, Charlton Kings Library, Cheltenham. Details from Gill Harmsworth, G6COH, tel Cheltenham 525162.

Gloucester (GARS)—2 May (Demonstration of items entered in the April construction contest, and NFD preparations (which will be at the Gordon League Rugby Ground)), 7.30pm. St

Barnabus Hall, Stroud Road, Gloucester. Sec requests that members check with any committee member regarding the venue of the club meetings this month. Details from Tony Martin, G4HBV.

Shirehampton (SARC)—11 May (HF NFD planning meeting), 25 May (Lecture/film), 7.30pm. Tyford House, High Street, Shirehampton, Bristol. During May the "Shire" df hunt season starts on Sunday afternoons. Further information from Ron, G4GTD, tel 0272 770504.

Street (S&DARS)—1 May (RTTY information and demonstration, also slow morse class), 5 June (Construction competition and slow morse class). Strode College, Church Road, Street, Somerset BA16 0AB. Details from W. Scriven, Tutor in Radio Studies, tel Street 42277. Welcome to this new club *(RR20)*.

Weston-super-Mare (WsMRS)—14 May (Bob McVey, G3GMC, will be talking about "How to go about winning a df hunt"), 7.30pm. Rugby Club, (off Drove Road), Weston-super-Mare. Details from Dave Restrick, G4/KA0NGP, 4 Ashcombe Road, Weston-super-Mare, Avon BS23 3DY, tel W-s-M 28482.

Yeovil (Y&DARC)—3 May (Question and answer evening), 10 May ("Propagation on the hf bands", by G3MYM), 17 May ("What determines hf signal strength", by G3MYM), 24 May (Discussion on current black boxes), 31 May (Natter night), 7.30pm. The Recreation Centre, Chilton Grove, Yeovil. Details from 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 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

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 04243 4726.

Satellit 2100 Grundig, 120, 90, 75, 60, 49, 41, 31, 25, 20, 10, 15, 13, and 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.

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.

RX vhf-uhf direct entry programmable scanner PRO2008 by Realistic, covers 4m, 2m, 70cm, front panel marked, hence £45. Heathkit oscilloscope model IO102, requires new fets, £15. Buyer collects both items. Tel Atherton (0942) 891140, evenings.

Standard C8800 2m fm 10W, mic, scanning facility, synthesized, memory, virtually new, never been used mobile, comp with power lead, mounting bracket, manual, £155. G4HKK. Tel Dave, 01-478 8043, between 7 and 9pm.

Trio TS120S solidstate tx/rx, used little, £325. G3VGO, QTHR. Tel 0872 864255.

Azden PCS3000 25W tx/rx, remote cable kit, £140 or exchange for 70cm tx/rx. G4UKF, QTHR. Tel 0935 82347 (Somerset).

Cossor radio, 1930 vintage, horn spkr, glass accumulator, mains power supply, in gwo, offers. Hartley 13A double beam scope, hf probe, very heavy, £30. G4FEH, QTHR. Tel 0325 52463.

FL2 multimode audio filter, half price, £45. G4NZY, QTHR. Tel Dave, 021-427 1788.

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.

KW160 top band, 10W, a.m./cw tx, 240V ac, exc cond, £40. Prefer buyer collect. G8UA, QTHR. Tel Burnley 26246.

Eddystone 840A, good cond, £60. KW108 monitor-scope, perfect cond, £65. Buyers to collect. Kirk, G4KQG. Tel 0602 257396.

ATUs, surplus to requirements: as new SEM Transmatch 160-10, Ezitune fitted, £70. Large (buyer collects) Detrola US Signal Corps atu, 2-18MHz high power, meter, roller coasters, vacuum capacitors, £30. G3UVE, QTHR. Tel Bexhill-on-Sea 215983.

IC2AT, US version, IC2 tone pad, £110. Bilateral 10·7MHz i.f. strip, ideal basis for tx/rx, £10. G3PJT, QTHR. Tel 022026 3137.

Yaesu FT230R 25W mobile fm tx/rx, mint cond, quick release mobile mount, £190. G4USK. Tel Maidenhead 27236.

Heath SB301 rx, phones, spkr, good cond, £90. G4BUW, QTHR. Tel 0344 420503.

FT790R, as new, no mods, comp with YM47 (standard), YM49 spkr, mics, nicads, charger, mobile mount, £265. MM432/30L 30W linear amp, as new, £95. Icom 245E 10W 2m multimode, recent check by Thanet, comp with mic, ICRM3 computerised remote controller, mobile mount, £260. Jaybeam six-el quad, unused, £20. Yaesu FT107M, built-in psu, 12 memories, comp with FC107 atu, immac, £600. Datong FL2 filter, as new, £60. Hygain TH3 tribander, well-used but good, £60. All prices open to a very near offer, and are collect or carriage extra. G4ULM, QTHR. Tel Huntingdon (0480) 219940, anytime up till 11pm.

P40 40ft post mount tower, not quite two years old, good cond, £275, buyer collects. HQ1 minibeam, slight damage, fully wkg, £45. 2m quagi, eight-el, £30. Carriage extra. G4PKK, QTHR. Tel Steve, 01-870 1132, Wednesday to Sunday evenings only.

Ex-model engineer, turned ham, offers 3·5in gauge, coal-fired, locomotive. Much work done, incl some boiler plates, etc, sell for £80, or swap for 70cm tx/rx, mobile or handheld. W.H.Y? G6YKY. Tel Norwich 662460 for further details.

Yaesu FT404 70cm handheld, near mint, spkr, mic, case, xtals SU8, SU20, RB0, RB2, RB4, RB6, RB14, £125 or exchange similar 2m equipment, cash adjustment. G6TVC. Tel Derek, Inkberrow 792767, evenings.

Generator, Honda E1500, output 1500W at 240V ac, 10A at 12V dc, exc cond, hardly used, £300 or exchange for computer printer (Epson or similar). G4IDE, QTHR. Tel Wolverhampton 781760.

Realistic Pro 2002 scanner, 50 channel, a.m., fm, vhf, uhf, incl discone antenna, £195. Teletext decoder, comp, circuits, £35. Commodore 1520 colour printer for VIC20 or 64, £90. G6TGK. Tel Worthing (0903) 690415.

Trio JR599S rx, trad amateur bands, 160-10m, 2m, a.m./fm/ssb/cw, in very good cond, orig packing, £100 ono. G4PMG, QTHR. Tel 0923 33973, home, 01-432 2252, work.

Nascom 2, 48k ram, two sound generators, prototype board, nascase, 8k Basic, extension Basic, assembler, disassembler, text processor, toolkits, games, exc cond, used little, £300. Trio TR2200GX, orig packing, mobile mount, unmarked, £85. G8HAY. Tel Driffield (0377) 46919.

Radio Communication, unbound, comp set, 1974-83, mint cond, *Practical Wireless, Practical Television,* 1948-66, buyer collects, offers. Hills, 66 Richmond Road, London SW20 0PQ. Tel 01-946 4573.

Racal rx, 1-30MHz (RA117), new cabinet, vgc, £220. FT7B Yaesu, all 10m, comp, exc cond, never used mobile, will deliver 50 miles, £300. G3ZJY, QTHR. Tel Durham (0385) 66773.

QTH, 650ft asl, three-bed semi, overlooking golf course, gas ch, garage space, quiet cul-de-sac, two miles M5, convenient shops, schools, 0·25 mile from GB3BM, exc vhf/uhf site, antennas no problems, offers, £22,500. G8TPM. Tel Rowley Regis (0384) 213794.

FT101Z WARC, 10 months old, mic, fan, pristine cond, spare set tubes, going solidstate, £400, no offers. FC707 antenna coupler, power meter, dummy load, £60. G4OBB NOT QTHR. 49 Headley Way, Headington, Oxford. Tel 0865 61866.

FT102 a.m./fm, fitted 200Hz cw filter, ssb filter, boxed, manuals, scanning mic, new August 1983, under warranty, as new, £540. Matching FC102 atu, £140. Share carriage. Reason for sale, moving QTH and upgrading station. Must be value. G4UKL. Tel Falmouth 40595.

Barlow Wadley XCR30 Mk2, gen cov rx, 0·5-30MHz, vgc, boxed, no offers, £80. Aston, G6HXB, 11 Salisbury Road, Southall UB2 5QJ. Tel 01-574 2957.

Owing to enforced economy drive, my FT200 tx and rx covers are surplus to requirement, price negotiable. Tel Mike, Sunderland 43987. David Michael Aldridge, G4NQH, 44 Riversdale Terrace, Tyne & Wear SR2 7NH.

Yaesu FT227RB memoriser, scanner, 10W, 2m tx/rx, remote mic, exc cond, £150 ono. Murphy B40 rx, £40. R1155, offers. G4WDH. Tel Brian, Southampton (0703) 433616.

Creed printer/perf type 7E(54), used little, £20. Telegraph signal generator type TSG40, all solidstate, three test texts on rom, 5 and 8 level coding, companion to distortion measuring set TDMS80, £60. Both ono. G5XB, QTHR. Tel 0734 722195.

Surplus gear: 2m, Liner 2 ssb, £70. Uniden 2030 fm, £70. Ampres 80W linear, £60. QM70 transverter, £60. Weston 30ft mast, wu, to, £200. Pendulum 30ft tubular guys, cables, rotar, £100, or sited approx 410 sq yd land, 100yd from sea, AN sq (Mablethorpe) three sheds, one brick, fruit trees, (room for caravan), services (masts have pp). Buyers collect and dismantle masts, £5,000 ovno. G6LYZ, 107 Hanson Lane, Halifax HX1 4SD, West Yorks.

TM201A, very slim, 5/25W, 2m tx/rx, only two months old, all orig packing, £225 for quick sale. G4RWI. Tel Nigel, Manchester (061) 485 3506.

Comp 2m station: IC202S, psu, recent nine-el Tonna, UR67 feeder, £130. Pye PF1 pocketfones, comp, no batteries, £5 pair. Double beam scope, needs repair, £10. 240/110V 500VA shrouded transformer, £10. Carriage extra all items. G4DIC, QTHR. Tel 0455 636315.

FT101ZD, WARC, fm, fan, vgc, £450. Creed 444

teleprinter, ST5 tv, twin printer facility, £100. HQ1 minibeam, £60, or the lot for £550. G4UAL. Tel 0233 38489 (Kent) after 6pm.

Drake MN4C atu, swr, power meter, rated 250W output, as new, boxed, from USA, full instruction book, £90. *Wanted:* Drake desk mic 7075, 7077. Drake lpf type 3300LP. G3VDU. Tel Pete, Nuneaton 349461.

FT102, fm, £500. FT225RD, xtals, Mutek fe, £395. G-whip, 10/15/20/40/80, £20. HF power meter/swr, £25. 22ft 2m qd antenna, £25. FT707FM, 100W, £310. G4MPQ, QTHR. Tel 07072 69157.

Yaesu FT480R, few months old, as new, £275. VIC20 computer, 3/8/16k ram, exc, £85. Trio 2200GX 2m portable, matching amplifier, charger, £95. Himound squeeze paddle, £8. G4TNY. Tel Dave, Hornchurch 57722.

KW2000B, psu, mic, spare valves, incl 6146B, KW1000C linear, four bands, spare valves, TenTec hf tuner. G3ZLN, QTHR. Tel Ipswich 49139.

Used once: 2 × 13-el portable Tonnas, phasing harness, 11m RG8U coaxial, N-plug, PL259, £60, may split. Never used! 2 × 23-el 1,296MHz Tonnas, 2 × N-plugs fitted, Tonna power divider, exc cond, £70 ono. G6ELH NOT QTHR. Tel Watford (0923) 30254.

Bargain: TS430S, fitted all options, mint cond, £800. Matching power supply type PS430, as new, £90. Buyer collects or carr extra. GM2BRA, QTHR.

KW2000A, mains psu, Shure mic, wkg, mint appearance, £100. Securicor £10 extra. AR88LF wkg, good appearance, £30. Buyer collects. G5WW. QTHR. Tel Great Yarmouth 740033.

Totsuko T1200 2m fm handheld, 10 memories, 4W output, nicads, charger, £100. FT707S, WARC bands, £275. FT290R, Mutek front end, nicads, charger, £175. FL2010, £45. FT902DM, £495. FC707, £45. Pye 20VR20 vcr, £150. Grundig V2X4 vcr, £125. G3GLL, QTHR.

Sale of 1,200 radio and tv service sheets, best offer. Sephton, 16 Bloemfontein Avenue, Shepherds Bush, London W12 7BL.

FT290 multimode, listen on input, Mutek front end, DRAE 4A supply, Tonna crossed Yagi rotator, λ/4 mobile whip, low loss foam coaxial, absolute bargain, £300 ono. RTTY ST5, Toni Tuna, £50. 20ft telescopic mast, wall clamps, £30 ono. G4OIN. Tel Andy, 021-451 2571.

HF station, 12 months old, TS530S, £300. AT230, £60. Table mic, £7. SM30WM wind-up mast, £150. TET tri-band beam, £65. Kenpro 400RC rotator, £55. The lot for £600. G4NGX, QTHR. Tel Chris, 01-898 5417, evenings.

Icom ICR70 hf rx. Additions fitted incl fm board, dc kit, FL44 (455kHz) ssb xtal filter, current new price around £650, mint cond, only £450, no offers. G4GXE NOT QTHR. Tel Buxton (0298) 71410, after 5pm.

One careful lady owner, TR2300, nicads, charger, helical, listen on input, VB2300 10W pa, £135. Microwave Modules morse talker, £75. MM atv tx and rx converter, £100. G3WCO. Tel Don, 051-426 2546.

Hafler DH101 stereo preamp, unused since being built and tested, this unit is one of the finest preamps available giving superb performance, it is surplus to my requirements and open to genuine offers. G6HPQ. Tel Tony, Southend (0702) 351936.

Yaesu FT790R 70cm multimode, nicads, nine-el Tonna, used 2h incl mobile antenna, £270. Eight-el x-y Yagi, free to collector. G6OIB NOT QTHR. Tel Ely (0353) 3992.

Yaesu FT101ZD fm, nine-band WARC model, mint cond, new Oct 1983, £499. Carriage included. Kenwood atu, good cond, six-band model, £50. Carriage included. G6CHB, QTHR. Tel John, 091-416 2606.

Welz AC38M hf atu, eight band, 200W p.e.p., one year old, as new, £42.50, incl delivery. GW4RLP, QTHR. Tel 0286 5322, evenings.

NRD515, immac cond, used few hours only, 300Hz, 600Hz filters fitted, £750. GW3CF, QTHR. Tel Prestatyn 89039.

TR7010 2m ssb/cw tx/rx, £85. Uniden FM88 2m fm tx/rx, £85. Trio R300 hf comms rx, £80. SR9 marine band rx, £25. Dragon 32 computer, software, joysticks, leads, £185. GW4MTE/GW8XJC, QTHR. Tel Richard, Porthcawl 4832, after 6pm.

Trio vfo 820, as new, £55 incl postage. Farnel 20V 20A power supply, £30. Buyer collects. G4NTY, QTHR. Tel 061-790 7673, after 6pm.

Test and hi-fi equipment, *Rad Coms,* other radio and electronic magazines, books. SAE lists. G3CBU, QTHR. Tel 0256 58921.

TS430S Kenwood, fitted ssb, cw filters, fitted fm board, Trio PS430, £700 ono. G4IUX, QTHR. Tel 021-475 8403.

Pye Bantam high band fm, tuned onto 2m, helical, handset incl, circuit diagram, alignment data, £20 plus carriage at cost. Icom ICB1050, wkg on 10m fm, £25. G4HPW. Tel 0733 49946 between 6-7pm, evenings only.

Trio 9000, 2m, all modes, nice cond, mic, cable, handbook, £260 or part exchange FT101E or purchase, state price. FT101. Letters only in first instance. Postage refunded. G2DCF, QTHR.

Brand new MML144/100LS, 1 or 3W drive, 100W out, suit FT290 only, £130. KDK FM202S 25W, £145. *Wanted:* uhf/fm, ex pmr gear for conversion (70cm). Anything considered, even not working or broken equipment. G6HKD. Tel Weymouth (0305) 787747, evenings.

Trio TS130S, PS30, exc cond, rarely used, £500 ovno. 9502 rotator, new, incl thrust bearing, £40. WISI 2m four-el crossed Yagi, new, £15. Two pa 40in horns, incl drivers, £70. G4LQT NOT QTHR. Tel Stafford (0785) 52604.

Trio TS700 2m multimode base rig, vgc, no mods, £200. G4FLY, QTHR. Tel 0734 594495.

Yaesu FT708R, NC9C charger, Datong D70 morse tutor, all as new, in orig packaging, would exchange for FRG7700, FT101, R1000, R600 or w.h.y.? G6CJL NOT QTHR. Tel Halifax (0422) 54635.

Blaupunkt Bamberg a.m./fm car stereo, record facility, quadratic equaliser, four spkrs, £110. Astronomical telescope, £35. Ford pb car radio, £25. Elac 750 record deck, Shure cartridge, £35. Fidelity mains tape recorder, £10. Require 70cm tx/rx, or w.h.y.? Bedford, G4NJP, QTHR.

Purpose built internal shack with 3/4 bedroom detached house, lounge, dining room, kitchen, breakfast room, utility room, bathroom, attached outbuildings comprising large workshop, large garage, hayloft, easily maintained garden, nr Chester/Warrington, £64,950. Tel 0928 88123.

Collectors item, offers please. MCR1 miniature communications rx by Philco (GB) c.1943, matching mains psu, four coil packs, xtal headphones, orig instructions, requires new IT4/DF91 and IR5/DK91 valves. SAE with tender, offers opened end of month. G3VZP, QTHR.

Yaesu FT720 combined 2m/70cm tx/rx, comp with control head, switching box, connecting cables, rf units giving 25W on 2m, 10W on 70cm, used home base only and in mint cond, £360. G6HPQ. Tel Tony, Southend (0702) 351936.

TS700 2m multimode, never used mobile, £275. Jaybeam eight-el quad Yagi, £20. Airmec vtvm, £15. Tel Braintree 40263.

Trio 430S, comp with fm, ssb filters, gen cov transmit and receive, psu, PS430, scanning mic, a.m. filter incl, reluctant sale, moving house, £760, inspection invited. Paul Leach, G4AMZ, 18 Gorsefield Hey, Wilmslow, Cheshire SK9 2NH. Tel Wilmslow 533857.

Datong morse tutor, mint cond, £38. G8ZZC, QTHR. Tel 0709 541277, after 6pm.

Eddystone 880/2 commercial 30 waveband cw/a.m./ssb rx, £125. Marine vhf rt, 55ch, 12V, £140. Redifon 24ch 24V, £75. Both as new. FT7 tx/rx, £190. HRO 5T, offers. SR600 rx, £35. G3DVF, QTHR. Tel Alnwick (0665) 602487, evenings.

STC M5 Starphone, 5W 5ch uhf mobile tx/rx, xtalled, working superbly on 70cm, two available, £75 each. Buyer(s) to inspect/collect or arrange carriage. G4HDK. Tel Eversly (0734) 731026.

Morse tuition program tapes for Commodore 64, VIC 20, Dragon Spectrum, ZX81-16k, with full operating and learning instructions, characters introduced in stages for easy, fast learning from complete beginner to test standard and beyond, sends any amount at any speed of random character groups for learning or a typed-in text for plain language practice and then checks your copy, the best program to get you that A licence, £6. GW3RRI, QTHR. Tel 0286 881886.

Datong FL3 multimode filter, autonotch, absolutely mint cond, comp with instructions, orig packaging, £80. G6IBC, QTHR. Tel John, 01-790 8163, after 5pm or weekends.

BBC 32k morse programs incl 500 words in store, 100 real 3min tests, random allsorts cw abbreviations, punctuation, save/playback of text typed in, output to speaker or external oscillator or rig; only £4.50. D. Brandon, G4UXD, 1 Woodlands Road, Chester CH4 8LB.

Comp station: Yaesu FT101E, XF30C cw filter, FV101B external vfo, YD844 deluxe desk mic, £350. Shipping extra. Delivery possible dependent on QTH. G3OLU, QTHR. Tel Braintree (Essex) (0376) 23429.

Electroniques ifts etc for G2DAF rx, Eddystone small rack with three panel units (14in panels), standard units, RAF R4187 rx unit, FT241, FT243 xtals, send for detailed list. R.A. Loveland, PO Box 6, Arundel, West Sussex BN18 0RU.

RAE practice program tapes for Commodore 64, VIC 20 (needs memory expansion), Spectrum, ZX81-16k, tests and gives unlimited practice in all RAE calculations. Don't let your maths make you fail the exam. Pass with this program, £6. GW3RRI, QTHR. Tel 0286 881886.

Icom IC255E fm tx/rx, just overhauled, cw ac pu, 5λ8 mag mount ant, £150 ono, or would part exchange for small hf rig in good cond such as TS120S or similar. G3ABB, QTHR. Tel Bexhill 214876.

FT707 psu, FTV707, FC707, regretfully as need for money in new house is the greater, mint cond, £675 ono. Cannot split. C. Jackson, G4NAB, 46 Coursepark Crescent, Titchfield Common, Nr Fareham, Hants.

Yaesu FT707 100W hf rig, matching power supply FP707, atu FC707, all boxed, manuals, exc cond, £450. G6JUI. Tel Reading 507137.

IC22 10W mobile tx/rx, R3, R5-7, S0, S20-23, mobile bracket, handbook, orig packing, immac, £80. Mono monitor, 6in high resolution (20kV), circuits, spare tube, £28. *Wanted:* portable colour tv. G4FYY, QTHR. Tel Crawley 514788.

Trio TR2300 2m fm portable nicads, charger, soft case, reverse repeat, handbook, original packaging, 5λ8 whip, gutter mount, £110. G8MEW, QTHR. Tel Dunstable (0582) 601008.

Practical Wireless, approx 100, all in new cond, what offers? Buyer collects. A. H. Jeffries, 4 King George Avenue, Walton, Surrey. Tel Walton 227811.

TS180S dfm, new bands, mobile leads, workshop manual, SP180 spkr, VF180 external vfo, YD148 mic, PS30 psu, £525. Daiwa CN1001A auto atu, £80. FT901DM workshop manual, £10. G4BXR. Tel 0908 566266, after 6pm.

813 valves, new , *Rad Com/Bulletins* vol 23 (1947) to vol 56 (1980), *SWM* vol 25, bound, vintage Eddystone and Raymart plug-in coil forms, offers invited. G3BZS, QTHR. Tel 0905 774358.

Tandy PRO2001 programmable fm uhf scanning rx, direct access to 16,560 frequencies, £90. Paul Donaldson, BRS85499, 4 Doe Meadow, Newburgh, Wigan, Lancs. Tel 02576 2126.

Trio TR7200G 2m fm, vgc, xtals R0-7, S20-23 incl, mic, mobile antenna, £95. *Wanted:* Trio 7010 or similar at about same price. GW4LFF. Tel Llantwit Major (04465) 4587.

QTH locator program tapes for Commodore 64, VIC20, Spectrum, ZX81-16k. Input locator (coverage extends to 13 large squares) or lat/long, gives lat/long of locator, distance, beam heading, contest score and total, easy, accurate, £6. GW3RRI, QTHR. Tel 0286 881886.

Complete antenna system, consisting of Strumech 30ft mini-tower (post mount), Diawa 7500R rotator, G4MH mini-beam, Jaybeam four-el 4m beam, 75m UR67, 25m rotator cable, can be seen in situ and demonstrated but will dismantle for buyer, reluctant QRT due to moving house, £350 ono. Yaesu FT101E, fitted fm, vgc, £300 ono. SP901, FC901, FTV250, FV101B, YO101, MMT70/28, in Yaesu box, offers? Mick Ford, G4KBP, QTHR. Tel Burton-on-Trent (0283) 812882.

Microwave Modules 144MHz double conversion mosfet converter, i.f.s. 2-4MHz, 4-6MHz, operating details, £10. Xtal calibrator Mk10, 500kHz-10MHz in 500kHz steps, working instructions, £10. Homebrew power supply if required, £5. G4DOW, QTHR. Tel 0844 44580, after 6pm.

VIC 20 computer, Datassette recorder, machine code monitor, super expander with 3k ram, joystick, books incl *VIC Revealed,* reference guide, *Personal computing on the VIC20,* £90. G4CZH, QTHR.

RTTY Amtor terminal unit MPTU1, VIC rtty program, new, £55. Telequipment type D52 dual beam scope, small in size, £60 ono. G4UJA. Tel Preston 39054.

FT480R, as new, £300. DRAE vhf wavemeter, £20. Five-el Jaybeam, £8. Light/medium duty rotator, £35. 5A 13·8V psu, £8. All ono. G4TQJ NOT QTHR. Tel Farnborough (0252) 514127, after 6pm.

FT101Z/digital, all band WARC, cond as new, service manual, orig packing, prefer buyer inspect and collect, but would deliver radius 50 miles for cost of petrol, £430 ovno. G3PGZ, QTHR. Tel Fillongley 41685.

KW77, good cond, amateur bands rx £60 ono or exchange 2m rig. Tel 0676 40147.

Icom IC215 2m 15ch fm, xtal controlled, 0·5 and 3W ops, extra xtals, £95. Belcom Liner 2 2m ssb, 8W op, 144·130-144·335 preamp fitted, works well, £50. *Wanted:* manual for Cossor 1035 Mk2 scope. G6HTZ, QTHR. Tel Alan, 0761 232150 (Somerset).

Nuvistor 144MHz converter, set of spare valves, psu, £25. One very home-built 144MHz tx, psu,

xtals, spare valves, £30. One 10W transistor modulator from a.m. days, £10. G5UM, 27 Ingarsby Lane, Houghton, Leicester LE7 9JJ.

Yaesu FT480R, used only few hours as fixed station, brand new cond, £285. DRAE 4A power supply, as new, £25. NRD515 rx, mint cond, 18 months old, £750. Tel 041-639 2173.

FT208 handheld, comp with carrying case, two FNB2 nicads, NC8 base, NC9C mains chargers, PA3 car adaptor, YM24A spkr/mic, the lot, £200. Yaesu FP80A matching power supply for FT480/FT780, £30. Tel Farnborough (0252) 547900.

Eddystone gc rx, 840C, offers. Philips N1700 vcr, comp but faulty, offers. Advance audio oscillator, 10Hz-100kHz, £40. Philips handheld dictation unit, mini-cassette, £15. 300 cassette cases, new. GM8CJW, QTHR. Tel 031-552 7727, after 6pm, or 05783 311.

QTH, 75ft agl, 100ft asl, ZN37b, western outskirts of Scunthorpe, exc vhf coverage from north through west to sse, detached, three beds, through lounge/diner, fitted kitchen, long distance views over Trent valley, £24,750. G8YVJ, QTHR. Tel Scunthorpe 856304.

Icom IC260E 144MHz multimode tx/rx, 1/10W, SOTA 144MHz 100W linear amp, 10W input, SOTA 13·8V/15A psu, Mutek SLNA144S preamp, all above for £350. Will consider splitting. MMC144/28 receive converter, £12. Steve Ayling, G4ASL, QTHR. Tel 01-668 3386.

FT101E in mint cond, cw filter, 12V leads, Yaesu spkr, spare pas, drivers, £400. FT221R in mint cond, no mods, all cables, mic etc, £295. G4AKG, QTHR. Tel 651 5147, afternoons only.

Icom 730 eight-band tx/rx, ssb/cw/fm, £430. 60ft Clarbrook alloy telescopic tower, motor winch, suitable heavy antennas, offers. RXs: R1000 with UL1000 rf amp, spkr, £250. Grundig 2100 Satellit with ssb unit, £110. *Wanted:* FT290R. 13·8V 25A psu. G3TSL. Tel Mike, Preston (0772) 635560.

General radio oscillators: 250M to 920MHz and 900M to 2,000MHz, two of each, offers. TRS80 model 1 level 2, 48k, lots of extras, £115 ono. G4GRU, QTHR. Tel 061-440 0556.

Drake R4C, MS4 spkr, £240 ono. Drake 2B, 2AQ Q-mult/spkr, £75 ono. G3RFI, QTHR. Tel 0767 260800.

FT208R 2m handheld, 144-148MHz, boxed, as new, mint cond, charger, case etc, hardly ever used, £160. GI4MCV, QTHR. Tel 0232 623985.

Icom IC271E, internal mains supply fitted, virtually unused, mint cond, £595. GW4ACO, QTHR. Tel 0492 515240.

C7900 Standard 10W 70cm fm, five memories, full or selective scanning, exc mobile rig, being new slim line, never used mobile, as new, reason for selling going base station only, being retired, £185. G2ATK, QTHR. Tel Pershore (Worcs) 553735.

Cushcroft R3 λ/2 triband vertical, remote tuned, comp with control unit, good cond, bargain, £75. Buyer collect. G3DPR, QTHR. Tel 028577 514.

Teleprinter, Siemens T100 punch line terminal, no keyboard, spare relays, service notes, Arabic typehead trolley, vgc, asking £9.99 (Trolley alone worth that!) 4m fm Ultra, working on 70·26MHz, £15. *Wanted:* hf 7 100W Bird 43-el. G3SLI, QTHR. Tel Reading 479850.

IC251E Mutek, £405 ono. Heathkit SB102 tx/rx, £110. Heathkit SB200 linear, 2 × 572B, £180. Yaesu FT227R, 2m fm, £120. MM 100W 144MHz linear, £75. All fb, plus carriage. GW3RVG, QTHR. Tel 0656 860434.

Icom 260E 2m multimode tx/rx, mint cond, in orig case, mobile bracket, scanning mic, £230. G4GBR, QTHR. Tel 0228 61120.

Dynamic rams, 4116 16k × 1, 150nS access, 50p each, eight for £3. 4027 4k × 1 200nS, 20p each. 4127-1 4k × 1, static rams, 75p each, eight for £4. Tel Newcastle (0632) 710834, after 5.30pm.

HRO bs coils, 7, 14, 21, 28MHz, £40. Redifon marine tx/rx GR286, £30. QQVO6-40, unused, £15. Collins TCS12 tx, £30. Command tx, 21MHz, £10. GM3MAS, QTHR. Tel 041-956 4897.

FRG7000 gen cov rx, 0·25-29·9MHz freq range, as new cond, £190. Heathkit OS2 scope, hardly used, good cond, £20. Tel Crewe (0270) 585937, after 6pm.

AR240 2m fm synthesized handheld tx/rx, 140-150MHz rubber duckie, whip, case, charger, nicads, box, £95 ono, or part exchange mobile type rig. *Wanted:* Rigonda/Vega 6in tube. G8DZH NOT QTHR. Tel Romford (0708) 46948.

Marconi vhf/uhf a.m./fm sig gen, TF1064A, £150. GEC base, two mobiles, hire channel, 169·4375, the lot, £100. Pye AM10D, glider channels, 130·10, 130·40, £80. All above vgc. GU3HKV, QTHR. Tel 0481 47278, 6/7pm only.

Yaesu FT101ZD Mk3, fm, £485. Yaesu FTV901R, 2m, 70cm, 4m modules, £295. FV101DM digital vfo, £100. Icom IC240 mobile fm tx/rx, £100. All above incl orig packing. Strumech Versatower, 30ft, head unit, homebrew base, needs welding, £80. G4MID. Tel Ted, Mildenhall (0638) 715178, 8.30am-5.30pm.

Generator, portable 3kVA, 240V, petrol, good cond, used only as standby, £250. 110V petrol, £120. Heavy duty trailer, 1·5 ton capacity, 8ft by 4ft 7in ramp, lights, sides, all steel, good cond, £200. G6DMS, QTHR. Tel 0371 84250 (Essex).

Probably one of the best air band rxs available: AP12 portable, comp with charger helical/whip antennas, fully xtalled, would suit listener in London area, might have other xtals to suit your location, £55 ono. G8XUE, QTHR. Tel 0582 841574.

Trio TS530, exc cond, used little, unmodified, incl mic, house purchase forces sale, £450 ono. Buyer arranges and pays carriage. G4NMI, QTHR.

FRG7700, as new, boxed, £220 ono. Colour tv 26in Tristar (Decca) s/std, slight intermittent fault 30min after switch on, otherwise vg picture, £20. Prefer buyer inspects and collects nr Croydon, Surrey. G1FGS. Tel Upper Warlingham 2499.

Microwave Modules MMT144/28 2m transverter, first class cond, £65. G4HLT. Tel Mike, Beaconsfield 6094.

Microwave Modules MML144/100LS linear, used little, still with box, £125. Tonna 70cm 19-el Yagi, £8. Microwave Modules 15dB attenuator, new, £10. Two of 35000μF capacitors, 35V dc, wkg, £2 each. G6LZO, QTHR. Tel 0274 679754.

FT101ZD (fm), transverter, FTV901R (fitted 2m and 70cm modules), comp, boxed, as new, spkr SP901P, comp hf, vhf, uhf station, £800. Emotator 502 (sax), control box, heavy duty cable, £130. Creed teleprinter 444, perforator, reader, PAG rtty terminal unit kit, pll afsk auto start stop, power supplies etc, £65. Catronics CT100 terminal unit, £60. Communication rx FRG7000, £180. Commercial rtty terminal unit, Plessey TSW10, built-in scope, handbook, £120. Extel printer (45·5 and 50·0 bauds) handbook, £130. Six bound volumes of *Radio Communication,* offers. G4EMT. Tel Skelmersdale 31105.

Yaesu FT707 hf tx/rx, FP707 psu, FC707 atu, FTV707 2m transverter, £475. Might take 2m mobile px. G8YCJ. Tel 01-467 2672.

2m Jaybeam 8XY, £20. Wood & Douglas 2m rf switched preamp, £10. Stephen James Mk2 mult tuner, £15. *Practical Wireless* homebrew speech processor, £8. Homebrew morse oscillator, £5. SML swr and pwr meter, £8. Havard swr meter,£5. SEM marine band converter, 28-30 i.f., £15. Mizuho 7MHz 21MHz 1W xtal cw txs, £10. ICS amateur radio course books, £10. Solatron oscilloscope, needs some attention, but works, £15. All ono. G4OAB, QTHR. Tel Runcorn 65804.

Yaesu FT290R, vgc, no mods, case, nicads, charger, telescopic and helical antennas, £190. MM linear, 30W, 1/3W in, £40. SMC 8A 12V psu, £15. Mobile mic, £10. Buyer collects. G6LUG. Tel Hull (0482) 509404.

Icom IC2E, case, charger, two spare packs, new nicads, 12V pack, £150 ono, or swap FT290R, or Standard C58. MC50 mic, new, unused, £25 ono. Radial kit for HF5V, £25 ono, or swap either for Welz SP15M. GW4RQQ (QTHR GW6ITL). Tel Anglesey (0248) 712763.

AR88D, 540MHz, 32MHz, in six bands, handbook, tuning tools, spare valves, a nice rx, everything you want is on the front panel, it all works, £35. Must collect. Thomson, 16 Coniston Road, Reddish, Stockport, Cheshire SK5 7EJ.

Uniden 2030 2m fm mobile, 13 xtal channels, toneburst, 10W or 1W output, £60. Could deliver within reason. Tel Reading (0734) 872366.

B28 rx, refurbished, new panel, £50. BC348R, mains power pack, output stage incorporated, £50. Airmec millivoltmeter 301A, £20. Trio JR310 rx, exc cond, £100. Transformers, other items. 813 valves, checked, £9 each. Avo 8X, hide case, £45. Barnes, G4DVH, QTHR. Tel 0229 54466.

Tektronix 585A oscilloscope, type 82 dual trace plug-in, manuals, £100. Would swap for IC202 or similar 2m ssb rig. W.H.Y? G6GNW NOT QTHR. Tel 0367 22144.

Yaesu FT290, as new, used little, Swiss quad and rotor, all new, £285. G1EIY NOT QTHR. Tel Midsomer Norton 414329.

FDK Multi 2000, fm, ssb, cw, £150 ono. A. Thores, GM4JKT 5 Havens Edge, Limekilns, Fife KY11 3LJ. Tel 0383 872846.

Hewlett Packard 1123A active probe (solidstate), bw, dc, 220MHz 100k/3pF input, 50μ Ω out, in case, all orig accessories, manual, £125. HP431C power meter, cw, 478B head 10MHz-10GHz, £120. 478B alone, £65. G8BXH, QTHR. Tel 01-428 0974.

70cm, 10fm, hf, Trio TS120V, 80m-10m, five-band and stab psu, £295. Trio 8400 70cm fm, 430/40, £180. 10fm or hf linear, 200W out, 10 in, 10 fm 25W out, 5 in, Farnell 30A switched, 14·5V-22V, £55. G4TBF. Tel Ted, Blackpool 700637.

Vertical antenna, five-band Hokushin HSHF5 trap antenna, have graduated to tower and mini beam and space limited, £25. G4MKK, QTHR. Tel 051-480 0240.

Telequipment type D43 scope, dual beam, 15MHz, good cond, £40 ono. Solartron CD1400 dual beam scope, time-base chassis ok, y-amps u/s, ok for spares, £15 ono. G3ZWK, QTHR. Tel 01-894 6383, after 6pm.

Datong up-converter, £80. Datong FL1 agile audio filter, £40. Antenna tuner AT120, £65. Datong automatic speech processor, £60. Scanning mic HM10, £12. SWR meter SWR9. £8. SWR meter SWR25, £8. Rotel phones RH711, £10. G4DVH, QTHR. Tel 0229 54466.

Grundig Satellit 3400 professional rx, lw, mw, SW1 SW2, fm, usb, lsb, 150kHz, 30MHz in 10 bands, £150 ono. Eddystone 940 rx, 500kHz, 30MHz in five bands, £125 ono. Tel 0375 33305.

FT101ZD Mk3 fm, FC902 atu, SP902 spkr, YD148 mic, HK708 key, all mint, £625. FT708R still under guarantee, £150. MMT144/28, £60. D70 morse tutor, £35. G4TXT, QTHR. Tel Luton (0582) 882701.

FT102, fm and narrow ssb filter fitted, four months old, orig packing, a gift at £630. G6AJV, QTHR. Tel 02974 3654.

Datong morse tutor, perfect cond, hardly used, £30 plus post. G4MKK, QTHR. Tel 051 480 0240.

2M 100W linear/preamp MML144/100S, hardly used, £100. G4NGW. Tel Ron, Derby (0332) 513394, after 6pm.

MM transverter, 2m for hf rig, four-el Yagi, MM transverter 432MHz for 2m rig, 18-el Parabeam, matching attenuator, £80 ono each, antenna included. Peter Lewis, G4VFG (QTHR as G6NSU). Tel Ivybridge 4030, evenings, Plymouth 775851, daytime, weekdays.

Mullard scope E800, 3·5in tube, £15 ono. Advance sig gen D1 less calibration charts, £10 ono. Both with handbook, circuit diagram etc, good cond. G6RM, QTHR. Tel Chelmsford 352500.

Printer Extel Transtel, rtty, code, small, ttl logic, dot matrix print head, £50. Rank Xerox telecopier 400, suit fax? £25. Two Sveart SA400 disc drives in case, psu, leads, for BBC, plus manual, utils, disc, £175. G8BXH. Tel 01-428 0974.

TR3200, 70cm portable, 11ch, carrying case, mobile mount, charger, £100. G4OII. Tel 0472 813450.

FT102 fm and narrow ssb filter fitted, four months old, orig packing, a gift at £630. G6AJV, QTHR. Tel 02974 3654.

Barlow Wadley XCR30 portable short wave rx, £65 or exchange for 2m tx/rx, portable electronic organ, or flute. Tel Scarborough 366360.

8080 microprocessor, eight 2708 integrated circuits on pcb, only £4. Similar with 803S. GEC tv tuner/i.f./video colour boards, £3. 0·5in vidicon camera, with lens, £36. Pye 1in, £18. 30A mains filter, £4. Tel 01-452 6724, evenings.

Oric 48k home computer, progs for morse, rtty, locators, £85. MML 432/100 70cm 100W linear, £135. Electron morse tutor program, £5. 13V 17A power supply, £60. GEC hiband mobile, £15. G8KMV, QTHR. Tel 0438 354689.

FDK M700AX 2m 25W fm mobile, exc cond, £150. G4SWE. Tel 077 784 769 (north Notts area).

Racal RA117E, £225. MA350B synthesizer, £90. RA218 ssb adapter, £50. RA17L, £165. RCA AR8516L, £135. Nems-Clark vhf rx, 30-260MHz type 1306, £150. Range extenders, 250-500, 500-900MHz, £75 each or £250 for all. Trio AT230, £80. VFO120, new, boxed, £45. BCC33 tx/rx, 2-15MHz, ssb/a.m., 100W, all solidstate except pa and rx, one input synthesized, Collins filters, matching atu, £200. VHF rx XTA33, 150-600MHz, £55. APR13 tuning units, 50-600MHz, four units, £50. New boxed valves, 4/65A QY3/65, £10. QY4/250, £15. Handbooks for all except XTA33, APR13. Carriage extra. GW3JAZ, QTHR. Tel Gresford (097 883) 2584.

Datong MK morse keyboard sender, mint, comp leads, etc, £75 ono. Wood & Douglas 2m tx, built, working, S23, boxed, £15 ono. CBM 64 rtty tx/rx, cw tx/rx, software cassette, £6 each. Tel Weymouth 786930.

Teleprinter, Siemens T100, vgc, 50/45·5 baud ttl interface, £30. ICL terminal, 7181/2, 85-key Hall effect keyboard, cond unknown, £30. Homebrew 3W 2m tx/rx, 6ch fm, G3WPO rx board, £30. G4EMV. Tel Peter, 0276 27298 (Surrey).

TS520, £320. SWR twin meter, £5. Tech gdo, £15. 14 AVQ, £20. ZL8, £10. Decca dummy load. £8. HB9CV, £5. EK9X key, £9. SIP arc welder, new, £40. All buyer collect. Tel 021-429 6783.

FDK750E, 430 transverter, 10W multimode on 2

and 70, all controls from one panel, auto repeater shift/tone, two vfos, crossband, boxed, all accessories, pristine, £325 ono. G4TRS. Tel Tony, South Benfleet (Essex) (03745) 55245.

Sony ICF2001, vgc, 150kHz-30MHz, a.m., ssb, 76-108MHz fm, mains adapter, £95 ono. G6IGW, QTHR. Tel Crewe 60062.

Trio 2200 2m portable, six channels incl R3-4, S20, S22, S13, 144·720, nicads, charger, £45. CDE rotator, £35. Eight-el 2m beam, £9. HF5, £40. Radial kit, £20. G6NWM, QTHR. Tel 0709 814911, between 6 and 7pm.

FT221R, Mutek front end, 11 fixed channel xtals, manual, proven performance in many contests, £340. FT290R, Mutek front end, exc cond, nicads, charger, case, flexiwhip, manual, orig packing, £220. MML 144/25 25W pa/preamp to suit above, as new, £40. TR7010 2m ssb/cw mobile 10W tx, 3dB nf rx, mobile mount, £75. MMT 432/28S 70cm transverter, satellite facility, £95. Trio TX599, JR599 tx + rx, 80-10m tx, 160-10m WWV, 2m rx, ssb/cw/a.m./fm, cw filter fitted, £280. FT101ZD fm, WARC bands, fan, 12V psu, cw filter, manual as new, £530. MM4000K rtty tx/rx, keyboard, £180. Versatower, 60ft, both winches, but no ground post. £325. Akai 4000D stereo reel-to-reel tape deck, needs attention, £30. TH3JNR triband beam, up for two months, £135. 144MHz W1SL linear, 2x4CX250, 1W in, 400W+ output, offers. Steve Marsh, G4BWG. Tel Upper Warlingham (Surrey) (088-32) 4656.

Icom IC701 solidstate, 160-10m, 100W, usb/lsb, cw/rtty tx/rx, matching psu/spkr, desk mic, suitable Amtech random wire atu, all mint cond, in orig boxes, best offer over £450 secures. G4OHB. Tel 021-449 3530 (Birmingham).

Drake 2C rx, matching spkr, 160m outboard converter, internal mod, slow tunes 10kHz per rev, agc mod, extra slow, new electrolytics, clean, unscratched, new control knobs in attractive style, any test, £135. G3RHM, QTHR. Tel 01-423 0306.

AR88D, handbook, £50. Hickok valve tester, £15. Taylor 20A cct analyser, £8. Over 100 io valves, £10. Marconi 365A and Admiralty morse keys, £10 each. Miscellaneous items on offer. Buyers inspect and collect. G4OPF, QTHR.

IC120 23cm 1W fm, inc antenna, £350. ICSM6 base mic, £20. 23cm 3 by 5λ/8 mobile, £20. IC25H, £250. IC45E, £210. 2m colinear ant, £40. G3WDN, QTHR. Tel Gt Yarmouth 667597.

Trio R600 gen cov rx, mint cond, incl 12V dc conversion leads, £190. G6XDC. Tel 061-437 3952.

Yaesu FT290R, four months old, mint cond, no mods, nicads, charger, helical antenna, £220 ono. House move forces sale. G8OWL NOT QTHR. Tel Dave, Birmingham (021) 454 1713, evenings.

TS130SE tx/rx, 100W, new bands, cw service manual, mic, exc cond, orig packing, £350. G4EMM, QTHR. Tel IoW (0983) 291592.

KW2000A, comp with psu/ls, Shure 444 mic, vgc, £180 ono. SX200N scanning rx, psu, vgc, £190 ono. Approx 230 rx and tx valves, mostly new, offers. Prefer buyer collects or carriage extra. Letters only please. G3OBX, QTHR.

Yaesu FT480R 2m multimode, orig packaging, exc cond, MM 15dB preamp, 10XY rotator, cables, comp station sale or will split, would consider trade-in fm mobile or handheld. G6USZ, QTHR. Tel Barnstaple (0271) 45277.

DFM7 frequency counter, can be used as normal counter or with i.f. offset for a direct frequency readout for any rx, comp in box, £25. 8 Carnarvon Road, Redland, Bristol. Tel 0272 47691.

Heath high performance solidstate rx SB303, ssb/cw, 80-10m filter, matching tx SB401, 170-180W spec transceive capability, comp, showroom cond, manuals, £300. Free delivery 50 miles. VHF project proposed. Heathkit solidstate electronic keyer HD1410, still packed, half price, £33. G3ANK/A. Tel 0202 486141.

TenTec Century 21 cw hf tx/rx, power variable between 0 and 60W input, ideal QRP set, good rx, fully xtalled for 80-10m bands, mains or portable operation, £130. G4TFH. Tel 01-885 1162.

Tono 9000E, full guaranteed, only two months old, bargain at £570. Reason for sale, upgrading. G3PCN NOT QTHR. Tel 01-866 3300.

FT-ONE Yaesu, fm board fitted, bargain for £849. No offers but will consider part exchange for w.h.y? G4JYH, QTHR. Tel 01-886 0126, daytime.

Complete 160m/80m cw/a.m. fixed/mobile station: Codar AT5 tx incl mic, key, ac psu, dc psu, T28 rx, 80Ω lpf, 80Ω dummy load, rf meter, Tavasu mobile whip, base, 160m/80m coils, spare set valves, mini atu, only as one lot, £69 ono. Well finished homebrew bureau style amateur radio console constructed in teak contiboard, 45in high, 38in wide, 15in deep, cupboard space below operating desk, hinged flap folds up for neat appearance when gear not in use, offers? *Rad Coms*, comp volumes 42 to 59 (1966-83), £1 per volume plus carriage. all A1 condition. Inspection invited. Delivery arrangements possible. Enquiries to G3HBZ, QTHR. Tel Tony, Sunbury-on-Thames (093 27) 82262.

Mains transformers: Gresham 6·3V 10A twice, or 6·7V, 7V (12V series), £10. Another, 215-0-215V 100mA, two 4V 6A, 4V 2·75A, 11V 2·5A, 2-0-2V, 1A, £5. Valves 6GM6, 2E26, £2 each. 6EW6, 6BL8, £1. G3MBL, QTHR. Tel 01-445 4321 (N London).

Trio LF30A lpf, new, unused, £15. Heavy Naval morse key, old type, £10. 10m vertical, 3dB gain, £10. ZX81, psu, 16k rampak, £30. Eddystone 888 rx, £35. Headsets, 600Ω stereo, £5. Browns type F, £5. G3JFC NOT QTHR. Tel 0474 872743.

Binoculars, 35 × 50 Scheffel coated optics, calibrated ocular, immac, £20. BC221AA, mains psu, orig charts, manual, £20. Sangamo time switch, perpetual, 200-250 ac, 20A, unused, £7.50. Codar airwound pa/atu coils, £1. Fourteen xtals for KW2000A/B, £6. G3ANK/A. Tel Christchurch (Dorset) (0202) 486141.

FT901D hf tx/rx, will deliver reasonable distance or arrange carriage, offers. G8GHU, QTHR. Tel Weymouth 789022, evenings.

Icom IC260E, 2m multimode, £220 ono. G6OBR. Tel Birmingham (021) 353 5806.

Yaesu FTDX401 tx/rx, 10-160m, comp with spkr mic, exc wkg order, vgc, £175, collected, £200, Securicor delivery. 1,296MHz tx and rx gear. Send sae for list. G6XM NOT QTHR. Tel Bransgore (Nr Christchurch) 73584.

Trio R1000 communication rx, 0-30MHz digital readout, six months old, mint cond, £225. Standard C58 multimode 2m, CPB58 25W linear, mobile mount, nicads, scanning mic, rubber duck, £250. 10m fm rig, 25W linear antenna, gutter mount, ready to go, £35. Icom ICHM10 scanning mic, £10. All items in vgc. G4RCG NOT QTHR. Tel Wakefield (0924) 362144, evenings, 0532 539820, daytime.

Microwave Modules MM2001, as new, half list price, £95. VIC20 incl psu plus stonechip 16k ram, £45. Going VIC6U. Prefer local sale. Buyer to collect. Tel Brighton (0273) 691852.

Oric 48k word processor, cassette based, machine code, full screen editor featuring full printer control, search, preview, save and load, £6.95. Database program ideal for log books, address files etc, £5.95. G6IDQ, QTHR.

FDK750E multimode, 430 expander, pair, £330. Yaesu FL2100Z, £325. Sale due to move. Buyer to collect. Many other items. Send sae for list. G8DR, QTHR. Tel 01-958 7924.

Facsimile equipment by Muirhead, D901FM tx, 900FM rx, xtal speed controlled, fully transistorised, workshop manuals, £150 pair. GEC BRT402E communications rx, 150kHz-30MHz, manual, £42. G8BMQ, QTHR. Tel 01-653 8489.

Yaesu FT101ZD/FM, FTV901R, FC902, SP901, Yaesu YM38, all boxes, handbooks, as new, £750. G6XGG, QTHR. Tel 01-958 9558 for demonstration.

EA12 Eddystone rx, amateur bands only, fine example of an outstanding rx, £135 ono. G4MVS, QTHR. Tel 01-644 8249.

FV101, matching separate vfo for Yaesu FT101 tx/rx, immac, £45. G3BRQ, QTHR. Tel Fleet (02514) 6588.

Marconi fm sig gen type 1066B/1, 10-470MHz, carrier level, modulation, incremental frequency meters, attenuator – 15dB, μV to 105dB μV, 0·2μV to 200mV output, £250. GW4LQK, QTHR. Tel 0407 5234, after 6pm.

TS830S, hardly used, mint cond, £530. KW EZee Match, £18. KW103 meter, £12. KW dummy load, £10. G-whip, 80m coil, unused, £16. Trio LF30 lpf, £14. Airmec rf generator 201, £15. KW trapped dipole, £8. Hygain 18AVT/WB, needs new screws, £6. Akai 4000DS tape deck, good cond, hb spare belt, £35. UR67 coaxial, reason for sale, going QRT. Prefer buyer(s) inspect/collect. G4AGO. Tel Rugby (0788) 811915.

FDK Multi 750E 2m rig, boxed, mint cond, 5h use only, Jaybeam 8Y/2m, unused, boxed, Hirschmann 250 rotator, SL100 extension bearing, unused, boxed, 5λ/8 2m gutter mount whip, £300 the lot. G3BNF. Tel Bath 859282.

Collectors items: 12 Ferranti intervalve trans tx valve, 250W, T2B (1917), pair Selsyn synchro motors, £10. Pair magslips, unused, £10. Two PX4s, unused, £10. CV2810 6in crt, £10. VCR97 with base, £5. 5CP1 crt, £5. Carriage extra. G3AUZ, QTHR. Tel 0909 473893.

70cm Kenwood TR8400 10W fm mobile, dual vfo, 430/440MHz, never used mobile, with Kenwood PS10 psu, hardly used, absolutely as new, £200. Carriage extra, or exchange for Yaesu FV102DM vfo for FT102. G4WBT, 97 Redland Drive, Northampton NN2 8UG.

Walkie talkie, Dymar 881, 881IS, comp with nicads, xtalled for marine use, 156MHz, easily adapted for 2m, 5ch, new, £85. 3ch reconditioned, £50. Supplied with circuit drawing. Some leather carrying cases available. G3SWC. Tel Rudgwick (040372) 2444, evenings.

FT290R case, nicads, charger, no mods, £210. 10/30W linear, £35. Datong D70 morse tutor, case slightly damaged, hence £30 only. G4WOI. Tel Roger, Portishead (0272) 843108, evenings and weekends.

Collins KWM380 hf tx/rx, comp with all accessories, £1,350. Alpha 78 hf bandpass 2kW linear, £1,100. KLM XT34A six-el 20/15/10m beam, £450. Clarks WT50 pneumatic mast, £950. Ham-M rotator, £195. Storno vhf fm tx/rx CQM600, £85. Most of the above equipment is in as new cond. Tel J. Yu, 01-390 4817, after 7pm.

Yaesu 101E Mk3, fitted dc converter, cw filter, fan, mic, rf speech processor as orig, spare set of valves, Holdings fm tx/rx conversion (not fitted), £300 ono. Hirschman three-wire rotator RO250, £30. G4RSY. Tel 01-651 0633 (Croydon).

FDK Multi 2700 2m tx/rx, 10m rx for Oscar, all mode, vfo, synthesizer, 143 to 148, usual features, £250. FDK Multi 700EX 2m tx/rx, 1-25W fm, £150. Both no mods, vgc. Jaybeam 11-over-11 slot fed, extendable to 14-el Yagi, numerous spare bits. G8TYQ NOT QTHR. Tel Hastings 446805.

Miscellaneous bits, all vgc: boom mic, headsets, £7; RS PL259+ reducers, £3 for 10; SO239, £2 for 10 (used once); new RS207-021, 200VA isolating transformers, £15; 30m six-core rotator cable (new), £5; Creed 7B, 30 reels Sony EIAJ videotape, hardly used, offers? All items buyer collects or pays postage. *Wanted:* Cambridge for 2m, ideally unconverted, must be in good nick, Coventry area. Circuit for Solarscope CD513 to copy, will pay postage and beer fund contribution. G4MRE. Tel Hugh, Kenilworth 511842.

Racal rx RA1217, all filters, £350. Hammarlund SP600JX rx, £80. Racal If adaptor RA237B, £45. Racal atu preselector RA197B, £40. Racal atu MA975, £45. Handbooks with all Racal units. Tel 021-553 0409 (Midlands), after 6pm.

Eddystone 770R rx, 18-165MHz, wkg, £60. 46 Gurney Avenue, Hereford, HR1 1XW. Tel Hereford 54144.

Yaesu FT290, £150. MM linear, 100W, 1/3W in, £110. MM 2m, preamp £20. MM 2m, 10m converter, £20. Trio 20A psu, PS30, £65. Trio desk mic, MC50, £15. Eddystone S840C, gc rx, £60. Adonis three-posn mic switch, K-tone, £20. Adonis tone squelch unit, £20. VHF 10ch scanner, £40. G8NDD, QTHR. Tel 051-632 2500.

Yaesu FTV707 transverter, 2m board, brand new, both boxed, can be seen wkg, £125 ono. G1DCC. Tel 01-958 6400.

Transformers, 500-0-500, 210mA, heater windings, £5. 1350V 110mA, £5. Mains variac 2A, £5. 1A, £3. Tubular glass resistors rf type, 250W 68Ω, £2. Equipment fan, 5in, £1. Pair 807s plus bases, £3. Tel Watford 40848, or 0608 810126, weekends.

Racal RA17L, very nice cond, in matching table cabinet, spare valves, handbook, buyer to inspect and collect, £175. MM 4m transverter with 144MHz drive double conversion, £85. G3SPJ, QTHR. Tel 01-311 8405.

High specification linear power supply, 13·8V at 10A, fully protected by power supply supervisor ic and over current circuitry, l.e.d. indication for normal, under or overvoltage (crowbar) status, size L250 W225 H130, bargain at £75. G3VBW, QTHR. Tel 0703 472584.

KW204 tx, KW202 rx, KW EZee Match, £300 ono. Buyer collects. G6NK, QTHR. Tel Weybridge (0932) 44058.

Sale/swap Trio TS120V, ideal for mobile, holidays etc, matching TL120 linear amplifier, full protection, remote frequency controller/vfo memories etc, all in unmarked cond, £400, or swap for IC251E or FT225RD or w.h.y? G4VOE. Tel 061-740 4126, anytime.

KW2000 and psu, £200. Tel Fairseat 823598.

ATU, Mizuho Sky Coupler KX2, very good cond, £15 ono. G6TXA, QTHR. Tel 01-785 2252, weekends.

Shure 444D dual impedance mic, as new, £25. G3VBW, QTHR. Tel 0703 472584.

Standard C58 multimode, 2m portable/mobile, case, nicads, charger, as new cond, never used mobile, £200 ono. G3WLG, QTHR. Tel Bristol (0272) 681068.

Racal RA17 film dials, as new, £5. Air spaced coaxial, 7/8in, 140ft, £50. Modem TG2393, 600/1200 baud, 2/4 wire, £35 pair. Hewlett Packard

143A scope, 15MHz, 12in crt, £140. G4HKY NOT QTHR. Tel 0484 603898.

Yaesu FT720RV, 2m 10W fm mobile, purchased 1.3.84, used on rx 5min only, exchange, for expensive multimode, refused by Western Electronics (UK) Ltd, £169. G1FUO NOT QTHR. Tel South Elmsall (0977) 43101.

FT101ZD Mk3, WARC, fan, mic etc, mint cond, £490 ono. Would part exchange for FT102, FT757 or similar (101 + cash difference). D104 deluxe preamplified, all chrome desk mic, £45 ono. *Wanted:* tribander. Tel Clive, 0279 28857, evenings.

Belcom AMR217B marine scanner, 10 channels fitted, £55. Codar AT5, matching psu, £45. G6AGT, QTHR. Tel Warrington (Cheshire) (0925) 74 295.

Yaesu FR101 rx, digital readout, as new, £150. Yaesu YO100 monitorscope, as new, £75. Eddystone 830/7 rx, gen cov rx, xtal controlled, amateur bands, £150. G3TFW, QTHR. Tel Caterham 44563.

Datong morse tutor, purchased in December, has worked for me, £25 ono. Tel St Helens 817144.

Electronic keyer, American Heath model SA5010 Umatic memory keyer, boxed, as new, £65 ono. G3VBW, QTHR. Tel 0703 472584.

Yaesu FR101DD multimode rx, a.m., fm, fsk, usb, lsb, 160-10m, 4m 2m, sw commercial bands, £150. Ferguson vhs video recorder, new heads, gwo, £100. Datong FL1 active audio filter, £25. Icom 1050B 10m fm converted, £25. Pye PF70, good working cond, £40. Pye PF1, comp set, rx/tx, charger, £25. Dymar 2m handheld, converted, £25. Avo model 7, £15. Black & white tv, £5. Tel 021-747 7925.

Kenwood TS520S, in exc cond, used very little, from new, bargain at the price, £285. R. Crosby, G4PQJ, 15 Churchill Way, Heckington, Sleaford, Lincs NG34 9RQ. Tel 0529 60661, evenings after 6pm.

FT480R, 2m multimode, exc cond, mobile mount, mic, manual, £300 ono. Going hf. G4WPR, ex G6UOA NOT QTHR. Tel Abingdon (0235) 20229.

WANTED

Signal generators (preferably Marconi), to cover 30-400MHz. Bencher lever. YO901P. Details of paper tear-off for Commodore printer. Thruline 250H. Heathkit barograph ID2090E, kit or complete. VIC20. Circuits of Farnell psu 15/2 TRC, and Advance MG5-40. G3AZI, QTHR. Tel 0772 37815.

Paper capacitors for 4kV power supply. 3-500Z valve base, and valve in any cond. Heater transformer for 3-500Z. Filament chokes if possible. Any other useful parts for linears. John Scott, GM3KJE, 5 Garthdee Terrace, Aberdeen.

Probe type TM5269 for Marconi TF1100 sensitive valve voltmeter, JA46/001 onwards. Terminal adaptor type TM5272 for TF1100. Details of circuits/construction of same will also be very welcome for photocopy etc. G6UGU. Tel John, 0302 841530.

KW107 atu, KW spkr, KW vox unit. G4LMQ, QTHR. Tel Upminster 23310.

Morse key. Older the better. Top price paid for double current c.1915 and similar. For own use by dedicated telegraphist. G3BEX, QTHR. Tel 049-46 5097.

Blyth amateur radio club needs tx/tx/rx to broaden club activities. Lower price bracket valve equipment preferred. Sec A. W. Baxter, 37 Newsham Road, Blyth, Northumberland NE24 5TJ. Tel 0670 353069.

Suitcase tx/rxs, any spares, incomplete or damaged sets, any connecting cables or spares for WS (Canadian) No29, well regulated and stabilized 12V or 13V psu. Capable of providing 50A continuous. Taylor, G3UCT, 8 Government House Road, York. Tel York (0904) 29777.

VFO 520 to match TS520. Tel Buckley 545177.

Set of seven two pin coils for megacycle meter model 59. NEMS Clarke 1306, converters to 1000MHz for cash, or exchange my Collins 390A. R. Davey, 53 Stalham Road, Hoveton St John, Norwich NR12 8DU. Tel Wroxham 3153.

For the wireless museum: pre-1950 radio books, magazines, catalogues, service sheets, manuals, QSL cards, valves, components, morse keys, any knobs! AVO valve tester manual. Beehive/letter neon. Gamages catalogue. Details to hon curator, G3KPO, QTHR. Tel Ryde (0983) 62513.

Galvanized steel guy wires, egg insulators, eight for a 40ft mast, must be new or ex-govt ok. G4EGB, QTHR. Tel Scarborough 362537.

Urgently wanted: P8271 disc controller chip for BBC computer. £30 cash waiting. Paul Martin, 3 Birch Close, Broadstairs, Thanet, Kent. Tel Thanet (0843) 61448 or 20592.

Exchange house, car, shack and Yagi in Bridgwater, Somerset, for similar in Guernsey, nr airport, for three weeks approx in August. Details to Les Jordan, G4KJP, 7 Orchard Lane, Bridgwater, Somerset TA6 7QY. Tel 0278 57259.

Pye Olympic low band a.m., wkg order. G6TVC. Tel Derek, Inkberrow 792767, evenings.

AT200 tuning unit to match Trio 520S. G4PCR, QTHR. Tel 0270 624310.

RSGB Bulletin Vol 27 No7, Jan 1952 and any information about Elizabethan "TVI-Proof" tx. 58-key McCann Duet concertina. Graham Coyne, G3YJR, Flat 1, Foundry Court, 131 Burngreave Road, Sheffield 3. Tel 306511, ext 492, daytime.

Altimeter, ex-RAF ref 6A/685-1512 or similar. Good heavy morse key or keyer. Exchange atu type variable capacitors 200+200pF, 450pF and 1,000pF. G3KAJ, QTHR. Tel Chorley 71343.

Marconi CR150 rx. Circuit diagram and/or manual for Eddystone S870 rx. G8WTY, QTHR. Tel Malvern (06845) 4968.

Yaesu atu for FT101E, old bands. Have Tokyo 200W atu, as new, built-in swr, power meter, 80-10m incl WARC bands, in exchange. G4TDA. Tel Keith, Rugby (0788) 70363, anytime.

Shimizu SS105S, in good cond, preferably with fm units fitted. G3LGH, QTHR. Tel 0706 48484.

FT75. Separate vfo, atu. G3KLY, QTHR. Tel 021-453 2920.

Buy or borrow for copying: handbook and circuit diagram for Trio 9R59 rx. All expenses will be paid. G6CJL NOT QTHR. Tel Halifax (0422) 54635.

Telonic sweeper. Data, plug-ins, accessories for model SM2000. Faulty units with data considered. GW2HCJ, QTHR. Tel 0766 770 637.

HF tx, eg KW2000, KW204, FL101. Would also consider good hb gear, eg G2DAF tx. GWO is not essential. Will inspect, collect, Surrey, Kent, Sussex. Tel Oxted (08833) 4718.

HQ1 mini beam and bell rotator, must be vgc, reasonable price. G4MQF. Arthur Ramsey, 51 Queens Road, Cadbury Heath, Bristol. Tel Bristol 676269, after 6pm.

Copy of write-up (believed *Rad Com* or *SWM*) how to use Codar AT5 tx on 40m. For same tx, ac mains psu type 250S in orig cond and gwo. G3AVQ, QTHR. Tel Henley-on-Thames 576852.

Bencher paddle. ATU for balanced feeder lines such as KW atu. G4UDT, QTHR. Tel 01-200 1839.

Scopex 4D10A oscilloscope, instruction manual, will pay all costs for copy or original to photostat. John Quinn, St Mary's College of Education, 191 Falls Road, Belfast. Tel 0232 227678, or 612533, evenings.

SSM Europa B 4 and 2m transverters. SSM power supply model CPS10. G3GHB, QTHR. Tel Inkberrow 792582, evenings.

HQ1 mini beam. G5EDS. Tel Swanley (0322) 60842.

2m linear, approx 1-30W for mobile work. 2m linear for shack, more powerful. FT101 less than two years old. E21 tune. Bank manager insists that all must be very reasonably priced. Desk mic. Tel Pete, 021-373 0060.

BBC micro, ideas, software, hardware, details etc for reception, transmission of sstv using BBC mod B micro. G4MID. the Mays, Barton Road, Thurston, Suffolk IP31 3PD. Tel Ted, Mildenhall (0638) 715178, work.

Circuit information on how to convert Harvard 410T 40ch 27MHz handheld nbfm tx/rx to work on 29·6MHz amateur band. G3ZRH, QTHR. Tel 0277 221465.

Eddystone short wave manuals No 1 and 2. *Short Wave* No 5 (edited and published by *Short Wave*). *RCA Guide to Transmitting Tubes,* 1942 or earlier. G4IMT, QTHR. Tel Bath 891254.

EHT board Tektronix 545B or transformer. G3ANG, QTHR.

Cushcraft R3 antenna, hf rx, about £50. ATU for 1·8-30MHz, 400W, three or four way antenna switch, good vswr/power meter. Capps, G1DPU, 309 Victoria Road, Lowestoft, Suffolk NR33 9LR. Tel 0502 65113.

Handbook or circuit diagram, for Koyo 1770 11-band radio, to buy or borrow for copying. all costs paid. RS85738. M. Hurley, 84 St Brendan's Park, Tralee, Co Kerry, Ireland.

2m multimode tx/rx. Telescopic mast. Trio R600/1000. Tel 01-935 7119, daily, 12-1pm.

Datong D70 morse tutor, will collect Manchester area. Tel 061-748 6109, after 6pm.

QRP atu joystick or Stephens-James or w.h.y? G8UA, QTHR.

Marconi morse key. NF5B, Dave Johnson, 15914 Val Vista, Houston, Texas, USA 77083. Tel (713) 530 7683.

Plug-in timebase unit type TD51 for telequipment D53A scope. Preferably in wkg order. Any fault finding hints on above would be very welcome. G4PNM, QTHR. Tel Tony, Bedworth (0203) 318301, anytime.

Eddystone 830/7 rx in exchange for KW204 tx and KW107 Supermatch atu. G8WTY, QTHR. Tel Malvern 4968.

HRO spares. Coil 3·5-7·3MHz with bandspread. Sprung fingers (five) on brown screw fixing mounting unit. G3MBL, QTHR. Tel 01-445 4321 (N London).

KW103 swr/power meter. *For sale:* FRG7, £110 or part exchange. Tel Herne Bay (02273) 3511, evenings or weekends.

Sweeper, data, plug-ins, accessories for Telonic SM2000 sweep generator. Ralph Taylor, GW2HCJ, QTHR. Tel 0766 770637, after 7pm.

Marconi morse key type 365FZ or similar. Full manual required for Atlanta rx, buy or willingly pay to borrow for copying. Tel 0963 32389.

Top band tx/rx, hb acceptable. Wish to use mobile. G4MYX, QTHR. Tel Tadcaster 832061, evenings.

KW107 antenna tuning system or similar. G4GJP, QTHR. Tel Wirksworth 3934, evenings and weekends.

KW TenTec Omni C. *For sale:* FT7, mains power supply, FL100 linear, £300. G3IYT. Tel 0472 812914.

For restoration of WS12 sender, ATP35 (PVI35) pa bottle. Gen on RCA rx R503/FRR23, made 1950s for US Navy. G8LIU, QTHR. Tel Uxbridge (0895) 30006.

Transmitter, modern professional quality, preferably 1-30MHz self-contained, size not too important, ship's tx or similar may prove ideal, quality rigs only, no rubbish please. G3UGE NOT QTHR. Tel 021-553 0409, after 6pm (Midlands).

B2, A3, tx/rx, good price for complete set. G3NYE, 49 Hawthorn Road, Gatley, Cheadle, Cheshire. Tel 061-863 6263, between 8am and 4pm.

DG5 digital readout for TS520. KW107 Supermatch or similar. 24h digital clock. G4VGH. Tel Malvern (06845) 61458.

ICS

Professional Quality Computer Interfaces and Software

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Software and hardware all in one module!
The simplest way ever to get on RTTY.
Just plug into a Commodore 64 or VIC-20 computer; connect up your rig (MIC, PTT, SPKR); plug in a 12 volt power unit and you're away!
Built-in tuning indicator. Wide and narrow shifts. Separate active 4-pole mark and space filters. NOT A PHASE LOOP DESIGN. European (IARU) AFSK tones. Programmable speeds (all commonly used speeds are available). FSK, AFSK and CW outputs.
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USA made.

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Also available:			
			P&P
MBA-RO	Self-contained Morse/ RTTY/ASCII Reader	**£179.00**	£2.00
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Picks signals out of the noise like no other terminal unit!
A professional quality CW/RTTY terminal unit which cuts no corners on selectivity, sensitivity or reliability.
A magic eye bargraph indicator makes tuning really easy and a multi-stage active filter with pre- and post-limiting and a floating comparator give 'state of art' reception of weak signals.
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Our split screen software is up to the same standards of professionalism as the CP-1 and beats all comers in terms of ease of use. It comes on E-PROM or cartridge (to suit your particular computer) with a ready-made connection cable, keyboard overlay and manual.
USA made.

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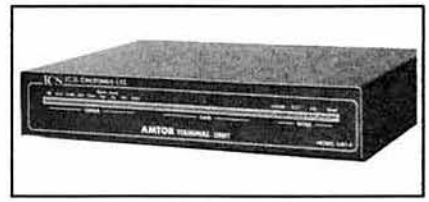
CP-1/VIC-20	VIC-20 software	**£39.00***	£1.00
CP-1/BBC-B	BBC Model B software	**£39.00***	£1.00
AMTOR 69	Runs AMTOR on the Commodore 64 with the CP-1	**£69.00**	£1.00

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

Best!



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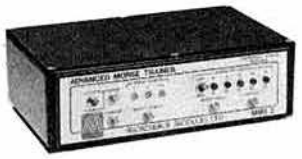

This advanced Morse Trainer is based on the MMS1, and includes all the same facilities, with the addition that the pupil may key his own morse into the unit so that he can perfect his sending ability. As this is a more advanced product, the speed range is 6-32 wpm.
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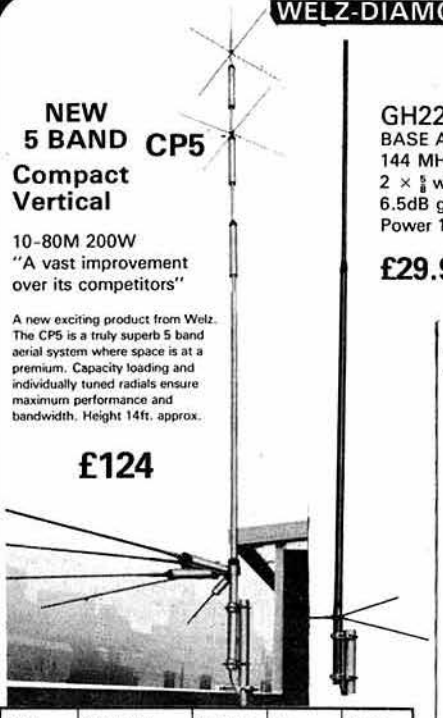

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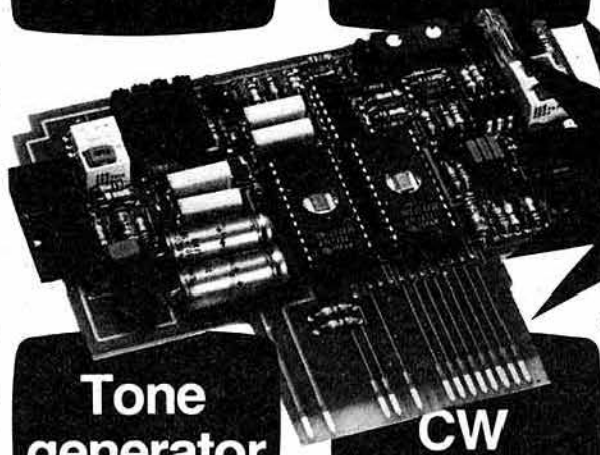

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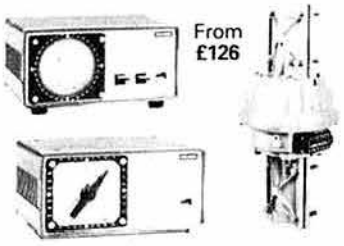

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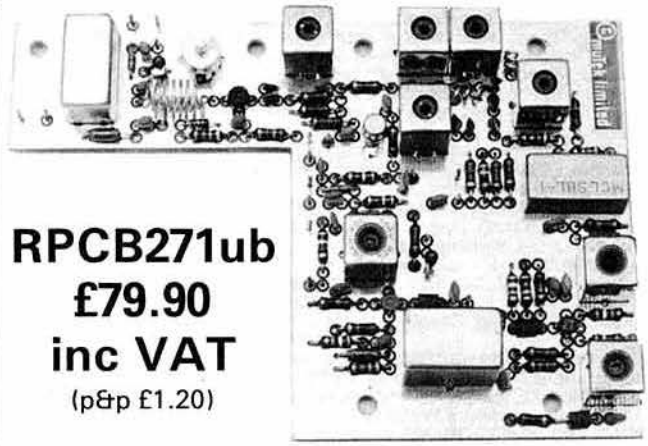

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We had a nasty experience a while ago when there was an unsuccessful attempt to manufacture a near copy of our FT221/5 front-end board. One aspect of that affair came to mind in a telephone conversation this afternoon. Why, asked the caller, had we never used high level mixers like the SRA-1H in our front-end boards? Would this not provide much improved dynamic performance? Strangely the answer is 'not really'. Here's why . . .
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HATELY ANTENNA TECHNOLOGY

GM3HAT  GM3HAT/A

DIPOLE of DELIGHT

SMALL SITE OPERATION

The range of models of the Dipole of Delight now available should allow the purchase of a version which will provide the answer to the frustration encountered by the majority of city-dwelling Radio Amateurs interested in DX on the HF bands. For the problems of a small site and limited accommodation the conventional advice given in such circumstances concludes:—
Use a trapped ground plane antenna and a semi-conductor transceiver with NO-TUNE final stage.

Regrettably it is not pointed out to the unfortunate enquirer that:—

(a) vertical antennas with traps have very narrow bandwidths of satisfactory operation and require accurate compensation with a high Q tuner unit.
(b) vertical induction fields in a crowded city site from an effective antenna height of zero metres produces excellent di-electric coupling to (and from) walls, trees, and nearby TV down-leads, but very little radiation to the Ionosphere.
(c) semi-conductor (and other) transceivers are self-protective in output power when coax SWR is greater than 1·7 to 1 and so are damnably difficult to adjust with a vertical antenna and ATU.
(d) every QSY up or down the band requires a re-tune which wastes time and loses the caller's priority in the alacrity of response needed in today's crowded bands. The second caller heard, hardly ever gets a reply.

An appropriate DIPOLE of DELIGHT supported horizontally at a modest height will enable all these problems to be cured "at a stroke".

To recap on the unique properties of the DD which has:—

1. Radiation is almost entirely horizontally polarised.
2. Efficient and fully balanced behaviour, so the coax takes all the power to the launch height.
3. Wide bandwidth so that NO ATU is required and genuine NO-TUNE action is available with modern amplifiers.
4. Multi-band models also give access to several Ionospheric paths so that a wider selection of band opening times can be enjoyed each day.

ANTENNA TECHNOLOGY and NEIGHBOURLINESS

As was stated in our earlier advertisements in this publication (Dec '83 to date), the outcome as regards TVI, VTR and stereo amplifier interference depends upon the particular circumstances. The DD is so efficient that it will probably produce field strengths at amateur bands which are greater than a conventional antenna. But by virtue of its excellent balance, a horizontally slung DD will produce considerably less vertical induction field than either a trapped ground plane antenna or an old-style "cut and coax" dipole with its unbalance current flowing down the outside of the screen.

The DD Monobanders have been tested to UHF and they have only one band of operation. There is NO OVERTONE and so these devices will have minimal radiation at VHF even if the transmitter should be generating a morsel up there. The monobanders are eminently wide band and have very low SWR values and would make excellent radiators for mounting in a loft space. Should the close presence of other objects lower the resonant frequency, short fold-backs will restore the proper behaviour. In fact more than one monobander could share the same attic, with separate down leads which are then switched at the shack for band change. And if anyone wants to change the direction of radiation, one might imagine two monobanders at right angles could similarly be selected at the feed points of two coaxial cables.

NEW MODEL

For the coming HF summer season we are introducing a monobander for 28 MHz. This has a genuine wideband behaviour so should be of interest to satellite users and those trying to get into the USA FM portion. For the rolling polarisation problem from the satellites, two orthogonally mounted antennas with cable-path difference of a quarter wave and a simple dual primary to single secondary transformer with turns ratio 1 to 1·414 would give unbeatable 29 MHz down-link reception. S values given below.

DDM 28 f MHz	28·0	28·4	28·8	29·2	29·7 Noise	50 ohm	Galaxy
Length 5·8m (19ft)	1·4	1·15	1·05	1·16	1·5 μV EMF	0·24	0·65

PRICES The UK Price includes Packing and Post and VAT. STATE MODEL.
The DX Price includes Packing and Post (Air outside Europe). Cheques may be written in any currency (allowing no restrictions nationally to UK).

	UK	DX		UK	DX
DD 7/14/21	£56·46	£56·00	DDM 14	£15·98	£15·28
DD 10/18/24	£56·46	£56·00	DDM 21	£11·64	£11·50
DD 14/21/28L	£46·75	£46·50	DDM 28	£11·64	£11·50
DD 7/14/21/28L	£58·50	£58·00	Data on request with SAE please.		

Money back guarantee of one month. SWR data given in good faith but does not constitute a contract.

HATELY ANTENNA TECHNOLOGY, 1 Kenfield Place, ABERDEEN AB1 7UW, Scotland, UK.
Proprietor: Maurice C. Hately, BSc(Eng), MSc, MIEE, Chartered Electrical Engineer. (GM3HAT) ANTENNAS MADE in SCOTLAND

Whenever you enter a LOWE ELECTRONICS' shop...

be it in Glasgow, Darlington, Cambridge, London or here at Matlock, then you can be certain that along with a courteous welcome you will receive straightforward advice. Advice given not with the intention of "making" a sale but the sort which is given freely by one radio amateur to another. Of course, if you decide to purchase then you have the knowledge that LOWE ELECTRONICS are the company that set the standard for amateur radio after-sales service. The shops are open Tuesday to Saturday and close for lunch 12.30 till 1.30pm.

In Glasgow the LOWE ELECTRONICS' shop (telephone 041 945 2626) is managed by Sim GM3SAN. Its address is 4/5 Queen Margaret's Road, off Queen Margaret's Drive. That's the right turn off Great Western road at the Botanical Gardens' traffic lights. Street parking is available outside the shop and afterwards the Botanical gardens are well worth a visit.

In the North East the LOWE ELECTRONICS' shop is found in the delightful market town of Darlington (telephone 0325 486121) and is managed by Don G3GEA. The shop's address is 56 North Road, Darlington. That is on the A167 Durham road out of town. A huge free car park across the road, a large supermarket and bistro restaurant combine to make a visit to Darlington a pleasure for the whole family.

Cambridge, not only a University town but now the location of a LOWE ELECTRONICS' shop managed by Tony G4NBS. The address is 162 High Street, Chesterton, Cambridge (telephone 0223 311230). From the A45 just to the north of Cambridge turn off into the town on the A1039, past the science park and turn left at the first roundabout. After passing a children's playground on your left turn left again into High Street. Easy and free street parking is available outside the shop.

The Capital City also has a LOWE ELECTRONICS' shop managed by Andy, G4DHQ. Easy to find, the address is 278 Pentonville Road, London N1 9NR (telephone 01 837 6702) and the shop is located on the lower sales floor of Hepworths. That's only a 3 minutes walk from Kings Cross railway station. So, when you're in the Capital City, visit LOWE ELECTRONICS.

Finally, here in Matlock David G4KFN is in charge. Located in an area of scenic beauty a visit to the shop can combine amateur radio with an outing for the whole family. May I suggest a meal in one of the town's inexpensive restaurants or a picnic on the hill tops followed by a spell of portable operation.

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**Delivery approximately five weeks*

Miscellaneous

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DX Edge (HF propagation prediction aid)	£13.98	£12.58
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Radio Communication bound volume, 1983	£16.90	£15.21
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	Non-members' price	Members' price
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Amateur Television Handbook (BATC)	£2.55	£2.30
Amateur Television Handbook Vol 2 (BATC)	£2.77	£2.49
AMSAT-UK Technical Manual (AMSAT-UK) (Includes all revises and updates, including Oscar 10 data sheets)	£14.37	£12.93
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NON-MEMBERS. Use left-hand price columns. Note that members' sundries are only available to members of RSGB.
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PRICES. These include postage, packing and VAT where applicable. For airmail despatch, please ask for price before ordering. Goods are obtainable, less p & p, at RSGB headquarters between 10am and 4pm, Monday to Friday.
POSTAL TERMS. Cash with order. **Stamps and book tokens cannot be accepted.** Cheques and postal orders should be crossed and made payable to "Radio Society of Great Britain". Our Giro account number is 5335256. Please write your name and address clearly on the order, and allow up to 28 days for delivery.

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The front panel layout and operation are actually simpler than some VHF FM transceivers, while the simple circuit design leaves fewer parts that could cause problems. Nevertheless, all of the essential modern operating features for HF SSB and CW are included, along with extras such as dual selectable noise blanker pulse widths (designed to blank the woodpecker or common impulse noise), full SWR metering and capabilities for an optional internal channel crystal*, narrow CW filter*, and FM unit*.

The extremely compact size and simple control layout make the FT77 ideal for mobile operation, or as the heart of a complete base station with the optional FP700 AC Power Supply, FV700DM Digital Scanning VFO and Memory System, FTV700 V/UHF Transvertor and the FC700 Antenna Tuner.

The low price of the FT77 coupled with the expansion capabilities presented by these accessories, make this transceiver the perfect choice for those new to amateur HF communication, or as a practical second rig for old timers.

Ask your authorised Yaesu dealer for a full colour leaflet or better still call in to him and try one out today!

GENERAL

FREQUENCY COVERAGE
Rx/Tx; 10-80M (*All* 8 bands)

FREQUENCY RESOLUTION
100Hz (Digital Readout)

FREQUENCY STABILITY
Better than 100Hz/½ Hr A.W.U.
Better than 300Hz during ½ Hr W.U.

MODES OF OPERATION
J3E (USB/LSB), A1A (CW), G3E* FM (Tx & Rx)

POWER REQUIREMENTS
13·5VDC; 1A Rx, 20A Tx

DIMENSIONS (EX/INC Projections)
250/340D × 245/248W × 100/115H, mm 6Kg (13·3lb) Nett

RECEIVER

SENSITIVITY
J3E/A1A (SSB/CWW) @ 10dB S + N/N; 0·3μV (2·4KHz)
A1A (CWN)* @ 10dB S + N/N; 0·15μV (600Hz)
G3E (FM)* @ 12dB SINAD; 0·7μV (12KHz)

CIRCUIT TYPE
J3E/A1A (SSB/CW); Single Conversion (8987·5KHz)
G3E (FM) ; Double Conversion (8981·5 & 455KHz)

SELECTIVITY (all @ −6dB & −60dB)

J3E/A1A (SSB/CWW);	2·4-5KHz,	2.08:1 SF
A1A (CWN)	; 0·6-1·3KHz,	2.17:1 SF
G3E (FM)	;12-24KHz,	2.00:1 SF

SPURIOUS REJECTIONS
Better than; −70dB image, −50dB IF

AUDIO
4W-16 Ohms, 3W in 4 ohms (@ 10% THD)

TRANSMITTER

POWER OUTPUT
J3E/A1A (SSB/CW): 100W PEP (80-12m)
: 85W PEP (10m)
G3E (FM) : 50 WATTS

AUDIO RESPONSE
350-2700Hz (@ −6dB)

SPURIOUS SUPRESSIONS
Carrier; Better than −40dB
General; Better than −40dB
Sideband; Better than −50dB (W/R 1KHz)

MICROPHONE IMPEDANCE
600 Ohms Nominal

OUTPUT IMPEDANCE
50 Ohms Nominal, Unbalanced

ACCESSORIES

FC700	*Antenna; tuner, load, SWR etc*
FP700	*Power Supply (mains to 12VDC)*
FV700DM	*Synthesized external VFO/memory*
MMB16	*Mobile bracket (accepts FT & FV & /or FC)*
MR7	*Rack Unit*
FTV700	*VHF/UHF monoband transvertor frame*
**TV*	*6m, 4m, 2m, 70cms module*

INTERNAL OPTIONS

D3000233	*FM Board (TX & RX)*
D3000234	*Crystal Marker (25KHz)*
XF8·9KC	*Crystal Filter (600Hz)*

ADDITIONAL ACCESSORIES

The FT77 (FT775) is electrically compatible with the FT707 accessories eg. FC707, FP707, FV707DM, FTV707 etc.

MICROPHONES

MD1B8	*Desk, 'Lift Out', c/w scanning*
YM38	*Desk, 'Swan neck' c/w scanning*
YM34	*Desk 'Swan neck'*
MH1B8	*Hand, 'Tone switch' c/w scanning*
YM35	*Hand, 'Standard' c/w scanning*
YM36	*Hand, 'Noise cancel'*
YM37	*Hand, 'Economy'*

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